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Jamie T. Hall
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**Subject: Comments on the 1309-1331 South Pacific Avenue Project (ENV-2019-4909-CE)**

Dear Mr. Hall,

We have reviewed the April 2021 Applicant's Response to Appeal ("Response") for the 1309-1331 South Pacific Avenue Project ("Project") located in the City of Los Angeles ("City"). After our review of the Response, we find that the Response is insufficient in addressing our concerns regarding the Project's air quality, health risk, and greenhouse gas impacts. As we asserted in our October 30th comment letter, an EIR should be prepared to adequately evaluate the Project's potential impacts.

## Summary

Our review concludes that the Report and Response still fail to adequately address the Project's potential air quality, health risk, and greenhouse gas impacts. Specifically, after our review of the Response, we found the following remaining issues:

- The Response's revised modeling includes unsubstantiated input parameters, including unsupported individual construction phase lengths and worker trip numbers;
- The Response fails to evaluate the Project's operational health risk impacts;
- The Report and Response fail to address potential cumulative impacts;
- SWAPE's revised CalEEMod model, which is based the Project-specific information provided by the Report and Response, indicates potentially significant construction-related criteria air pollutant emissions;
- SWAPE's revised health risk analysis, which is consistent with the methodology relied upon for the Response's construction health risk analysis, indicates a potentially significant health risk impact; and

- The Response's revised modeling indicates potentially significant greenhouse gas emissions.

*As a result of our finding of potentially significant air quality and health risk impacts, the proposed Project does not qualify for a Class 32 Exemption under the California Environmental Quality Act ("CEQA") and 14 Cal. Code of Regs. 1500 et seq. ("CEQA Guidelines") and, therefore, a full CEQA analysis should be prepared to adequately assess and mitigate the potential air quality and health risk impacts that the Project may have on the surrounding environment. We recommend that the City prepare an EIR with a health risk assessment ("HRA") as required under the Commerce Municipal Code ("CMC" or "Code").*

# Air Quality

## Incorrect Reliance on Class 32 Categorical Exemption

In our October 30th comment letter, we the Project does not qualify for an exemption pursuant to CEQA Guidelines § 15332, because the April 2020 City Planning Commission Recommendation Report's ("Report") analysis of the Project's air quality impact is inadequate. The Response maintains that the proposed Project qualifies for a Class 32 CEQA Exemption. However, we reiterate that the Project's air quality impact analysis, as well as the subsequent categorical exemption, is unsubstantiated for the following five reasons:

(1) The Report and Response rely upon an incorrect and unsubstantiated air model;
(2) The Report and Response fail to adequately evaluate the health risk impacts associated with diesel particulate matter emissions;
(3) The Report and Response fail to address cumulative health risk impacts;
(4) SWAPE's revised analysis indicates potentially significant criteria pollutant emissions; and
(5) SWAPE's revised screening-level health risk assessment indicates a potentially significant health risk impact.

### *1) Incorrect and Unsubstantiated Air Model*

In our October 30th comment letter, we identified several issues with the April 2020 City Planning Commission Recommendation Report's ("Report") air model (California Emissions Estimator Model, "CalEEMod")[1] that artificially reduced the Project's construction and operational emissions. After review of the Response, we found that the Response fails to address all our concerns and maintain that the Report's CalEEMod model is flawed and fails to accurately estimate the Project's criteria air pollutant emissions. As such, we find the Report and Response to be inadequate and maintain that an EIR should be prepared to adequately evaluate the Project's local and regional air quality impacts. Until a proper air quality analysis is conducted, the Project should not be approved.

#### Unsubstantiated Changes to Individual Construction Phase Lengths

As discussed in our October 30th comment letter, the Report's CalEEMod model included unsubstantiated changes to the default individual construction phase lengths. Review of the Response demonstrates that the Project again fails to justify or correct this modeling error. As discussed below,

[1] http://caleemod.com/

we find the Report and Response to be inadequate and maintain that the air quality impact significance determination is unsubstantiated.

Regarding the unsubstantiated changes to the default individual construction phase lengths, the Response states:

> "The changes to the model's default duration of each construction phase was based on the project-specific schedule proposed as provided by the Project Applicant directly to DKA Planning. (See Attachment C: Original Air Quality Data Needs Worksheet and Attachment D: Updated Data Needs Worksheet.) When project specific information is available it is appropriate to revise the CalEEMod default values. SWAPE incorrectly suggests that the "potential" construction schedule is not "accurate." SWAPE has no basis to assume that the Applicant provided construction schedule is inaccurate. The schedule provided is the most accurate schedule that can be provided at this time and is appropriate for air quality construction modeling. It should be noted that all of the phase lengths are considerably longer than the default values thus more emissions were considered over time. As to SWAPE comments about the potential for increased daily emissions from a shorter phase period, there is basis to assume that, for example 112 days of architectural coating work could be compressed into 5 days. Again, the phase lengths are the best estimates by the Project Applicant for construction of this Project. SWAPE has provided no basis, reasonable or otherwise, to revert to CalEEMod default values that are not specific to this Project. The updated air quality modeling worksheets include the site preparation phase. (See Attachment A, Page 6 (3.0 Construction detail, Construction Phase).) The inclusion of 12 days of site preparation construction air quality emission still resulted in less than significant construction air quality emissions, consistent with the original air quality emissions impact determination. The modeling does not include a paving phase, as the proposed project's design with underground parking and vehicle circulation does not generally include surface-level improvements that meet the CalEEMod model's definition of "...laying concrete or asphalt such as in parking lots, roads, driveways, or sidewalks." Emissions from the construction of underground garage levels and ramps, however, are included in the building construction phase of analysis so these emissions were fully accounted for" (pp. 105-106).

In addition, review of the Response's CalEEMod Output Files demonstrates that the "1331 South Pacific Avenue Future" model includes a site preparation phase and a revised architectural coating phase length of 110 (see excerpts below) (Response, pp. 116, 138, 164).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstructionPhase | NumDays | 10.00 | 32.00 |
| tblConstructionPhase | NumDays | 2.00 | 31.00 |
| tblConstructionPhase | NumDays | 100.00 | 112.00 |
| tblConstructionPhase | NumDays | 5.00 | 110.00 |
| tblConstructionPhase | NumDays | 1.00 | 12.00 |

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days |
|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 6/15/2021 | 6/30/2021 | 5 | 12 |
| 2 | Demolition | Demolition | 7/1/2021 | 8/15/2021 | 5 | 32 |
| 3 | Grading | Grading | 7/16/2021 | 8/28/2021 | 5 | 31 |
| 4 | Building Construction | Building Construction | 8/30/2021 | 2/1/2022 | 5 | 112 |
| 5 | Architectural Coating | Architectural Coating | 6/1/2022 | 11/1/2022 | 5 | 110 |

As demonstrated in the excerpts above, the architectural coating phase length was increased by approximately 2,100%. However, the revised individual construction phase lengths remain unsupported for five reasons.

First, the Response's claim that "all of the phase lengths are considerably longer than the default values thus more emissions were considered over time" is incorrect. Rather, by artificially increasing the individual construction phase lengths, the model dilutes the emissions associated with architectural coating, resulting in a *decrease in daily construction-related emissions*.

Second, while the Response's revised CalEEMod model includes a site preparation phase, it still fails to include a paving phase. As demonstrated in the excerpt above, the Response claims that the Project would not include "surface-level improvements that meet the CalEEMod model's definition of '...laying concrete or asphalt such as in parking lots, roads, driveways, or sidewalks'" to justify this omission. However, this is incorrect. According to the Report, the Project "will provide 127 parking spaces in 2 subterranean levels" (p. 1). The, the land uses proposed by the Project would include 'laying concrete or asphalt such as in parking lots.' As a result, the Response's claim that Project construction would not include a paving phase is unsupported.

Third, the Response's claim that "SWAPE has provided no basis, reasonable or otherwise, to revert to CalEEMod default values that are not specific to this Project" is unsupported. Rather, CalEEMod default values should only be changed when project-specific information, *supported by substantial evidence*, is available. According to the CalEEMod User's Guide:

> "CalEEMod was also designed to allow the user to change the defaults to reflect site- or project-specific information, when available, *provided that the information is supported by substantial evidence as required by CEQA*." [2]

Here, while the Air Quality Technical Report ("AQ Report") provided a *potential* construction schedule, the source for the construction schedule was the AQ Report itself (AQ Report, p. 31, Table 5). This is incorrect, as the Project documents should substantiate the construction phase length changes included in the model, not vice versa. Moreover, the construction schedule included in the AQ Report is a *potential* construction schedule. Simply providing a potential construction schedule does not constitute substantial evidence that the revised construction schedule would be accurate for the proposed Project.

[2] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 12.

Finally, while the Response claims that the revised construction schedule was "provided by the Project Applicant directly to DKA Planning," it does not provide any record of this communication.

Fourth, SWAPE did not compress "112 days of architectural coating work... into 5 days." Rather, the *default* architectural coating phase length is 5 days. This default value is based on a SCAQMD construction survey, and thus is based on reasonable construction period data.[3] In the Response's model, however, the default architectural coating phase length was significantly and disproportionately increased by approximately 2,100%. As a result, the Response's claim that SWAPE compressed 112 days of architectural coating work into 5 days is misleading.

Fifth, the updated modeling provided by the Response includes an even more significant increase to the architectural coating phase length than was included in the Report's modeling. Specifically, as discussed above, the architectural coating phase length was increased by approximately 2,100%, from the default value of 5- to 110-days, in the Response's revised "1331 South Pacific Avenue Future" model (Response, pp. 116, 138, 164). This is an even more significant and disproportional increase than in the original "1331 South Pacific Avenue Future" model, which included an architectural coating phase length of 88 days (Technical Appendix, pp. 273, 302, 329):

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days |
|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 5/1/2020 | 6/15/2020 | 5 | 32 |
| 2 | Grading | Grading | 6/16/2020 | 7/28/2020 | 5 | 31 |
| 3 | Building Construction | Building Construction | 7/29/2020 | 12/31/2020 | 5 | 112 |
| 4 | Architectural Coating | Architectural Coating | 5/1/2021 | 9/1/2021 | 5 | 88 |

Thus, the architectural coating phase lengths included in the Report and Response are inconsistent. As a result, we maintain our October 30th comment that the revised individual construction phase lengths are unsupported.

As previously stated in our October 30th comment letter, by including unsubstantiated changes to the default individual construction phase lengths, the model may underestimate the Project's construction-related emissions and should not be relied upon to determine Project significance. As such, we maintain our October 30th comment that the Report and Response's CalEEMod models are incorrect, and the less-than-significant air quality impact conclusion should not be relied upon.

### Unsubstantiated Reductions to Worker Trips

As discussed in our October 30th comment letter, the Report's CalEEMod model included unsubstantiated reductions to the default number of worker trips required for construction. Review of the Response demonstrates that the Project again fails to justify or correct this modeling error. As

[3] "Appendix A Calculation Details for CalEEMod ." October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 6.

discussed below, we find the Report and Response to be inadequate and maintain that the air quality impact significance determination is unsubstantiated.

Regarding the unsubstantiated changes to the default worker trip numbers, the Response states:

> "The changes to the model's default number of construction worker trips was based on the project-specific details of the anticipated workforce based on the scope of work during those phases on a given day given constraints of the relatively small project site. When Project specific information is available it is appropriate to revise the CalEEMod default values, which are conservative rules of thumb for these types of phases. Moreover, the reduction of 20 trips from the default assumptions is de minimis" (pp. 106).

However, this response is insufficient. While the Response states that the revised construction worker trips were based on "project-specific details," both the Report and Response failed to provide these project-specific details or otherwise substantiate the changes. As previously stated, according to the CalEEMod User's Guide:

> "CalEEMod was also designed to allow the user to change the defaults to reflect site- or project-specific information, when available, *provided that the information is supported by substantial evidence as required by CEQA*." [4]

Here, as the Report and Response fail to provide the project-specific details used to derive the revised worker trip numbers, or otherwise substantiate the revised values. As a result, we cannot verify the changes, and we maintain our October 30th comment that the Report and Response's CalEEMod models should not be relied upon to determine Project significance.

### *2) Diesel Particulate Matter Health Risk Emissions Inadequately Evaluated*

As discussed in our October 30th comment letter, the Report failed to prepare a quantified construction or operational health risk analysis ("HRA"). The Response estimates that Project construction would result in an excess cancer risk of 6.7 in one million, based on a quantified construction HRA (pp. 295, Table 2). However, the Response's evaluation of the Project's health risk impacts, as well as the subsequent less-than-significant impact conclusion, remains insufficient for three reasons.

