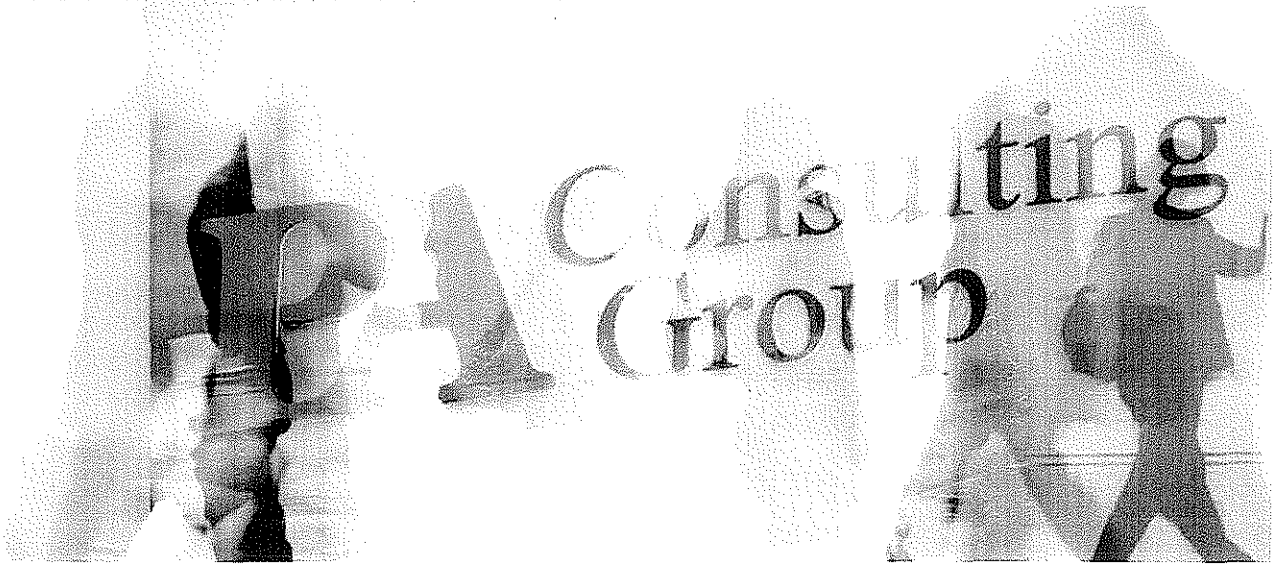
PA Consulting Group

CITY OF LOS ANGELES – OFFICE OF THE CITY ADMINISTRATIVE OFFICER

Fire Department Deployment of Resources Study

March 3, 2014



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EXECUTIVE SUMMARY

Objectives and Deliverables

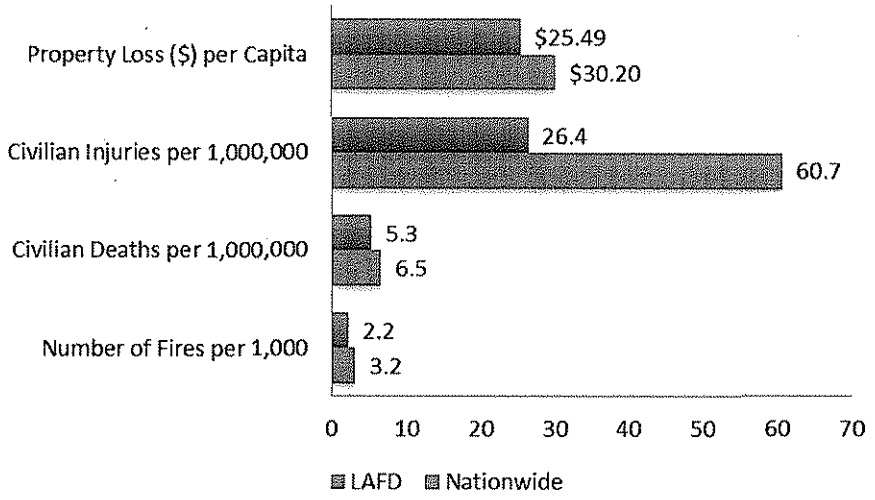
In 2013, the City of Los Angeles (the City) issued a Request for Proposal (RFP) to provide an analysis of deployment of Fire and Emergency Medical Service (EMS) resources within the City by the Los Angeles Fire Department (LAFD or The Department), in order to determine the most effective and cost-efficient model to best deliver these services to the residents of Los Angeles. PA Consulting (PA) and its subcontractors, Fire Rescue Solutions and Art Hsieh were selected to provide the requested services.

PA's analysis provides:

- Organizational and operational recommendations. PA conducted numerous interviews with LAFD staff, which revealed cultural, organizational, process and technology challenges. The first section of this report is intended to set a long term roadmap for the Department's progress against them
- An analysis of the integrity of LAFD's incident data, its usability to support deployment decision-making, and of the dispatch process itself
- An evaluation of LAFD's current EMS operations as well as recommendations on alternative EMS service delivery options.

LAFD's challenges

The Department is an integral and valued part of the community, having performed essential services for more than 125 years. The dedication, heroism and commitment to excellence of the Department's men and women are unquestioned and lead to exceptional performance in terms of limiting "Fire Loss" relative to other US departments, as demonstrated in the following exhibit.



However, the multiple interviews conducted by PA with LAFD command structure staff, as well as with key City stakeholders, and other US fire departments and public safety agencies revealed significant cultural, organizational, process and technology challenges which seriously impair the Department's performance.

Cultural Challenges

- The organization has not fully come to terms with the changing business priorities that have emerged over the last 30 years, particularly the decline in the number and seriousness of fire related incidents and the increase in EMS emergencies.
- LAFD's culture relies heavily on sworn personnel even where a civilian with the required technical skills would be more effective. There is also a tendency to avoid having civilians supervise sworn personnel. Examples include the current management of technology initiatives and systems, Human Resources functions and procurement and supply. This contrasts with practices at, for example, the Police Department.
- There is a cultural aversion to change and fear of litigation, and concepts and changes that would benefit the citizenry are not being implemented. Examples include paramedical outreach, community safety and educational programs, assessment of fall risk and fire detection and alarm systems in private homes, etc.
- The Department is almost entirely a reactive organization, responding to emergencies and then just returning to their stations. LAFD's operations are not driven by a Strategic Plan supported by Standards of Cover and its deployment model is not supported by rigorous and robust data analytics.
- Driven by a series of negative events in recent years the public's perception is that LAFD is not effectively and efficiently managed. Despite this there is still an enormous amount of goodwill and the public generally trusts its Fire Department. This trust should be more fully leveraged to reduce community risk and restore confidence.

Organizational Challenges

- Driven by the platoon model and other factors there is a lack of accountability, engagement and community presence from the current command structure staff. The alignment of management does not sufficiently support engagement with the communities they serve.
- The Fire Chief has become a revolving position, which has destabilized the LAFD.

- Deputy Chiefs (DCs), Assistant Chiefs (ACs) and Battalion Chiefs (BCs) on Administrative Duty are often put in positions for which they lack technical skills. Furthermore, ACs and BCs are rotated every two years, never allowing them to develop sufficient expertise to move the role forward.
- Due to their inability to select their own command structure staff, previous Fire Chiefs have suffered from a lack of support and loyalty, causing significant disruption, inefficiency and organizational harm.
- The disciplinary process is broken, driven by fear of litigation, reprisals and the perception that it is a "no-win" situation. The Department is not sufficiently able to manage performance outside of the disciplinary process. In addition, significant improvements should be made to the promotion and recruiting processes.
- LAFD should improve its communication within the organization and also with the media and the public. LAFD's message should be consistent across the organization (from the Deputy Chief level down to the Firefighter rank). Media interactions, especially with regards to data and systems, have been inexpertly handled, causing significant harm to the Department.
- There are numerous administrative and managerial positions which do not require fire suppression expertise and/or experience, but require specific skills, training and experience and should be civilianized. In order to enhance the effectiveness of its organization, LAFD should strive to appoint the best person qualified for a position by virtue of experience, training and qualifications to any post in the organization, including Division heads. Civilianization opportunities exist in dispatch, fire prevention, air operations, grants, professional standards, employee relations, risk management, fire facilities, supply and maintenance, EMS training and public relations.
- The EMS command and control structure is convoluted. There is no single point of accountability for EMS delivery and administration. Orders from the EMS Assistant Chief must be approved and delivered through the chain of command in order to be implemented by the EMS Battalion Captains. A different bureau handles EMS training.

Process Challenges

- The absence of a Strategic Plan and Standards of Cover creates and reinforces a highly tactical and reactive culture responding without a long term frame of reference. Recently the Planning Section has initiated the early stages of the Strategic Planning process and this work should be accelerated and completed. Thorough and fully vetted Standards of Cover, which define the criteria to be satisfied by deployment and operations, are an essential prerequisite to making large scale staffing and deployment model changes.
- Risk analysis is the appropriate tool to be used for operational planning, subject to the criteria set out in the Standards of Cover. The Department has invested in sophisticated risk analytics tools such as ADAM[1]. However currently, little rigorous statistical and risk based analysis is employed. LAFD lacks appropriately skilled civilian employees.
- Call volume continues to rise. The department estimates there will be 400,000 calls for EMS service in 2014. At the time this report is written, there is no plan to address this concern, other than to staff additional ambulances.
- The overall EMS receiving system (hospital Emergency Departments) is strained. LAFD transport units routinely wait beyond 15 minutes, in a range of between 72 and 130 hours per shift. This is about 2.3% to 4.2% of total ambulance time, per 24-hour shift. While the percentage is small, it does represent the

[1] See section 4.2.6 for a description of the ADAM model.

equivalent of having several ambulances unavailable to the system. Although this is framed as a hospital bed issue, it adversely affects performance of the EMS system overall.

- Out-of-hospital care is a healthcare function involving a set of key processes for which performance standards can be defined. The department has no appropriate means of performance management short of discipline; the adversarial disciplinary process precludes meaningful discussion of medical practice by EMS providers. As a result, there is very little medically-focused interaction among those who provide EMS services.
- LAFD does not remotely cover the cost of providing EMS service, although there is no presumption of having to do so. LAFD is able to bill only if it transports patients.

Technology Challenges

- There are multiple technology initiatives underway that should be aggregated under a single point of accountability. Some technology initiatives, such as Automatic Vehicle Location (AVL) and Dynamic Risk Cover Modeling, should be given priority but only as part of an integrated vision. The Department does not have a Chief Technology Officer and the lack of a single point of accountability and coordination creates program risks and financial risk for the City.
- LAFD does not collect data that would allow it to produce outcomes metrics and does not display confidence in the data it does collect.
- There is no consensus within the Department on whether to purchase a new CAD system, upgrade the current one, or merge with LAPD's CAD system, and LAFD does not have the necessary expertise and experience to make this decision or manage the conversion or implementation.

LAFD's data has been heavily criticized by the media and City stakeholders over the recent years. Chapter 4 of this report describes PA's assessment of LAFD's data integrity and granularity in the context of a risk based deployment model. PA is confident that the quality of LAFD's data is actually sufficient to be used for response time analysis and for simulating the impact of deployment and dispatch changes. PA believes that the "data issues" faced recently by the Department were not caused by the quality of the data itself but by the way it has been presented by the Department to the City and the public.

Emergency Medical Service responses have grown to approximately four-fifths of the Department's call volume. The EMS function involves many tasks that are repeatable and even routine than does fire suppression. Therefore the City requested specific consideration of EMS business models. This analysis, along with PA's EMS-specific recommendations (most of which have been incorporated into the Roadmap above) will be found in chapter 5.

PA's Recommendations

Addressing these challenges will require a well-structured and sequential approach. The City has recently seen effective change in a mixed sworn/civilian department, namely the dramatic performance and productivity gains achieved by LAPD beginning with Chief Bratton and continuing under the leadership of Chief Beck. Many of the changes and improvements recommended by this report have had parallels in LAPD and there is much for LAFD to learn from those efforts.

Based on its study of the LAFD, PA has made a number of recommendations, some of which involve significant and deep-seated changes. The City Administrative Officer and Fire Department will have to develop an implementation timeline. PA has divided its recommendations into three priority groups.

Priority Group 1 focuses on establishing a vision for the Department as well as organizational and operational changes which can be implemented relatively quickly and which will begin to impact on the Department's culture.

In an organization resistant to change, such as LAFD, organizational changes should be implemented from the top down (i.e. starting with the command structure) in order to be better accepted by the rank and file. Therefore, most of the recommendations in Group 1 are focused on the current command structure, management model, strategic plan and the development of standards of coverage. Specific recommendations in Group 1 include:

- Develop LAFD's Strategy in the form of a Strategic Plan and Standards of Cover
- Streamline and Modernize LAFD's Organization
  - Divide LAFD's emergency response organization into four geographical bureaus each commanded by a single Deputy Chief (not on Platoon Duty) who would report to the Chief Deputy in charge of the four bureaus
  - Transition LAFD's Assistant Chiefs to an 8h-10h day, 4-5 day/week work schedule largely eliminating overtime for the executive team
  - Implement a 5 year employment contract for the Fire Chief position
  - Create a senior EMS position at the Deputy Chief rank or its equivalent, filled by a medical or EMS professional. EMS-related functions should be consolidated under this individual, including training, performance management and quality improvement functions.
  - Create and civilianize senior management positions including:
    - Chief Information Officer (CIO)/Chief Technology Officer (CTO) – as at the vast majority of large organizations including LAPD – to be filled by a technology professional who would be the equivalent of a Deputy Chief and who would be responsible for all technology initiatives.
    - Employee/Labor Relations Director –all Human Resources and Labor Relations matters should be handled by a civilian professional with relevant expertise and experience.
    - Media Communication Director – to be filled by a communication expert who would handle most of the Department external communication, and set up as a civilian post.
    - Community Communication Director – all internal communication matters should be handled by a civilian professional with relevant expertise and experience, replacing the current Community Liaison Officer position.
    - Analytics Director – a civilian professional with a strong background in statistics and data analysis.

    Spending approval for technology enhancements should be contingent on the review and approval of the new CIO/CTO. In the interim, LAPD's CIO, supported by her staff, should assess LAFD's technology initiatives and advise the CAO and LAFD on the associated spending.
  - Civilianize rank and file positions which do not require fire suppression expertise and/or experience, including dispatch call takers, fire prevention, air operations, grants, etc.
  - Merge LAFD's and the Los Angeles Police Department's (LAPD) CAD systems – While LAFD command structure staff has raised important concerns about using the LAPD's dispatch system, PA does not believe they are insurmountable
  - Streamline, broaden and implement higher standards for the promotion process that include EMS competencies.
  - Implement a rigorous selection process for new recruits based on expertise and experience and facilitate the access to the Fire Academy recruiting process for LAFD's cadets.

- Ensure all EMTs/Paramedics have valid and unexpired certification/licenses in order to minimize litigation risks.
- Address Performance Management – The Department must be able to manage performance to improve skills and productivity as part of management and training not as part of the disciplinary process. This requires an educational performance improvement process, rather than discipline.

- Seize Operational Improvement Opportunities
  - Upgrade the position of Battalion Chief Staff Assistant to the Captain rank, and extend it to all battalions.
  - Staff Task Forces to meet risk-based criteria, not a uniform number of members – The criteria by which a Task Force is to be staffed will be laid out in the Standards of Cover.
  - Implement a 1+1 ambulance staffing model by converting all engines to assessment engines, redefining the staffing ALS ambulance to a "1+1" model (one paramedic and one EMT on each ambulance), and converting all constant-staffed BLS ambulances to ALS.

Priority Group 2 focuses on the implementation of a risk based deployment model supported by the implementation of Standards of Cover and other additional changes.

Specific recommendations in Group 2 include:

- Implement a risk based approach to deployment and staffing that is based on the Standards of Cover – New duty systems should be negotiated and delivered, different apparatus should be mobilized to incidents and performance management targets set, monitored and published to drive continuous improvement, based on data managed and analyzed by data analytics professionals.
- Accelerate the implementation of technology initiatives – Under the CTO's guidance, the AVL project should be accelerated and fully integrated with the CAD system and the Dynamic Risk Cover Tool should be given higher priority and implemented as soon as possible.
- Develop a pilot program in which the transport function would be fully outsourced in a small area of LAFD's service territory. In addition to a cost/benefit evaluation, a pilot program will provide information on the feasibility and implementation time of such a model, and its ability to satisfy the criteria set out in the Standards of Cover.

Priority Group 3 focuses on driving the cultural changes that will be the most challenging to address.

Specific recommendations of Group 3 include:

- Manage Performance – Fixing the disciplinary process, and creating a distinct performance improvement process, will involve cultural change and is included in Group 3 although the initial development of a performance management process is part of the first Priority Group.
- Implement a sustained Community Safety Program for the Department – Working in partnership with other public services and community groups, the Department should give far more emphasis to reducing community and individual risk such as slips, trips and falls for the elderly, medication monitoring e.g. diabetes, congestive heart failure, sepsis evaluation, fitting of smoke and carbon monoxide detectors, home risk assessments, public, schools and community group education.
- Implement an end-to-end emergency and mobile health care solution – As the nature of health care provision continues to rapidly evolve, LAFD should become a leader in reconfiguring existing EMS resources and develop new non-urgent services that are tightly integrated with private and public accountable care organizations.
- Under the supervision of the Medical Director, review the medical priority dispatch protocol in light of the implementation of other recommendations.

Some of the recommendations included in this report were inspired by what has already been successfully accomplished at LAPD, including:

- A long term employment contract for the Chief
- The civilianization of the dispatch center
- The management of technology initiatives by an Information Technology subject matter expert

The Department should therefore leverage the experience of its neighbor by engaging as early as possible with the Police Department on how to successfully manage change and should seek LAPD's collaboration on the civilianization of the dispatch center, the creation of new CIO/CTO position and the merger of the CAD systems.

In addition, implementing and managing change at LAFD will be a challenging and long process. To be successful in this endeavor, the Department will need a clear and robust change management structure, which should be developed and managed in collaboration with change management professionals.

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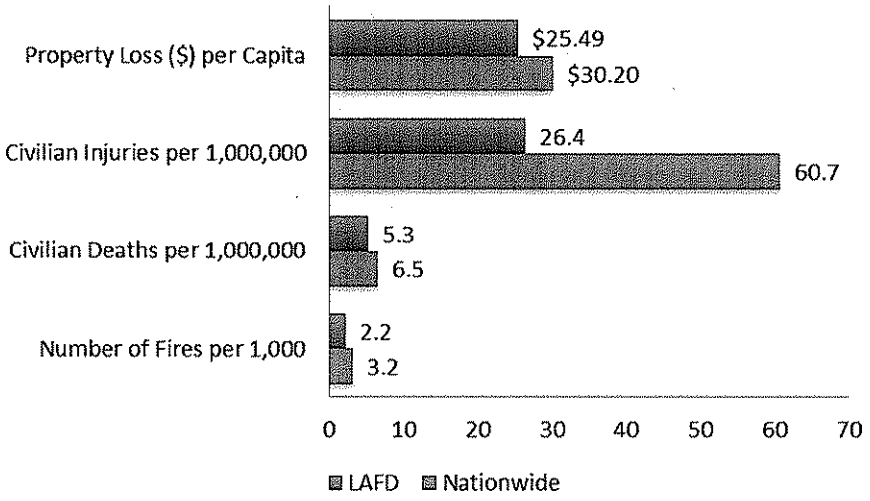
1 INTRODUCTION

The Los Angeles Fire Department (LAFD or the Department) provides fire, rescue and Emergency Medical Services (EMS) to nearly 4 million residents working or living in the City of Los Angeles. More specifically, LAFD's mission statement is to "preserve life and property, promote public safety and foster economic growth through leadership, management and actions, as an all risk life safety response provider."

The Department is an integral and valued part of the community, having performed essential services for more than 125 years. The dedication, heroism and commitment to excellence of the Department's men and women are unquestioned and lead to exceptional performance in terms of limiting "Fire Loss" relative to other US departments, as demonstrated in the following exhibit.

Figure 1: Fire Loss – LAFD vs. Nationwide



Data source: 2012 NFPA report "Fire Loss in the United Stated During 2011" Tables 7, 8, 9 & 10 and LAFD NFIRS 2011 data

In addition, LAFD managed to sustain a high level of performance even during the recent economic downturn, which triggered significant staff and budget cuts. The Department's budget was reduced by 16% between FY 2009 and FY 2012, and 370 sworn positions were eliminated in FY 2012.

In this challenging economic context, the City of Los Angeles is looking for solutions to help the Department become a more effective and efficient organization while considering the current budget constraints. To assist City Leadership and the Department in accomplishing this goal, PA has been contracted by the office of City Administrative Officer (CAO) to analyze the current deployment of fire and EMS resources and make recommendations on the most efficient and cost-effective model that could be implemented by the Department.

As PA made progress on to its assessment of LAFD's operations, it became clear that changing the operating model of a large public safety organization such as LAFD could not be achieved without significant changes to the organizational structure. PA therefore conducted a review of LAFD's organization and identified the following high level challenges (a detailed description of all the challenges identified by PA is included in section 3.1.2):

- While LAFD offers an outstanding level of service, it comes at a very high cost for the taxpayers.
- LAFD does not have a long term vision or Standards of Cover and is highly reactive and tactical in its deployment and staffing decision making and can be inconsistent, especially across Platoons.
- The leadership is constantly changing. Over the last 6 years, four different Fire Chiefs have been appointed.
- The use of Platoon Duty at high levels of the organization (Battalion and Division Commanders) does not promote accountability engagement and a sense of ownership of units of structure.
- The Department's deployment models do not account for the varying levels of risk throughout the day and across the City and should be informed by rigorous statistical and risk based analysis. The emphasis on staffing to a uniform worst-case risk and measuring success only by response time is particularly inappropriate to the Department's emergency medical mission.
- LAFD's published response time data is seen by the public as being unreliable.
- The current organization does not fully reflect the extent of LAFD's function. The vast majority (85%) of LAFD's calls are EMS related.
- The use of Deputy, Assistant and Battalion Chiefs in non-fire/EMS technical management positions or subject matter expert jobs is sub optimal and leads to inefficiencies and higher than necessary costs.

The remainder of this report outlines a series of recommendations designed to address these challenges. In particular, the report details PA's three Priority Groups of recommendations to address LAFD's organizational and deployment challenges, for which the City Administrative Officer and Fire Department will have to develop an implementation timeline:

- Priority Group 1 focuses on vision, organizational and operational changes. We believe that for an organization to accept any changes to its operating model, organizational changes should be implemented from the top down. The organizational changes suggested in Group 1 will therefore primarily focus on revisions to the current organizational structure of the command structure. The recommendations in Group 1, via the completion of LAFD's Strategic Plan and the implementation of Standards of Cover, lays the ground work for fact-based enhancements to deployment and emergency response models.
- Priority Group 2 focuses on LAFD's operating model and specifically on the implementation of a risk based deployment model supported by the implementation of Standards of Cover and other additional changes.
- Priority Group 3 focuses on the cultural changes that will be the most challenging to address.

The report also includes a detailed incidents data integrity analysis, an evaluation of LAFD's current EMS operations and analysis of alternative EMS service delivery options.

2 PA'S METHODOLOGY

In order to complete this assignment, PA has formed a team made up of independent international Fire and EMS experts, as well as management consultants with deep expertise in organizational change and complex analytics.

The insights gathered in this report were aggregated from:

- Interviews conducted with LAFD, City staff and other US fire departments and public safety agencies:
  - LAFD interviewees included the Fire Chief, all the Deputy Chiefs, most of the Assistant Chiefs as well as multiple Battalion Chiefs (BCs) and Captains.
  - City staff interviewees included multiple City officials, including council members, commissioners, members of the Mayor's Staff, and CAO staff, as well as LAPD staff.
- The team's review of LAFD's documents and reports as well as publicly available information and data.
- An analysis of LAFD's incidents data.
- An analysis of LAFD's financial data (revenue, cost, billing, etc.).
- The expertise of our Fire and EMS Subject Matter Experts.
- Survey of selected fire departments and public safety agencies (Seattle, Dallas, Phoenix and Miami) and interviews with the Los Angeles County Fire Department.
- In order to ensure that this report would include realistic recommendations which would fit with LAFD's political and operational environment, PA collaborated very closely with LAFD command structure staff and City staff, organizing regular follow up meetings and sharing its preliminary findings early in the process. LAFD's and the City's feedback on PA's recommendations was ultimately incorporated in this report.