First, the Response's construction HRA is incorrect, as it relies upon exhaust $PM_{10}$ emissions estimates from a flawed air model (pp. 292). As previously discussed, when we reviewed the Project's CalEEMod output files, provided in the Air Quality Emissions Analysis, we found that several of the values inputted into the model are not consistent with information disclosed in the Report or Response. As a result, the HRA utilizes an underestimated diesel particulate matter ("DPM") concentration to calculate the health risk associated with Project construction. As such, the Response's HRA underestimates the Project's construction-related cancer risk and should not be relied upon to determine Project significance

[4] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 12.

Second, the Response fails to address our January 13th comment regarding the Project's operational TAC emissions. This is incorrect, as the September 2019 *Technical Memorandum* indicates that the proposed land uses are expected to generate approximately 2,033 average daily vehicle trips, which will generate additional exhaust emissions and continue to expose nearby sensitive receptors to DPM emissions (pp. 140, Table 3). However, the Report and Response fail to discuss the potential TAC emissions resulting from Project operation or indicate the concentrations at which such pollutants would trigger adverse health effects. Thus, without making a reasonable effort to connect the Project's operational TAC emissions to the potential health risks posed to nearby receptors, the Report and Response are inconsistent with CEQA's requirement to correlate the increase in emissions generated by the Project with the potential adverse impacts on human health.

Third, while the Response includes an HRA evaluating the health risk impacts to nearby, existing receptors as a result of Project construction, the HRA fails to evaluate the *cumulative* lifetime cancer risk to nearby, existing receptors as a result of Project *construction and operation together*. According to OEHHA guidance, "the excess cancer risk is calculated separately for each age grouping and then summed to yield cancer risk at the receptor location."[5] However, the Response's HRA fails to sum each age bin to evaluate the total cancer risk over the course of the Project's total construction and operation. This is incorrect and thus, an updated analysis should quantify the entirety of the Project's construction and operational health risks and then sum them to compare to the SCAQMD specific numeric threshold of 10 in one million.[6]

### *3) Failure to Evaluate Cumulative Impacts*

The Report and Response fail to evaluate the cumulative impacts resulting from both nearby proposed projects. According to CEQA Guidelines §15355, "'Cumulative impacts' refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." CEQA Guidelines § 15064(h)(1) goes onto say,

> "... the lead agency shall consider whether the cumulative impact is significant and whether the effects of the project are *cumulatively considerable*. An EIR must be prepared if the cumulative impact may be significant and the *project's incremental effect, though individually limited, is cumulatively considerable*. 'Cumulatively considerable' means that the *incremental effects* of an individual project are significant when *viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects*." (Emphasis added).

Thus, the proposed Project may result in a cumulatively considerable impact when considered in conjunction with nearby projects. Review of the Develop San Pedro website demonstrates that the proposed Project is located in close proximity to several projects, including the San Pedro Courthouse Revitalization, Mixed Use Project by South Bay Developers, LLC, and Palos Verde Apartments, as well as

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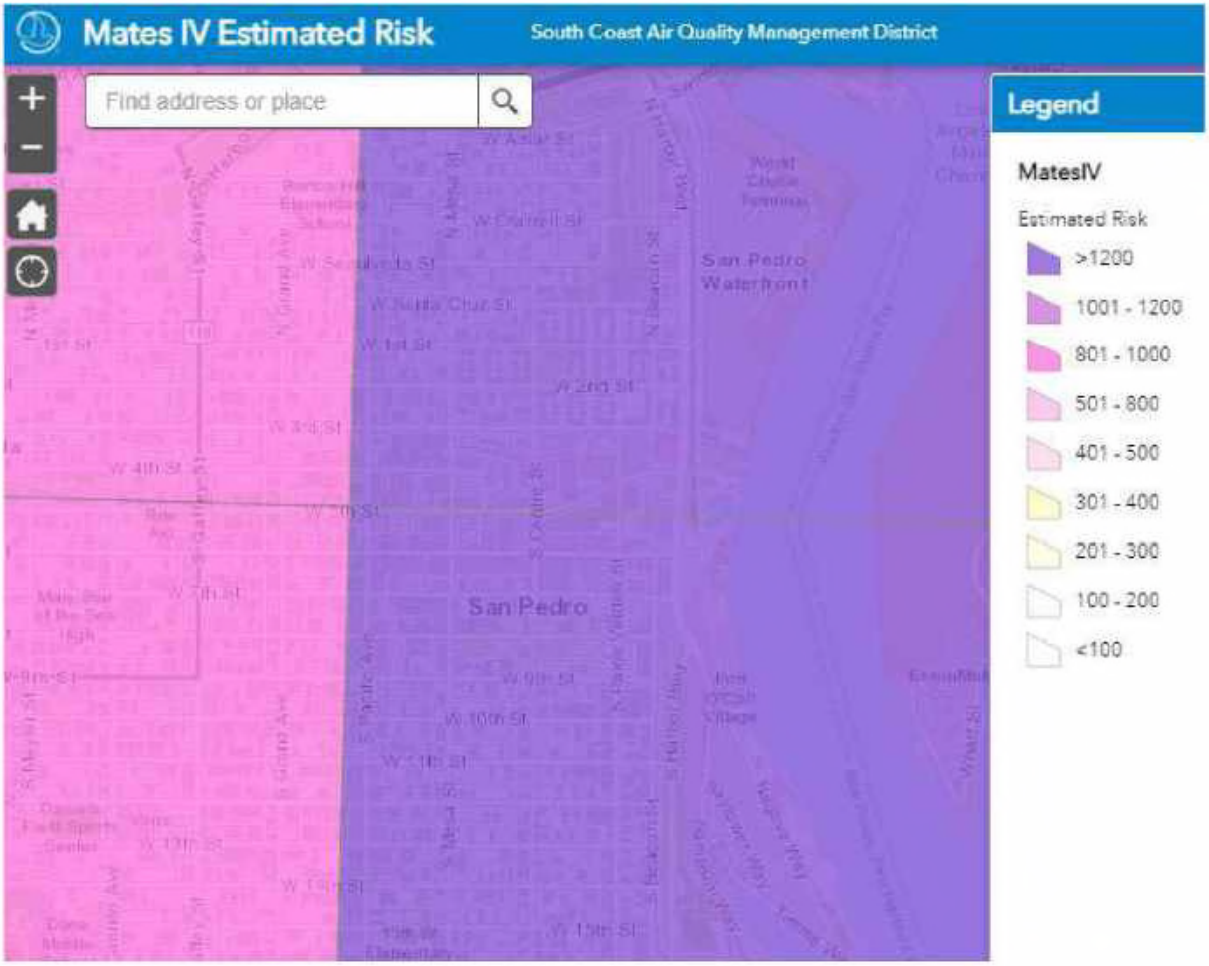
[5] "Guidance Manual for preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf p. 8-4

[6] "South Coast AQMD Air Quality Significance Thresholds." SCAQMD, April 2019, *available at:* http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf.

an 80-room hotel with a rooftop deck and bar.[7] Therefore, construction and operation of the proposed Project will occur in conjunction with the operation of these other proposed projects. However, the Report and Response have not addressed or evaluated the cumulative impact resulting from the proposed Project in conjunction with both the projects nearby and the baseline risk posed to residents within San Pedro. As a result, the cumulative risk posed to nearby sensitive receptors to the Project in conjunction with the proposed sources of TACs in the vicinity of the Project site is unknown. Therefore, the proposed Project may result in a significant air quality impact that has not been previously identified or addressed.

Furthermore, the Project site is located within an area where the baseline excess cancer risk is already significant. Specifically, review of the SCAQMD's *Mates IV Estimated Risk* interactive map indicates baseline estimated cancer risk values greater than 1,200 in one million (see excerpt below).[8]




[7] Downtown Developments." Develop San Pedro, *available at:* https://developsanpedro.com/map/downtown-developments/.

[8] "MATES IV Carcinogenic Risk Interactive Map." SCAQMD, May 2015, *available at:* https://scaqmd-online.maps.arcgis.com/apps/webappviewer/index.html?id=470c30bc6daf4ef6a43f0082973ff45f.

Thus, people living within the Project's vicinity are already exposed to harmful concentrations of TAC emissions. However, when evaluating the Project's health risk impacts, the Report and Response fail to address the existing significant health impacts associated with living within the Project's vicinity. As a result, the severity of the Project's health risk impacts, in conjunction with existing sources of TAC emissions in the vicinity of the Project site, are unknown.

### *4) Updated Analysis Indicates Significant Air Quality Impact*

As discussed in our October 30th comment letter, SWAPE's updated CalEEMod model indicated potentially significant construction-related reactive organic gas/volatile organic compound ("ROG"/"VOC") and nitrogen oxides ("$NO_X$") emissions. Regarding this analysis, the Response states:

> "SWAPE's emissions analysis is based on arbitrary manipulation of the air quality model, particularly with regard to the construction schedule for the grading and architectural coatings phase.
>
> - SWAPE's analysis inexplicably shortens the construction of this Project to five months, rather than the 17 months proposed for the Project. This key assumption is not based on any facts, but this random speculation distorts the remainder of the air quality analysis in several key ways.
> - SWAPE's modeling assumes just two days of grading to export 23,348 cubic yards of soil. This is a random, artificial assumption that is not physically possible and is not consistent with the proposed 31 days of grading of this Project site. The result of SWAPE's distorted grading schedule is to artificially inflate NOx hauling emissions to 814.6 lb/day and VOC/ROG to 27 lb/day. o
> - SWAPE's modeling assumes just five days to apply architectural coatings to the development. There is no basis to this random assumption. The Project's air quality analysis properly assumes the phased application of coatings as the construction and finishing of the structures are completed. The result of SWAPE's distorted architectural coatings assumption is to inflate VOC/ROG emissions to 139.4 lb/day.
> - These and other arbitrary manipulations of the model further distorts the actual construction schedule and is not based on any Project specific facts.
> - In addition, SWAPE's analysis is based on 109 dwelling units, not 102 as currently proposed.
> - SWAPE's arbitrary five-month construction process results in an operational date of 2021, which artificially raises operational emissions from the vehicle fleet. The Project is anticipated to be operational no earlier than late 2022.
>
> When the proper construction schedule and project parameters are used in the CalEEMod air quality model, the project's emissions neither exceed the SCAQMD's regional or localized significance thresholds, as disclosed in the published air quality analysis" (pp. 107-108).

However, this response is insufficient for two reasons.

First, as discussed above, we reiterate that the Response's CalEEMod model should not be relied upon. Specifically, we reiterate our comments regarding the unsubstantiated changes to the individual construction phase lengths and worker trips, as well as the unsubstantiated construction-related mitigation measures. Moreover, the Response's claims that SWAPE's model included arbitrary and inexplicable assumptions is incorrect. Rather, the assumptions in SWAPE's updated modeling reflected the CalEEMod default values, which should be used in the absence of project-specific information supported by substantial evidence. As a result, we reiterate our October 30th comment that the Project's air quality significance determination should not be relied upon.

Second, in an effort to more accurately estimate the Project's construction-related emissions, we prepared a revised CalEEMod model, using the Project-specific information provided by the Report and Response. In our revised model, we omitted the unsubstantiated changes to the individual construction phase lengths and worker trips. Our revised analysis estimates that the Project's construction-related VOC and operational $NO_x$ emissions *still* exceed the SCAQMD thresholds of 75- and 55-pounds per day ("lbs/day"), respectively, despite the Response's claim otherwise (see table below).[9]

**Maximum Daily Construction Emissions (lbs/day)**

| Model | VOC/ROG | $NO_x$ |
|---|---|---|
| Response (Winter Output File) | 6.15 | 83.57 |
| SWAPE (Winter Output File) | 107.92 | 788.26 |
| **Percent Increase** | **1655%** | **843%** |
| **SCAQMD Regional Threshold (lbs/day)** | **75** | **100** |
| ***Threshold Exceeded?*** | ***Yes*** | ***Yes*** |

As you can see in the excerpt above, when estimated using revised input parameters, the Project's construction-related ROG/VOC and operational $NO_x$ emissions increase by approximately 1,655% and 843%, respectively, and exceed the SCAQMD significance thresholds when modeling utilizing revised input parameters. Thus, our model demonstrates that the Project would result in a potentially significant air quality impact that was not previously identified or addressed in the Report and Response. As a result, we maintain our October 30th comment that an EIR should be prepared to adequately assess and mitigate the potential air quality impacts that the Project may have on the surrounding environment.

### *5) Updated Analysis Indicates Significant Health Risk Impact*

We prepared an updated, screening-level operational HRA based on the Response's revised CalEEMod output files. In order to conduct our screening-level risk analysis we relied upon AERSCREEN, which is a screening level air quality dispersion model.[10] The model replaced SCREEN3, and AERSCREEN is included

[9] "South Coast AQMD Air Quality Significance Thresholds." SCAQMD, April 2019, *available at*: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf.
[10] U.S. EPA (April 2011) AERSCREEN Released as the EPA Recommended Screening Model, http://www.epa.gov/ttn/scram/guidance/clarification/20110411_AERSCREEN_Release_Memo.pdf

in the OEHHA[11] and the California Air Pollution Control Officers Associated ("CAPCOA")[12] guidance as the appropriate air dispersion model for Level 2 health risk screening analyses ("HRSAs"). A Level 2 HRSA utilizes a limited amount of site-specific information to generate maximum reasonable downwind concentrations of air contaminants to which nearby sensitive receptors may be exposed. If an unacceptable air quality hazard is determined to be possible using AERSCREEN, a more refined modeling approach is required prior to approval of the Project.

In order to estimate the health risk impacts posed to residential sensitive receptors as a result of the Project's operational TAC emissions, we prepared a preliminary HRA based on the Response's revised CalEEMod output files. Consistent with the Response's methodology, we used the annual $PM_{10}$ exhaust estimate as a surrogate for DPM emissions (pp. 292). Consistent with recommendations set forth by OEHHA, we assumed residential exposure begins during the third trimester stage of life. Subtracting the 504-day construction period, included in the Response's CalEEMod model, from the total residential duration of 30 years, we assumed that after Project construction, the sensitive receptor would be exposed to the Project's operational DPM for an additional 28.62 years, approximately. The Response's revised operational CalEEMod emissions indicate that operational activities will generate approximately 33 pounds of DPM per year throughout operation. The AERSCREEN model relies on a continuous average emission rate to simulate maximum downward concentrations from point, area, and volume emission sources. To account for the variability in equipment usage and truck trips over Project operation, we calculated an average DPM emission rate by the following equation:

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{32.8\ lbs}{504\ days} \times \frac{453.6\ grams}{lbs} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.000472\ g/s}$$

Using this equation, we estimated a construction emission rate of 0.000472 grams per second ("g/s"). Operational activity was simulated as a 0.72-acre rectangular area source in AERSCREEN with dimensions of 65 by 45 meters. A release height of three meters was selected to represent the height of exhaust stacks on operational equipment and other heavy-duty vehicles, and an initial vertical dimension of one and a half meters was used to simulate instantaneous plume dispersion upon release. An urban meteorological setting was selected with model-default inputs for wind speed and direction distribution.

The AERSCREEN model generates maximum reasonable estimates of single-hour DPM concentrations from the Project site. EPA guidance suggests that in screening procedures, the annualized average concentration of an air pollutant be estimated by multiplying the single-hour concentration by 10%.[13] According to the AQ Report, the nearest sensitive receptors are located approximately 10 feet west of

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[11] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf

[12] CAPCOA (July 2009) Health Risk Assessments for Proposed Land Use Projects, http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf.

[13] "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources Revised." EPA, 1992, *available at*: http://www.epa.gov/ttn/scram/guidance/guide/EPA-454R-92-019_OCR.pdf; *see also* "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf p. 4-36.

the Project site (AQ Report, p. 16). However, review of the AERSCREEN output files demonstrates that the MEIR is located approximately 25 meters from the Project site. Thus, the single-hour concentration estimated by AERSCREEN for Project operation is approximately 2.582 $\mu g/m^3$ DPM at approximately 25 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.2582 $\mu g/m^3$ for Project operation at the MEIR.

We calculated the excess cancer risk to the MEIR using applicable HRA methodologies prescribed by OEHHA. Consistent with the 504-day default construction schedule, the annualized average concentration for operation was used for the remainder of the 30-year exposure period, which makes up the remaining 0.87 years of the infantile stage of life (0 – 2 years), the entire child stage of life (2 – 16 years), and the entire the adult stage of life (16 – 30 years).

Consistent with the Response's methodology, we did not use Age Sensitivity Factors ("ASF(s)"). This represents a less health protective scenario than what is currently recommended by SCAQMD, the air quality district with jurisdiction over the City, and several other air districts in the state. Furthermore, in accordance with the guidance set forth by OEHHA, we used the 95th percentile breathing rates for infants.[14] Finally, according to SCAQMD guidance, we used a Fraction of Time At Home ("FAH") Value of 1 for the 3rd trimester and infant receptors.[15] We used a cancer potency factor of 1.1 $(mg/kg\text{-}day)^{-1}$ and an averaging time of 25,550 days. The results of our calculations are shown below.

[14] "Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics 'Hot Spots' Information and Assessment Act," July 2018, *available at:* http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab2588supplementalguidelines.pdf, p. 16.
"Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

[15] "Risk Assessment Procedures for Rules 1401, 1401.1, and 212." SCAQMD, August 2017, *available at:* http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1401/riskassessmentprocedures_2017_080717.pdf, p. 7.

**The Maximum Exposed Individual at an Existing Residential Receptor (MEIR)**

| Activity | Duration (years) | Concentration (ug/m3) | Breathing Rate (L/kg-day) | Cancer Risk without ASFs |
|---|---|---|---|---|
| Construction | 0.25 | * | 361 | * |
| ***3rd Trimester Duration*** | ***0.25*** | | | |
| Construction | 1.13 | * | 1090 | * |
| Operation | 0.87 | 0.2582 | 1090 | 3.7E-06 |
| ***Infant Exposure Duration*** | ***2.00*** | | | ***3.7E-06*** |
| Operation | 14.00 | 0.2582 | 572 | 3.1E-05 |
| ***Child Exposure Duration*** | ***14.00*** | | | ***3.1E-05*** |
| Operation | 14.00 | 0.2582 | 261 | 1.0E-05 |
| ***Adult Exposure Duration*** | ***14.00*** | | | ***1.0E-05*** |
| **Lifetime Exposure Duration** | **30.00** | | | **4.5E-05** |

* Construction-related cancer risk estimated by the Response.

As demonstrated in the table above, the estimated excess cancer risks posed to adults, children, and infants at the MEIR located approximately 25 meters away, over the course of Project operation alone, are approximately 10, 31, and 3.7 in one million, respectively. The estimated excess cancer risk over the course of Project operation, without ASFs, is approximately 45 in one million. Furthermore, when summing the Project's construction-related cancer risk of 6.7 in one million, as estimated by the Response, with the Project's operational cancer risk of 45, as estimated by SWAPE, we estimate a lifetime excess cancer risk of 51.7,[16] without ASFs (pp. 295). Thus, the child and lifetime cancer risks exceed the SCAQMD threshold of 10 in one million, thus resulting in a potentially significant impact not previously addressed or identified by the Report and Response.

As the Response fails to prepare a more refined analysis of the Project's operational health risk impacts, SWAPE's HRA represents the only reasonable effort to connect the Project's operational TAC emissions and the potential health risk impacts posed to nearby sensitive receptors. As previously stated in our October 30th comment letter, our analysis represents a screening-level HRA, which is known to be conservative and tends to err on the side of health protection. [17] The purpose of the screening-level construction and operational HRA shown above is to demonstrate the link between the proposed Project's emissions and the potential health risk. Our screening-level HRA demonstrates that construction and operation of the Project could result in a potentially significant health risk impact, when correct exposure assumptions and up-to-date, applicable guidance are used. Since our screening-

[16] Calculated: 6.7 in one million + 45 in one million = 51.7 in one million.

[17] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 1-5

level HRA indicated a potentially significant impact, we recommended that the City should prepare an analysis that makes a reasonable effort to connect the Project's air quality emissions and the potential health risks posed to nearby receptors. By failing to prepare a refined analysis of the Project's health risk impacts, the Response lacks evidence to support its conclusion that the Project would result a in a less-than-significant health risk impact.

## Greenhouse Gas

### Failure to Adequately Evaluate Greenhouse Gas Emissions

As discussed in our October 30th comment letter, the Report claims that the Project is categorically exempt pursuant to CEQA Guidelines § 15332 (p. 1). As a result, the Project's potential greenhouse gas ("GHG") impacts have not been evaluated. However, as discussed above, the proposed Project does not qualify for a Class 32 Exemption, as the Report and Response fail to adequately analyze the Project's potential air quality impacts. Review of the Response demonstrates that the Project again fails to provide adequate information to support the omission of a GHG impact analysis. We maintain our October 30th comment that a full CEQA analysis should be prepared for the proposed Project, including an evaluation of the Project's GHG impacts, for the following three reasons.

First, regarding the Project's omission of a GHG analysis, the Response states:

> "[A]n assessment of criteria pollutant emission has been prepared, but there are no requirements for preparation of GHG analyses to validate the Class 32 exemption. As such, the air quality analysis meets State and City guidance on the preparation of air quality analyses for Class 32-eligible projects and the SWAPE analysis is flawed in its use of GHG criteria that have not been sanctioned for use by the SCAQMD, City, or any other entity" (pp. 109).

However, as discussed above, we maintain that the proposed Project does not qualify for a Class 32 Exemption. As a result, we recommend that a full CEQA analysis be prepared for that adequately evaluates and mitigates the Project's potential GHG impact.

Second, despite the Response's claim that "SWAPE's estimate of project GHG emissions is artificially high because of unsubstantiated, artificial assumptions," we reiterate our comments regarding the unsubstantiated individual construction phase lengths and worker trip numbers. As a result, we maintain our October 30th comment that the Report and Response's air modeling should not be relied upon.

Third, the Response's revised modeling indicates a potentially significant GHG impact. The Response's revised CalEEMod output files, disclose the Project's mitigated emissions, which include approximately 677 MT $CO_2e$ of total construction emissions and approximately 1,333 MT $CO_2e$/year of annual operational emissions (sum of area, energy, mobile, waste, and water-related emissions). Furthermore, according to CAPCOA's *CEQA & Climate Change* report, service population is defined as "the sum of the number of residents and the number of jobs supported by the project."[18] The Project's CalEEMod output

[18] CAPCOA (Jan. 2008) CEQA & Climate Change, p. 71-72, http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA-White-Paper.pdf.

files indicate that the Project would house 254 residents. As the Project does not contain any nonresidential land uses, we estimate a service population of 254 people.[19] When dividing the Project's GHG emissions (amortized construction + operational) by the service population, we find that the Project would emit approximately 6 MT $CO_2e$/SP/yr.[20] The SCAQMD provides an updated Tier 4 service population efficiency target goal of 3.0 MT$CO_2e$/SP/year for target year 2035.[21] When we compare the Project's service population efficiency of 6 MT $CO_2e$/SP/year, as estimated by SWAPE, to the SCAQMD's Tier 4 service population efficiency target goal of 3.0 MT$CO_2e$/SP/year, we find a potentially significant GHG impact (see table below).

| **Response Modeling Greenhouse Gas Emissions** | |
|---|---|
| **Project Phase** | **Proposed Project (MT $CO_2e$/year)** |
| Construction (amortized over 30 years) | 22.56 |
| Area | 1.76 |
| Energy | 442.04 |
| Mobile | 782.48 |
| Waste | 23.60 |
| Water | 83.32 |
| **Total** | **1,355.77** |
| Service Population | 245 |
| **Service Population Efficiency** | **6** |
| Threshold | 3 |
| ***Exceed?*** | ***Yes*** |

As the table above demonstrates, the Project's GHG emissions, as estimated by the Response, exceed the SCAQMD's 2035 service population efficiency threshold of 3.0 MT $CO_2e$/SP/year, thus demonstrating a potentially significant impact not previously assessed or identified in the Report and Response. Thus, even when using the Response's modeling rather than SWAPE's updated modeling, the Project's GHG emissions indicate a potentially significant impact. As a result, we recommend that a full CEQA analysis be prepared to adequately evaluate the Project's impacts and incorporate mitigation accordingly.

[19] Calculated: 254 residents + 0 employees = 254 service population.
[20] Calculated: (1,355.77 MT $CO_2e$/year) / (254 service population) = (6 MT $CO_2e$/SP/year).
[21] See SCAQMD (Dec. 5, 2008) Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans, http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2; *see also* SCAQMD (Oct. 2008) Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold, http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgattachmente.pdf; SCAQMD (Sep. 28, 2010) Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group # 15, http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-minutes.pdf.