3 ROAD MAP FOR THE LONGER TERM DEVELOPMENT OF LAFD

3.1 LAFD's Current State

3.1.1 Background on LAFD's Operations

Overview

LAFD provides Fire and EMS service to approximately 4 million citizens working or living in the 470 square miles that makes up the City of Los Angeles. LAFD's service area is divided into 2 regions, North and South, and 14 battalions. Platoon Duty staffing is based on 3 shifts (A, B and C). There is one Battalion Commander for each battalion and each shift, leading to a total of 42 Battalion Commander positions.

LAFD operates with 3,222 sworn firefighters/Emergency Medical Technicians (EMTs) and firefighter paramedics based at 106 community fire stations. Sworn firefighters are supported by a team of 315 civilians who are primarily focused on administrative as well as fleet services tasks.

Overall, the Department covers approximately 1,100 incidents/day and 400,000 incidents per year. Reflecting trends nationally and across the globe the vast majority of these incidents are medical in nature.

Apparatus

The Department's apparatus includes a combination of truck companies, engine companies, ambulances and other special apparatus. In addition to its 42 (aerial ladder) truck companies, LAFD operates:

- 61 four-member engine companies
- 30 nine- or ten-member Task Forces, each made up of a truck, a pump and an engine
- 11 five- or six-member Light Forces each of which operates either an engine or a truck
- 1 five-member truck company

The engines are commonly referred to as "triples" for three capabilities: pump water, carry hose, and store water.

An Advanced Life Support (ALS) incident may require one or the combination of the following apparatus configurations: an "Assessment Light Force" which is made by a truck and an engine staffed by 5 firefighters and one firefighter paramedic, an "Assessment Engine" staffed by 3 firefighters and one firefighter paramedic, and a "Paramedic Rescue Ambulance" staffed with 2 firefighter paramedics. A Basic Life Support (BLS) incident could require one or more of a "BLS Light Force" made up by one truck

and one engine and staffed by 6 firefighters/EMTs, a "BLS Engine" staffed by 4 firefighters/EMTs and one "BLS Rescue Ambulance" staffed by 2 EMTs.

The Department dispatches different apparatus configurations depending on the incident type. The gravity of the incident will determine the apparatus configuration and the number of apparatus to be dispatched.

The Department staffs a total of 134 Rescue Ambulances (RAs) daily, 93 for ALS incidents and 41 for BLS incidents, for a total of 134 twenty-four hour/platoon-duty ambulances. In addition the department staffs one assessment fireboat, one assessment helicopter, and 6 peak-hour BLS ambulances. The peak-hour ambulances are only staffed for 10 hours a day.

Platoon Duty vs. Administrative Duty

LAFD firefighters may be assigned either to Platoon or Administrative Duty. Platoon Duty refers to a field assignment as opposed to Administrative Duty which refers to an administrative assignment. Administrative Duty is very often considered as a career advancement opportunity as it provides firefighters a better understanding of the management of the organization. Administrative Duty assignments are offered on a rotational basis, for a period of 2 years in administrative divisions such as planning, supply and maintenance, professional standards, etc. LAFD has historically used sworn personnel in positions that do not require fire or EMS field experience. As a result the mix of civilian experts and sworn in these positions is out of balance.

Firefighters on Platoon Duty are required to work nine 24h shifts in 27 days, which is equivalent to 56h per week. On the other hand, sworn staff on Administrative Duty are required to work 160h in a 28-day period which is equivalent to 40h per week.

Constant Staffing

LAFD's current resource deployment model is based on a "constant staffing" model. This model basically ensures that all fixed-positions in the field are filled at all times, through the use of straight time or overtime. This concept was first introduced at LAFD in 1968 when the City asked the Department to develop a budget savings plan. At the time of inception this model allowed the City to hire fewer full-time firefighters and to fill daily field vacancies with firefighters working overtime, therefore leading to cost savings for the City since it was less costly to pay a firefighter overtime than hiring additional firefighters (due to the high pension and benefits costs). However, over-reliance on overtime to cover normal expected requirements can negatively impact on team dynamics, productivity and safety (PA has not reviewed the use of overtime or suggested alternatives).

The current platoon duty/constant staffing model described above is focused on providing maximum response at all times. It does not take into account the likelihood that maximum response will be needed at all times, nor the way that the availability of support from other stations or areas of the City changes. These considerations would be accounted for in a risk-based, variably-staffed model that begins with the Standards of Cover and would be maintained by the new Analytics Director and staff.

3.1.2 Challenges

As mentioned previously, LAFD is trusted and highly regarded by the public. It deals with a multitude of different incidents, the majority of which are dealt with effectively. However, it faces a number of cultural, organizational, process and technology challenges.

Cultural Challenges

- The organization has not fully come to terms with the changing business priorities that have emerged over the last 30 years, particularly the decline in the number and seriousness of fire related incidents and the increase in EMS emergencies.

- LAFD's culture relies heavily on sworn personnel even where a civilian with the required technical skills would be more effective. There is also a tendency to avoid having civilians supervise sworn personnel. Examples include the current management of technology initiatives and systems, Human Resources functions and procurement and supply. LAFD could benefit from adopting policies and practices employed by LAPD to put the most technically qualified people in the right positions regardless of their sworn status.
- There is a cultural aversion to change and fear of litigation, and concepts and changes that would benefit the citizenry are not being implemented. Examples include paramedical outreach, community safety and educational programs, assessment of fall risk and fire detection and alarm systems in private homes, etc.
- LAFD is almost entirely a reactive organization, responding to emergencies and then just returning to their stations. The Department's operations are not driven by a Strategic Plan supported by Standards of Cover and its deployment model is not supported by rigorous and robust data analytics.
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- There are multiple technology initiatives underway that should be aggregated under a single point of accountability. Some technology initiatives, such as Automatic Vehicle Location (AVL) and Dynamic Risk Cover Modeling, should be given priority but only as part of an integrated vision. The Department does not have a Chief Technology Officer and the lack of a single point of accountability and coordination creates program risks and financial risk for the City.
- LAFD does not collect data that would allow it to produce outcomes metrics and does not display confidence in the data it does collect.
- There is no consensus within the Department on whether to purchase a new CAD system, upgrade the current one, or merge with LAPD's CAD system. In addition, LAFD does not have the necessary expertise and experience to make this decision or manage the conversion or implementation.

3.2 Recommendations

Addressing the challenges outlined in the previous section will require a well-structured and sequential approach since they cannot be addressed all at the same time. PA has made a number of recommendations, some of which involve significant and deep-seated changes. The City Administrative Officer and Fire Department will have to develop an implementation timeline, and LAFD will need professional project management and change management support to successfully implement the recommended changes. PA has divided its recommendations into three Priority Groups:

- Priority Group 1 focuses on establishing a vision for the Department as well as organizational and operational changes which can be implemented in the short term (18 months) and which will begin to impact on the Department's culture. In an organization resistant to change, such as LAFD, organizational changes should be implemented from the top down (i.e. starting with the command structure) in order to be better accepted by the rank and file. Therefore, most of the recommendations in Group 1 are focused on the current command structure, management model, strategic plan and the development of the Standards of Cover.
- Priority Group 2 focuses on the implementation of a risk based deployment model supported by the implementation of Standards of Covers and other additional changes.
- Priority Group 3 focuses on driving the cultural changes that will be the most challenging to address.

The City has recently seen effective change in a mixed sworn/civilian department, namely the dramatic performance and productivity gains achieved by LAPD beginning with Chief Bratton and continuing under the leadership of Chief Beck. Many of the changes and improvements recommended by this report have had parallels in LAPD and there is much for LAFD to learn from those efforts.

3.2.1 Priority Group 1

The recommendations in Priority Group 1 focus on the following core themes:

- Develop LAFD's Strategy and Standards of Cover
- Streamline and Modernize LAFD's Organization
- Seize Operational Improvement Opportunities

Develop LAFD's Strategy

Develop a Strategic Plan

LAFD is viewed as a tactical organization that lacks a long-term vision, and organizational, departmental and individual objectives. The first step of LAFD's transformation should therefore to develop a comprehensive Strategic Plan.

Strategic Planning is a critical process within any organization or group – this is especially true for planning around activities as critical as public safety for the City. LAFD's Strategic Plan should provide an overall direction, trends and initiatives that then drive decisions and actions that will shape and guide what the Fire Department function is, what it does, and why it does it.

In particular, the Strategic Plan should include considerations of:

- Long-term investment strategies and programs.
- The impact of changes in the Department's regulatory and political environments
- Transformational changes in the business model – processes, organization and systems.
- Major human capital challenges, such as skilled labor shortages.
- Evolving public expectations.

Since these considerations may evolve with time, the Strategic Plan should be considered as a living document which should be updated every 3 to 5 years.

Increasingly, the real differentiator of success in today's world is not necessarily the strategy an organization chooses, but how successful that organization is in implementing its chosen strategy. To successfully execute a chosen strategy, LAFD should drive the Strategic Plan into the heart of the organization by the subsequent development of Departmental Plans linked to organizational and individual, objectives which are constantly measured and assessed. This will engender the performance based culture which is a significant omission in LAFD at present.

As part of this planning process, the Department should change its public image or "brand" to reflect the shift in demand towards EMS. The most direct approach would be to change its name. Other major departments in the United States have done so, such as Dallas Fire Rescue, Miami Fire Rescue, and Mesa Fire and Medical Department. Suggestions should be first developed within senior management circles. The workforce in its entirety should then be consulted over the name change. While the demand on the Department has shifted to EMS, LAFD remains the City's fire responder. Therefore the name should include the word "Fire". This will also gain a higher degree of support amongst personnel on such a controversial but essential measure. The status quo should not be an option.

Note that the Planning Section has recently initiated the early stages of the Strategic Planning process. In order for this process to be successful, PA recommends LAFD to work with external professionals that specialize in this area.

Develop Standards of Cover

In parallel to the development and implementation of a Strategic Plan, LAFD should clearly define its operating model, or Standards of Cover. Standards of Cover should reflect both rigorous data analysis and an assessment of local expectations. PA recommends that the Department use external experts to help develop its Standards of Cover.

Standards of Cover are a rational and systematic way of looking at the basic service provided by an emergency services agency through assessing community fire and non-fire risks, defining baseline and benchmark emergency response, plan future station locations, determining apparatus and staffing patterns, evaluating workload and ideal unit utilization, measuring service delivery performance, and supporting strategic planning and policy development relative to resource procurement and allocation.

Standards of Cover have four key components. The first is a community risk assessment identifying the fire and non-fire risks that are either common and /or unique to the agency completing the process. The second component is a determination of levels of service to be provided within the area serviced based on analysis and risk. The third component analyzes the agency's current response capability in terms of time and on-scene performance for personnel and equipment. The final portion is a development of standards describing how resources should be allocated and deployed to maximize emergency response effectiveness.

Streamline and Modernize LAFD's Organization

In order to best support the transition to any alternative deployment model and address LAFD's organizational challenges, PA believes that LAFD should implement the following changes:

- Divide LAFD's Service area into four geographical areas, each commanded by a single Deputy Chief.
- Transition LAFD's Assistant Chiefs to an 8h-10hday, 4-5 day/week work schedule.
- Implement a 5-year employment contract for the Fire Chief position.
- Create a senior EMS position at the Deputy Chief rank or its equivalent.
- Create and civilianize senior management positions.
- Civilianize rank and file positions which do not require fire suppression expertise and/or experience.
- Merge LAFD's and LAPD's CAD systems.
- Streamline and implement broader standards for the promotion process that include EMS competencies.
- Implement a rigorous selection process for new recruits
- Ensure that all EMTs/Paramedics have valid certifications/licenses.
- Address performance management.

- Make the spending approval for technology enhancements contingent on the review and approval of the new CIO/CTO.

Divide LAFD's Service area into four geographical areas each commanded by a single Deputy Chief

The Platoon Duty System is well established in a number of urban US Fire Departments, including LAFD. It is operationally "fit for purpose" but is resource intensive. Organizationally, it does not engender accountability and is inappropriate for management and public outreach.

To increase accountability, performance and community engagement, the Platoon Duty System should be amended so that LAFD's service region is divided into 4 geographical bureaus (matching LAPD's Divisions) under the supervision of four Deputy Chiefs (Bureau Commanders). Each Bureau Commander should be responsible and accountable for the activities of their own bureau, whether on or off duty. Note that this recommendation should only be implemented once the position of Staff Assistant to Battalion Chief is reinstated as discussed later in this section.

The outcome will result in more productive Bureau Commanders with complete ownership of their elements of the Strategic Plan. Additionally, the added Battalion Chief Staff Assistant position and the new scheduling will help improve firefighter safety as well as LAFD's efficiency and flexibility, in addition to lowering costs.

Transition LAFD's Assistant Chiefs to an 8h-10hday, 4-5 day/week work schedule

Administrative Duty assignments do not require 24h shifts. Assistant Chiefs on Administrative Duty assignments work a traditional work week schedule. In general this scheduling should be extended to all jobs defined at the Assistant Chief level, with limited exceptions.

In addition, Assistant Chiefs are currently eligible for overtime. Under the 8h-10h/day model, Assistant Chiefs, like Deputy Chiefs, should not be eligible for overtime, as it is the case for the vast majority of private and governmental organizations. This will provide the City better control over its annual compensation budget for the Department.

The combination of the bureaus creation mentioned previously and the transition to an 8h-10hday, 4-5 day/week work for the Assistant Chiefs is a common system being used in other Departments. It usually involves the development of a separate, Flexible Duty System (FDS) involving 40 core hours with a number of "on call" hours for which an enhancement to salary is paid.

The Bureau Commander should be expected to manage their core hours to reflect the needs of their bureau and not rigidly adhere to a Monday - Friday 9-5 regime. Major shift swapping prevalent in other parts of the organization will not be possible on this system, which is entirely positive. All Deputy and Assistant Chiefs positions should be transitioned to the same FDS system as the Bureau Commanders (except as noted below).

With a number of personnel on the FDS system, the current operational deployment method of a shift always predominantly responding with the same AC should be replaced by one where the nearest available AC or DC on duty should respond. This will bring strengths and weaknesses of teams and individuals to the forefront, which should be used as an opportunity to build on the strengths and address the weaknesses. Initially this off hours rollout system will be supplemented by platoon duty AC's in the Central Bureau who will cover the entire territory to support the AC's rolling out in each bureau.

A potential weakness of this system is that the AC or DC on duty may have longer response times. This places more responsibility on the BC which was a concern to some officers interviewed. The performance of any single individual within a peer group will vary and the key is within the promotion, probation and

continuous assessment regime and some organizational changes that should accompany this recommendation.

In summary, the post of Bureau Commander should be seen as one of the most highly sought within the organization. It is a key development post for an aspiring Fire Chief as it will be the only other one with complete geographic responsibility.

Implement a 5-year employment contract for the Fire Chief position

Fire Chiefs are currently appointed by the Mayor and can be (and have been) replaced frequently. This has created continuity and performance challenges over the years and has affected the Chiefs ability to think for the long term good of the organization.

To address these challenges, the position of Fire Chief should be based on a 5 year employment contract which will provide a measure of protection from internal and external pressures. This model has worked well in LAPD and has helped attract nationally recognized candidates to the position. Under this new contract:

- The Chief should have the ability to select his/her team down to the Battalion Chief level.
- The Chief should be given and assessed against clear and measurable short and medium term targets by City elected officials.
- He or she should be given the autonomy to manage and deploy resources to deliver those objectives.
- He or she should be judged primarily on the achievement of those objectives within the agreed budget.
- The political oversight and scrutiny over the Chief's decisions should be regular but measured and conducted by the Fire Commission.

The implementation of this new contract should make the Fire Chief more accountable for the success of its Department, which, if successful, should ultimately help re-build the trust between the City and its Fire Department.

Such type of contracts has proven to be a successful model at LAPD, where Chief Bratton and Chief Beck were given the time, autonomy and authority to make the necessary changes to LAPD's organization. In addition, this model is used in other Fire Departments, where Fire Chiefs are largely given the autonomy to manage their Department, subject to political oversight and scrutiny. Additionally, Police Chiefs have complete operational independence.

Create a senior EMS position at the Deputy Chief rank or its equivalent

While 85% of LAFD's response is related to EMS calls, the organizational structure for the Department's command structure is still focused on fire suppression. Nearly all officers interviewed for this study recommended that the EMS nature of LAFD's operations be better emphasized in the Department's organizational culture and structure. In order to do so, a senior EMS position should be created and should be at the rank of Deputy Chief or its equivalent, filled by a medical or EMS professional. LAFD may consider promoting internal EMS professionals or pursue external recruitment. EMS-related functions should be consolidated under the EMS Deputy Chief command, including training, performance management and quality improvement functions.

In addition, creating such a position will transform the field personnel's vision of EMS as they may consider paramedic training as a "highly desirable" attribute in the promotion process to reach the officer level. In particular, the paramedic trained personnel should be seen as highly desirable for promotion to captain.

Create and civilianize senior management positions

The vast majority of the positions within LAFD are held by sworn personnel (91%). Some of these are administrative and managerial positions which do not require fire suppression expertise and/or experience, but require specific skills, training and experience which sworn personnel may not have. Consequently, Deputy, Assistant and Battalion Chiefs on Administrative Duty are often put in positions for which they lack technical skills. Furthermore, they rotate positions every two years, never allowing them to develop sufficient expertise to move the role forward.

In order to enhance the effectiveness of its organization, LAFD should strive to appoint the best person qualified for a position by virtue of experience, training and qualifications to any post in the organization, including Division heads. This can be accomplished by civilianizing selected positions within LAFD and creating positions to be filled by civilian professionals.

For the civilianization process to be successful, LAFD's culture of sworn staff reporting only to other sworn staff must change. For some functions, such as IT, it should be required to hire a highly qualified and experienced civilian who would become the line manager for sworn personnel, who are experts in their field but have narrower terms of reference in other areas. This model has proven successful at LAPD.

In addition, note that Fire and Rescue outside the U.S. have been appointing civilians to senior posts for many years for example, personnel, IT, finance, procurement, project management, fleet management, premises etc. The use of civilians in Fire and Rescue Services has been widely recognized as a sensible and effective model.

However, there is a clear risk in excess civilianization. In times of austerity, it is almost certain that civilian personnel will be released prior to any sworn officer irrespective of the importance of the position that they hold. The Department could therefore in the future be at risk of losing vital staff at the expense of those considered less critical. This would be unrecoverable in the short term.

PA recommends the creation and civilianization of the following civilian positions:

- CIO/CTO
- Employee/Labor Relations Director
- Media Communication Director
- Community Communication Director
- Analytics Director

CIO/CTO

The Department currently has multiple technology initiatives underway:

- New CAD system Request For Proposal
- Implementation of Automatic Vehicle Location
- I&DA Task Force
- FIRESTAT
- Strategic Technology Working Group.

However, these initiatives are scattered across the organization and are not aggregated under a single point of accountability which greatly impairs their implementation and chances of success.

Similar to the vast majority of large organizations, LAFD should create a CIO/CTO position which should be filled by a technology professional who would be the equivalent of a Deputy Chief and who would be responsible for all technology initiatives.

LAPD has recently implemented this recommendation with great success. LAFD should leverage LAPD's experience on this matter and should transfer the management of its technology initiative to LAPD while LAFD's new CIO/CTO is being selected.

PA has reviewed LAFD's preliminary FY 2014-2015 budget and has noticed multiple budget items related to the Department's technology initiatives. While PA supports the prompt implementation of these initiatives, the spending for technology enhancements should be conditioned on the review and approval of the interim and new CIO/CTO.

Employee/Labor Relations Director

The current Employee Relations Officer position should be civilianized and all Human Resources matters should be handled by a civilian professional with relevant expertise and experience.

Media Communication Director

All the Chiefs interviewed concur with the fact that LAFD must improve its communication with the media and the public. While it is the Fire Chief's responsibility to represent the Department in front of City officials, the public and the media, he or she should be supported by a communication expert who would handle most of the Department external communication.

Community Communication Director

The current Community Liaison Officer position should be civilianized and all internal communication matters should be handled by a civilian professional with relevant expertise and experience.

Analytics Director

As mentioned previously, the issues reported with LAFD's data were not caused by the quality of the data itself but by the way it was presented to the City and the public. PA believes that LAFD's data and deployment tools should be managed by a civilian professional with a strong background in statistics and data analysis.

Civilianize rank and file positions which do not require fire suppression expertise and/or experience

While the previous recommendation focused exclusively on positions at the Battalion Chief rank and above, this recommendation focused exclusively on the rank and file.

In collaboration with the officers interviewed, PA has identified the following functions where civilianization should occur in the rank and file:

- Dispatch call taking operations should be civilianized and conditioned to a 40 hour week but radio dispatcher positions should still be held by sworn personnel. Call taking has been completely civilianized in many US Fire Departments. In order to ensure that civilianization of call takers is not detrimental to LAFD's effectiveness, employment standards and work rules for the civilian call takers should be carefully crafted to prevent high absenteeism levels, civilian call takers should receive extensive training and adequate policies should be developed and implemented to deal with surge conditions. Civilianizing call taking operations (62 positions) should save the Department approximately $4.8M a year according to PA's estimates.
- Air Operations: helicopter pilots should be civilianized but the experience of the air observer is critical for this function and it should therefore still be held by a sworn firefighter. There are two other alternative models. First, the Air Operations could be fully outsourced providing the observer is seconded from the Department. Alternatively, a single combined Air Operations Department could be created with the Department of Water and Power and LAPD. This would increase operational resilience and almost certainly reduce combined costs. We recommend that this latter option is subject

to further scrutiny with potential partners. LAFD should civilianize 18 positions within the Air Operations division, leading to $1.1M in annual savings.

- Fire Prevention should be partially civilianized. The exact extent would need a closer examination of the job descriptions but we estimate that just under 50 % of posts should be civilianized, leading to $4.7M in annual savings. One department within Fire Prevention already has a good blended mix of sworn/civilian and is operating efficiently. If this recommendation is adopted, it is strongly recommended that the civilians that are employed be already suitably qualified to maintain expertise. A general rule should be observed that those with a public facing enforcement role should be sworn. An alternative is to devolve the fire safety arrangements at planning stage to the City Building Department with LAFD concentrating on inspection of existing buildings, especially those involving life safety.
- Professional Standards should be civilianized with the exception of two personnel who understand the operational working environment of sworn personnel. This should reduce costs by $60k per year, develop expertise and mitigate the detrimental effects of the current system which is seen as unfit for purpose.
- Grants should be fully civilianized providing uniformed personnel are able to represent the Department for presentational bids. This should save LAFD $518k per year.
- Fire Facilities should be fully civilianized, generating annual savings of $30k per year.
- Risk Management should be partially civilianized providing that they have some recourse to high level uniformed advice. This would save LAFD $144k per year.
- Supply and Maintenance should be partially civilianized, yielding $355k of savings per year. In addition, this function should be placed under the Administrative Services Bureau.
- EMS training should be handled by civilian EMS professionals who have the expertise and experience to do so. This can be an implemented using an outsourced model. This recommendation should save the Department $380k per year.
- LAFD's Public Relations staff should be civilianized, saving LAFD $205k per year. Note that LAFD is currently in the process of recruiting an external Public Relations professional who would be a civilian.

Civilianizing the positions mentioned above should create estimated savings of $12.3M due to lower wages, pensions, benefits, and overtime rates, as described in the following table. To determine this estimate, the cost for each sworn officer was calculated and subtracted by the cost of a civilian for the positions identified above. On average, replacing a firefighter III with a civilian position should save LAFD $68k per year (this assumes that a civilian will receive a very limited amount of overtime pay compared to a firefighter III).