## Disclaimer

SWAPE has received limited discovery regarding this project. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

Sincerely,

Matt Hagemann, P.G., C.Hg.

Paul E. Rosenfeld, Ph.D.

| | |
|---|---|
| Attachment A: | SWAPE Health Risk Calculations |
| Attachment B: | SWAPE Project CalEEMod Modeling |
| Attachment C: | SWAPE Project AERSCREEN Modeling |
| Attachment D: | Paul Rosenfeld CV |
| Attachment E: | Matt Hagemann CV |

Attachment A

| Operation | |
|---|---|
| **Emission Rate** | |
| Annual Emissions (tons/year) | 0.0164 |
| Daily Emissions (lbs/day) | 0.089863014 |
| Emission Rate (g/s) | 0.000472 |
| Release Height (meters) | 3 |
| Initial Vertical Dimension (meters) | 1.5 |
| Max Horizontal (meters) | 65.0 |
| Min Horizontal (meters) | 45.0 |
| Total Acreage | 0.722782602 |
| Setting | Urban |
| Population | 3,990,000 |
| Total Pounds of DPM | |
| Total DPM (lbs) | 32.8 |

**The Maximum Exposed Individual at an Existing Residential Receptor (MEIR)**

| Activity | Duration (years) | Concentration (ug/m3) | Breathing Rate (L/kg-day) | Cancer Risk without ASFs |
|---|---|---|---|---|
| Construction | 0.25 | * | 361 | * |
| ***3rd Trimester Duration*** | ***0.25*** | | | |
| Construction | 1.13 | * | 1090 | * |
| Operation | 0.87 | 0.2582 | 1090 | 3.7E-06 |
| ***Infant Exposure Duration*** | ***2.00*** | | | ***3.7E-06*** |
| Operation | 14.00 | 0.2582 | 572 | 3.1E-05 |
| ***Child Exposure Duration*** | ***14.00*** | | | ***3.1E-05*** |
| Operation | 14.00 | 0.2582 | 261 | 1.0E-05 |
| ***Adult Exposure Duration*** | ***14.00*** | | | ***1.0E-05*** |
| **Lifetime Exposure Duration** | **30.00** | | | **4.5E-05** |

* Construction-related cancer risk provided by Response.

# 1331 South Pacific Avenue Future

**Los Angeles-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Enclosed Parking with Elevator | 127.00 | Space | 0.00 | 50,800.00 | 0 |
| Apartments Mid Rise | 102.00 | Dwelling Unit | 0.72 | 83,158.00 | 245 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 11 | | | **Operational Year** | 2022 |
| **Utility Company** | Los Angeles Department of Water & Power | | | | |
| **CO2 Intensity (lb/MWhr)** | 1227.89 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Consistent with Response's model.

Construction Phase - See SWAPE comment about construction phase changes.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment -

Off-road Equipment - Consistent with Response's model.

Trips and VMT - See SWAPE comment about worker trips.

Demolition - Consistent with Response's model.

Grading - Consistent with Response's model.

Vehicle Trips - Consistent with Response's model.

Woodstoves - Consistent with Response's model.

Construction Off-road Equipment Mitigation - Consistent with Response's model.

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| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 46 |
| tblFireplaces | NumberGas | 86.70 | 0.00 |
| tblFireplaces | NumberNoFireplace | 10.20 | 109.00 |
| tblFireplaces | NumberWood | 5.10 | 0.00 |
| tblGrading | AcresOfGrading | 0.00 | 1.24 |
| tblGrading | MaterialExported | 0.00 | 23,348.00 |
| tblLandUse | LandUseSquareFeet | 102,000.00 | 83,158.00 |
| tblLandUse | LotAcreage | 1.14 | 0.00 |
| tblLandUse | LotAcreage | 2.68 | 0.72 |
| tblLandUse | Population | 292.00 | 245.00 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 41.00 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 41.00 |
| tblTripsAndVMT | HaulingTripNumber | 2,919.00 | 3,335.00 |
| tblVehicleTrips | HO_TTP | 40.60 | 41.00 |
| tblVehicleTrips | HS_TTP | 19.20 | 19.00 |
| tblVehicleTrips | HW_TTP | 40.20 | 40.00 |
| tblVehicleTrips | ST_TR | 6.39 | 5.29 |
| tblVehicleTrips | SU_TR | 5.86 | 5.29 |
| tblVehicleTrips | WD_TR | 6.65 | 5.29 |
| tblWoodstoves | NumberCatalytic | 5.10 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 5.10 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.4253 | 1.8922 | 1.3737 | 5.1000e-003 | 0.1662 | 0.0544 | 0.2205 | 0.0405 | 0.0521 | 0.0926 | 0.0000 | 476.7460 | 476.7460 | 0.0441 | 0.0000 | 477.8477 |
| **Maximum** | **0.4253** | **1.8922** | **1.3737** | **5.1000e-003** | **0.1662** | **0.0544** | **0.2205** | **0.0405** | **0.0521** | **0.0926** | **0.0000** | **476.7460** | **476.7460** | **0.0441** | **0.0000** | **477.8477** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2021 | 0.4253 | 1.8922 | 1.3737 | 5.1000e-003 | 0.1200 | 0.0544 | 0.1743 | 0.0291 | 0.0521 | 0.0813 | 0.0000 | 476.7459 | 476.7459 | 0.0441 | 0.0000 | 477.8475 |
| **Maximum** | **0.4253** | **1.8922** | **1.3737** | **5.1000e-003** | **0.1200** | **0.0544** | **0.1743** | **0.0291** | **0.0521** | **0.0813** | **0.0000** | **476.7459** | **476.7459** | **0.0441** | **0.0000** | **477.8475** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 27.82 | 0.00 | 20.97 | 28.03 | 0.00 | 12.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| 1 | 6-15-2021 | 9-14-2021 | 1.2674 | 1.2674 |
| 2 | 9-15-2021 | 9-30-2021 | 0.1165 | 0.1165 |
| | | Highest | 1.2674 | 1.2674 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.3625 | 0.0122 | 1.0547 | 6.0000e-005 | | 5.8200e-003 | 5.8200e-003 | | 5.8200e-003 | 5.8200e-003 | 0.0000 | 1.7214 | 1.7214 | 1.6700e-003 | 0.0000 | 1.7631 |
| Energy | 5.0700e-003 | 0.0433 | 0.0184 | 2.8000e-004 | | 3.5000e-003 | 3.5000e-003 | | 3.5000e-003 | 3.5000e-003 | 0.0000 | 440.9420 | 440.9420 | 0.0102 | 2.8300e-003 | 442.0399 |
| Mobile | 0.1680 | 0.8845 | 2.3175 | 8.4600e-003 | 0.6994 | 7.0700e-003 | 0.7065 | 0.1875 | 6.6000e-003 | 0.1941 | 0.0000 | 781.4787 | 781.4787 | 0.0402 | 0.0000 | 782.4833 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 9.5243 | 0.0000 | 9.5243 | 0.5629 | 0.0000 | 23.5961 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 2.1084 | 74.1211 | 76.2295 | 0.2183 | 5.4800e-003 | 83.3187 |
| **Total** | **0.5355** | **0.9400** | **3.3906** | **8.8000e-003** | **0.6994** | **0.0164** | **0.7158** | **0.1875** | **0.0159** | **0.2034** | **11.6327** | **1,298.2633** | **1,309.8960** | **0.8332** | **8.3100e-003** | **1,333.2011** |

## 2.2 Overall Operational

**Mitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.3625 | 0.0122 | 1.0547 | 6.0000e-005 | | 5.8200e-003 | 5.8200e-003 | | 5.8200e-003 | 5.8200e-003 | 0.0000 | 1.7214 | 1.7214 | 1.6700e-003 | 0.0000 | 1.7631 |
| Energy | 5.0700e-003 | 0.0433 | 0.0184 | 2.8000e-004 | | 3.5000e-003 | 3.5000e-003 | | 3.5000e-003 | 3.5000e-003 | 0.0000 | 440.9420 | 440.9420 | 0.0102 | 2.8300e-003 | 442.0399 |
| Mobile | 0.1680 | 0.8845 | 2.3175 | 8.4600e-003 | 0.6994 | 7.0700e-003 | 0.7065 | 0.1875 | 6.6000e-003 | 0.1941 | 0.0000 | 781.4787 | 781.4787 | 0.0402 | 0.0000 | 782.4833 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 9.5243 | 0.0000 | 9.5243 | 0.5629 | 0.0000 | 23.5961 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 2.1084 | 74.1211 | 76.2295 | 0.2183 | 5.4800e-003 | 83.3187 |
| **Total** | **0.5355** | **0.9400** | **3.3906** | **8.8000e-003** | **0.6994** | **0.0164** | **0.7158** | **0.1875** | **0.0159** | **0.2034** | **11.6327** | **1,298.2633** | **1,309.8960** | **0.8332** | **8.3100e-003** | **1,333.2011** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 6/15/2021 | 6/28/2021 | 5 | 10 | |
| 2 | Site Preparation | Site Preparation | 6/29/2021 | 6/29/2021 | 5 | 1 | |
| 3 | Grading | Grading | 6/30/2021 | 7/1/2021 | 5 | 2 | |
| 4 | Building Construction | Building Construction | 7/2/2021 | 11/18/2021 | 5 | 100 | |
| 5 | Paving | Paving | 11/19/2021 | 11/25/2021 | 5 | 5 | |
| 6 | Architectural Coating | Architectural Coating | 11/26/2021 | 12/2/2021 | 5 | 5 | |

**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Grading (Grading Phase): 1.24**

**Acres of Paving: 0**

**Residential Indoor: 168,395; Residential Outdoor: 56,132; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 3,048 (Architectural Coating – sqft)**

**OffRoad Equipment**

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| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Dumpers/Tenders | 5 | 8.00 | 16 | 0.38 |
| Demolition | Excavators | 1 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 1 | 1.00 | 247 | 0.40 |
| Demolition | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Site Preparation | Dumpers/Tenders | 2 | 8.00 | 16 | 0.38 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Grading | Bore/Drill Rigs | 1 | 8.00 | 221 | 0.50 |
| Grading | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Grading | Dumpers/Tenders | 5 | 8.00 | 16 | 0.38 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Rubber Tired Dozers | 1 | 1.00 | 247 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Building Construction | Air Compressors | 2 | 8.00 | 78 | 0.48 |
| Building Construction | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |
| Building Construction | Cranes | 1 | 4.00 | 231 | 0.29 |
| Building Construction | Forklifts | 2 | 6.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Paving | Cement and Mortar Mixers | 4 | 6.00 | 9 | 0.56 |
| Paving | Pavers | 1 | 7.00 | 130 | 0.42 |
| Paving | Rollers | 1 | 7.00 | 80 | 0.38 |
| Paving | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Architectural Coating | Generator Sets | 2 | 8.00 | 84 | 0.74 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 10 | 25.00 | 0.00 | 347.00 | 14.70 | 6.90 | 41.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 4 | 10.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 12 | 30.00 | 0.00 | 3,335.00 | 14.70 | 6.90 | 41.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 10 | 95.00 | 19.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 3 | 19.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Clean Paved Roads

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0376 | 0.0000 | 0.0376 | 5.6900e-003 | 0.0000 | 5.6900e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 6.9600e-003 | 0.0587 | 0.0605 | 1.0000e-004 | | 3.0000e-003 | 3.0000e-003 | | 2.8600e-003 | 2.8600e-003 | 0.0000 | 8.8556 | 8.8556 | 1.8500e-003 | 0.0000 | 8.9019 |
| **Total** | **6.9600e-003** | **0.0587** | **0.0605** | **1.0000e-004** | **0.0376** | **3.0000e-003** | **0.0406** | **5.6900e-003** | **2.8600e-003** | **8.5500e-003** | **0.0000** | **8.8556** | **8.8556** | **1.8500e-003** | **0.0000** | **8.9019** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.6900e-003 | 0.0818 | 0.0205 | 2.6000e-004 | 6.1100e-003 | 2.9000e-004 | 6.4000e-003 | 1.6800e-003 | 2.7000e-004 | 1.9500e-003 | 0.0000 | 25.3255 | 25.3255 | 1.6100e-003 | 0.0000 | 25.3657 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.4000e-004 | 4.2000e-004 | 4.7300e-003 | 1.0000e-005 | 1.3700e-003 | 1.0000e-005 | 1.3800e-003 | 3.6000e-004 | 1.0000e-005 | 3.7000e-004 | 0.0000 | 1.2362 | 1.2362 | 4.0000e-005 | 0.0000 | 1.2371 |
| **Total** | **3.2300e-003** | **0.0822** | **0.0252** | **2.7000e-004** | **7.4800e-003** | **3.0000e-004** | **7.7800e-003** | **2.0400e-003** | **2.8000e-004** | **2.3200e-003** | **0.0000** | **26.5616** | **26.5616** | **1.6500e-003** | **0.0000** | **26.6028** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0376 | 0.0000 | 0.0376 | 5.6900e-003 | 0.0000 | 5.6900e-003 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 6.9600e-003 | 0.0587 | 0.0605 | 1.0000e-004 | | 3.0000e-003 | 3.0000e-003 | | 2.8600e-003 | 2.8600e-003 | 0.0000 | 8.8556 | 8.8556 | 1.8500e-003 | 0.0000 | 8.9019 |
| **Total** | **6.9600e-003** | **0.0587** | **0.0605** | **1.0000e-004** | **0.0376** | **3.0000e-003** | **0.0406** | **5.6900e-003** | **2.8600e-003** | **8.5500e-003** | **0.0000** | **8.8556** | **8.8556** | **1.8500e-003** | **0.0000** | **8.9019** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.6900e-003 | 0.0818 | 0.0205 | 2.6000e-004 | 3.9900e-003 | 2.9000e-004 | 4.2800e-003 | 1.1600e-003 | 2.7000e-004 | 1.4300e-003 | 0.0000 | 25.3255 | 25.3255 | 1.6100e-003 | 0.0000 | 25.3657 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 5.4000e-004 | 4.2000e-004 | 4.7300e-003 | 1.0000e-005 | 8.2000e-004 | 1.0000e-005 | 8.3000e-004 | 2.3000e-004 | 1.0000e-005 | 2.4000e-004 | 0.0000 | 1.2362 | 1.2362 | 4.0000e-005 | 0.0000 | 1.2371 |
| **Total** | **3.2300e-003** | **0.0822** | **0.0252** | **2.7000e-004** | **4.8100e-003** | **3.0000e-004** | **5.1100e-003** | **1.3900e-003** | **2.8000e-004** | **1.6700e-003** | **0.0000** | **26.5616** | **26.5616** | **1.6500e-003** | **0.0000** | **26.6028** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 2.7000e-004 | 0.0000 | 2.7000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.9000e-004 | 4.3700e-003 | 2.2600e-003 | 1.0000e-005 | | 1.7000e-004 | 1.7000e-004 | | 1.6000e-004 | 1.6000e-004 | 0.0000 | 0.4828 | 0.4828 | 1.4000e-004 | 0.0000 | 0.4864 |
| **Total** | **3.9000e-004** | **4.3700e-003** | **2.2600e-003** | **1.0000e-005** | **2.7000e-004** | **1.7000e-004** | **4.4000e-004** | **3.0000e-005** | **1.6000e-004** | **1.9000e-004** | **0.0000** | **0.4828** | **0.4828** | **1.4000e-004** | **0.0000** | **0.4864** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.0000e-005 | 2.0000e-005 | 1.9000e-004 | 0.0000 | 5.0000e-005 | 0.0000 | 6.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0495 | 0.0495 | 0.0000 | 0.0000 | 0.0495 |
| **Total** | **2.0000e-005** | **2.0000e-005** | **1.9000e-004** | **0.0000** | **5.0000e-005** | **0.0000** | **6.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0495** | **0.0495** | **0.0000** | **0.0000** | **0.0495** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 2.7000e-004 | 0.0000 | 2.7000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.9000e-004 | 4.3700e-003 | 2.2600e-003 | 1.0000e-005 | | 1.7000e-004 | 1.7000e-004 | | 1.6000e-004 | 1.6000e-004 | 0.0000 | 0.4828 | 0.4828 | 1.4000e-004 | 0.0000 | 0.4864 |
| **Total** | **3.9000e-004** | **4.3700e-003** | **2.2600e-003** | **1.0000e-005** | **2.7000e-004** | **1.7000e-004** | **4.4000e-004** | **3.0000e-005** | **1.6000e-004** | **1.9000e-004** | **0.0000** | **0.4828** | **0.4828** | **1.4000e-004** | **0.0000** | **0.4864** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.0000e-005 | 2.0000e-005 | 1.9000e-004 | 0.0000 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0495 | 0.0495 | 0.0000 | 0.0000 | 0.0495 |
| **Total** | **2.0000e-005** | **2.0000e-005** | **1.9000e-004** | **0.0000** | **3.0000e-005** | **0.0000** | **3.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0495** | **0.0495** | **0.0000** | **0.0000** | **0.0495** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 2.7300e-003 | 0.0000 | 2.7300e-003 | 6.8000e-004 | 0.0000 | 6.8000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.8800e-003 | 0.0169 | 0.0174 | 4.0000e-005 | | 8.0000e-004 | 8.0000e-004 | | 7.5000e-004 | 7.5000e-004 | 0.0000 | 3.0523 | 3.0523 | 7.8000e-004 | 0.0000 | 3.0719 |
| **Total** | **1.8800e-003** | **0.0169** | **0.0174** | **4.0000e-005** | **2.7300e-003** | **8.0000e-004** | **3.5300e-003** | **6.8000e-004** | **7.5000e-004** | **1.4300e-003** | **0.0000** | **3.0523** | **3.0523** | **7.8000e-004** | **0.0000** | **3.0719** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0259 | 0.7857 | 0.1972 | 2.4700e-003 | 0.0587 | 2.7600e-003 | 0.0615 | 0.0161 | 2.6400e-003 | 0.0188 | 0.0000 | 243.4020 | 243.4020 | 0.0155 | 0.0000 | 243.7888 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.3000e-004 | 1.0000e-004 | 1.1300e-003 | 0.0000 | 3.3000e-004 | 0.0000 | 3.3000e-004 | 9.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.2967 | 0.2967 | 1.0000e-005 | 0.0000 | 0.2969 |
| **Total** | **0.0260** | **0.7858** | **0.1983** | **2.4700e-003** | **0.0590** | **2.7600e-003** | **0.0618** | **0.0162** | **2.6400e-003** | **0.0189** | **0.0000** | **243.6987** | **243.6987** | **0.0155** | **0.0000** | **244.0857** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 2.7300e-003 | 0.0000 | 2.7300e-003 | 6.8000e-004 | 0.0000 | 6.8000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.8800e-003 | 0.0169 | 0.0174 | 4.0000e-005 | | 8.0000e-004 | 8.0000e-004 | | 7.5000e-004 | 7.5000e-004 | 0.0000 | 3.0523 | 3.0523 | 7.8000e-004 | 0.0000 | 3.0719 |
| **Total** | **1.8800e-003** | **0.0169** | **0.0174** | **4.0000e-005** | **2.7300e-003** | **8.0000e-004** | **3.5300e-003** | **6.8000e-004** | **7.5000e-004** | **1.4300e-003** | **0.0000** | **3.0523** | **3.0523** | **7.8000e-004** | **0.0000** | **3.0719** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0259 | 0.7857 | 0.1972 | 2.4700e-003 | 0.0384 | 2.7600e-003 | 0.0412 | 0.0111 | 2.6400e-003 | 0.0138 | 0.0000 | 243.4020 | 243.4020 | 0.0155 | 0.0000 | 243.7888 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.3000e-004 | 1.0000e-004 | 1.1300e-003 | 0.0000 | 2.0000e-004 | 0.0000 | 2.0000e-004 | 6.0000e-005 | 0.0000 | 6.0000e-005 | 0.0000 | 0.2967 | 0.2967 | 1.0000e-005 | 0.0000 | 0.2969 |
| **Total** | **0.0260** | **0.7858** | **0.1983** | **2.4700e-003** | **0.0386** | **2.7600e-003** | **0.0414** | **0.0112** | **2.6400e-003** | **0.0138** | **0.0000** | **243.6987** | **243.6987** | **0.0155** | **0.0000** | **244.0857** |

## 3.5 Building Construction - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0917 | 0.7980 | 0.8206 | 1.3700e-003 | | 0.0447 | 0.0447 | | 0.0430 | 0.0430 | 0.0000 | 116.9275 | 116.9275 | 0.0204 | 0.0000 | 117.4385 |
| **Total** | **0.0917** | **0.7980** | **0.8206** | **1.3700e-003** | | **0.0447** | **0.0447** | | **0.0430** | **0.0430** | **0.0000** | **116.9275** | **116.9275** | **0.0204** | **0.0000** | **117.4385** |

## 3.5 Building Construction - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 2.9500e-003 | 0.0938 | 0.0254 | 2.4000e-004 | 5.9800e-003 | 1.9000e-004 | 6.1800e-003 | 1.7300e-003 | 1.8000e-004 | 1.9100e-003 | 0.0000 | 23.4172 | 23.4172 | 1.4400e-003 | 0.0000 | 23.4531 |
| Worker | 0.0204 | 0.0159 | 0.1796 | 5.2000e-004 | 0.0521 | 4.3000e-004 | 0.0525 | 0.0138 | 4.0000e-004 | 0.0142 | 0.0000 | 46.9736 | 46.9736 | 1.3800e-003 | 0.0000 | 47.0081 |
| **Total** | **0.0234** | **0.1097** | **0.2051** | **7.6000e-004** | **0.0580** | **6.2000e-004** | **0.0587** | **0.0156** | **5.8000e-004** | **0.0161** | **0.0000** | **70.3907** | **70.3907** | **2.8200e-003** | **0.0000** | **70.4612** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0917 | 0.7980 | 0.8206 | 1.3700e-003 | | 0.0447 | 0.0447 | | 0.0430 | 0.0430 | 0.0000 | 116.9274 | 116.9274 | 0.0204 | 0.0000 | 117.4384 |
| **Total** | **0.0917** | **0.7980** | **0.8206** | **1.3700e-003** | | **0.0447** | **0.0447** | | **0.0430** | **0.0430** | **0.0000** | **116.9274** | **116.9274** | **0.0204** | **0.0000** | **117.4384** |

## 3.5 Building Construction - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 2.9500e-003 | 0.0938 | 0.0254 | 2.4000e-004 | 4.0400e-003 | 1.9000e-004 | 4.2300e-003 | 1.2500e-003 | 1.8000e-004 | 1.4300e-003 | 0.0000 | 23.4172 | 23.4172 | 1.4400e-003 | 0.0000 | 23.4531 |
| Worker | 0.0204 | 0.0159 | 0.1796 | 5.2000e-004 | 0.0313 | 4.3000e-004 | 0.0317 | 8.7300e-003 | 4.0000e-004 | 9.1300e-003 | 0.0000 | 46.9736 | 46.9736 | 1.3800e-003 | 0.0000 | 47.0081 |
| **Total** | **0.0234** | **0.1097** | **0.2051** | **7.6000e-004** | **0.0353** | **6.2000e-004** | **0.0360** | **9.9800e-003** | **5.8000e-004** | **0.0106** | **0.0000** | **70.3907** | **70.3907** | **2.8200e-003** | **0.0000** | **70.4612** |

## 3.6 Paving - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 1.8000e-003 | 0.0168 | 0.0177 | 3.0000e-005 | | 8.8000e-004 | 8.8000e-004 | | 8.2000e-004 | 8.2000e-004 | 0.0000 | 2.3481 | 2.3481 | 6.8000e-004 | 0.0000 | 2.3652 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **1.8000e-003** | **0.0168** | **0.0177** | **3.0000e-005** | | **8.8000e-004** | **8.8000e-004** | | **8.2000e-004** | **8.2000e-004** | **0.0000** | **2.3481** | **2.3481** | **6.8000e-004** | **0.0000** | **2.3652** |

## 3.6 Paving - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.9000e-004 | 1.5000e-004 | 1.7000e-003 | 0.0000 | 4.9000e-004 | 0.0000 | 5.0000e-004 | 1.3000e-004 | 0.0000 | 1.3000e-004 | 0.0000 | 0.4450 | 0.4450 | 1.0000e-005 | 0.0000 | 0.4453 |
| **Total** | **1.9000e-004** | **1.5000e-004** | **1.7000e-003** | **0.0000** | **4.9000e-004** | **0.0000** | **5.0000e-004** | **1.3000e-004** | **0.0000** | **1.3000e-004** | **0.0000** | **0.4450** | **0.4450** | **1.0000e-005** | **0.0000** | **0.4453** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 1.8000e-003 | 0.0168 | 0.0177 | 3.0000e-005 | | 8.8000e-004 | 8.8000e-004 | | 8.2000e-004 | 8.2000e-004 | 0.0000 | 2.3481 | 2.3481 | 6.8000e-004 | 0.0000 | 2.3652 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **1.8000e-003** | **0.0168** | **0.0177** | **3.0000e-005** | | **8.8000e-004** | **8.8000e-004** | | **8.2000e-004** | **8.2000e-004** | **0.0000** | **2.3481** | **2.3481** | **6.8000e-004** | **0.0000** | **2.3652** |