Table 1: Cost savings based on PA's civilianization recommendations for the rank and file

			Annual Cost per Sworn Firefighter							Annual Cost per Civilian								
Organization	Position	Total Positions in Division	Total Positions Civilianized	Annual Salary	Overtime	Benefits	Pension Costs	Annual Cost of Sworn Firefighter	Total Cost of Sworn Staff	Annual Salary	Overtime	Benefits	Pension Costs	Bonus	Annual Cost of Civilian	Reserve Costs	Total Cost of Civilian Staff	Savings
	Dispatcher Call Takers		62	$99,714	$35,803	$12,626	$39,826	$187,969	$11,654,103	$61,322	$3,908	$10,597	$15,723	$692	$92,242	$1,165,410	$6,884,405	
Dispatchers	TOTAL	90	62															$4,769,698
	FHP (I-111)		12	$100,770	$35,803	$12,626	$40,248	$189,447	$2,273,368	$75,616	$3,908	$10,597	$19,388	$853	$110,361	$227,337	$1,551,675	
	FHP IV		3	$113,984	$35,803	$12,626	$45,525	$207,938	$623,815	$85,531	$3,908	$10,597	$21,930	$965	$122,931	$62,382	$431,174	
	FHP V		1	$117,346	$35,803	$12,626	$46,868	$212,643	$212,643	$88,053	$3,908	$10,597	$22,577	$994	$126,129	$21,264	$147,393	
	FIRE CHIEF HELICOPTER PILOT IV - SD		2	$132,827	$35,803	$12,626	$53,051	$234,307	$468,615	$99,670	$3,908	$10,597	$25,555	$1,125	$140,855	$46,861	$328,572	
Air Operations	TOTAL	46	18															$1,119,628
	Fire Inspector II		24	$114,399	$35,803	$12,626	$45,691	$208,519	$5,004,462	$85,842	$3,908	$10,597	$22,010	$969	$123,326	$500,446	$3,460,261	
	Fire Captain I		8	$126,298	$35,803	$12,626	$50,443	$225,170	$1,801,360	$103,540	$3,908	$10,597	$26,548	$1,169	$145,760	$180,136	$1,346,219	
	Fire Inspector I		46	$92,554	$35,803	$12,626	$36,966	$177,949	$8,185,675	$69,450	$3,908	$10,597	$17,807	$784	$102,546	$818,568	$5,535,675	
Fire	Fire Captain II		3	$129,562	$35,803	$12,626	$51,747	$229,738	$689,215	$128,145	$3,908	$10,597	$32,856	$1,446	$176,952	$68,922	$599,777	
Prevention*	TOTAL	184	81															$4,738,781
Professional	Fire Captain II		2	$129,562	$35,803	$12,626	$51,747	$229,738	$459,477	$128,145	$3,908	$10,597	$32,856	$1,446	$176,952	$45,948	$399,851	
Standards	TOTAL	24	2															$59,626
	Fire Captain II		1	$129,562	$35,803	$12,626	$51,747	$229,738	$229,738	$128,145	$3,908	$10,597	$32,856	$1,446	$176,952	$22,974	$199,926	
Legal Liaison &	Fire Inspector I		4	$92,554	$35,803	$12,626	$36,966	$177,949	$711,798	$69,450	$3,908	$10,597	$17,807	$784	$102,546	$71,180	$481,363	
Research Unit	Fire Inspector II		4	$114,399	$35,803	$12,626	$45,691	$208,519	$834,077	$85,842	$3,908	$10,597	$22,010	$969	$123,326	$83,408	$576,710	
(Grants)	TOTAL	11	9															$517,614
Building Facility	Fire Captain II		1	$129,562	$35,803	$12,626	$51,747	$229,738	$229,738	$128,145	$3,908	$10,597	$32,856	$1,446	$176,952	$22,974	$199,926	
Management	TOTAL	5	1															$29,813
	Fire Captain II		1	$129,562	$35,803	$12,626	$51,747	$229,738	$229,738	$128,145	$3,908	$10,597	$32,856	$1,446	$176,952	$22,974	$199,926	
Risk	Fire Captain I		2	$126,298	$35,803	$12,626	$50,443	$225,170	$450,340	$103,540	$3,908	$10,597	$26,548	$1,169	$145,760	$45,034	$336,555	
Management	TOTAL	6	3															$143,598
	Fire Captain II		2	$129,562	$35,803	$12,626	$51,747	$229,738	$459,477	$128,145	$3,908	$10,597	$32,856	$1,446	$176,952	$45,948	$399,851	
	Fire Captain I		1	$126,298	$35,803	$12,626	$50,443	$225,170	$225,170	$103,540	$3,908	$10,597	$26,548	$1,169	$145,760	$22,517	$168,277	
Supply and	Firefighter III		4	$99,378	$35,803	$12,626	$39,691	$187,498	$749,993	$74,570	$3,908	$10,597	$19,120	$842	$109,037	$74,999	$511,145	
Maintenance	TOTAL	28	7															$355,365
	FIREFIGHTERIIIE		1	$120,863	$35,803	$12,626	$48,273	$217,565	$217,565	$90,693	$3,908	$10,597	$23,254	$1,024	$129,474	$21,756	$151,231	
	Fire Captain I		2	$126,298	$35,803	$12,626	$50,443	$225,170	$450,340	$103,540	$3,908	$10,597	$26,548	$1,169	$145,760	$45,034	$336,555	
	FIREFIGHTERIIIL		3	$121,955	$35,803	$12,626	$48,709	$219,093	$657,279	$91,512	$3,908	$10,597	$23,464	$1,033	$130,513	$65,728	$457,267	
EMS Training	TOTAL	10	6															$380,131
	Fire Captain II		1	$129,562	$35,803	$12,626	$51,747	$229,738	$229,738	$128,145	$3,908	$10,597	$32,856	$1,446	$176,952	$22,974	$199,926	
	Firefighter III UV		3	$95,327	$35,803	$12,626	$38,074	$181,830	$545,490	$71,531	$3,908	$10,597	$18,341	$807	$105,184	$54,549	$370,100	
Public Relations	TOTAL	4	4															$205,203
																	Total Savings	$12,319,458

*: The total number of positions in the Fire Prevention Bureau (184) excludes the number of positions in the Legal Liaison & Research Unit.

The total annual cost of a sworn/civilian position includes salary, bonus, overtime, benefits and pension costs. The annual salary for each sworn position was provided by LAFD while the associated bonus, overtime benefit and pension costs were computed based on assumptions provided by the Department.

The number of positions to be civilianized in each division was estimated by PA.

To estimate the salary of a civilian position replacing any rank below Captain I (including Fire Inspector I and Fire Inspector II), PA used the ratio of a civilian LAPD Police Service Representative (dispatcher) salary ($61,042.25 per year) to an LAFD Firefighter III salary ($81,349 per year) as provided in Attachment 9 of the City's Inter-Department Correspondence titled "Review of LAFD Dispatch Staffing and Administrative Duty Assignments", dated August 16, 2006. This ratio (0.75) was then applied to the average salary of the sworn position to be replaced. For instance, if the sworn position salary was $100,000 per year, the equivalent civilian salary would have been $75,000 per year.

To estimate the salary of civilians being assigned to Captain I positions and above, PA draw a parallel between the organization of LAFD's Administrative Bureau and the Emergency Services Bureau using the following assumptions:

- Civilians replacing ACs should receive a salary equivalent to the current Fire Administrator, i.e. $181,202 per year
- Civilians replacing DCs should receive a salary equivalent to the current Fire Administrator, i.e. $181,202 per year, inflated by the ratio of a DC salary to an AC salary
- Salaries for civilians replacing BCs were assumed to be equivalent to the average salary of civilian staff reporting directly to the Fire Administrator (staff on level 2 of the organization chart)
- Salaries for civilians replacing Captains II were assumed to be equivalent to the average salary of civilian staff reporting directly to the staff on level 2 (staff on level 3 of the organization chart)
- Salaries for civilians replacing Captains I were assumed to be equivalent to the average salary of civilian staff reporting directly to the staff on level 3

The average overtime pay for a civilian was derived from the "overtime general" costs approved for the FY 2012-2013 budget ($1,230,910). In the absence of detailed information on the repartition of the overtime budget across the civilian ranks, PA has evenly distributed this budget across the current 315 civilian positions which resulted in an average overtime pay of $3,908 per year.

To estimate the bonus of a civilian position, PA used the ratio of an LAPD dispatcher bonus to its salary, as provided in the document mentioned above. This ratio was then applied to the civilian salary estimate.

Civilian pension and benefits costs were computed based on LAFD's assumptions.

PA has also considered "Reserve Costs" for coverage of vacancies and absences of civilian staff. Due to a lack of detailed financial information, PA has arbitrarily applied to the cost of each civilian position a reserve cost representing 10% of the annual cost of a sworn firefighter.

Streamline, broaden and implement higher standards for the promotion process that include EMS competencies

While a promotion process is currently in place at LAFD, it is not seen internally as functioning to ensure that the right training, education and experience are appropriately considered in the promotion process. PA did not conduct a rigorous review of the level of performance at the Battalion Chief rank, but a large number of officers interviewed have mentioned the imbalance of performance across newly promoted Battalion Chiefs. Interviewees expressed the view that in some cases individuals had been promoted before they were ready for promotion, or were not appropriately mentored during their probation period, which ultimately resulted in subpar performance.

The Department should therefore improve its succession path and implement much higher standards for promotion. In particular, the probation system for Battalion Chiefs should be rigorously overhauled to ensure performance and competency consistency. The probation system should allow for extensions if necessary.

EMS Battalion Captains should be at least on par with fire suppression Captains in eligibility for promotion and advancement within the department. This would continue to shape the culture of the department to embrace its EMS mission.

Administrative Duty positions are often part of the promotion process and represent an extremely useful method of getting potential senior officers exposure to the Headquarters environment and to the management structure of the Department. However, the way the process is managed needs substantial overhaul:

- A proper application and selection process needs to be put in place for those wishing to enter Administrative Duty. The process should be open to competition and transparent.
- A proper and well documented handover procedure should be implemented which includes discussion between the present and future incumbents, and the line manager.
- The line manager should set clear written objectives for the incoming officer who should be required to undergo departmental induction including pre start meetings and study, and regular appraisals while in post.
- Posting of personnel after Administrative Duty should be entirely on merit and achievement of objectives while in Administrative Duty and not either at the gift of the Chief (Battalion Chief's and above) or seniority (Captains).

Merge LAFD's and LAPD's CAD systems

LAFD and LAPD dispatch functions are supported by separate CAD systems and dispatch centers. LAFD's CAD system is considered by many to be 30 years old but this is not entirely true. The hardware was renewed when LAFD moved its dispatch center from City Hall East to the new Metropolitan Fire Communications (MFC) building in 2012. Furthermore, the dispatch algorithms have been updated and modernized on a regular basis.

Even so, LAFD's CAD crashed twice in March 2013. These two crashes and the advanced age of the system prompted the Department to start looking for a replacement. As the time this report was written, LAFD was developing a statement of need and an RFP to evaluate CAD solutions – whether entirely custom, off-the-shelf, or off-the-shelf with additional customization.

Off the shelf CAD solutions do not provide only fire dispatch functions but support multiple forms of response, i.e. they provide at least fire, police, and EMS dispatch functions. Therefore, if the Department were to roll out a fire only CAD, they may have to develop and maintain it wholly internally, which may prove to be very costly for the City.

LAPD has rolled out a new CAD system very recently with great success. Several large municipalities across the US have very recently transitioned to one CAD for fire, police and EMS, including New York City[2], Boston[3], Portland[4], Aurora[5] and several cities in Illinois[6]. While LAFD command structure staff has

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[2] Source: http://www.nyc.gov

[3] Source: https://www.cityofboston.gov/ems/divisions/dispatchoperations.asp

[4] Source: http://www.portlandonline.com/911/index.cfm?c=55336

[5] Source: http://www.intergraph.com/assets/pressreleases/2013/08-21-2013.aspx

raised important concerns about using the LAPD's dispatch system, PA does not believe they are insurmountable. PA has also interviewed the LAPD staff in charge of the implementation of this new CAD. PA believes that there should not a barrier to LAFD's use of LAPD's CAD system. It is likely that an expert Chief Technology Officer (whose decision it would be) would concur that LAFD should not purchase or develop a new, independent CAD system:

- LAPD's CAD system is capable of supporting police, fire and EMS functions. LAPD has already integrated one external system to its CAD, having added the Department of Transportation operations.
- Having recently gone through the implementation of its own CAD system, LAPD would be well positioned to support LAFD in developing business requirements and ensuring that LAPD's CAD vendor appropriately implements their requirements.
- LAPD's CAD system has proven to be reliable.
- Use of a common system would provide both procurement and maintenance cost savings for the City, relative to the purchase or internal development of an entirely new CAD.
- Multiple large municipalities across the US have very recently transitioned to one CAD for fire, police and EMS. Examples include New York City, Boston, Portland, Aurora, etc.

Note that this is a complex issue and while discussions between LAPD and LAFD with regards to this merger have already occurred, the process has been slow. Regardless of the final outcome, this dialog should be advanced.

Assuming that both CADs would be merged, the City should then consider co-locating LAFD's and LAPD's dispatch centers as well as training multi-system dispatchers.

Implement a rigorous selection process for new recruits

LAFD has started the recruiting process for the new Fire Academy which will be offered in 2014. The Department has been very successful in attracting potential new firefighters since it received more than 14,000 applications. Among these 14,000 applications, only 600 will be invited to participate in a screening "pass" or "fail" test which will determine the final candidates attending the Fire Academy.

While receiving a large number of applications is the first step of a successful recruiting process, there are many improvements to be made to LAFD's process. LAFD was unable to screen all the applications before issuing its invitations. Manually screening 14,000 applications is an overwhelming task and cannot be completed given the scarce number of administrative resources the Department currently has. Therefore, LAFD should use an automated screening system, which should look for key words in the candidate's application (such as fire, rescue, emergency, etc.) and pre-select the most relevant applications. Automated screening may also be able to increase the diversity of the tested population. These systems are commonly used by most Human Resources departments of large organizations, similar to LAFD.

In addition, the screening test should not be a "pass" or "fail" type of exercise but should provide a grade which will enable the ranking of the candidates. This will allow the Department to select only the best candidates for the Fire Academy.

In parallel, LAFD should facilitate the access to the Fire Academy recruiting process for LAFD's cadets. Senior officers mentioned that a large number of cadets who they thought would be great firefighters do not join the Fire Academy due to the flaws in the selection process. Those cadets should be encouraged to compete for positions.

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[6] Source: http://www.ci.decatur.il.us/police/operations.html - http://www.peoriagov.org/information-systems/

Ensure all EMTs/Paramedics have valid certifications/licenses

California law states that an EMT/paramedic is responsible for the renewal of his/her certification/license. Even though it is not the Department's responsibility to renew certifications and licenses, LAFD should very closely monitor their expiration dates using an automated system which should create individual alerts at an appropriate time before the expiration date. Furthermore, such system should be linked to the City's payroll system and CAD system so that individuals whose paramedic licenses have expired do not receive a paramedic pay differential and are not dispatched as paramedics.

Address Performance Management

The Department must be able to manage performance as part of normal management and training activities, not only as part of the disciplinary process. This is a particular issue in the area of Emergency Medical Services. Paramedical care involves a number of tasks that are performed frequently and for which standards of performance can be defined. It has been shown that care is improved when tasks such as IV insertion are performed consistently. This requires an educational performance improvement process, rather than discipline.

PA has found substantial evidence that the discipline process is broken. Fixing the disciplinary process, and creating a distinct performance improvement process, will involve cultural change and the third Priority Group includes the recommendation of an overall revamp of performance management and discipline. But, it is a particularly pressing problem for Emergency Medical Services and a "quick hit" to improve EMS performance management is among the first Priority Group of recommendations.

Seize Operational Improvement Opportunities

Upgrade the position of Battalion Chief Staff Assistant to the Captain rank, and extend it to all battalions

In 2011 the position of Staff Assistant to Battalion Chief was eliminated in an attempt to reduce costs for the City, although some have been temporarily reinstated. In addition to other, more administrative duties, assistants to the Battalion Chief play a vitally important role in the operational field, enabling more efficient operational decision making and enhancing firefighter and public safety. In addition, their role is to support the development and competence of newly promoted BC's. All the Chiefs interviewed for this study suggested that this position should be reinstated.

If reinstated, this position should be considered as an opportunity for advancement in the organization and should be filled in by high potential Captains. In addition, in order to further promote EMS in the Department and better represent the extent of LAFD's EMS function, preference should be given to Captains who have a paramedic license. Implementing such model would lead to having more paramedic-qualified Battalion Chiefs.

Institute a Task Force staffing policy based on criteria of need or risk, defined in the Standards of Cover

Based on the interviews PA conducted, it is not necessary to set a uniform standard of 10 members for a Task Force.[7] The Task Force has already been based on a 9 member configuration, for a period of five to nine years. PA was not informed of any specific safety incidents, attributable to the lack of a 10th man, that arose during that period, and it can be assumed that they would have been identified by staff or unions had they been apparent. Within the current 10 person configuration, personnel are regularly

[7] This does not refer to specialized units such as Hazardous Materials or Rescue Squads.

detached from the configuration for other tasks. This separation of personnel suggests a tacit acceptance of the safety of the 9 person model. Furthermore, other western Fire Departments such as Seattle, Phoenix and Los Angeles County do not use the Task Force as a unit of deployment, except for specialized needs such as hazardous materials or technical rescue.

Finally, a 9 member configuration still complies with National Fire Protection Association (NFPA) standards. NFPA Standard 1710 does not address Task Forces per se, but recommends minimum staffing of four members for engine companies, and four for truck companies; one or two more in areas of high risk.[8] LAFD's own guidelines says the "standard established a minimum of four-member engine companies, and a minimum of five-member truck companies in areas with tactical hazards, high hazard occupancies, and high incident frequencies."[9]

The criteria by which a Task Force is to be staffed at either nine or ten members should be laid out in the Standards of Cover. It should be made explicit that Task Force staffing will not be based on any uniform size standard but rather that the staffing of individual Task Forces should be supported by appropriate risk analyses. This analysis will not preclude a 10-member staffing level when necessary. If concerns remain, concomitant training of all Captains and Battalion Chiefs in Dynamic Risk Assessment (DRA) will enhance firefighter safety.

Implement a 1+1 ambulance staffing model and the deployment of one paramedic on every engine

LAFD currently dispatches a mix of BLS ambulances, ALS ambulances and assessment engines. Not all fire engines carry paramedics. There are 2 paramedics in each ALS ambulance; in general LAFD dispatches the closest paramedic (e.g., from an assessment engine) and an ALS ambulance. Anecdotally approximately 2/3 of all incidents require only basic life support, but 2/3 of LAFD's EMS dispatches are for ALS capability. It may be possible to reduce the disparity by a more detailed and risk-based analysis of the medical dispatch protocol; but because the 911 system cannot provide precise diagnosis one should expect that ALS dispatch will continue to predominate.

LAFD should convert all engines to assessment engines, redefine the ALS ambulance staffing to a "1+1" model (one firefighter paramedic and one firefighter EMT on each ambulance), and convert all constant-staffed BLS ambulances to ALS. This change can be accomplished within the currently authorized staffing level.

Overall the number of firefighter positions would not change but there would be a net conversion of 75 firefighter paramedic positions to firefighter EMTs. A total of 66 constant-staffed paramedic positions will have to be created. Firefighter paramedics would be deployed to 25 engines in non-assessment single-engine, Light Force or Task Force stations, and 41 constant-staffed BLS ambulances would be converted to 1+1 staffing. On the other hand 93 constant-staffed paramedic positions on ALS would be converted to EMTs. Finally, six variable-staffed EMTs on BLS ambulances would be converted to paramedic positions. The net change is to convert 3x(93-66)-6 = 75 paramedic positions to EMT positions.

In addition, LAFD would have to re-equip 22 non-assessment engines in assessment light force or assessment Task Force stations as assessment engines. That will permit the engine to be dispatched on EMS calls without the truck.

The 1+1 staffing model has a clear standardization advantage, in that the "BLS" ambulance category will be eliminated. It uses paramedics more efficiently, as the dispatch of two apparatus would result in only

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[8] National Fire Protection Association (NFPA) Standard 1710, 2010 Edition, paragraph 5.2.3 and subparagraphs.

[9] Los Angeles Fire Department, "Training Bulletin No. 76", Revised June 27, 2011, p. 3.

two paramedics arriving. Part of the standardization would also be to modify the dispatch protocol so that a light force or Task Force dispatches to EMS calls only as an engine company.

3.2.2 Priority Group 2

Implement a risk based approach

The Standards of Cover define the operational targets that a Fire Department seeks to achieve. As noted below in 4.2.3, it is now generally accepted that those standards should be phrased as fractiles or frequencies, such as "the 80th percentile of travel time will be 240 seconds or less," or equivalently "in 80% of incidents the travel time will be less than 240 seconds." Deployment, dispatch, and other operational plans constructed to meet fractile standards should be developed using a risk based approach.

Numerous Fire Departments have been implementing a risk based approach to fire cover for many years now, a process which has grown in sophistication since its inception some 10 years ago.

The objective of this initiative was to:

- Reduce the number of fire and other emergency incidents.
- Reduce the resulting loss of life.
- Reducing the number and severity of injuries.
- Reducing the commercial, economic and social impact of fires.
- Safeguarding the environment.
- Providing value for money.

This approach results in a Risk Management Plan (RPM), to reduce the risk to the community and is regularly reviewed and amended to reflect the changing risks and priorities.

The RMP for any Department consists of the following elements:

a. Identify the risk to life for both the community and firefighters posed by buildings; for example, age, construction and density.

b. Identify the risk to the community from various types of incidents by, for example, time of day, day of the week, time of the year.

c. Determine strategies and tactics to proactively reduce the risk, for example, public education, smoke and carbon monoxide alarm fitment etc.

d. Identify the resource requirements, disposition and speed of response.

e. Develop a "Resource follows Risk" model; proactively deploying resources from low to high risk areas at specific times.

f. Modify the dispatch protocols as needed based on the types of calls determined to be more likely based on call time and location, and to recognize the key risks associated with different call types.

g. Measure performance outcomes and amending the RMP or the tactics needed to deliver it.

For an RMP to be delivered to its fullest extent, all of a. to f. above should be implemented. However, it is possible for c. above to be delivered separately, either before or after the remaining elements which concentrate on response. In fact, item c. is recommended as part of Priority Group 3.

For a risk based approach to be successfully delivered, an entirely different approach should be introduced by the Fire Department to ensure a successful conclusion. For example, new duty systems should be negotiated and delivered, different apparatus should be mobilized to incidents and performance

management targets set, monitored and published to drive continuous improvement. It is not something that can be delivered quickly but it can be commenced modestly and extended as circumstances allow.

An essential prerequisite to rollout is a very clear and consistent communications strategy from the top of the organization stating why the change is necessary, what it aims to achieve, timescales and what the impact will be on staff. When this has been achieved, rollout should commence and the early changes monitored, amendments made where necessary, before wider adoption across the Department.

The intelligent use of data is integral to the success of risk based mobilizing. The data should be (and should be seen to be) accurate. Ideally, the data should be over of a number of years, ideally 5 but this could be reduced to 2 initially in a Department with high activity levels such as LAFD. Data should include, at a minimum, information regarding incident types, overall numbers, frequency by different time frames, location and impact (ranging from minimal to death or serious injury).

This data will determine the optimum location of resources and how they should be dispatched to incidents. In addition, if a preventative strategy is also to be adopted (see above), socio economic data will also need to be gathered and analyzed to identify, for example, areas of deprivation and future development in order to prioritize resource deployment on incident reduction activities.

Computer software is available to assist Departments in analyzing the data and to optimize resource deployment. The use of this software enables evidence based managerial decisions to be made. The absence of such data and the decisions made could otherwise be criticized as "evidence light" by interest groups intent on preserving the status quo. Sophisticated solutions, including shift changes, resource relocation etc. should not be undertaken without underpinning evidence.

Despite the need for data, there are some obvious and well known risks which should be able to be anticipated and mitigated without complex analysis. A well-known example is that fire frequency is at a low point during early morning and yet, conversely, road traffic accidents are at a peak with the morning rush hour. It seems obvious therefore, that many more ambulances should be crewed at the expense of fire trucks and those ambulances should ideally be crewed adjacent to the accident black spots in the area.

LAFD already "crews up" to cover specific risks such as brush fires and major media events. However, it usually represents an increase in resources in an already well-resourced Department and there is limited evidence of taking resources from a lower risk area, and moving them to areas of higher risk during periods of increased danger.

It is difficult to know how a risk based deployment may affect LAFD until the data has been collected and analyzed but examples include:

a. Closing very quiet stations either by night or by day
b. Varying crewing levels either by day, night or day of the week i.e. reducing a Task Force Station to an Engine Company at night.
c. Erecting temporary fire stations in areas of high risk by time of year (brush fires)
d. Placing extra ambulances in known high risks for temporary periods (Hollywood at weekends)
e. Purchasing Smaller Fire Trucks staffed by a smaller number of firefighters to deal with, for example, cars on the highway, skip fires, trees etc.
f. Repositioning, closure or the provision of extra stations

A risk based deployment model should bring the following positive outcome to LAFD:

- More effective utilization of resources
- Improved public safety by reducing the risk to members of the community.
- Lower costs due to better utilization of both human resources and physical assets.