## 3.6 Paving - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.9000e-004 | 1.5000e-004 | 1.7000e-003 | 0.0000 | 3.0000e-004 | 0.0000 | 3.0000e-004 | 8.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.4450 | 0.4450 | 1.0000e-005 | 0.0000 | 0.4453 |
| **Total** | **1.9000e-004** | **1.5000e-004** | **1.7000e-003** | **0.0000** | **3.0000e-004** | **0.0000** | **3.0000e-004** | **8.0000e-005** | **0.0000** | **9.0000e-005** | **0.0000** | **0.4450** | **0.4450** | **1.0000e-005** | **0.0000** | **0.4453** |

## 3.7 Architectural Coating - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.2672 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.3300e-003 | 0.0197 | 0.0230 | 4.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 3.4644 | 3.4644 | 1.9000e-004 | 0.0000 | 3.4691 |
| **Total** | **0.2696** | **0.0197** | **0.0230** | **4.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **3.4644** | **3.4644** | **1.9000e-004** | **0.0000** | **3.4691** |

## 3.7 Architectural Coating - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.0000e-004 | 1.6000e-004 | 1.8000e-003 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 5.2000e-004 | 1.4000e-004 | 0.0000 | 1.4000e-004 | 0.0000 | 0.4697 | 0.4697 | 1.0000e-005 | 0.0000 | 0.4701 |
| **Total** | **2.0000e-004** | **1.6000e-004** | **1.8000e-003** | **1.0000e-005** | **5.2000e-004** | **0.0000** | **5.2000e-004** | **1.4000e-004** | **0.0000** | **1.4000e-004** | **0.0000** | **0.4697** | **0.4697** | **1.0000e-005** | **0.0000** | **0.4701** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.2672 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.3300e-003 | 0.0197 | 0.0230 | 4.0000e-005 | | 1.0700e-003 | 1.0700e-003 | | 1.0700e-003 | 1.0700e-003 | 0.0000 | 3.4644 | 3.4644 | 1.9000e-004 | 0.0000 | 3.4691 |
| **Total** | **0.2696** | **0.0197** | **0.0230** | **4.0000e-005** | | **1.0700e-003** | **1.0700e-003** | | **1.0700e-003** | **1.0700e-003** | **0.0000** | **3.4644** | **3.4644** | **1.9000e-004** | **0.0000** | **3.4691** |

### 3.7 Architectural Coating - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.0000e-004 | 1.6000e-004 | 1.8000e-003 | 1.0000e-005 | 3.1000e-004 | 0.0000 | 3.2000e-004 | 9.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.4697 | 0.4697 | 1.0000e-005 | 0.0000 | 0.4701 |
| **Total** | **2.0000e-004** | **1.6000e-004** | **1.8000e-003** | **1.0000e-005** | **3.1000e-004** | **0.0000** | **3.2000e-004** | **9.0000e-005** | **0.0000** | **9.0000e-005** | **0.0000** | **0.4697** | **0.4697** | **1.0000e-005** | **0.0000** | **0.4701** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.1680 | 0.8845 | 2.3175 | 8.4600e-003 | 0.6994 | 7.0700e-003 | 0.7065 | 0.1875 | 6.6000e-003 | 0.1941 | 0.0000 | 781.4787 | 781.4787 | 0.0402 | 0.0000 | 782.4833 |
| Unmitigated | 0.1680 | 0.8845 | 2.3175 | 8.4600e-003 | 0.6994 | 7.0700e-003 | 0.7065 | 0.1875 | 6.6000e-003 | 0.1941 | 0.0000 | 781.4787 | 781.4787 | 0.0402 | 0.0000 | 782.4833 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Mid Rise | 539.58 | 539.58 | 539.58 | 1,842,711 | 1,842,711 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | | |
| Total | 539.58 | 539.58 | 539.58 | 1,842,711 | 1,842,711 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.00 | 19.00 | 41.00 | 86 | 11 | 3 |
| Enclosed Parking with Elevator | 16.60 | 8.40 | 6.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Mid Rise | 0.546501 | 0.044961 | 0.204016 | 0.120355 | 0.015740 | 0.006196 | 0.020131 | 0.030678 | 0.002515 | 0.002201 | 0.005142 | 0.000687 | 0.000876 |
| Enclosed Parking with Elevator | 0.546501 | 0.044961 | 0.204016 | 0.120355 | 0.015740 | 0.006196 | 0.020131 | 0.030678 | 0.002515 | 0.002201 | 0.005142 | 0.000687 | 0.000876 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 390.7732 | 390.7732 | 9.2300e-003 | 1.9100e-003 | 391.5730 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 390.7732 | 390.7732 | 9.2300e-003 | 1.9100e-003 | 391.5730 |
| NaturalGas Mitigated | 5.0700e-003 | 0.0433 | 0.0184 | 2.8000e-004 | | 3.5000e-003 | 3.5000e-003 | | 3.5000e-003 | 3.5000e-003 | 0.0000 | 50.1688 | 50.1688 | 9.6000e-004 | 9.2000e-004 | 50.4669 |
| NaturalGas Unmitigated | 5.0700e-003 | 0.0433 | 0.0184 | 2.8000e-004 | | 3.5000e-003 | 3.5000e-003 | | 3.5000e-003 | 3.5000e-003 | 0.0000 | 50.1688 | 50.1688 | 9.6000e-004 | 9.2000e-004 | 50.4669 |

## 5.2 Energy by Land Use - NaturalGas

### Unmitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Mid Rise | 940128 | 5.0700e-003 | 0.0433 | 0.0184 | 2.8000e-004 | | 3.5000e-003 | 3.5000e-003 | | 3.5000e-003 | 3.5000e-003 | 0.0000 | 50.1688 | 50.1688 | 9.6000e-004 | 9.2000e-004 | 50.4669 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **5.0700e-003** | **0.0433** | **0.0184** | **2.8000e-004** | | **3.5000e-003** | **3.5000e-003** | | **3.5000e-003** | **3.5000e-003** | **0.0000** | **50.1688** | **50.1688** | **9.6000e-004** | **9.2000e-004** | **50.4669** |

### Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Apartments Mid Rise | 940128 | 5.0700e-003 | 0.0433 | 0.0184 | 2.8000e-004 | | 3.5000e-003 | 3.5000e-003 | | 3.5000e-003 | 3.5000e-003 | 0.0000 | 50.1688 | 50.1688 | 9.6000e-004 | 9.2000e-004 | 50.4669 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **5.0700e-003** | **0.0433** | **0.0184** | **2.8000e-004** | | **3.5000e-003** | **3.5000e-003** | | **3.5000e-003** | **3.5000e-003** | **0.0000** | **50.1688** | **50.1688** | **9.6000e-004** | **9.2000e-004** | **50.4669** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Mid Rise | 403928 | 224.9725 | 5.3100e-003 | 1.1000e-003 | 225.4329 |
| Enclosed Parking with Elevator | 297688 | 165.8008 | 3.9200e-003 | 8.1000e-004 | 166.1401 |
| **Total** | | **390.7732** | **9.2300e-003** | **1.9100e-003** | **391.5730** |

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Apartments Mid Rise | 403928 | 224.9725 | 5.3100e-003 | 1.1000e-003 | 225.4329 |
| Enclosed Parking with Elevator | 297688 | 165.8008 | 3.9200e-003 | 8.1000e-004 | 166.1401 |
| **Total** | | **390.7732** | **9.2300e-003** | **1.9100e-003** | **391.5730** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.3625 | 0.0122 | 1.0547 | 6.0000e-005 | | 5.8200e-003 | 5.8200e-003 | | 5.8200e-003 | 5.8200e-003 | 0.0000 | 1.7214 | 1.7214 | 1.6700e-003 | 0.0000 | 1.7631 |
| Unmitigated | 0.3625 | 0.0122 | 1.0547 | 6.0000e-005 | | 5.8200e-003 | 5.8200e-003 | | 5.8200e-003 | 5.8200e-003 | 0.0000 | 1.7214 | 1.7214 | 1.6700e-003 | 0.0000 | 1.7631 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0267 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.3038 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0320 | 0.0122 | 1.0547 | 6.0000e-005 | | 5.8200e-003 | 5.8200e-003 | | 5.8200e-003 | 5.8200e-003 | 0.0000 | 1.7214 | 1.7214 | 1.6700e-003 | 0.0000 | 1.7631 |
| **Total** | **0.3625** | **0.0122** | **1.0547** | **6.0000e-005** | | **5.8200e-003** | **5.8200e-003** | | **5.8200e-003** | **5.8200e-003** | **0.0000** | **1.7214** | **1.7214** | **1.6700e-003** | **0.0000** | **1.7631** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0267 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.3038 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0320 | 0.0122 | 1.0547 | 6.0000e-005 | | 5.8200e-003 | 5.8200e-003 | | 5.8200e-003 | 5.8200e-003 | 0.0000 | 1.7214 | 1.7214 | 1.6700e-003 | 0.0000 | 1.7631 |
| **Total** | **0.3625** | **0.0122** | **1.0547** | **6.0000e-005** | | **5.8200e-003** | **5.8200e-003** | | **5.8200e-003** | **5.8200e-003** | **0.0000** | **1.7214** | **1.7214** | **1.6700e-003** | **0.0000** | **1.7631** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 76.2295 | 0.2183 | 5.4800e-003 | 83.3187 |
| Unmitigated | 76.2295 | 0.2183 | 5.4800e-003 | 83.3187 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Mid Rise | 6.64571 / 4.18969 | 76.2295 | 0.2183 | 5.4800e-003 | 83.3187 |
| Enclosed Parking with Elevator | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **76.2295** | **0.2183** | **5.4800e-003** | **83.3187** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Apartments Mid Rise | 6.64571 / 4.18969 | 76.2295 | 0.2183 | 5.4800e-003 | 83.3187 |
| Enclosed Parking with Elevator | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **76.2295** | **0.2183** | **5.4800e-003** | **83.3187** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 9.5243 | 0.5629 | 0.0000 | 23.5961 |
| Unmitigated | 9.5243 | 0.5629 | 0.0000 | 23.5961 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Mid Rise | 46.92 | 9.5243 | 0.5629 | 0.0000 | 23.5961 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **9.5243** | **0.5629** | **0.0000** | **23.5961** |

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Apartments Mid Rise | 46.92 | 9.5243 | 0.5629 | 0.0000 | 23.5961 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **9.5243** | **0.5629** | **0.0000** | **23.5961** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

### Fire Pumps and Emergency Generators

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

### Boilers

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

### User Defined Equipment

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# 1331 South Pacific Avenue Future

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Enclosed Parking with Elevator | 127.00 | Space | 0.00 | 50,800.00 | 0 |
| Apartments Mid Rise | 102.00 | Dwelling Unit | 0.72 | 83,158.00 | 245 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 11 | | | **Operational Year** | 2022 |
| **Utility Company** | Los Angeles Department of Water & Power | | | | |
| **CO2 Intensity (lb/MWhr)** | 1227.89 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Consistent with Response's model.

Construction Phase - See SWAPE comment about construction phase changes.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment -

Off-road Equipment - Consistent with Response's model.

Trips and VMT - See SWAPE comment about worker trips.

Demolition - Consistent with Response's model.

Grading - Consistent with Response's model.

Vehicle Trips - Consistent with Response's model.

Woodstoves - Consistent with Response's model.

Construction Off-road Equipment Mitigation - Consistent with Response's model.

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 46 |
| tblFireplaces | NumberGas | 86.70 | 0.00 |
| tblFireplaces | NumberNoFireplace | 10.20 | 109.00 |
| tblFireplaces | NumberWood | 5.10 | 0.00 |
| tblGrading | AcresOfGrading | 0.00 | 1.24 |
| tblGrading | MaterialExported | 0.00 | 23,348.00 |
| tblLandUse | LandUseSquareFeet | 102,000.00 | 83,158.00 |
| tblLandUse | LotAcreage | 1.14 | 0.00 |
| tblLandUse | LotAcreage | 2.68 | 0.72 |
| tblLandUse | Population | 292.00 | 245.00 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 41.00 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 41.00 |
| tblTripsAndVMT | HaulingTripNumber | 2,919.00 | 3,335.00 |
| tblVehicleTrips | HO_TTP | 40.60 | 41.00 |
| tblVehicleTrips | HS_TTP | 19.20 | 19.00 |
| tblVehicleTrips | HW_TTP | 40.20 | 40.00 |
| tblVehicleTrips | ST_TR | 6.39 | 5.29 |
| tblVehicleTrips | SU_TR | 5.86 | 5.29 |
| tblVehicleTrips | WD_TR | 6.65 | 5.29 |
| tblWoodstoves | NumberCatalytic | 5.10 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 5.10 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 107.9089 | 770.7806 | 213.5676 | 2.5207 | 62.8002 | 3.5497 | 66.3499 | 17.1446 | 3.3876 | 20.5322 | 0.0000 | 273,037.9654 | 273,037.9654 | 17.7860 | 0.0000 | 273,482.6146 |
| **Maximum** | **107.9089** | **770.7806** | **213.5676** | **2.5207** | **62.8002** | **3.5497** | **66.3499** | **17.1446** | **3.3876** | **20.5322** | **0.0000** | **273,037.9654** | **273,037.9654** | **17.7860** | **0.0000** | **273,482.6146** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 107.9089 | 770.7806 | 213.5676 | 2.5207 | 41.8766 | 3.5497 | 45.4263 | 12.0088 | 3.3876 | 15.3964 | 0.0000 | 273,037.9654 | 273,037.9654 | 17.7860 | 0.0000 | 273,482.6146 |
| **Maximum** | **107.9089** | **770.7806** | **213.5676** | **2.5207** | **41.8766** | **3.5497** | **45.4263** | **12.0088** | **3.3876** | **15.3964** | **0.0000** | **273,037.9654** | **273,037.9654** | **17.7860** | **0.0000** | **273,482.6146** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 33.32 | 0.00 | 31.54 | 29.96 | 0.00 | 25.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 2.0666 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | 0.0000 | 15.1801 | 15.1801 | 0.0147 | 0.0000 | 15.5474 |
| Energy | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |
| Mobile | 0.9727 | 4.6567 | 13.2445 | 0.0482 | 3.9184 | 0.0388 | 3.9573 | 1.0486 | 0.0362 | 1.0849 | | 4,903.6887 | 4,903.6887 | 0.2452 | | 4,909.8178 |
| **Total** | **3.0671** | **4.9913** | **21.7827** | **0.0502** | **3.9184** | **0.1046** | **4.0230** | **1.0486** | **0.1020** | **1.1506** | **0.0000** | **5,221.8915** | **5,221.8915** | **0.2657** | **5.5600e-003** | **5,230.1886** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 2.0666 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | 0.0000 | 15.1801 | 15.1801 | 0.0147 | 0.0000 | 15.5474 |
| Energy | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |
| Mobile | 0.9727 | 4.6567 | 13.2445 | 0.0482 | 3.9184 | 0.0388 | 3.9573 | 1.0486 | 0.0362 | 1.0849 | | 4,903.6887 | 4,903.6887 | 0.2452 | | 4,909.8178 |
| **Total** | **3.0671** | **4.9913** | **21.7827** | **0.0502** | **3.9184** | **0.1046** | **4.0230** | **1.0486** | **0.1020** | **1.1506** | **0.0000** | **5,221.8915** | **5,221.8915** | **0.2657** | **5.5600e-003** | **5,230.1886** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 6/15/2021 | 6/28/2021 | 5 | 10 | |
| 2 | Site Preparation | Site Preparation | 6/29/2021 | 6/29/2021 | 5 | 1 | |
| 3 | Grading | Grading | 6/30/2021 | 7/1/2021 | 5 | 2 | |
| 4 | Building Construction | Building Construction | 7/2/2021 | 11/18/2021 | 5 | 100 | |
| 5 | Paving | Paving | 11/19/2021 | 11/25/2021 | 5 | 5 | |
| 6 | Architectural Coating | Architectural Coating | 11/26/2021 | 12/2/2021 | 5 | 5 | |

**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Grading (Grading Phase): 1.24**

**Acres of Paving: 0**

**Residential Indoor: 168,395; Residential Outdoor: 56,132; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 3,048 (Architectural Coating – sqft)**

**OffRoad Equipment**

1331 South Pacific Avenue Future - Los Angeles-South Coast County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Dumpers/Tenders | 5 | 8.00 | 16 | 0.38 |
| Demolition | Excavators | 1 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 1 | 1.00 | 247 | 0.40 |
| Demolition | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Site Preparation | Dumpers/Tenders | 2 | 8.00 | 16 | 0.38 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Grading | Bore/Drill Rigs | 1 | 8.00 | 221 | 0.50 |
| Grading | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Grading | Dumpers/Tenders | 5 | 8.00 | 16 | 0.38 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Rubber Tired Dozers | 1 | 1.00 | 247 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Building Construction | Air Compressors | 2 | 8.00 | 78 | 0.48 |
| Building Construction | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |
| Building Construction | Cranes | 1 | 4.00 | 231 | 0.29 |
| Building Construction | Forklifts | 2 | 6.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Paving | Cement and Mortar Mixers | 4 | 6.00 | 9 | 0.56 |
| Paving | Pavers | 1 | 7.00 | 130 | 0.42 |
| Paving | Rollers | 1 | 7.00 | 80 | 0.38 |
| Paving | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Architectural Coating | Generator Sets | 2 | 8.00 | 84 | 0.74 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 10 | 25.00 | 0.00 | 347.00 | 14.70 | 6.90 | 41.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 4 | 10.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 12 | 30.00 | 0.00 | 3,335.00 | 14.70 | 6.90 | 41.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 10 | 95.00 | 19.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 3 | 19.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Clean Paved Roads

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 7.5132 | 0.0000 | 7.5132 | 1.1376 | 0.0000 | 1.1376 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.3930 | 11.7296 | 12.0950 | 0.0209 | | 0.5992 | 0.5992 | | 0.5721 | 0.5721 | | 1,952.3273 | 1,952.3273 | 0.4083 | | 1,962.5353 |
| **Total** | **1.3930** | **11.7296** | **12.0950** | **0.0209** | **7.5132** | **0.5992** | **8.1124** | **1.1376** | **0.5721** | **1.7096** | | **1,952.3273** | **1,952.3273** | **0.4083** | | **1,962.5353** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.5355 | 15.6860 | 4.0562 | 0.0516 | 1.2431 | 0.0573 | 1.3003 | 0.3407 | 0.0548 | 0.3955 | | 5,604.6848 | 5,604.6848 | 0.3519 | | 5,613.4824 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1072 | 0.0737 | 1.0069 | 2.8600e-003 | 0.2794 | 2.2600e-003 | 0.2817 | 0.0741 | 2.0800e-003 | 0.0762 | | 284.6925 | 284.6925 | 8.3900e-003 | | 284.9022 |
| **Total** | **0.6426** | **15.7597** | **5.0631** | **0.0545** | **1.5225** | **0.0595** | **1.5820** | **0.4148** | **0.0569** | **0.4717** | | **5,889.3772** | **5,889.3772** | **0.3603** | | **5,898.3846** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 7.5132 | 0.0000 | 7.5132 | 1.1376 | 0.0000 | 1.1376 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.3930 | 11.7296 | 12.0950 | 0.0209 | | 0.5992 | 0.5992 | | 0.5721 | 0.5721 | 0.0000 | 1,952.3273 | 1,952.3273 | 0.4083 | | 1,962.5353 |
| **Total** | **1.3930** | **11.7296** | **12.0950** | **0.0209** | **7.5132** | **0.5992** | **8.1124** | **1.1376** | **0.5721** | **1.7096** | **0.0000** | **1,952.3273** | **1,952.3273** | **0.4083** | | **1,962.5353** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.5355 | 15.6860 | 4.0562 | 0.0516 | 0.8104 | 0.0573 | 0.8677 | 0.2345 | 0.0548 | 0.2893 | | 5,604.6848 | 5,604.6848 | 0.3519 | | 5,613.4824 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1072 | 0.0737 | 1.0069 | 2.8600e-003 | 0.1677 | 2.2600e-003 | 0.1700 | 0.0467 | 2.0800e-003 | 0.0488 | | 284.6925 | 284.6925 | 8.3900e-003 | | 284.9022 |
| **Total** | **0.6426** | **15.7597** | **5.0631** | **0.0545** | **0.9781** | **0.0595** | **1.0376** | **0.2812** | **0.0569** | **0.3380** | | **5,889.3772** | **5,889.3772** | **0.3603** | | **5,898.3846** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.5303 | 0.0000 | 0.5303 | 0.0573 | 0.0000 | 0.0573 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.7872 | 8.7497 | 4.5291 | 0.0112 | | 0.3344 | 0.3344 | | 0.3105 | 0.3105 | | 1,064.4648 | 1,064.4648 | 0.3179 | | 1,072.4132 |
| **Total** | **0.7872** | **8.7497** | **4.5291** | **0.0112** | **0.5303** | **0.3344** | **0.8647** | **0.0573** | **0.3105** | **0.3677** | | **1,064.4648** | **1,064.4648** | **0.3179** | | **1,072.4132** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0429 | 0.0295 | 0.4028 | 1.1400e-003 | 0.1118 | 9.0000e-004 | 0.1127 | 0.0296 | 8.3000e-004 | 0.0305 | | 113.8770 | 113.8770 | 3.3600e-003 | | 113.9609 |
| **Total** | **0.0429** | **0.0295** | **0.4028** | **1.1400e-003** | **0.1118** | **9.0000e-004** | **0.1127** | **0.0296** | **8.3000e-004** | **0.0305** | | **113.8770** | **113.8770** | **3.3600e-003** | | **113.9609** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.5303 | 0.0000 | 0.5303 | 0.0573 | 0.0000 | 0.0573 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.7872 | 8.7497 | 4.5291 | 0.0112 | | 0.3344 | 0.3344 | | 0.3105 | 0.3105 | 0.0000 | 1,064.4648 | 1,064.4648 | 0.3179 | | 1,072.4132 |
| **Total** | **0.7872** | **8.7497** | **4.5291** | **0.0112** | **0.5303** | **0.3344** | **0.8647** | **0.0573** | **0.3105** | **0.3677** | **0.0000** | **1,064.4648** | **1,064.4648** | **0.3179** | | **1,072.4132** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0429 | 0.0295 | 0.4028 | 1.1400e-003 | 0.0671 | 9.0000e-004 | 0.0680 | 0.0187 | 8.3000e-004 | 0.0195 | | 113.8770 | 113.8770 | 3.3600e-003 | | 113.9609 |
| **Total** | **0.0429** | **0.0295** | **0.4028** | **1.1400e-003** | **0.0671** | **9.0000e-004** | **0.0680** | **0.0187** | **8.3000e-004** | **0.0195** | | **113.8770** | **113.8770** | **3.3600e-003** | | **113.9609** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.7305 | 0.0000 | 2.7305 | 0.6847 | 0.0000 | 0.6847 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.8803 | 16.9058 | 17.4408 | 0.0355 | | 0.7952 | 0.7952 | | 0.7525 | 0.7525 | | 3,364.5817 | 3,364.5817 | 0.8651 | | 3,386.2084 |
| **Total** | **1.8803** | **16.9058** | **17.4408** | **0.0355** | **2.7305** | **0.7952** | **3.5257** | **0.6847** | **0.7525** | **1.4372** | | **3,364.5817** | **3,364.5817** | **0.8651** | | **3,386.2084** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 25.7310 | 753.7864 | 194.9185 | 2.4818 | 59.7344 | 2.7517 | 62.4862 | 16.3710 | 2.6326 | 19.0036 | | 269,331.7527 | 269,331.7527 | 16.9108 | | 269,754.5235 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1286 | 0.0884 | 1.2083 | 3.4300e-003 | 0.3353 | 2.7100e-003 | 0.3380 | 0.0889 | 2.5000e-003 | 0.0914 | | 341.6310 | 341.6310 | 0.0101 | | 341.8826 |
| **Total** | **25.8596** | **753.8748** | **196.1268** | **2.4852** | **60.0698** | **2.7545** | **62.8242** | **16.4599** | **2.6351** | **19.0950** | | **269,673.3837** | **269,673.3837** | **16.9209** | | **270,096.4061** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.7305 | 0.0000 | 2.7305 | 0.6847 | 0.0000 | 0.6847 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.8803 | 16.9058 | 17.4408 | 0.0355 | | 0.7952 | 0.7952 | | 0.7525 | 0.7525 | 0.0000 | 3,364.5817 | 3,364.5817 | 0.8651 | | 3,386.2084 |
| **Total** | **1.8803** | **16.9058** | **17.4408** | **0.0355** | **2.7305** | **0.7952** | **3.5257** | **0.6847** | **0.7525** | **1.4372** | **0.0000** | **3,364.5817** | **3,364.5817** | **0.8651** | | **3,386.2084** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 25.7310 | 753.7864 | 194.9185 | 2.4818 | 38.9448 | 2.7517 | 41.6966 | 11.2681 | 2.6326 | 13.9007 | | 269,331.7527 | 269,331.7527 | 16.9108 | | 269,754.5235 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1286 | 0.0884 | 1.2083 | 3.4300e-003 | 0.2012 | 2.7100e-003 | 0.2039 | 0.0560 | 2.5000e-003 | 0.0585 | | 341.6310 | 341.6310 | 0.0101 | | 341.8826 |
| **Total** | **25.8596** | **753.8748** | **196.1268** | **2.4852** | **39.1461** | **2.7545** | **41.9005** | **11.3241** | **2.6351** | **13.9592** | | **269,673.3837** | **269,673.3837** | **16.9209** | | **270,096.4061** |