The UK has been implementing Integrated Risk Management Plans for the last 10 years, leading to the following beneficial outcomes:

- Overall attendance at incidents is down 40%.
- Response times at fires are down 48%.
- Building fires have decreased by 39%.
- Minor outdoor fires have decreased by 44%.
- Road traffic collisions have decreased by 24%.
- Flooding has decreased by 8%.

In conclusion, RMP's are dynamic documents, reviewed and revised regularly as circumstances change and new information becomes available. It may take a number of years to achieve some of the changes identified in them and to meet the targets and objectives. As the same time, they are also likely to identify a number of early actions that can be taken to improve community safety and service delivery. An important underpinning principle however, is that there must be adequate evidence to support and justify any changes proposed, ensuring the maintenance and improvement in community safety.

Accelerate the implementation of other technology initiatives

As mentioned previously, multiple technology initiatives are underway at the Department, one of them being the implementation of the AVL System.

In order to support the transition to a risk based deployment model, the Department should ensure that all AVL projects will be completed in the first half of 2015. In addition, the Dynamic Risk Cover Tool should be given higher priority and implemented as soon as possible.

The Phoenix Fire Department has had AVL for the last 20 years and London has successfully used the DRCT system to reduce response times.

Develop a pilot for the transport outsourcing model

Like many other parts of California, Los Angeles can develop requests for proposals to permit other agencies to perform the transport function of the city's EMS system. There is concern over the impact of outsourcing transport, although Los Angeles County follows this model. We know of no studies indicating that outsourcing transports leads to increases in morbidity or mortality.

Even if ambulance transport were outsourced, LAFD would continue to provide paramedic services. This approach could be called a "treat/private transport" model. However, we have observed possible confusion with a different proposal that would involve billing for EMS services when the patient is treated by an LAFD paramedic but not transported to a hospital. The billing proposal is not reviewed in this report.

In order to better understand the costs and benefits of the outsourced transport model, the City should develop a pilot program for which the EMS function would be fully outsourced in only a small area of LAFD's service territory (one or two battalions). In addition to a cost/benefit evaluation, a pilot will provide information on the feasibility and implementation time of such project. Further details on the model are included in Section 5.3.2.

3.2.3 Priority Group 3

Manage Performance

PA has found substantial evidence that the discipline process is broken. This has resulted in:

- Managers unwilling or afraid to instigate proceedings.

- A lack of distinction and confusion between discipline, performance and capability.
- Inappropriate issues being referred for discipline.
- An unwieldy, bureaucratic, time consuming, expensive and ultimately ineffective disciplinary process.

This situation appears to have evolved over recent years possibly as a result of several successful litigations against the Department which has resulted in more issues being processed to the disciplinary stage than is justified "just in case" of a future litigation.

Consequently, managers have lost confidence in their ability to manage performance in its broadest sense and the Departments ability to follow matters to the correct conclusion. This has become a significant and negative feature of the Department's culture, and for that reason it is given a complete treatment as a Group 3 recommendation; however, and especially for Emergency Medical Services, it is a particularly pressing problem and Priority Group 1 includes the recommendation that the Department make initial steps to address it (as described above).

The whole issue is most unsatisfactory and can represent a threat to both performance and safety. It is not an easy or quick problem to fix. PA recommends the following steps:

1. Discipline, promotion and training are interrelated and should be considered as such. Improving LAFD's training and promotion processes will have a direct, positive impact on discipline.
2. The new Director of Employee/Labor Relations should form a task force with sworn personnel, union leadership and the City attorney to focus on this issue and produce a clear, revised policy document on the management of individual performance. PA believes that this should fall into 3 sections:
    a. Performance: a performance issue arises when an individual's actions in the course of their work fall below expectations on one or more occasions. This may be for many reasons and the managers' role should be to support the individual to "up their game", particularly if they know that they are capable of more. This could be achieved by regular reviews, increased oversight, remedial training, mentoring etc. The vast majority of performance issues should be capable of being resolved by these actions.
    b. Capability: a capability issue is where the individual is regularly displaying signs that they are incapable of carrying out their role in a safe and responsible manner and to the standards required. This may be as a result of, for example, over promotion, a struggling new recruit or the inability to take on new tasks within a role. The actions in this case should involve all of those in Performance above but within a more formalized framework with clear targets and assessments against deadlines, in essence, a formal Improvement Plan. If the individual does not improve, this may result in termination or demotion.
    c. Disciplinary Issues: discipline should deal only with misconduct or actions in the course of duty which are so outside of norms as to place other staff, the public or the Department at severe risk. A suspected disciplinary offense should be independently investigated and clearly defined sanctions, including possible dismissal as penalties for proven misdemeanors. Disciplinary procedures should be very much the exception rather than the rule. A department taskforce consisting of respected individuals from all ranks and bureaus should be essential in guiding the development of performance management guidelines and set limits of when discipline should occur.
3. To supplement the production of the new guidance, all managers, including Captains in charge of shifts, should attend a compulsory training event to emphasis the revised procedures. The thrust of the training would be to foster a change in mind set that performance can be better improved through supportive training, coaching and mentoring, with discipline as a last resort to change behavior. The training event should involve good and bad case studies and incident role play.

4. The new policy should be carefully monitored by LAFD's Human Resources Division over the first year of its life with feedback to those involved, minor revisions made as a result of experience, but most importantly to ensure it is consistently implemented throughout. There should be no presumption that a new policy and some training will fix the problem alone.
5. PA is aware of the problems incurred in the Professional Standards Division (PSD). Elsewhere in this document PA recommends that the majority of PSD be civilianized with professionals brought in who have previous experience of dealing with such issues. A small contingent of sworn personnel would be necessary to support the new team, to add context to the uniformed working environment.

Implement a sustained Community Safety Program for the Department

Reference is made previously to proactively reducing community risk. The trust that the Department and its staff have with the public is an unexploited asset which should be utilized to reduce community risk as has been done in many areas in the U.S. LAFD at present is almost entirely a reactive organization, responding to emergencies and then returning to their stations. Some stations attend a very small number of calls and there is excess capacity which should be used to good effect

Working in partnership with other public services and community groups, the Department should give far more emphasis to reducing community and individual risk such as slips trips and falls for the elderly, medication monitoring e.g. diabetes, congestive heart failure, sepsis evaluation, fitting of smoke and carbon monoxide detectors, home risk assessments, public, schools and community group education.

This has a number of advantages:

- Reducing the number of transports, therefore reducing wall time.
- Improving the life chances of the community.
- Improving the "worth" of the Department to elected officials.
- Giving more "bang for the buck"
- Utilizing current spare capacity.
- Enhancing the job satisfaction of staff.

Implement an end-to-end emergency and mobile health care solution

As the nature of health care provision continues to rapidly evolve, LAFD can be a leader in reconfiguring existing EMS resources and develop new non-urgent services that are tightly integrated with private and public accountable care organizations. Advantages to this model include:

- Pair properly trained and equipped EMS personnel with non-urgent and schedule service calls that result in improved patient outcomes, better community health, and a reduction of unnecessary responses
- Provide opportunities for lateral and vertical career growth for LAFD EMS personnel.
- Foster greater integration and deeper relations with other city, county and private agencies involved in the provision of health care.
- Capture an additional revenue stream that will be promoted by the Affordable Care Act.

Review and modify medical priority dispatch protocol

In following these recommendations, LAFD will take several actions to improve the efficiency with which it uses medical resources. These include improved data collection, 1+1 ambulance staffing and the creation of a Risk Management Plan to drive deployment, redeployment, posting and dispatch. With these changes, the Department should also revisit its medical priority dispatch protocols. Revising those protocols is beyond PA's expertise. The Department's Medical Director should lead a review of its medical priority dispatch protocol.

3.3 Proposed Organizational Changes to Support PA's Recommendations in the First Priority Group

In order to support and illustrate the organizational changes presented in the previous section, PA has developed the organization chart shown in Figure 3. This chart only focuses on command and management positions and differentiates sworn and civilian positions.

Changes relative to LAFD's current organization chart for the Deputy, Assistant and Battalion Chief ranks (see Figure 2) include:

- The concept of the 4 bureaus.
  - The four Bureau Commanders should be supervised by a Chief Deputy reporting directly to the Fire Chief and be supported by Assistant Commanders.
  - Three Assistant Commanders should be assigned to the Central Bureau to cover off hours for the four bureaus. In addition, the Central Bureau Assistant Commander assigned to business hours should be in charge of the Dispatch Center.
  - The functions of the current Assistant Chief position at the Airport should be transferred to the Assistant Commander of the West Bureau.
  - The Air Operations Chief should report directly to the Valley Bureau Commander.
  - A Training and Development Chief should report to the Chief Deputy
- A new CIO/CTO position
- A new EMS Deputy Chief
- The creation of civilian Subject Matter Experts positions supporting the Chief of Staff. The Chief of Staff has become an administrative position with limited responsibilities while it should be in charge of some of LAFD's key administrative functions. In addition to the Planning Chief, the Chief of Staff should supervise the following key staff:
  - Employee Relations Director
  - Media Communication Director
  - Community Communication Director
  - Analytics Director
- The upgrade of the position of Battalion Chief Staff Assistant to Captain II, and its extension to all battalions (note that this change is not reflected in Figure 3).
- The creation of a personal assistant to the Fire Chief position. This position should be filled by a Captain I reporting directly to the Chief of Staff.
- The elimination of the Assistant Chief Special Operations position:
  - The Disaster Preparedness Battalion Chief position (currently under Special Operations) should be eliminated and consolidated under the supervision of the Chief Deputy.
  - Air Operations (currently under Special Operations) should report to the Chief Deputy while Arson should report to the Homeland Security Assistant Chief.
- The Human Resources function currently handled by the Administrative Services Bureau should be transferred to the new Employee Relations Director.

Details regarding the positions being eliminated, re-assigned created and upgraded are included in Appendix A.

Figure 2: LAFD's Current Organization Chart for Deputy, Assistant and Battalion Chief Ranks

A/C – Assistant Chief
B/C – Battalion Chief

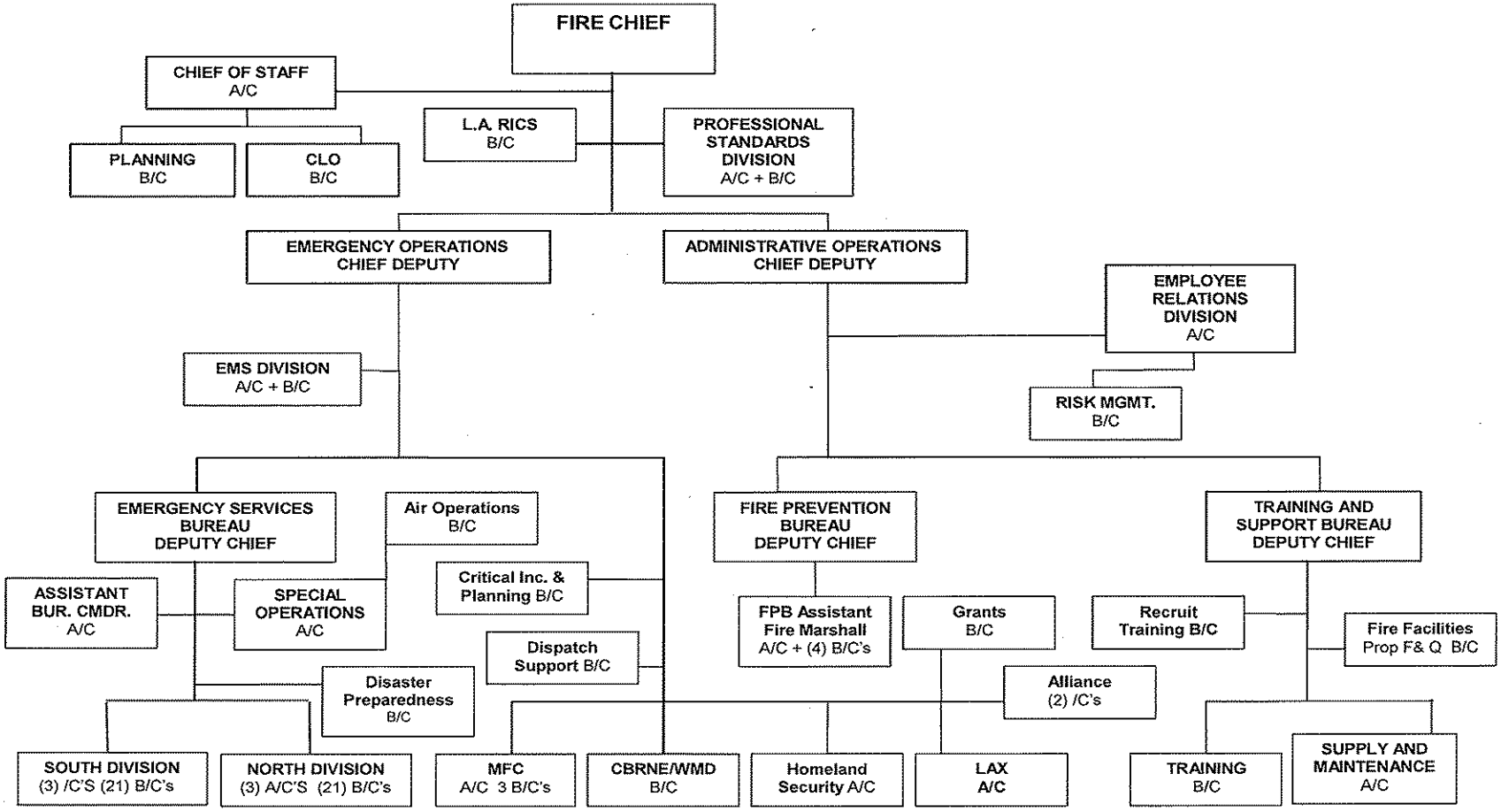
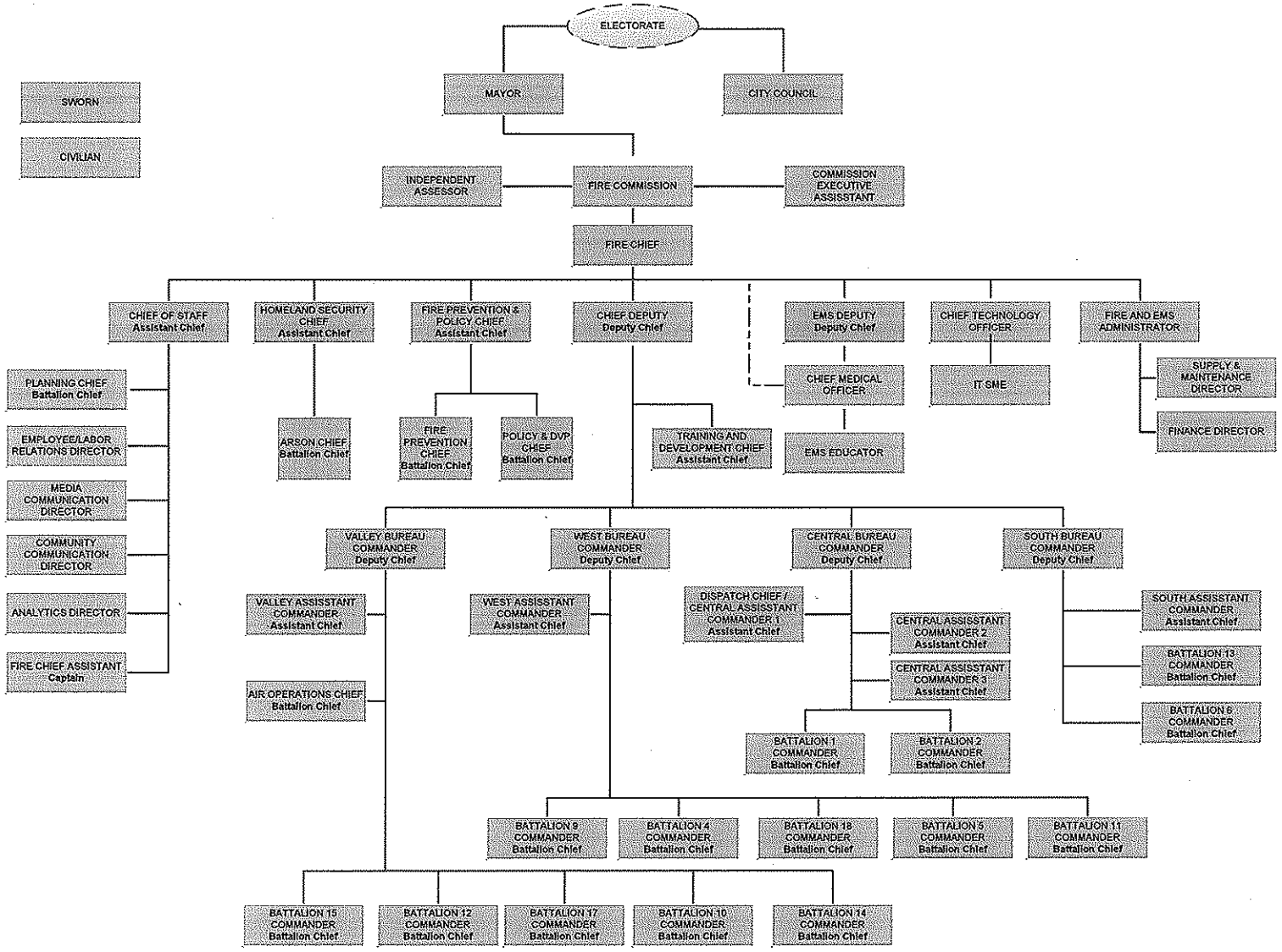


Figure 3: Proposed Organization Chart



PA projects that these organizational recommendations will yield approximately $4.3M per year in additional costs. While the significant reduction in the number of Assistant Chief positions will create savings of approximately $3M, the additional costs of upgrading the position of Battalion Chief Staff Assistant, and extending it to all battalions should be close to $6M.

However, PA also recommends the civilianization of some of LAFD rank and file staff as described in section 3.2.1. PA estimates savings from this civilianization process to reach $12.3M.

Collectively, PA's recommendations would save approximately $8M per year.

Table 2: Projected cost of PA's organizational recommendations

	Annual Cost per Position						Annual Cost Savings		Additional Annual Costs		Net
Position	Annual Salary	Overtime	Benefits	Pension Costs	Bonus	Annual Cost of Position	Number of Positions Eliminated	Total Cost Savings	Number of Positions Created	Total Cost	Additional Costs
Deputy Chief	$242,977	$0	$12,626	$97,045	$0	$352,648	5	$1,763,242	6	$2,115,890	$352,648
Assistant Chief	$199,574	$35,803	$12,626	$79,710	$0	$327,713	17	$5,571,123	8	$2,621,705	($2,949,418)
Battalion Chief	$157,551	$35,803	$12,626	$62,926	$0	$268,906	3	$806,718	2	$537,812	($268,906)
Captain II	$129,562	$35,803	$12,626	$51,747	$0	$229,738	0	$0	22	$5,054,244	$5,054,244
Difference Captain II - FFIII*	$30,185	$0	$0	$12,056	$0	$42,240	0	$0	21	$887,044	$887,044
Civilian Eq. DC	$213,226	$3,908	$10,597	$54,671	$2,407	$284,809	0	$0	1	$284,809	$284,809
Civilian Eq. AC	$181,202	$3,908	$10,597	$46,460	$2,045	$244,212	0	$0	3	$732,636	$732,636
Civilian Eq. BC	$152,279	$3,908	$10,597	$39,044	$1,719	$207,547	0	$0	1	$207,547	$207,547
					Total Sworn Positions**		25	$8,141,084	38	$10,329,652	$2,188,568
					Total Civilian Positions		0	$0	5	$1,224,992	$1,224,992
					TOTAL**		25	$8,141,084	43	$12,441,688	$4,300,604

* This row represents the costs of upgrading the current 21 positions for Staff Assistant to Battalion Chief from Firefighter III to Captain II.

** Excludes the number of positions upgraded from Firefighter III to Captain II for the Staff Assistant to BC.

4 DATA INTEGRITY ANALYSIS

The recommendations in PA's second Priority Group focus on the implementation of a risk based deployment model. The successful implementation of a risk based model is contingent on the use of accurate, reliable and comprehensive data. This section of the report presents PA's assessment of LAFD's data integrity and granularity in the context of a risk based deployment model.

PA concludes that LAFD's dispatch data can be used for response time analysis and for simulating the impact of deployment and dispatch changes. The variances in the dataset appear to be independent and should be well modeled as normal random errors, with the possible exception of the error due to manual time stamping. Manual data entry most likely leads to overstatements of response times although the size of the overstatement may not be significant.

Over the last several years the quality of the information provided by the Department has been questioned both in the press and in public. Some of these questions were occasioned by errors or inaccuracies in the way data were captured from the CAD system or recorded. These issues were studied by the Fire Commission through the Task Force on Information and Data Analysis ("I&DA Task Force") and have been fixed. Other questions were stimulated by the way the Department describes the information it provided the public:

- The Department changed the way it characterized response times: where previously any response in 359 seconds or less (under 6 minutes) was characterized as "five minutes", LAFD switched to using the term "five minutes" only for responses in 300 seconds or less, without re-characterizing previous data or providing a proper basis for comparison
- The Department reported a deployment change as being justified wholly by a computer model (ADAM) while the computer model actually only provided support for expert judgment.

In the future, PA recommends that the Department use civilian data analysts and statisticians who are experts both in data analysis and the reporting of analytic results. In particular, the proposed organizational changes in 3.3 include the addition of a civilian Analytics Director.

In 2012, the Fire Commission developed the I&DA Task Force to review response time data. The appointment followed several months of public discussion of the appropriateness of the response times reported and projected by the Department, and of the quality of the underlying CAD database. The I&DA Task Force reviewed the validation of the underlying data and made a number of suggestions for improvement in the systems and processes used to store dispatch data.

Although the Department has not published response times since the I&DA Task Force made its report, individuals we interviewed within the Department seemed confident that the data recorded since September 2012 are accurate. We further interviewed one of the I&DA Task Force's external advisors,

who provided his opinion that almost all data problems have been corrected to his satisfaction. The one exception is the reliance on manual data entry in the absence of AVL data. Response times have high variability and therefore it is important to consider the precision of any estimates and to ensure they are based on large sample sizes.

In PA's opinion, there has been enough data accumulated since October 2012 that the Department can begin to publish response times. We note in the following section the importance of measuring based on identified fractiles or percentiles of performance metrics. The nature of those kinds of statistics is that they can only be collected from large datasets. Fractiles of small samples will not give a good indication of performance. Thus, fractile performance metrics should only be reported for sizable fractions of LAFD's emergency response organizations, not just a small subset of stations.

The CAD database yields an additional type of information that is even more valuable for setting standards of cover and evaluating deployment strategies, namely the demand for emergency services. The set of incidents in the database is the best representation available of the demand for services, already classified by service type and location. Coupled with an appropriate simulation tool these data can be used to simulate the response time impacts of different deployment strategies.

4.1 Data quality

PA initially attempted to evaluate the quality of LAFD's dispatch data and determine the extent to which it had improved as a consequence of the work of the I&DA Task Force. In September PA submitted an extensive data request to LAFD, including a request for dispatch data since January, 2007. In early November PA was able to obtain access to some data, based on extracts with locational identifying information removed, directly from the database used by FirstWatch. FirstWatch provides incidents data analysis tools to the Department, as well as dashboards for performance monitoring and operation reporting.

Not all CAD fields were present in the extracts available to PA. In particular we did not have access to any detail of call location that was finer than First-In District. The Department was concerned that such information would violate the privacy of health information unless PA could guarantee certain required data protections, which at this time we cannot. In addition, LAFD could not provide any data about the outcomes (success or failure) of either EMS or Fire Suppression responses, because it has very little such information. The collection of such data will be an important part of a performance management program. We found a number of problems with the data, some of which were only present early in the period (indicating that they were corrected). It is our opinion that the remaining problems in the data are typical errors and variations found in large datasets.

The problems PA identified include:

- Variation and error in timestamps, because they rely on manual input. There are also sporadic records with some missing timestamps (e.g., timestamps for Time Assigned and Time on Scene but not Time En Route). These errors cannot be ignored but it should be possible to estimate their size and frequency, and account for them.
- Timestamps are recorded in "prevailing time". This means that a unit can appear to arrive on scene before it was dispatched, because in the interim the clock was reset (end of Daylight Time). This is probably a programming issue in the CAD system – a better practice is for all times to be recorded in "standard time" and available in that format for analysis. The data can still be used for decision support if records with this problem are eliminated (a very small fraction of the total dataset will be affected).
- Missing data fields for entire months. For example the data extract contained no timestamps at all for September 2013, and for October and November was missing certain timestamps (e.g., it had Time Assigned and Time En Route but not Time on Scene). The dataset did contain data that are

derived from the missing timestamps, such as the time from "WRS" to "On Scene", so we assume the timestamps are present in MIS but were not transferred to the dispatch data provided to PA.

- Missing days or subperiods: There was not data for June 29, 2013, and on each of June 26, 27, 28 and 30 there was not data for incidents between 6 AM the following midnight. This was probably also a data transfer problem although we did not verify that the data was in the MIS database.
- Missing "Emergency" indicators: One of the fields in the CAD database indicates whether an incident is an emergency ("E") or non-emergency ("N"). For a number of incidents in October and November 2012, this field was blank. We had been told that there had been previous problems with the classification of emergencies, but those problems had been fixed; we consider this as evidence that the correction was made but was not completely effective before November 2012.
- Some of the coding in the dataset did not correspond to other information we had been provided about LAFD's deployment. We noted there were units assigned to Fire Stations whose numbers are greater than 120, and incidents that were responded to by Battalion 22. We did not find any of the Fire Stations with numbers larger than 120 or Battalion 22 in the listings provided by LAFD; they are actually in another city.
- About 8% of the EMS incidents in the database were missing the "algorithm" field, which could adversely impact the ability to simulate dispatch; however, it should be possible to determine the algorithm from the "incident type" field.

The nature of the data we received made it somewhat difficult to evaluate metrics other than response times, such as unit workloads and the frequency of "collisions". These issues will be described in the appropriate sections below.

Overall, PA believes that LAFD's dispatch data can be used for response time analysis and for simulating the impact of deployment and dispatch changes. The variances in the dataset appear to be independent and should be well modeled as normal random errors, with the possible exception of the manual timestamps. Until the implementation of AVL, particular attention should be paid to the statistical biases introduced by manual timestamps. We believe that manual data entry is most likely to be delayed, which would actually lead to overstatements of response times (that is, reported response times would be longer than the actual response times); the size of the overstatement may not be significant.

Data analysis should be conducted by trained civilian data analysis and statisticians who are experts both in the reporting of analytic results as well. The Fire Department has been "burned" by imprecisely defining terms like 'five minute response time", and by changing the definition without appropriately restating past results. Expertise in analysis particularly means being able to explain the limits imposed by variation in the underlying data, and how much confidence can be place in each conclusion. Expert analysts can also help LAFD better understand the impact of any changes in deployment or dispatch. It is possible, for example, to design a simulation that can forecast the extent to which a policy can reduce or increase response times, better than one can forecast the response times themselves.

4.1.1 Geographic detail

As noted, the finest level of geographic detail available to PA was First-In District. We thought the First-In Districts were likely to be too small to use to detect geographic differences, and larger areas would be appropriate. The dispatch data contained a "Geographic Code" (GEO_CD) field that distinguished among 8 different groups of First-In Districts. These areas are shown in Figure 4. They vary considerably in size and the basis for the groupings was not explained. Therefore we chose in general to consider distinctions only between the four bureaus proposed earlier in this report. Of course these bureaus are not yet defined, but are intended to approximate the geographic structure of the Police Department. As an approximation, PA defined North, West, Central and South groups of First-In Districts as shown in Figure 5.

Figure 4: Map of Geo_CD Codes

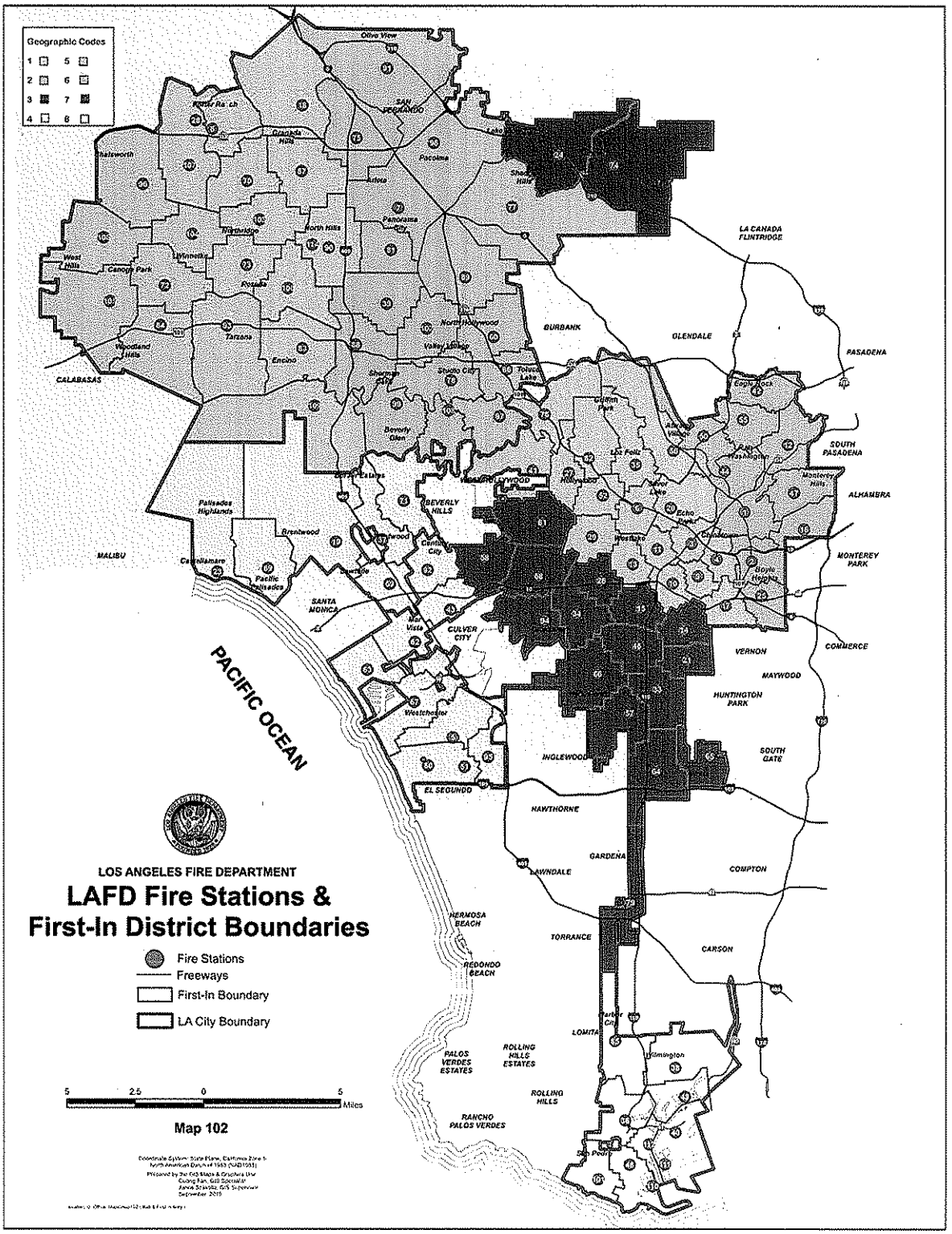
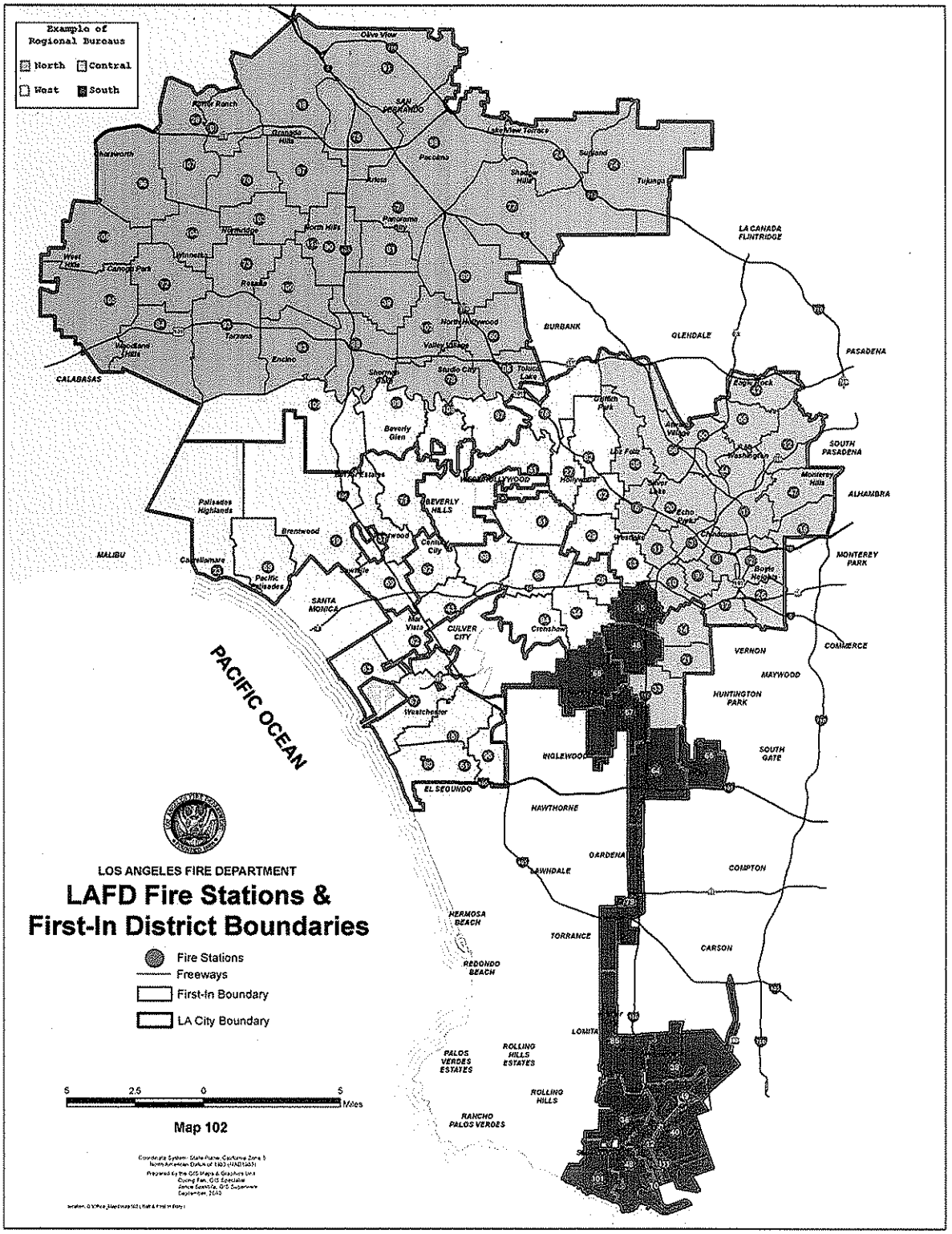


Figure 5: Map of Regional Bureaus



4.2 Usability of the CAD database as a decision support tool

PA believes that LAFD's current database and simulation tools are suitable for deployment and dispatch policy decision-making. Dispatch data will continue to be subject to occasional errors, especially due to the manual data input until AVL is fully deployed, but the error rate should be acceptable and consistent with data entry variability.

We illustrate the range of information that can be extracted from the CAD database for decision-making by describing the characteristics of the incident distribution (demand data) and the response times. We then consider the kinds of standards that can be set for the Department. Finally we report on PA's review of the operations of the Metro Communications Division (MCD, the dispatch center) and provide recommendations.

PA reviewed dispatch system data since Oct. 1, 2012. This date was chosen because we had been told that data after Sept. 30, 2012 should be of a more uniform, and higher, quality that earlier data, as the recommendations of the I&DA Task Force had been implemented by then. As time goes by, the set of "good" data will continue to grow. We did not review raw data from the CAD system.

Finally, we made reasonable assumptions for when each piece of EMS apparatus is available to the system, and when it was not to calculate unit utilizations metrics. We assumed that if an ambulance unit is dispatched at least once during the day, then the unit is available for the entire 24 hour of the day (with the exception of variably staffed or flex ambulance units, which were available for 10 hours on the days that it is dispatched). We did not make any assumptions for when ambulance maintenances or repairs.

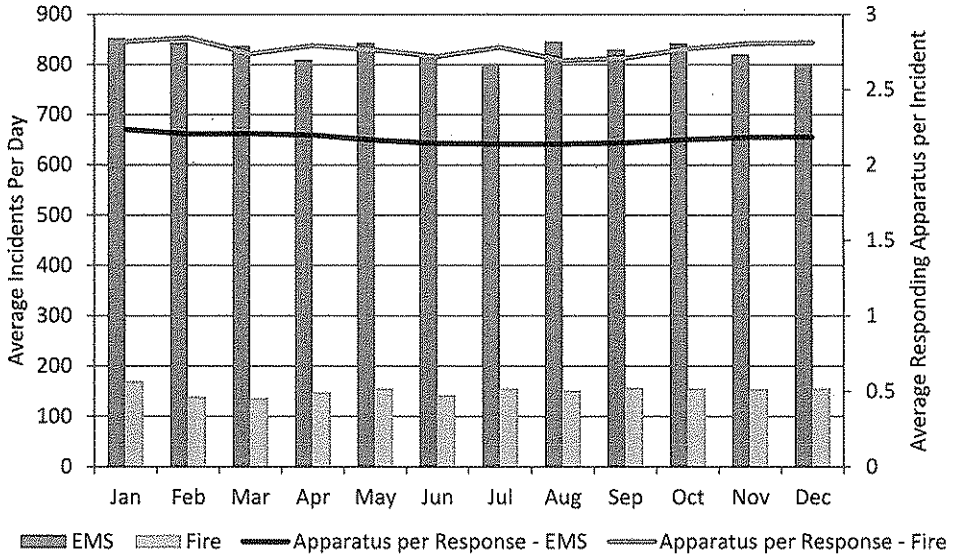
4.2.1 Incident data and initial findings

We examined approximately one year's worth of Fire and EMS dispatch data from October 1, 2012 through November 20, 2013, which consisted of approximately 456,000 incidents, and 985,000 responses. The data contains incident level details (such as time, rough geographical location as represented by 8 separate areas, and type), and response level details (such as responding units, and their associated response times). A few events in October and November 2012 were not identified as Emergency or Non-Emergency. Other than the October and November 2012 Emergency / Non-Emergency issue, other issues identified by the I&DA Task Force appeared to have been addressed. However, since data for the various response times such as WRS time, En-Route time, and On Scene time are still manually entered, the data is still vulnerable to manual entry errors.

In order to understand how best to deploy emergency service apparatus and personnel, we first have to understand and characterize the demand for these services. Using the dispatch data provided to PA, we examined emergency responses from October 1, 2012 through November 20, 2013. "Emergency" means the "Emergency/Non-Emergency" field is not "N"; it includes the blank values in that field, and thus could include some non-emergency incidents, in October and November 2012. The same condition is applied to all the charts, tables and analyses in this chapter, except the collision and Unit Hour Utilization (UHU) analyses in 4.2.2 and 4.2.5: only emergency incidents are considered, but that category includes incidents with a blank "Emergency/Non-Emergency" field.

At the highest level of detail, incidents are divided into EMS calls and Non-EMS calls. Non-EMS calls can include various hazard and rescue calls, not just fires, but in this report we will refer to them all as "Fire" calls. Figure 6 shows the relative frequencies of those calls by month. EMS calls account for approximately 80% of the total calls during this period.

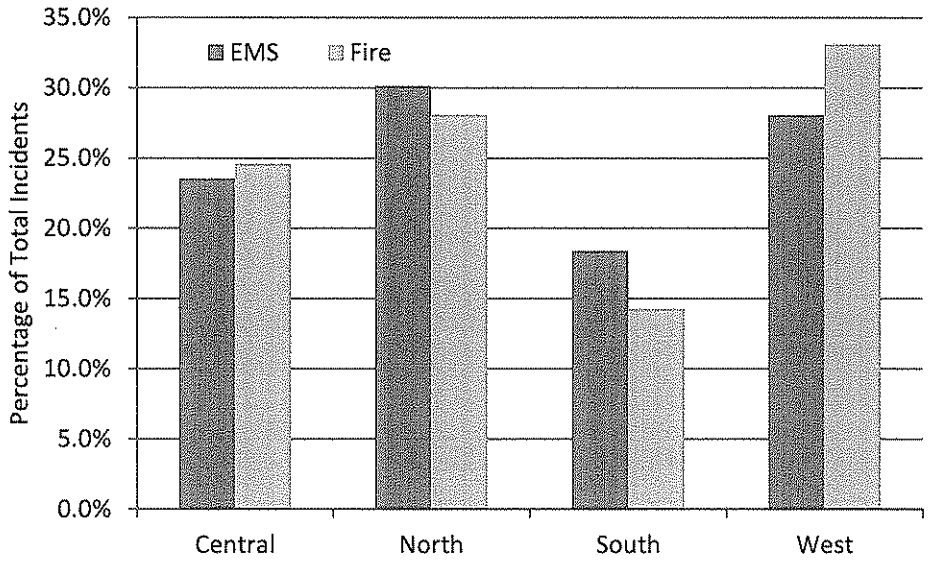
Figure 6: Fire and EMS Incidents from October 2012 through November 20 2013



Note: Data for June 26-30 2013 was incomplete data so those days are not included

The number of incidents varies greatly by geography, as seen in Figure 7. A constant staffing model, given the differences in incident rates by geography may lead to drastically different workloads depending on where resources are staffed. We analyzed the geographical data by assigning stations to one of four geographic bureaus (based on LAPD's four bureaus), which are shown in Figure 5.

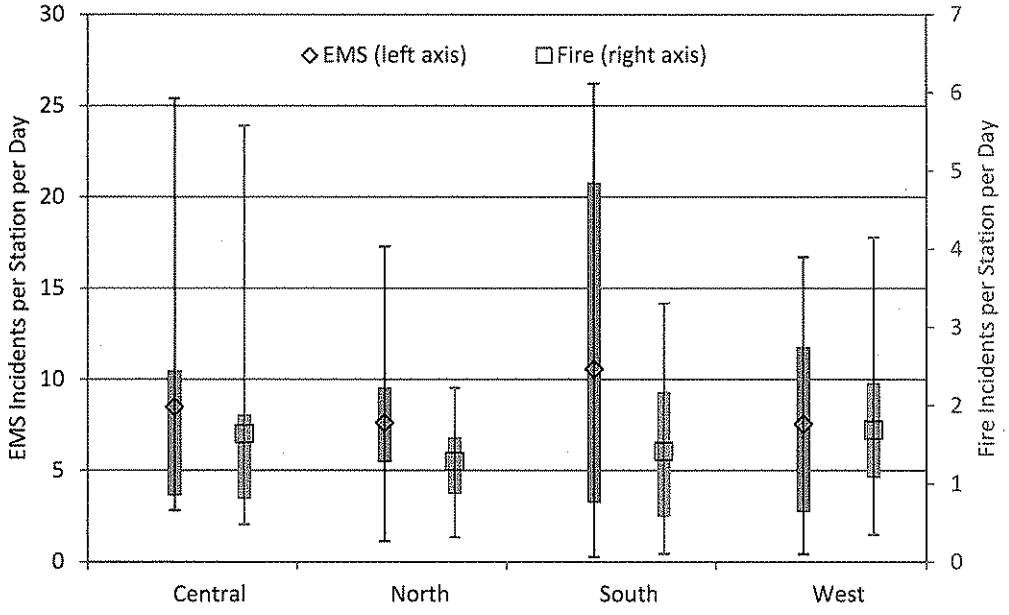
Figure 7: Number of Incidents by Geographic Area, October 1 2012 – November 20 2013



On a typical day, each station can expect to see approximately 8 EMS related incidents, and a little less than two Fire related incidents, however, the workload between the fire stations vary greatly. Figure 8 shows the variations in the number of incidents across all the different stations by the four different

bureaus. The variations are likely due to the different incident risk profiles of the neighborhoods surrounding each station.

Figure 8: Fire and EMS Incidents per Station per Day Statistics



Note: Thin bars indicate the absolute minimum and maximum incidents per station per day for each bureau. Thick bars indicate the range of 25th and 75th percentile of incidents per day per station by bureau.

One of the fundamental issues in determining whether to maintain the constant staffing model will be whether fire or medical risk shows significant variation across the day or week. Figure 9, Figure 10, and Figure 11 examine those variations for each call category. Weekend days are distinguished from weekends. Of the weekday days, Wednesdays have the lowest number of Fire calls by volume (and Thursdays the highest with Fridays close behind), and Wednesdays and Thursdays have about the same number of EMS calls by volume, the lowest among weekdays (and Fridays the highest). Sundays has the lowest number of calls by volume for both Fire and EMS. The variation between incident rates for Fire is slightly higher than incident rates for EMS calls.

Figure 9: Variations in EMS and Fire incidents by Day of Week

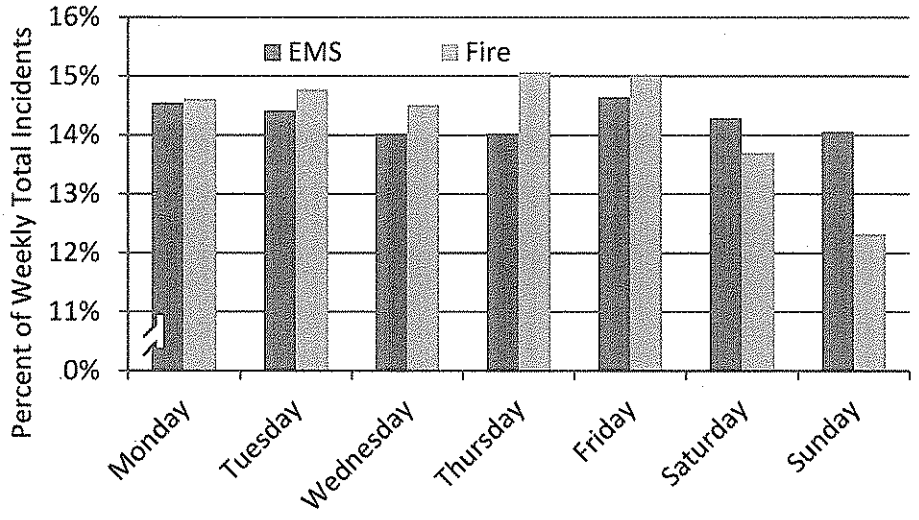


Figure 10: Variations in Fire Incidents by Hour

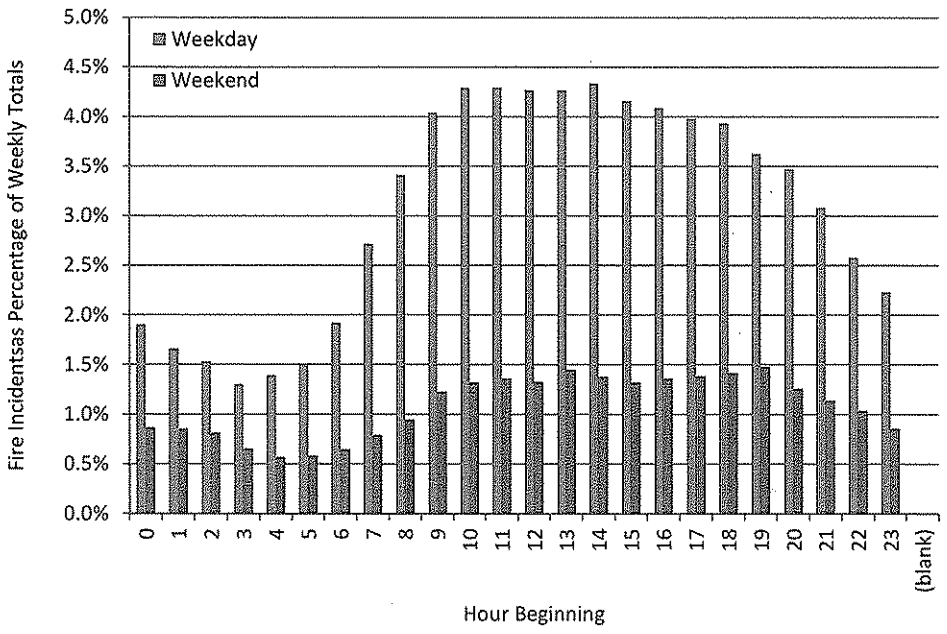
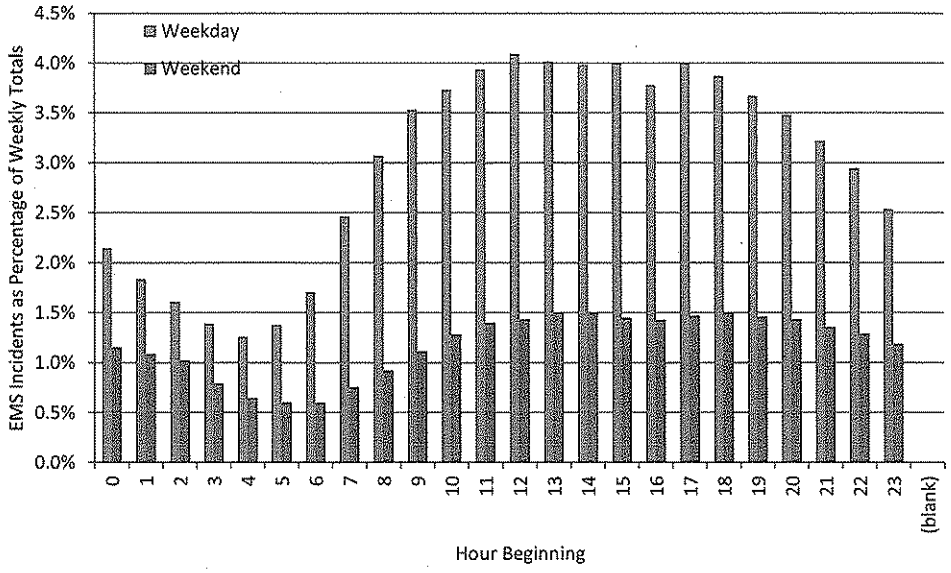


Figure 11: Variations in EMS Incidents by Hour



Finally, in order to show both the distribution of the calls by severity and geography, the following two tables show the call counts (Fire and EMS) by dispatch algorithm (EMS) or number of units (Fire) and geographic area. The dispatch algorithm or number of units dispatched is an indicator of the severity of the incident. The "undetermined" column refers to unknown First-In District values (such as the ones in Battalion 22). These tables indicate that EMS risk, in terms the distribution of severity or type of EMS incidents, is pretty uniform across the city, but not so fire risk.

Table 3: Geographical breakdown of EMS Dispatches by Dispatch Algorithm

EMS Dispatch Algorithm	Central	North	South	West	Undetermined	City-wide
11	15%	14%	16%	15%	15%	15%
12	50%	50%	51%	49%	50%	50%
13	5%	4%	5%	4%	5%	5%
14	15%	14%	14%	16%	15%	15%
15	7%	9%	6%	8%	8%	8%
21	0%	0%	0%	0%	0%	0%
27	0%	0%	1%	0%	0%	0%
99 or Missing	8%	8%	8%	8%	8%	8%
Grand Total	100%	100%	100%	100%	100%	100%
Bureau / Total	24%	31%	18%	27%	0.01%	100%

Table 4: Geographical Breakdown of Fire Dispatches by Units Dispatched

Resources Dispatched	Central	North	South	West	Undetermined	City-wide
1	17%	19%	21%	20%	14%	19%
2	24%	18%	13%	17%	9%	18%
3	7%	5%	6%	13%	27%	8%
4	2%	2%	2%	2%	0%	2%
5	1%	1%	1%	1%	0%	1%
6	1%	1%	2%	0%	0%	1%
7	1%	1%	2%	1%	0%	1%
8	1%	1%	2%	0%	0%	1%
9	5%	8%	14%	6%	0%	7%
10	4%	5%	7%	3%	0%	4%
11	4%	6%	7%	4%	50%	5%
12	4%	4%	3%	3%	0%	3%
13	6%	11%	7%	11%	0%	9%
14	7%	5%	4%	5%	0%	6%
>14	16%	13%	9%	15%	0%	14%
Grand Total	100%	100%	100%	100%	100%	100%
Bureau / Total	25%	28%	14%	33%	0.01%	100%

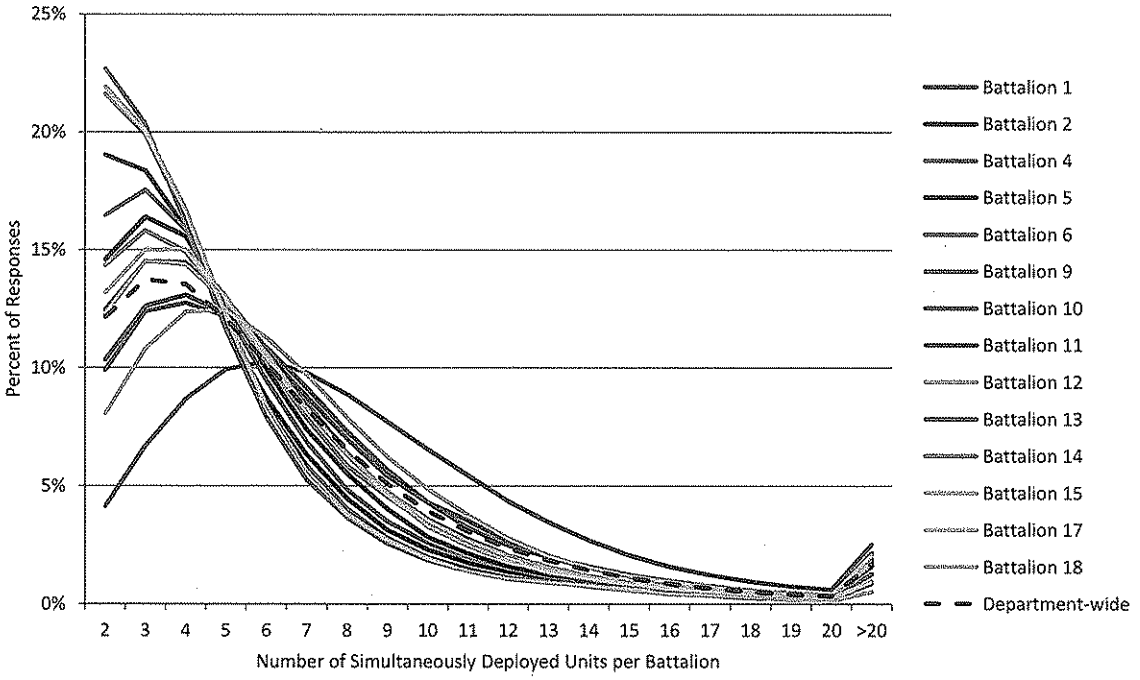
4.2.2 "Collisions"

The term "collision" is used to refer to times when two or more incidents "collide" in time and geographically, so that a desired unit cannot be dispatched because it is already assigned to another incident. Estimating the collision frequency requires knowledge of incident location, tracking historical dispatch decisions and simulating the actual dispatch algorithms. It was not feasible for PA to do this analysis but it appears to be one of the features of the ADAM software.

However, with the data that we have, it is possible to examine the number of times that multiple apparatuses serving a particular area were out at the same time, as shown in Figure 12. The more apparatus assigned at a given time, the greater the likelihood of a collision. An important parameter of this analysis is the geographic area or unit of structure over which one counts the simultaneous dispatches. Because it is common for units from different stations to be dispatched to the same incident, individual stations or First-In Districts would represent too fine a level of detail. PA conducted this analysis by battalion.

Overall, the average number of simultaneously deployed resources per battalion is between 4 (Battalion 15) and 8 (Battalion 13) units. In 90 percent of the time, between 8 (Battalion 15) and 14 (Battalion 13) units are deployed per battalion at the same time. Among other things, this may indicate an imbalance in workload between the Battalions, and that incident risk (which could be frequency or severity) is higher in certain geographic locations.

Figure 12: Frequency of Simultaneous Dispatches, October 2012 through November 20, 2013



4.2.3 Response time standards and goals

PA investigated goals generally set for response time.

Fire suppression responses

Based on a limited amount of documentary research, conversations and interviews, and the experience of an expert subcontractor, it appears that fire departments typically follow response time guidelines from the NFPA. Los Angeles County Fire Department, for example, considers those guidelines to be best practice but has not officially adopted them as standards, and this appears to be common. NFPA guidelines are phrased in terms of turnout time (time period from dispatch to "en route") and travel time (time period from "en route" to "on scene"):[10]

- 80 seconds turnout time
- 240 seconds (four minutes) travel time for first arriving engine company
- 480 seconds (eight minutes) travel time for initial full alarm assignment.

These are phrased as goals. It is unreasonable to expect that such a goal would be achieved in every case. One could measure the achievement of a goal based on the average (mean) turnout or travel time, but averages will tend to be skewed by extreme cases (since the times cannot be less than zero, but can be very long). The average does not provide citizens with a reasonable expectation of the service level to expect. According to the Commission on Fire Accreditation International (CFAI),

[10] National Fire Protection Association (NFPA) Standard 1710, 2010 Edition, paragraph 4.1.2.1.

> For many years, fire agencies have been using a statistical term based on of the three types of central tendency. The three types are mean, median, and mode. For over 50 years, fire agencies have been discussing their average response time. When the original [International Association of Fire Chiefs] Task Force on Accreditation researched this subject, it discovered averaging was not a true reflection of performance, nor is it a quality measure. A few isolated abnormal response times will skew the average, providing an inaccurate picture of the agency's overall response time performance. In early CFAI documentation, it was suggested that fractile goals were more relevant in defining an expected response goal for fire and EMS response times instead of using averages. This is still the case.
>
> Most contemporary fire departments no longer refer to average travel times. They now use a fractile measure such as 80 percent, or whatever has been set by local policy as a response time goal. In essence, the performance is better measured in terms of how often the department is able to achieve the goal as compared to 100 percent of the time. For example, a department would create a performance measurement indicating fire apparatus will arrive at the scene of the dispatched incident within a certain period of time, 80 percent of the time....
>
> The Pareto principle, also known as the 80-20 rule, states for many events 80 percent of the effects come from 20 percent of the causes.[11]

CFAI appears to be recommending the use of the 80th percentile, although later they discuss 90th percentiles also. The NFPA standard includes reference to a 90th percentile standard for the two travel time goals above.[12] If the 90th percentile of response time is 8 minutes, then citizens know that 9 times out of 10 their 911 call will yield a response in 8 minutes or less.

The NFPA guideline is not a mandatory standard. Each jurisdiction is to determine the criterion it will meet, and to include that criterion in its Standards of Cover.

PA attempted to get benchmark response time data, to which LAFD could be compared. PA investigated the use of data from the National Fire Incident Reporting System (NFIRS). However, we were cautioned by an expert on our team that "response time data from NFIRS is the least valid data set that comes out of the system," in large part because the data definitions provided by NFIRS are imprecise and subject to various interpretations by the departments submitting the data.

Standards of Cover, in addition to setting goals for response metrics, should also explain what those goals are and the current state of achievement. For example, the City of San Diego's response time goal is that 90% of response times should be 6 minutes (360 seconds) or less; the 90th percentile of actual response times is 8:50 (530 seconds).[13] San Diego's performance is similar to LAFD's as reported in Table 5 below. On the other hand, the Pasadena Fire Department responds to 90% of fire incidents within 5:52 (352 seconds).[14]

LAFD's fire response time performance will be found in Table 5.

EMS responses

NFPA also provides guidelines for EMS response:

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[11] Commission on Fire Accreditation International, *Standards of Cover 5th Edition*, p. 51.

[12] National Fire Protection Association (NFPA) Standard 1710, 2010 Edition, paragraph 5.2.4.1.1.

[13] Citygate Associates LLC, "Fire Service Standards of Response Coverage Deployment Study for the City of San Diego Fire-Rescue Department" vol. 1, Feb. 14, 2011, p. 61.

[14] Citygate Associates LLC, "Fire Department Station Location Study – City of Pasadena", presented to the City of Pasadena Public Safety Committee, March 5, 2012, p. 13.

- 60 seconds turnout time
- 240 seconds (four minutes) travel time for first arriving unit with an Automatic External Defibrillator
- 480 seconds (eight minutes) travel time for first arriving ALS unit, provided that the ALS goal is met.

There appears to be much less agreement in the literature that time is of the essence in EMS response. Anecdotally, fire suppression response goals are designed to avoid flashover, which is a concern with all structure fires, while response times for EMS are based on the ability to resuscitate cardiac arrest victims. According to one recent study,

> To date, patients with out-of-hospital cardiac arrest remain the only field-based patient population with a consistent association between time (response interval) and survival... EMS agencies in North America are generally held to strict standards about intervals, particularly the response interval. Meeting such expectations requires comprehensive emergency vehicle and personnel coverage throughout a community and travel at high speeds in risky traffic situations (e.g., intersections) that occasionally result in crashes causing injury and death to emergency vehicle occupants and others.[15]

But, "[i]n this North American sample, there was no association between EMS intervals and mortality among injured patients with physiologic abnormality in the field." In fact, "[p]revious studies have demonstrated an apparent association between increasing out-of-hospital time and decreased mortality (i.e., the appearance that longer times decrease mortality), even after accounting for injury severity."

In other words, this study indicates that response time is not a useful metric for EMS dispatch, except for cardiac arrest. Other studies support this conclusion. Furthermore in PA's interviews, individuals in the LAFD EMS function expressed the opinion that outcomes metrics (for example from ePCR data), review of individual EMS incident responses would be much better ways to measure (and improve) EMS service delivery.

As with fire, LAFD's EMS response time performance will be found in Table 5.

4.2.4 LAFD's current Fire and EMS response times

Figure 13 shows the distribution of response times (as measured by Incident Creation Time to Time On Scene) for emergency incidents from October 1 2012 through November 20 2013. The figure includes "cumulative distribution curves" for each of the four geographic areas (potential bureaus) shown in Figure 5) as well as for the City as a whole.

The data indicates that in 86% of the incidents, the fastest response time (response time of the first unit on scene) was less than 480 seconds (8 minutes). The 90th percentile of the response time is 538 seconds (just under 9 minutes).

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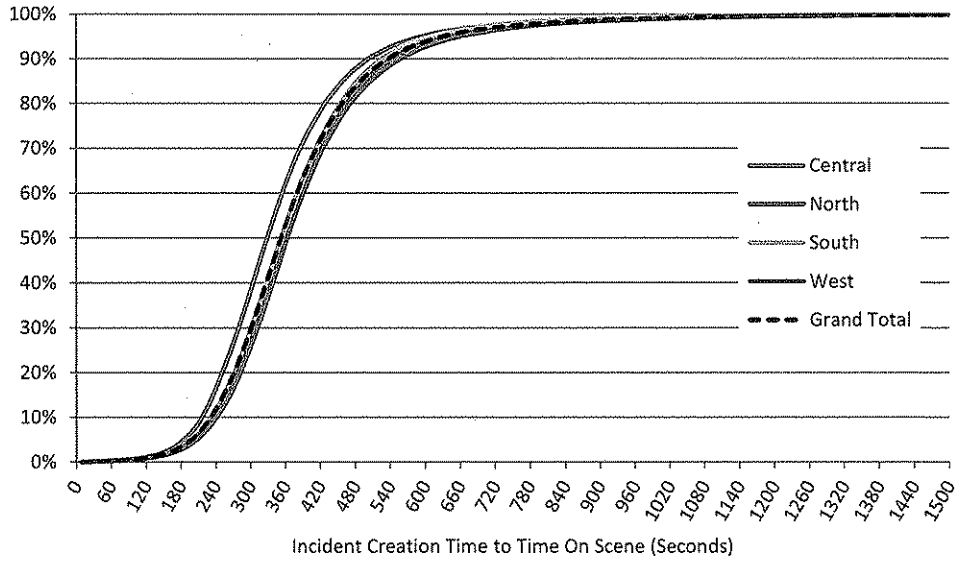
[15] Newgard C.D., Schmicker, R.H., Hedges, J.R., at al., "Emergency Medical Services Intervals and Survival in Trauma: Assessment of the 'Golden Hour' in a North American Prospective Cohort," **Annals of Emergency Medicine** 55:3 (March, 2010), pp. 235-246.

Figure 13: Cumulative Distribution of all Emergency Response Times from October 1, 2012 through November 20, 2013



In the Central Bureau, the response times are less than in the other bureaus, likely because the Central Bureau is much more geographically compact than the other bureaus, thus decreasing the travel times, and reducing the response times as well. The average response time for emergency calls in the area identified as the "Central Bureau" is approximately 355 seconds, which is between 20 and 35 seconds faster than average response times in the areas identified with the other three bureaus. Further, the difference between 90th percentile response times is even greater: 90% of emergency services incidents in the Central bureau are responded to in less than 505 seconds, which is 23 to 55 seconds less than the 90th percentile response times for the other bureaus (the 560 second value is for the West bureau). These differences between the different bureaus are statistically significant, but may not be as significant practically.

The overall trend that Central bureau has the fastest expected response times still holds when looking at EMS only, and Fire only incidents. Overall, EMS incidents tend to have faster responses than Fire incidents, and this holds for all bureaus. The variations in Fire response times in the South bureau is the highest, as the 90th percentile of expected fire response is highest for the South bureau even when the expected response time is second lowest of the four bureaus.

The distribution curves in Figure 13 are much flatter around the 90th percentile than the 80th (city-wide, the difference between the 90th and 88th percentiles is 23 seconds while, the difference between the 80th and 78th percentiles is only 10 seconds).

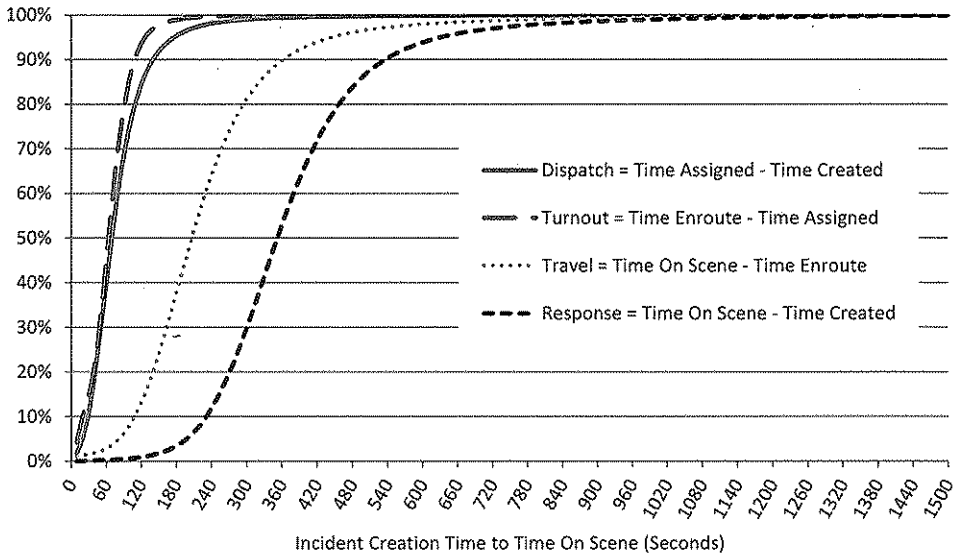
Figure 14 shows the different components of the response time of the first unit on scene: dispatch time (from incident creation to unit assignment), turnout (unit assignment to enroute), and travel time (enroute to onsite). Travel time dominates the response. Dispatch and Turnout happen relatively quickly, with city-wide average times of 82 and 67 seconds respectively. Turnout time has low variation, with a standard deviation of 49 seconds; the standard deviation of dispatch time is 81 seconds. The difference indicates the greater complexity of the dispatch process, where the number of questions needed will differ from call to call.

Travel time takes significantly longer than the other components, with a mean of 230 seconds city-wide (240 seconds in the North and West bureaus). The NFPA standard is actually phrased in terms of travel

time rather than response time, e.g.: "The fire department's fire suppression resources shall be deployed to provide for the arrival of an engine company within a 240-second travel time to 90 percent of the incidents."[16] Travel time is much more variable than dispatch or turnout time, possibly due to the differing distances between responding resource and the incident location and traffic along the way.

Furthermore, while dispatch and turnout times are largely under LAFD's control, and can be improved through better training or process design, improving travel time requires changing resource pre-positioning (deployment). The first step in evaluating LAFD's ability to take a structured approach to finding better deployments would be to compare actual travel times to predicted (model-based) travel times. For example, ADAM simulates dispatch and computes response time using a model of travel times based on experience (which may not control for traffic conditions at different times of the day). Predicted travel times were not available, and additional locational data would be needed to predict travel times using a GIS.

Figure 14: Response Time Durations Breakdown by Component

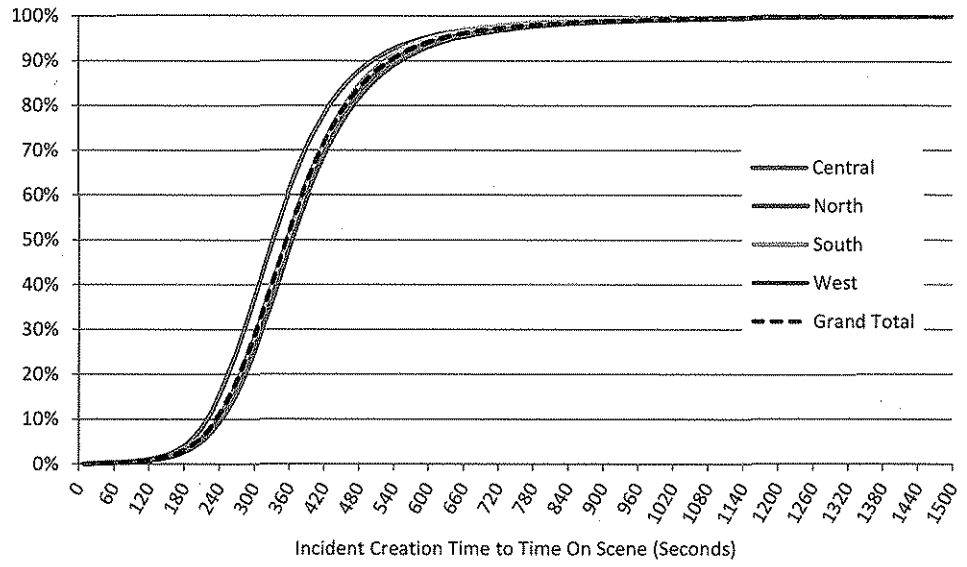


EMS response times analysis 2012-2013

Figure 15 shows that the distribution of responses to incidents identified in the dataset as "EMS". The 90th percentile of response times city-wide was 534 seconds, while the 90th percentile of travel times was 357 seconds.

[16] National Fire Protection Association (NFPA) Standard 1710, 2010 Edition, paragraph 5.2.4.1.1. The 90th percentile of LAFD travel time to emergency calls city-wide, in the data we analyzed, was 363 seconds.

Figure 15: Cumulative Distribution of EMS Response Times from October 1, 2012 through November 20, 2013



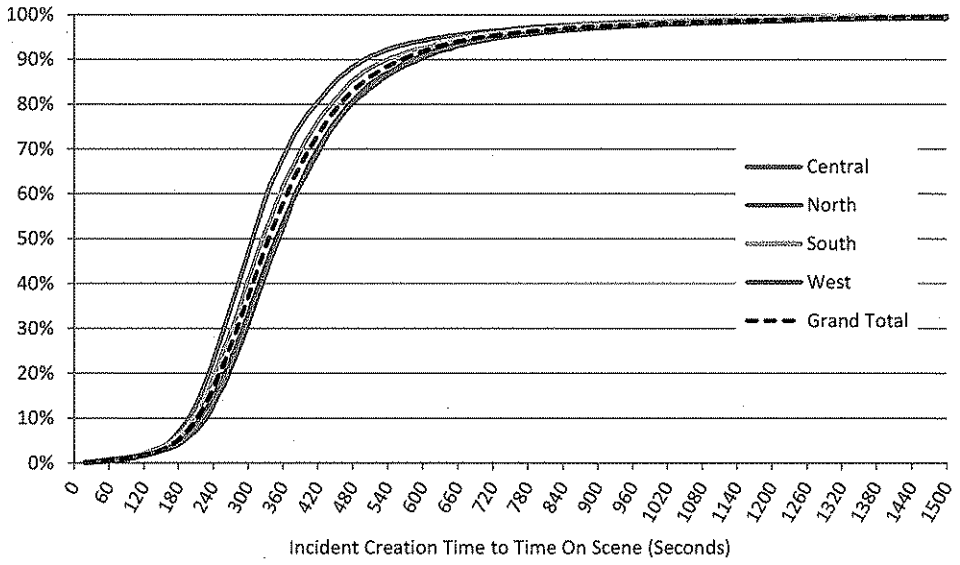
Fire response times analysis 2012-2013

Figure 16 shows that the distribution of responses to incidents identified in the dataset as "EMS". The 90th percentile of response times city-wide was 564 seconds, while the 90th percentile of travel times was 409 seconds. We have seen a number of cases where standards allow for a longer response times to fire calls than EMS calls. The justification is that it takes longer to prepare for a fire response, but that would not explain the difference in the travel times.

The difference between standards for EMS and Fire responses is an interesting one. Using preparation time to justify the difference means it is based on the ability to respond, not the need for a fast response. In fact, several of the people PA interviewed about EMS commented that EMS calls generally do not require as urgent a response as fires, and even in the case of cardiac arrest reducing ALS response time may not be the most effective approach to improving outcomes[17].

[17] Most cardiac arrests require immediate assistance. Reducing the response time from 8min to 7min will very often not change the outcome of a cardiac arrest. Bystander CPR has been shown to improve outcomes in cardiac arrests, and facilitating bystander CPR, as has been done in San Ramon Valley FPD using the PulsePoint app, is a promising approach.

Figure 16: Cumulative Distribution of Fire Response Times from October 1, 2012 through November 20, 2013



Summary data

The following table summarizes important information about the distribution of response times and variation between areas attributed to each of the four bureaus:

Table 5: Expected Response Times by Bureau in Seconds[18]

	Central	North	South	West	City wide Average
Average Response Time	355	389	375	391	379
Difference from Central	-	35	21	37	25
90th Percentile of Response Times	505	543	528	560	538
Percentile rank of 505 Seconds*	90%	86%	88%	85%	87%
Average Turnout Time	66	67	68	68	67
90th Percentile of Turnout Times	109	107	112	111	110
Average Travel Time	206	240	226	240	230
90th Percentile of Travel Times	328	371	355.8	382	363
Average EMS Response Time	356	387	377	390	379
90th Percentile of EMS Response	505	539	527	554	534
Percentile rank of 505 Seconds*	90%	86%	88%	85%	87%
Average EMS Turnout Time	67	67	68	68	67
90th Percentile of EMS Turnout Times	110	107	112	112	110
Average EMS Travel Time	205	236	226	236	227
90th Percentile of EMS Travel Times	325	364	353	374	357
Average Fire Response Time	346	403	363	397	382
90th Percentile of Fire Response	502	581	541	596	564
Percentile rank of 502 Seconds*	90%	84%	88%	83%	86%
Average Fire Turnout Time	60	69	68	64	65
90th Percentile of Fire Turnout Times	104	107	112	110	108
Average Fire Travel Time	214	266	233	261	247
90th Percentile of Fire Travel Times	353	434	383	435.8	408.6

*The time values in these three rows are the 90th percentiles of the distribution for the Central bureau.

While average turnout and travel times compare well with NFPA standards, 90th percentiles do not. In defining its Standards of Cover, the Department will have to assess whether the geography of the City requires a different standard than the NFPA 90th percentile, or whether the dispatch data force too broad a set of incidents to be included in the calculation.

[18] The information presented in this table is based on approximately one year's worth of Fire and EMS dispatch data from October 1, 2012 through November 20, 2013, which consisted of approximately 456,000 incidents, and 985,000 responses. Response time is the sum of dispatch time, turnout time and travel time. The three components are defined on page 56.

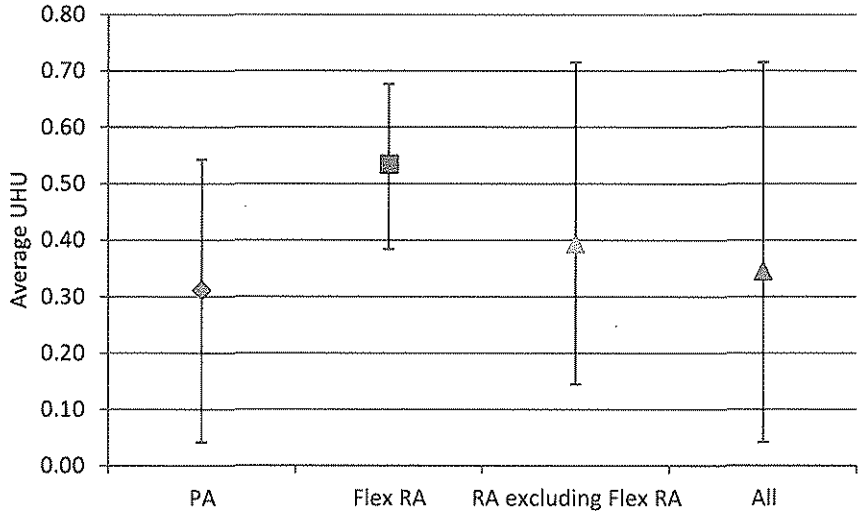
4.2.5 Workload metrics

In addition to response time, a key element of the standards of cover will probably be workload. The Department's dispatch data generally support the computation of workload metrics. The dispatch data allow dispatches to be counted, and timed, by unit. The dispatch data will have to be supplemented by additional data sources in order to get fully accurate information about unit service hours, especially for units that are deployed, redeployed, or removed during the analysis time horizon. This section demonstrates the use of dispatch data to compute utilization data for ambulances.

Figure 17 shows the UHU of ALS and BLS ambulances as computed from the dispatch data. UHU is computed by dividing the total number of dispatches for an each ambulance by the length of time for which the ambulance was on duty. Lacking an independent source of "on duty" data, PA assumed that an ambulance was available for an entire day if it got one assignment that day; therefore the total available time was the number of days on which the ambulance had at least one dispatch, times 24 hours/day ("normal" ambulance) or 10 hours/day ("flex" ambulance).

On average, this data indicates that "Variably Staffed" (Flex) BLS ambulances have the highest UHU (53%) compared to other types of ambulances (ALS ambulance UHU is 31%, and Non Flexible BLS ambulance UHU is 39%). The average across the system is 34%. This indicates that the variably staffed ambulance units in the system are the most heavily utilized. Newer ambulances (activated 2013) tend to have lower UHUs compared to the rest of the fleet. This might be due to new ambulances being deployed as the "backup" or second to deploy ambulances (based on their numerical designations) at each station.

Figure 17: ALS and BLS Apparatus Unit Hour Utilizations from October 2012 to November 2013



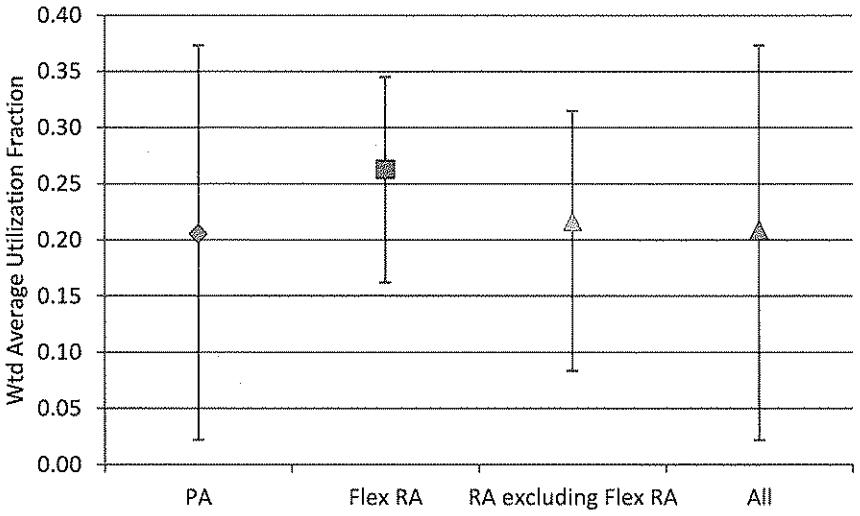
Note: Bars indicate maximum and minimum range of UHU for each type of apparatus. Flex RA unit UHUs calculated assuming 10 hours availability per day, whereas UHUs for PA and RA excluding Flex RA are calculated based on 24 hour availability per day.

A paper by an Acting Director of the California EMS Agency[19] reported lower UHU for LAFD, at 30%. This is very close to the figure computed here; the discrepancy is probably due to the fact that the paper used data from an earlier period, as well as the lack of an independent source of "on duty" times.

[19] Smiley, Daniel R. and Steven D. Smiley, "Ambulance Service Delivery and Efficiency in California," http://www.umdcipe.org/conferences/Moscow/papers/Ambulance_Service_Delivery_and_Efficiency_in_California.doc.

UHU may be a reasonable utilization metric for transport services, but it does not represent the actual workload of an EMT or paramedic. A better measure of workload is the utilization fraction, that is, the percentage of time that the firefighter is actually on dispatch. It is similar to UHU, except that the denominator is total dispatch time rather than the count of dispatches. The two would be equal if all dispatches were an hour in length; but they are not. The average duration of an LAFD BLS ambulance dispatch, average, according to the dispatch data provided to PA, is 30 minutes, and ALS ambulances average 36.5 min. The extra 6.5 minutes probably represent treatment by the firefighter paramedics.

Figure 18: ALS and BLS Apparatus Utilization Fractions from October 2012 to November 2013



Note: Bars indicate maximum and minimum range of UHU for each type of apparatus. Flex RA unit UHUs calculated assuming 10 hours availability per day, whereas UHUs for PA and RA excluding Flex RA are calculated based on 24 hour availability per day.

Figure 18 illustrates the utilization fractions for each class of ambulance. The data points represent the ratio of dispatch time to on-duty time for all dispatches and units of a particular type – in other words they are weighted averages over all the ambulances of each type, weighted by unit on-duty time (not simple averages over all ambulances). The error bars, though, indicate the maximum and minimum utilizations for individual ambulances of each type.

While the variable-staffed BLS ambulances are on dispatch 26% of the time, ALS ambulances are on dispatch only 21% of the time, and some cases as little as 2.2%. It appears that firefighter paramedics may be underutilized. Underutilization can lead to the decay of medical skills from lack of practice, and interviews led PA to believe that such decay has been observed in LAFD. Skill decay can be remedied by training assigned through performance management; it may be prevented or mitigated by increasing utilization.

4.2.6 Deccan ADAM overview

Deccan International's Apparatus Deployment Analysis Module (ADAM) is a simulation model used across the US. ADAM uses client's Computer Aided Dispatch (CAD) data to measure how response times (and incident coverage) changes with changes in asset deployments / resource deployments / resource capabilities (professional vs. volunteer) / travel time restrictions due to traffic pattern changes. As of November 2013, 99 clients currently use CAD / ADAM, and 3 of those clients also use 1710 CAD / 1710 ADAM (National Fire Protection Association Standard 1710 compliant clients). ADAM presents the response time and coverage data visually on a color coded map to allow users to quickly visualize areas

of concern. ADAM can produce hypothetical equivalents to the CAD data that would be consistent with different deployment patterns.

ADAM uses two years of CAD data to create a time – distance relationship regression model (with workload constraints) to estimate travel times from new locations to which resources may be deployed. Time component (broken into several time blocks like Weekday mornings, Friday nights) is taken from CAD response times. Distances traveled are calculated based on the starting point of the responding unit, and the location of the incident (also classified into rural vs. urban traffic patterns). Traffic patterns are also taken into account, and can be updated periodically to reflect recent changes. Automatic Vehicle Location (AVL) data may improve on the accuracy of the regression, but AVL data is not required to use ADAM.

It is important to note that ADAM's simulated response times are based on recorded response times rather that a travel time model based on routing and simulated traffic. This means that the simulated response times should reflect all the influences upon recorded response times, including data entry errors or delays. This allows for some consistency between the standards of cover, the deployment simulation model, and actual recorded response times. The standards of cover should be based on achieving recorded response times that are consistent with the historically desired outcomes and the simulation model estimates what response times will be recorded after a deployment change.

PA has not used ADAM but has interviewed LAFD staff and Deccan International. ADAM includes a representation of the Fire Department's dispatch algorithm. It uses a series of incidents, most likely taken from historical records, and simulates the way resources are assigned. ADAM tracks the progress of the simulated incidents, and can produce reports of metrics such as response times, travel times, workload, etc. These are reports of projection, not actual operations, but the projection reports should have the same format as reports from an associated product that analyzes actual CAD data.

It is probably difficult to use ADAM to model changes in dispatch algorithms, as the new algorithms must be coded. ADAM can be used to simulate changes in the home locations of resources (deployment), and even deployment to new locations. ADAM may not be able to simulate scheduled movements during the day, such as prepositioning or posting ambulances or staff that move each day between, say, a station with a daytime workload and a station with an evening workload. We have also been given to understand that ADAM is used to separately model deployment of fire, BLS and ALS apparatus, and may not be able to simulate multi-use apparatus without some approximation or proxying.

ADAM is a simulation model. It is a representation of reality rather than reality itself. Like any model it will have to be calibrated using historical "backcasts" to ensure it is properly set up. The calibration will also identify biases or systematic variances between ADAM and actual operations. It is common for models to produce better outcomes than can be achieved in practice, because of the approximations and simplifications inherent in modeling.

The calibration process helps the user understand how to correct for the model biases. For example, a "backcast" model run using historical data may indicate an average response time of 6 minutes, while the historic response time was actually 7:30. If the model then projects a 4:30 response time from a deployment change, it would be unreasonable to expect actual operation to achieve that, but not at all reasonable to expect to achieve a 6-minute average response time from the new deployment.

Our review of LAFD data and dispatch algorithms has demonstrated the complexity of the issues facing LAFD. One approach to planning would be to construct a specialized discrete-event simulation model of dispatch and incident operation, a difficult and expensive task. PA believes that with proper training and staffing, LAFD should be able to obtain sufficient insight s from ADAM or a similar tool.

Calibration and accounting for model biases are two of the reasons why PA recommends that LAFD employ expert data analysts. Deccan does not recommend that ADAM users try to create models of new

deployment strategies in ADAM; Deccan's modelling experts, construct those models for use by LAFD or other clients. By the same token, using those models and properly interpreting the results also requires specialized expertise although in this case in data analysis rather than in constructing simulations.

5 EMERGENCY MEDICAL SERVICES COMPARATIVE ANALYSIS

Multiple EMS deployment models are currently used across the US, ranging from fully integrated EMS operations, to fully outsourced, with hybrids models in between. This section of the report provides an assessment of LAFD's current EMS operations as well as recommendations on alternative service delivery models. Additionally, a cost benefit analysis is provided for each alternative model.

5.1 Current State of LAFD's EMS service delivery

5.1.1 Overview

The LAFD is responsible for the second largest EMS system in the United States. There were 333,000 calls for EMS service in 2012, which is over 910 runs every 24 hours and resulted in approximately 560 transports daily to 57 hospitals in and around Los Angeles. Of these calls, approximately 7% were transported in a "code 3" emergency response mode (2012 data), i.e., with lights and siren.

5.1.2 EMS Staffing

LAFD staffs two types of transport units: 93 ALS ambulances daily, staffed with two licensed paramedics, and 41 BLS rescue ambulances staffed with two certified EMTs. All personnel are trained LAFD firefighters who could be used in fire and hazard mitigation if the need arises. In total, there are about 134 ambulances staffed daily. Another six BLS ambulances are "variably staffed", that is, staffed only during 10-hour peak periods.

In addition to transport ambulances, LAFD also staff 55 ALS Assessment Engines, one Assessment Truck, and 26 Assessment Light Forces, which include a paramedic firefighter. These resources are sent to EMS calls when the acuity level requires a rapid ALS response.

There is an EMS Assistant Chief whose primary responsibilities are developing EMS policies and procedures, overseeing EMS data collection from the electronic patient care reporting (ePCR) system, and performing quality assurance/ improvement activities. The EMS Chief reports to the Deputy Chief of Emergency Operations. In addition, there is a single Medical Director who reports to the Emergency Operations Deputy Chief.

Seven, 24-hour EMS Battalion Captains provide support services to EMS field units, such as restocking controlled substances and liaison with hospital emergency departments. There are an additional 9

"Administrative Duty" EMS Battalion Captains, who work daylight hours and perform a variety of functions. The EMS Battalion Captain reports to the Battalion Chief.

EMS training is the responsibility of the EMS Training Unit, which is under the direction of the Bureau of Training and Support Deputy Chief.

5.1.3 EMS Revenue

LAFD is required by the city to perform full cost recovery efforts for EMS billing. LAFD contracts with a third-party billing agency, which has an employee working within LAFD's revenue unit.

MediCare defines the level of transport service for which ambulance providers can bill. LAFD bills $974 for Basic Life Support (BLS) transport, and $1,373 for Advanced Life Support (ALS) transport. In addition, LAFD charges $15.75 per mile of transport. This compares to the maximum allowable rate defined by the Los Angeles County EMS agency, which is $1,444.75 for ALS transport and $1,033.50 for BLS transport, plus $19.00/mile and additional adders for standby time, waiting time, "code 2" (urgent) or "code 3" transport.

In FY2013, LAFD collected $71 million in transport fees annually, with net revenue of $67 million while it costs the city approximately $200 million to provide this service.

5.1.4 Challenges facing LAFD EMS

Through interviews with LAFD staff and literature review, PA has identified a number of challenges facing the Department. These challenges are described below. Specific recommendations are provided, associated with these challenges. Those that fit into the roadmap described in chapter 3 are also described there (and identified here by Priority Group).

Call volume continues to rise. The department estimates there will be 400,000 calls for EMS service in 2014. At the time this report is written, there is no plan to address this concern, other than to staff additional ambulances.

As call volume increases, LAFD must improve the efficiency with which it uses medical resources. Based on PA's analysis of dispatch data, the Unit Hour Utilization of paramedic (ALS) ambulances averages 21% and no ambulance had UHU above 40%. PA believes that a typical average UHU is between 40% and 50%. The City of Philadelphia has reported UHU levels of 62% to 69%.[20] Such a high utilization would probably be unrealistic without a modification of the constant staffing model, as fatigue would adversely impact effectiveness. Higher utilization levels may also raise the concern that response times will deteriorate; but, a uniform standard of response may not be medically appropriate.

- As part of its Standards of Cover analysis (Group1), LAFD should set response time and other criteria by EMS call category.
- LAFD should implement 1+1 staffing of ALS ambulance to improve paramedic utilization (Group 1).
- Under the supervision of the Medical Director, LAFD should review its medical priority dispatch protocol (Group 3).
- LAFD should identify its high-volume EMS users ("superusers"). A pilot community program to develop customized treatment plans associated with regular home visits would provide a test of the cost-effectiveness of community paramedicine. This falls outside the scope of the Roadmap provided in chapter 3.

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[20] City of Philadelphia Office of the Controller, "EMERGENCY MEDICAL SERVICES: Implementation Status of December 2007 Recommendations," Sept. 9, 2011; at http://www.philadelphiacontroller.org/publications/audits/EMS_FollowUP_Audit2011.pdf.

The overall EMS receiving system (emergency departments) is strained. LAFD transport units routinely wait beyond 15 minutes, in a range of between 72 and 130 hours per shift. This is about 2.3% to 4.2% of total ambulance time, per 24-hour shift. While the percentage is small, it does represent ambulance time that is not available to the system. While the issue is framed as a hospital bed issue, there is a performance drag on the EMS system overall.

In addition to possible activity by the County EMS Agency, wall time is being addressed by a statewide task force in which LAFD is already participating. It may be possible for Los Angeles County to adopt approaches piloted elsewhere. For example, we understand that Santa Clara County has provided a "six-sigma" consultant to assist hospitals.

Fundamentally this is a problem to be solved by the hospitals, not LAFD, and on at least a County-wide basis. Some of the officers PA's interviewed mentioned the possibility of a "concierge" type staging system at hospitals with highest levels of wait time, in which staffing would be provided by transport agencies at the cost of hospital emergency departments. PA's opinion is that any such system must be developed by the hospitals.

If the hospitals are unable to address the problem there are at least two alternatives to explore. One would be for the County Department of Health Service to clarify that hospitals must take legal responsibility for patients when the patient arrives on hospital property. The second would be to bill hospitals for wall time.

- LAFD should develop the capability to bill facilities for ambulance waiting time. This is not part of the Roadmap because it is not PA's opinion that the Department should have billing for waiting time as part of its long-term organizational strategy, merely that the Department should be prepared if the hospitals are unable to solve the wall time problem.
- LAFD should investigating outsourcing ambulance transport through a pilot program (Group 2).

The EMS command and control structure is convoluted. There is no single bureau responsible for EMS delivery and administration. Orders from the EMS Assistant Chief must be approved and delivered through the chain of command in order to be implemented by the EMS Battalion Captains. A different bureau handles EMS training.

- Create a Deputy Chief position dedicated to EMS. The occupant of this position should be a licensed medical or paramedical professional who has the knowledge, skills and experience to oversee clinical functions. The Deputy Chief will have the responsibility for essential EMS functions in the Department, including training and doctrine as well as oversight of medical standards and performance improvement. This is part of Priority Group 1.
- There should be straight line reporting for clinical supervision. EMS Captains should have at least "dotted line" reporting up to the EMS Deputy Chief.
- EMS-specific training and ongoing medical education is minimal. The EMS Deputy Chief should develop and defend a recommended staffing level of EMS educators – paramedics, nurses or even physicians.

So as long as LAFD continues to provide EMS services, it should allocate the appropriate financial, logistical and administrative resources to successfully perform this function.

The department's Medical Director, well known and respected in the national community, has little to no oversight over EMS providers who perform under his license. Other major urban departments have several medical directors who oversee clinical and quality improvement functions; LAFD has only one. No administrative support is provided to the LAFD medical director.

- The Medical Director should have authority commensurate with a high-ranking officer. He or she should report to the EMS Deputy Chief, but also have access to the Fire Chief. EMS providers practice under the license of the Medical Director.

- Increase medical oversight, which could be in the form of additional physicians, physician assistants, QI nurses, paramedics under the authority of the Medical Director, along with administrative assistance and quality assurance analysts.

At the core, out-of-hospital care is a healthcare function, for which performance standards can be defined. The department has no appropriate means of performance management short of discipline; the adversarial disciplinary process precludes meaningful discussion of medical practice by EMS providers. As a result, there is very little medically-focused interaction among those who provide EMS services.

- Use a separate performance management process to reorient EMS clinical issues to a no punitive, quality-improvement focused medical model. Train EMS Battalion Captains in principles of performance management. Define clear firewalls as to when discipline may occur. This is part of the recommendation for performance management (Group 3).
- Develop medical "near-miss" reporting model for field personnel. Develop culture that medical errors should be shared and learned from. This would be a follow-up, or possibly even a consequence, of the recommendation for performance management (Group 3).

LAFD does not remotely cover the cost of providing EMS service, although there is no presumption of having to do so. However, there may be a dynamic that encourages transport of patients for which there is little medical necessity to do so.

If current trends continue, the reimbursement rate for EMS transports will continue to decline, even while call volume increases (an increase in the MediCal population may offset part of this). While it is unclear as to the long-term effect of the Affordable Care Act, the Department has no long-range plan to evaluate and capture new revenue streams. This is a long-term challenge to the Department; the relevant recommendations extend beyond the Roadmap:

- Acquire additional outcomes data and improve data input processes by field personnel.
- Develop partnerships with Accountable Care Organizations to manage populations within its response zone.
- Build upon successful relationship with Kaiser hospitals to deliver additional services for fee.
- Reuse Kaiser destination plan for other hospital organizations.
- Partner with regional EMS fellowship programs, providing fertile training ground for future EMS system physicians.

5.2 Summary of service delivery options used in comparable organizations

We attempted to benchmark how other large, urban fire-based EMS transport systems provide service. Through LAFD, we sent benchmark surveys to seven departments across the country. Four departments responded to the survey:

- Dallas Fire-Rescue Department (TX); population 1,241,162; coverage area 385 square miles
- City of Miami Department of Fire Rescue (FL); population 413,892; coverage area 36 square miles
- Phoenix Fire Department (AZ); population 1,445,600; coverage area 519 square miles
- Seattle Fire Department (WA); population 634,535; coverage area 84 square miles

We have not received a survey response from Los Angeles County Fire Department, but we were able to conduct an interview. It is described in section 5.3.1.

The findings from the four survey respondents were:

- All departments use cross-trained paramedic-firefighters and EMT-firefighters to staff their EMS and fire apparatus.
- Miami was the only department responding to the survey that routinely staffs BLS ambulances. Seattle has a few BLS ambulances, but contracts with a private ambulance provider to transport most routine EMS calls.
- Staffing patterns on ALS ambulances vary. Dallas staffs two paramedics, although they are researching alternative patterns. Miami staff 2 paramedics and 1 EMT per ambulance. Phoenix has 1 paramedic and 1 EMT on each ambulance. Seattle staffs two paramedics. Paramedic staffing patterns on fire apparatus also varies, ranging from little to none in the cases of Seattle and Miami, to most or all in Dallas and Phoenix.
- The rate of transport among the four departments range from 41 to 57 percent of EMS incidents.
- Organization structure: Dallas and Seattle have separate divisions to manage their EMS. Miami and Phoenix EMS functions are housed within fire operations.
- Medical oversight: Seattle and Phoenix have full time medical directors. Dallas and Miami contract with outside emergency physician practice groups for medical direction. Seattle additionally uses several physicians, nurses and other medical civilian staff for EMS quality assurance/improvement, as well as dispatch. Other departments have a small number of department line personnel such as Captains and Lieutenants performing these functions.
- Billing practices range widely. Seattle does not bill at all for EMS services; it is entirely tax-supported. Recovery rates from billing were reported by only two departments, Miami at 30-35 percent, and Dallas at 46 percent.
- We were unable to compare costs of providing EMS services. Most of the departments did not report the costs of fire apparatus responding to EMS incidents.

5.2.1 Los Angeles County

The County of Los Angeles Fire Department (LACoFD) does not provide ambulance transport although it does provide paramedic services. The County has defined seven Exclusive Operating Areas (EOAs) for ambulance service. Within each EOA there a single authorized private ambulance provider. One provider can cover more than one EOA; there are four private ambulance providers servicing the seven EOAs. The providers are not paid by LACoFD nor do they pay franchise fees to the County; they bill the patient for their transport services.

LACoFD utilizes a variety of apparatus when responding to both medical and fire calls. For medical incidents, the dispatch center will send the closest fire apparatus (engine or truck), which may be staffed with EMT-Firefighters or Paramedic-Firefighters. In addition, a LACoFD rescue squad, staffed by two paramedic-firefighters, is also dispatched to the event. The rescue squad uses a utility vehicle, not an ambulance. An ambulance is also dispatched from the authorized private provider within that EOA. The private provider ambulance is staffed with two EMTs.

If paramedic-level care is not required for treatment, the patient is handed over to the private provider ambulance for transport to a hospital. If advanced level care is required, an LACoFD paramedic-firefighter from the rescue squad will accompany the patient in the ambulance. In those situations, the private ambulance provider will reimburse LACoFD for the advanced care provided by the paramedic-firefighter, at an average of one hundred dollars per incident. In turn the private provider can bill the patient at the higher ALS rate.

Discussions with LACoFD indicated that the Department is not likely to respond to a request by the City of Los Angeles to manage its Emergency Medical Services. When a jurisdiction submits such a request, it is for both fire and EMS services. The department functions as a cohesive whole, and does not distinguish its EMS function from fire services.

5.3 Alternative Service Delivery Options that LAFD could consider

LAFD EMS system can be configured in a seemingly endless number of ways. For the purpose of this report, we have organized these options in three broad areas of consideration.

- LAFD maintains its EMS system in house, implementing more efficient and effective service methods.
- LAFD implements a hybrid model, by outsourcing the transport component of the EMS service while maintaining paramedic level service on assessment companies.
- LAFD outsources all EMS functions. An outside agency performs all EMS tasks.

5.3.1 LAFD maintains its EMS system in house, implementing more efficient and effective service methods.

LAFD has a long history of providing emergency care and transport to Los Angeles citizens and visitors.

90% of the time, the first unit arrives at an emergency EMS incident within 534 sec (just under 9 minutes); the average response time is 379 sec. (about 6-1/3 minutes).[21] The first unit is not always an ambulance; ambulances arrive in an average of 486 sec. (just over 8 minutes) and the 90th percentile ambulance response is 791 sec. (not quite 13-1/4 minutes). This includes all categories of EMS incident, most of which do not require immediate ambulance service.

Advantages

- All EMS providers are trained firefighters, allowing them to serve multiple roles within emergency services.
- There is a high level of coordination of emergency resources, whether on a day to day incident or a large scale disaster response.
- With the city's poor payer mix of medically indigent and underinsured population, it may be a challenge for a for-profit agency to recover enough revenue to offset costs.

Disadvantages

- LAFD sends a large number of resources to a medical incident, which is expensive, takes units out of service, and may have little medical justification for the majority of incidents.
- In the current system, 136 ambulances are mandated to be in service on a 24 hour basis. With an average of 910 calls for service daily, resulting in approximately 560 transports, each ambulance averages 6 EMS responses and less than 4 transports per day. While response time is one data point for measuring system performance, there are several performance issues that can arise from an oversupply of ambulances, such as skill degradation and a loss of experience. Beyond a small percentage of call types where time is critical (i.e. cardiac arrest, severe trauma, anaphylaxis) there is little to no data about the clinical benefit of a short response time.
- There are more paramedic ambulances than there are EMT rescue ambulances. However, there are more patients who require EMT level care, compared to those requiring paramedic level care.
- Although LAFD captures 67 million dollars in reimbursement revenue, this is only a third of its EMS operating costs.

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[21] Figures in this paragraph are based on the dispatch data described in chapter 4.

Options

If LAFD is to retain its full service EMS delivery model, there are several options it can consider. There may be a combination of options that can improve service delivery while reducing cost.

1. Staff all ambulances with one paramedic and one EMT ("1+1" staffing). Reassign paramedics to more assessment engines and Light Forces. Modify dispatch protocols so that two paramedics arrive at the scene of critical EMS incidents, and fewer other apparatus respond to lower acuity calls. This is the option that PA has recommended.
2. Staff all ambulances to three personnel, and minimize the number of responses of non-transport units to all but the most critical medical incidents. The initial configuration would be two paramedics and one EMT. Additional resources can help to distribute lifting and moving tasks, reducing opportunity for injury. In more critical cases, the EMT can drive the unit to the hospital while two paramedics continue working on the patient. Staffing would come from consolidating the current number of ambulances and redeploying those formerly on the BLS ambulances to the paramedic units. A schedule would be used to rotate EMS personnel between transport and non-transport units so that all personnel retain competencies and experience in EMS and fire-related duties.
3. There is a significant level of resources invested in the paramedic in terms of initial training, continuing education, and ALS level equipment. LAFD may consider replacing assessment paramedics with Advanced EMTs, who require less time to be trained, but still are able to deliver the most essential ALS level care in time dependent incidents such as cardiac arrest, drug overdoses, myocardial infarction and severe allergic reactions (anaphylaxis) – particularly if the Department chooses not to go to 1+1 staffing of ambulances. The fewer remaining paramedics would be engaged with more critical patients, more often. This would serve to improve retention of paramedic skills and build valuable patient experience. (PA's recommended alternative, with rotation of paramedics between ambulances and assessment apparatus, has a similar skill retention benefit.)
4. Increase the number of BLS ambulances while decreasing the number of paramedic ambulances. More paramedics could be deployed to assessment engines and Light Forces. BLS level patients currently being transported by paramedic ambulances can be safely transported by EMT ambulances. This would require a more detailed review of the dispatch protocol to ensure that ALS ambulances are dispatched when likely to be needed and not otherwise. Assessment engines can evaluate the need for paramedic level transport, and pending approval from the Local Emergency Medical Services Agency (LEMSA)[22], accompany the patient to the hospital if needed.

PA noted in its utilization data analysis (section 4.2.5) that there is some evidence that LAFD firefighter paramedics are underutilized. This would become even more apparent if hospitals succeed in reducing wall time, which would reduce time on dispatch for ambulances. Reducing the number of paramedics per ALS ambulance may improve utilization, and will certainly help paramedics to avoid skill decay (for example, the number of opportunities for an ambulance crew to insert an IV may stay the same but the number of paramedics on the crew would be halved, doubling the number of opportunities per member). Reducing the number of ALS ambulance would have a similar effect by increasing the number of opportunities per crew.

Opportunities exist for LAFD to implement community paramedicine using paramedics who are trained to evaluate and manage nonacute patients in a chronic care setting. Examples might be performing after

[22] "California's EMS Act authorizes each county to develop an EMS program and to designate a local EMS agency (LEMSA) that oversees the delivery of EMS within that geographic area. This level of governance allows for local control of emergency medical services that is desirable in a state as large and diverse as California." Source: http://emsaac.org/about/lemsas

discharge followup and routine care of diabetic or congestive heart failure patients, or assisting high-frequency users into pathway level care that actually makes a difference. These targeted interventions may be reimbursable by insurance carriers, if current demonstration projects continue to be as successful as they are. Cost and benefit data for community paramedicine were not yet available; PA has recommended testing community paramedicine with EMS "superusers".

PA did not consider the costs and benefits of a physician deployment model. LAFD currently employs only one physician, the Medical Director. Data about what it would cost the Department to employ or contract additional physicians was not available, but such a model would be considerably more expensive than either the current model or one using community paramedics.

Financial considerations

While maintaining its EMS system in house and evaluating alternative EMS models, the Department should explore ways to reduce its costs without impacting the safety of the residents of Los Angeles.

Consider for example the replacement of paramedic staff by EMTs as paramedics retire. A total of 38 paramedics are scheduled to retire over the next 5 years. The average salary, benefits and pension costs difference between a dual function Paramedic and an EMT is $18,682[23]. Taking into consideration overtime costs, replacing 38 paramedics with EMTs would save close to $1M over the next 5 years.

Table 6: Cost savings of replacing paramedics by EMTs over the next 5 years

	2014	2015	2016	2017	2018	Total over 2018-2014 period
Number of paramedics retiring	4	7	15	5	7	38
Paramedic Salary, Benefits and Pension Costs	$156,429	$156,429	$156,429	$156,429	$156,429	-
AEMT Salary, Benefits and Pension Costs	$137,747	$137,747	$137,747	$137,747	$137,747	-
Average Number of OT hours – Paramedic and AEMT	884	884	884	884	884	-
Average OT Cost – Paramedic	$46,664	$46,664	$46,664	$46,664	$46,664	-
Average OT Cost – AEMT	$40,602	$40,602	$40,602	$40,602	$40,602	-
Salary Costs Savings	**$98,977**	**$173,210**	**$371,165**	**$123,722**	**$173,210**	**$940,285**

PA's recommendation – 1+1 staffing of all ambulances and the conversion of all engines to assessment engines – would result in the conversion of 75 paramedic positions to EMTs (see page 30). If the Department did this conversion immediately, the annual salary savings would be $1.86M.

[23] As of FY2013-14.

5.3.2 LAFD implements a hybrid model, by outsourcing the transport component of the EMS service while maintaining paramedic level service on assessment companies.

Like many other parts of California, Los Angeles can develop requests for proposals to permit other agencies to perform the transport function of the city's EMS system. Such RFP could include fees paid to the city to help cover the cost of LAFD's portion of the system (EMS first response) but Los Angeles County, for example, does not collect such fees. LAFD paramedics would accompany critical patients to the hospital, aboard the contracted transport provider ambulances. The ambulances would most likely be staffed with two EMTs but could have a 1+1 configuration. Personnel would not work 24 hour shifts.

LAFD could adopt a paramedic response model similar to Los Angeles County Fire Department, where paramedics respond in a utility vehicle rather than an engine or Light Force. This would reduce the wear and tear on heavy, expensive to maintain fire apparatus and keep fire companies available in their battalions.

For nonurgent incidents, contracted ambulances may be sent without LAFD paramedic first response. Permission would be needed from the LEMSA to permit a 1+1 staffed unit to perform as an ALS unit. A unit staffed with two EMTs would respond to low level BLS calls, as LAFD units do currently.

Advantages

- LAFD could significantly reduce the overhead of providing its current level of EMS, in the form of reduced staffing, rolling stock maintenance and medical equipment purchasing. All LAFD engines would be deployed as assessment engines, ensuring consistent coverage across the city. Fees paid by the contracted transport provider would cover the cost of the paramedic first responder.
- Additional cost savings may be realized through a reduction in administrative support. The risk of liability may also be reduced, although that would be difficult to quantify.
- Labor costs associated with private transport agencies is generally lower than those associated with public agencies. This may result in the same number, or more ambulances available to the system than is currently available.

Disadvantages

- A private agency will attempt to keep its overhead costs in line with revenue generation. While fewer ambulances will likely adequately cover call volume, it is possible that during times of system stress, surge capacity may be limited. However, that could be partially offset by having agreements with other ambulance agencies that currently operate within the city boundaries.
- LAFD would have limited control over who is working aboard the ambulances. There would need to be greater coordination between the contracted provider and LAFD.
- There is a risk of a service gap if the contracted agency fails to perform in accordance with the agreement.

Financial considerations

With regards to cost and revenue, the outsourced transport model has one significant disadvantage: LAFD would lose its major source of revenue, i.e. the billing for ambulance transports. The Department generated $67M[24] in FY 2012-13 from ambulance transport service, which represents approximately 25% and 12% of the Department's EMS and total budget, respectively. Furthermore, LAFD's ambulance

[24] This figure is net of the payment made by the Department to Intermedix, the organization which manages LAFD's billing system

transport revenue collection is expected to grow significantly in the coming years thanks to refinements made to the Department's billing technology and to the recent implementation of "Covered California". Note that following the implementation of the Electronic Patient Care Reporting (ePCR), LAFD's ambulance transport revenues have increased from $58M in FY2011-2012 to $71M in FY2012-2013.

Offsetting the revenue loss would be a cost reduction. PA estimated the salary cost reduction by assuming LAFD would staff all assessment engines, an increase of 25 constant-staffed paramedic positions (75 paramedics). The paramedic positions currently assigned to ALS ambulances would be retained although they would be deployed on utility vehicles rather than ambulances. The 41 constant-staffed and 6 variable-staffed BLS ambulances would be replaced by the private ambulance provider, saving 3x(2x41) + 2x6 = 258 EMT positions.

The second column of Table 7 indicates that this particular reconfiguration would provide only $30.8M in annual savings. Even if no paramedics were added, the savings would only be $46M per year, less than 70% of the foregone revenue from transport billing. Note however that this does not include savings from vehicle maintenance and replacement, which while no doubt considerable were not available to PA.

The elimination of 75 paramedic-firefighters assumes there would continue to be 93 two-member paramedic units in fire stations, analogous to the current deployment of ALS ambulances (although they could be deployed on utility vehicles instead of ambulances, as done by LACoFD). Especially once it becomes comfortable with the outsourced ambulance service, LAFD could reduce the number of paramedic units so that each is associated with two or three engine companies. Reducing the number of paramedic units by about half, to 47, would result in the elimination of 2x46x3 = 276 additional paramedic-firefighter positions for a net reduction of 201. The third column of Table 7 demonstrates that this configuration would provide $86.8M in annual salary cost savings, more than offsetting the lost transport revenue.

Table 7: Salary cost savings of outsourcing ambulance transport

2-member paramedic units	93	46
Additional paramedic positions	75	(201)
Paramedic Salary, Benefits and Pension Costs	$156,429	$156,429
Average OT Cost – Paramedic	$46,664	$46,664
Total cost of additional paramedics	$15,231,975	($40,821,693)
EMT positions eliminated	258	258
AEMT Salary, Benefits and Pension Costs	$137,747	$137,747
Average OT Cost – AEMT	$40,602	$40,602
Total EMT cost savings	$46,014,042	$46,014,042
Net savings	$30,782,067	$86,835,735

5.3.3 LAFD outsources all EMS functions. An outside agency performs all EMS tasks.

In this option the city would develop a request for proposal for an outside agency to perform all EMS functions. LAFD would refocus its mission on fire suppression and hazard mitigation. The city could generate revenue from fees attached to the contract, as well as any fines when the contracted agency does not perform to standards. PA contacted the LEMSA, and it believes this will not endanger the City's right under section 1797.201 of the California Health & Safety Code to provide EMS services.

Advantages

- LAFD could reduce its overhead significantly, upwards of 200 million dollars. Savings would be realized through a major reduction in workforce, rolling stock and maintenance.
- The contracted agency would have a focus on providing EMS services. It may have better flexibility in providing other related services such as community paramedicine. Its ability to recover revenue may be greater.

Disadvantages

- LAFD would lose the revenue it currently collects for transport. Presumably other cost reductions will outweigh that loss.
- Other cost savings would be realized through reduction of management, support services and communications (dispatch) staffing.
- There is a significant risk of service gap if the contracted agency fails to fulfill its agreement. This may be partially offset with the city retaining rights to the system's ambulances and other components, and can staff vehicles if necessary.
- There is a long history of the city providing its citizens with EMS services. There would be significant labor and management pressure to not outsource the system entirely.

In order to complete a cost benefit analysis of a fully outsourced model, PA has requested a breakdown of the Department's EMS costs. Unfortunately, LAFD does not separate EMS costs from fire suppression costs. However, the data provided by the Department enabled PA to develop a cost estimate. LAFD reported a budget of $2.8M and $32.8M for Legal, Liaison and Research, and Operations Control and Dispatch respectively. Using the fact that 80% of the calls answered by LAFD are EMS calls, one could assume that 80% of these costs are attributable to EMS. By adding $233.3M budgeted in FY 2013-14 for Emergency Ambulance Service, PA estimates the Department's EMS total cost to be approximately $262M.

Table 8: PA's estimate of LAFD's total EMS costs

Budget Item	Total Cost of Program	Share Attributable to EMS	LAFD's EMS Costs
Legal, Liaison and Research	$2,748,361	80%	$2,198,689
Operations Control and Dispatch	$32,795,742	80%	$26,236,594
Emergency Ambulance Service	$233,316,340	100%	$233,316,340
Total	**$268,860,443**		**$261,751,622**

This approximation is consistent with the revenues that LAFD could have generated assuming a full recovery[25] of its ambulance transport costs. The Department indicated that they made 142,778 ALS and 64,016 BLS transports in the calendar year 2012. Applying LAFD's ALS and BLS rates of $1,373 and $974, the total revenue generated would have equaled $258.4M[26], close to PA's estimate for the Department's EMS costs.

[25] Note that due to Medi-Cal and Medicare statutes, the Department is not in a position to achieve full recovery.

[26] In order to compute LAFD's potential total revenues, revenues generated from the application of the mileage fee should be added.

Considering LAFD's net revenues of $67M[27] from ambulance transport for FY 2012-13, LAFD's total net EMS costs would be approximately $195M. Consequently, if the Department was to reduce its costs by fully outsourcing its EMS function, the outsourcing costs would have to be less than $195M.

In order to produce a more accurate cost estimate of the fully outsourced EMS model, the City would have to issue a Request for Information (RFI) and/or RFP in order to gather market information. PA estimates the costs of such solicitation to be between $845k and $1.05M:

- RFI: $45,000 to $100,000
- RFP (defining detailed requirements, contracts, fee structure, etc.): $300,000
- Evaluation period: $150,000
- Negotiation period: $350,000 to $500,000

The City could also develop a pilot program for which the EMS function would be fully outsourced in only a small area of LAFD's service territory. In addition to a cost evaluation, a pilot program will provide information on the feasibility and implementation time of such project.

One of PA's deliverable for this assignment was to evaluate if LAFD's EMS function could be fully outsourced to the County of Los Angeles. During an interview with PA, the County stated that contracting with the Department for EMS services is not an option that they would consider (see 5.2.1).

[27] LAFD generated $67M in revenues from the transport of patients to hospitals in FY 2012-13. This figure is net of the payment made by the Department to Intermedix, the organization which manages LAFD's billing system.

A APPENDIX: IMPACT OF PA'S RECOMMENDATIONS ON LAFD'S POSITIONS

The impact of PA's organizational recommendations on the number of positions eliminated, reassigned, created and upgraded is detailed in the tables below.

Table 9: Positions eliminated or re-assigned based on PA's recommendations (25 positions)

Rank	Title	Vacant	Comments
Assistant Chief	Professional Standards Division	N	Duties and responsibilities associated with this position will be transferred to the Employee Relations Director
Deputy Chief	Administrative Operations	N	Duties and responsibilities associated with this position are redistributed across multiple Assistant Chiefs and civilian staff
Battalion Chief	LA RICS	N	This position is eliminated and consolidated under the new CIO/CTO
Battalion Chief	Community Liaison Officer	N	Duties and responsibilities associated with this position will be transferred to the Community Communication Director
Assistant Chief	Employee Relations Officer	N	Duties and responsibilities associated with this position will be transferred to the Employee Relations Director
Deputy Chief	Emergency Operations	N	Duties and responsibilities associated with this position will be transferred to the new Chief Deputy
Assistant Chief	EMS Division	N	Duties and responsibilities associated with this position will be transferred to the new EMS Deputy
Assistant Chief	LAX Airport Security	N	This function will be transferred to the Assistant Commander of the West Bureau
Assistant Chief	Assistant Division Commander	N	Duties and responsibilities associated with this position will be transferred to the new EMS Deputy
Deputy Chief	Emergency Services Bureau	N	Duties and responsibilities associated with this position will be transferred to the new Chief Deputy and the 4 Bureau Commanders
Assistant Chief	Special Operations	N	This position is eliminated
Assistant Chief	Fire Suppression	N	This position is replaced by six Assistant Commander positions
Battalion Chief	Disaster Preparedness Section	N	This position is eliminated and consolidated under the supervision of the Chief Deputy
Assistant Chief	Division South Shift A	N	This position is replaced by the 4 Bureau Commander positions and the six Assistant Commander positions
Assistant Chief	Division South Shift B	N	This position is replaced by the 4 Bureau Commander positions and the six Assistant Commander positions

Assistant Chief	Division South Shift C	N	This position is replaced by the 4 Bureau Commander positions and the six Assistant Commander positions
Assistant Chief	Division North Shift A	N	This position is replaced by the 4 Bureau Commander positions and the six Assistant Commander positions
Assistant Chief	Division North Shift B	N	This position is replaced by the 4 Bureau Commander positions and the six Assistant Commander positions
Assistant Chief	Division North Shift C	N	This position is replaced by the 4 Bureau Commander positions and the six Assistant Commander positions
Deputy Chief	Fire Prevention Bureau	N	Duties and responsibilities associated with this position are aggregated under the Fire Prevention & Policy Chief
Assistant Chief	Assistant Fire Marshal	N	Duties and responsibilities associated with this position are aggregated under the Fire Prevention & Policy Chief
Deputy Chief	Training and Support Bureau	N	Duties and responsibilities associated with this position will be transferred to the Training & Development Chief
Assistant Chief	Training Division	Y	Duties and responsibilities associated with this position will be transferred to the Training & Development Chief
Assistant Chief	Assistant Bureau Commander	Y	Duties and responsibilities associated with this position will be transferred to the Training & Development Chief
Assistant Chief	MFC Division	N	Duties and responsibilities associated with this position will be transferred to the Central Assistant Commander

Table 10: Positions created or upgraded based on PA's recommendations (64 positions)

Rank	Title	Comments
Captain II	Fire Chief Assistant	Duties include day to day support to the Fire Chief
Civilian Eq. Assistant Chief	Media Communication Director	Civilian position responsible for communication with the media
Civilian Eq. Assistant Chief	Community Communication Director	Civilian position responsible for LAFD's interaction with the community
Civilian Eq. Assistant Chief	Analytics Director	Civilian position to be filled by a statistician or PhD in mathematics and responsible for LAFD's data analytics
Assistant Chief	Fire Prevention & Policy Chief	Sworn position responsible for fire prevention and policy, reporting to the Chief
Battalion Chief	Fire Prevention Chief	Sworn position focused on Fire Prevention
Battalion Chief	Policy & Dvp Chief	Sworn position focused on Policy and Development
Assistant Chief	Training & Dvp Chief	Sworn position focus on Training and Development, reporting to the Chief Deputy
Deputy Chief	Bureaus Chief Deputy	Supervises the 4 Bureau Commanders as well as Training and Development
Deputy Chief	EMS Deputy	Responsible for LAFD's EMS operations
Civilian Eq. Deputy Chief	Chief Technology Officer	Civilian position in charge of LAFD' IT and technology
Deputy Chief	Valley Bureau Commander	Responsible for LAFD's operation in the Valley Bureau
Deputy Chief	West Bureau Commander	Responsible for LAFD's operation in the West Bureau
Deputy Chief	Central Bureau Commander	Responsible for LAFD's operation in the Central Bureau
Deputy Chief	South Bureau Commander	Responsible for LAFD's operation in the South Bureau
Assistant Chief	Valley Assistant Commander	Supports the Valley Bureau Commander
Assistant Chief	West Assistant Commander	Supports the West Bureau Commander

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