## 3.5 Building Construction - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.8336 | 15.9591 | 16.4119 | 0.0273 | | 0.8948 | 0.8948 | | 0.8590 | 0.8590 | | 2,577.8111 | 2,577.8111 | 0.4506 | | 2,589.0759 |
| **Total** | **1.8336** | **15.9591** | **16.4119** | **0.0273** | | **0.8948** | **0.8948** | | **0.8590** | **0.8590** | | **2,577.8111** | **2,577.8111** | **0.4506** | | **2,589.0759** |

## 3.5 Building Construction - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0578 | 1.8447 | 0.4823 | 4.8900e-003 | 0.1216 | 3.7700e-003 | 0.1254 | 0.0350 | 3.6100e-003 | 0.0386 | | 522.2732 | 522.2732 | 0.0308 | | 523.0424 |
| Worker | 0.4072 | 0.2799 | 3.8264 | 0.0109 | 1.0619 | 8.5800e-003 | 1.0705 | 0.2816 | 7.9000e-003 | 0.2895 | | 1,081.8314 | 1,081.8314 | 0.0319 | | 1,082.6283 |
| **Total** | **0.4650** | **2.1246** | **4.3086** | **0.0158** | **1.1835** | **0.0124** | **1.1959** | **0.3166** | **0.0115** | **0.3282** | | **1,604.1046** | **1,604.1046** | **0.0627** | | **1,605.6707** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.8336 | 15.9591 | 16.4119 | 0.0273 | | 0.8948 | 0.8948 | | 0.8590 | 0.8590 | 0.0000 | 2,577.8111 | 2,577.8111 | 0.4506 | | 2,589.0759 |
| **Total** | **1.8336** | **15.9591** | **16.4119** | **0.0273** | | **0.8948** | **0.8948** | | **0.8590** | **0.8590** | **0.0000** | **2,577.8111** | **2,577.8111** | **0.4506** | | **2,589.0759** |

## 3.5 Building Construction - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0578 | 1.8447 | 0.4823 | 4.8900e-003 | 0.0818 | 3.7700e-003 | 0.0856 | 0.0252 | 3.6100e-003 | 0.0288 | | 522.2732 | 522.2732 | 0.0308 | | 523.0424 |
| Worker | 0.4072 | 0.2799 | 3.8264 | 0.0109 | 0.6372 | 8.5800e-003 | 0.6458 | 0.1774 | 7.9000e-003 | 0.1853 | | 1,081.8314 | 1,081.8314 | 0.0319 | | 1,082.6283 |
| **Total** | **0.4650** | **2.1246** | **4.3086** | **0.0158** | **0.7190** | **0.0124** | **0.7314** | **0.2026** | **0.0115** | **0.2141** | | **1,604.1046** | **1,604.1046** | **0.0627** | | **1,605.6707** |

## 3.6 Paving - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.7214 | 6.7178 | 7.0899 | 0.0113 | | 0.3534 | 0.3534 | | 0.3286 | 0.3286 | | 1,035.3425 | 1,035.3425 | 0.3016 | | 1,042.8818 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.7214** | **6.7178** | **7.0899** | **0.0113** | | **0.3534** | **0.3534** | | **0.3286** | **0.3286** | | **1,035.3425** | **1,035.3425** | **0.3016** | | **1,042.8818** |

## 3.6 Paving - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |
| **Total** | **0.0772** | **0.0530** | **0.7250** | **2.0600e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **204.9786** | **204.9786** | **6.0400e-003** | | **205.1296** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.7214 | 6.7178 | 7.0899 | 0.0113 | | 0.3534 | 0.3534 | | 0.3286 | 0.3286 | 0.0000 | 1,035.3425 | 1,035.3425 | 0.3016 | | 1,042.8818 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.7214** | **6.7178** | **7.0899** | **0.0113** | | **0.3534** | **0.3534** | | **0.3286** | **0.3286** | **0.0000** | **1,035.3425** | **1,035.3425** | **0.3016** | | **1,042.8818** |

## 3.6 Paving - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0772 | 0.0530 | 0.7250 | 2.0600e-003 | 0.1207 | 1.6300e-003 | 0.1224 | 0.0336 | 1.5000e-003 | 0.0351 | | 204.9786 | 204.9786 | 6.0400e-003 | | 205.1296 |
| **Total** | **0.0772** | **0.0530** | **0.7250** | **2.0600e-003** | **0.1207** | **1.6300e-003** | **0.1224** | **0.0336** | **1.5000e-003** | **0.0351** | | **204.9786** | **204.9786** | **6.0400e-003** | | **205.1296** |

## 3.7 Architectural Coating - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 106.8938 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.9337 | 7.8592 | 9.1870 | 0.0161 | | 0.4296 | 0.4296 | | 0.4296 | 0.4296 | | 1,527.5172 | 1,527.5172 | 0.0829 | | 1,529.5897 |
| **Total** | **107.8275** | **7.8592** | **9.1870** | **0.0161** | | **0.4296** | **0.4296** | | **0.4296** | **0.4296** | | **1,527.5172** | **1,527.5172** | **0.0829** | | **1,529.5897** |

## 3.7 Architectural Coating - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0814 | 0.0560 | 0.7653 | 2.1700e-003 | 0.2124 | 1.7200e-003 | 0.2141 | 0.0563 | 1.5800e-003 | 0.0579 | | 216.3663 | 216.3663 | 6.3800e-003 | | 216.5257 |
| **Total** | **0.0814** | **0.0560** | **0.7653** | **2.1700e-003** | **0.2124** | **1.7200e-003** | **0.2141** | **0.0563** | **1.5800e-003** | **0.0579** | | **216.3663** | **216.3663** | **6.3800e-003** | | **216.5257** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 106.8938 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.9337 | 7.8592 | 9.1870 | 0.0161 | | 0.4296 | 0.4296 | | 0.4296 | 0.4296 | 0.0000 | 1,527.5172 | 1,527.5172 | 0.0829 | | 1,529.5897 |
| **Total** | **107.8275** | **7.8592** | **9.1870** | **0.0161** | | **0.4296** | **0.4296** | | **0.4296** | **0.4296** | **0.0000** | **1,527.5172** | **1,527.5172** | **0.0829** | | **1,529.5897** |

### 3.7 Architectural Coating - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0814 | 0.0560 | 0.7653 | 2.1700e-003 | 0.1274 | 1.7200e-003 | 0.1292 | 0.0355 | 1.5800e-003 | 0.0371 | | 216.3663 | 216.3663 | 6.3800e-003 | | 216.5257 |
| **Total** | **0.0814** | **0.0560** | **0.7653** | **2.1700e-003** | **0.1274** | **1.7200e-003** | **0.1292** | **0.0355** | **1.5800e-003** | **0.0371** | | **216.3663** | **216.3663** | **6.3800e-003** | | **216.5257** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.9727 | 4.6567 | 13.2445 | 0.0482 | 3.9184 | 0.0388 | 3.9573 | 1.0486 | 0.0362 | 1.0849 | | 4,903.6887 | 4,903.6887 | 0.2452 | | 4,909.8178 |
| Unmitigated | 0.9727 | 4.6567 | 13.2445 | 0.0482 | 3.9184 | 0.0388 | 3.9573 | 1.0486 | 0.0362 | 1.0849 | | 4,903.6887 | 4,903.6887 | 0.2452 | | 4,909.8178 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Mid Rise | 539.58 | 539.58 | 539.58 | 1,842,711 | 1,842,711 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | | |
| Total | 539.58 | 539.58 | 539.58 | 1,842,711 | 1,842,711 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.00 | 19.00 | 41.00 | 86 | 11 | 3 |
| Enclosed Parking with Elevator | 16.60 | 8.40 | 6.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Mid Rise | 0.546501 | 0.044961 | 0.204016 | 0.120355 | 0.015740 | 0.006196 | 0.020131 | 0.030678 | 0.002515 | 0.002201 | 0.005142 | 0.000687 | 0.000876 |
| Enclosed Parking with Elevator | 0.546501 | 0.044961 | 0.204016 | 0.120355 | 0.015740 | 0.006196 | 0.020131 | 0.030678 | 0.002515 | 0.002201 | 0.005142 | 0.000687 | 0.000876 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |
| NaturalGas Unmitigated | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Mid Rise | 2575.69 | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0278** | **0.2374** | **0.1010** | **1.5200e-003** | | **0.0192** | **0.0192** | | **0.0192** | **0.0192** | | **303.0227** | **303.0227** | **5.8100e-003** | **5.5600e-003** | **304.8234** |

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Mid Rise | 2.57569 | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0278** | **0.2374** | **0.1010** | **1.5200e-003** | | **0.0192** | **0.0192** | | **0.0192** | **0.0192** | | **303.0227** | **303.0227** | **5.8100e-003** | **5.5600e-003** | **304.8234** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 2.0666 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | 0.0000 | 15.1801 | 15.1801 | 0.0147 | 0.0000 | 15.5474 |
| Unmitigated | 2.0666 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | 0.0000 | 15.1801 | 15.1801 | 0.0147 | 0.0000 | 15.5474 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.1464 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 1.6645 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.2557 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | | 15.1801 | 15.1801 | 0.0147 | | 15.5474 |
| **Total** | **2.0666** | **0.0973** | **8.4372** | **4.5000e-004** | | **0.0466** | **0.0466** | | **0.0466** | **0.0466** | **0.0000** | **15.1801** | **15.1801** | **0.0147** | **0.0000** | **15.5474** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.1464 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 1.6645 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.2557 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | | 15.1801 | 15.1801 | 0.0147 | | 15.5474 |
| **Total** | **2.0666** | **0.0973** | **8.4372** | **4.5000e-004** | | **0.0466** | **0.0466** | | **0.0466** | **0.0466** | **0.0000** | **15.1801** | **15.1801** | **0.0147** | **0.0000** | **15.5474** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# 1331 South Pacific Avenue Future

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Enclosed Parking with Elevator | 127.00 | Space | 0.00 | 50,800.00 | 0 |
| Apartments Mid Rise | 102.00 | Dwelling Unit | 0.72 | 83,158.00 | 245 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 11 | | | **Operational Year** | 2022 |
| **Utility Company** | Los Angeles Department of Water & Power | | | | |
| **CO2 Intensity (lb/MWhr)** | 1227.89 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Consistent with Response's model.

Construction Phase - See SWAPE comment about construction phase changes.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment - Consistent with Response's model.

Off-road Equipment -

Off-road Equipment - Consistent with Response's model.

Trips and VMT - See SWAPE comment about worker trips.

Demolition - Consistent with Response's model.

Grading - Consistent with Response's model.

Vehicle Trips - Consistent with Response's model.

Woodstoves - Consistent with Response's model.

Construction Off-road Equipment Mitigation - Consistent with Response's model.

1331 South Pacific Avenue Future - Los Angeles-South Coast County, Winter

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | CleanPavedRoadPercentReduction | 0 | 46 |
| tblFireplaces | NumberGas | 86.70 | 0.00 |
| tblFireplaces | NumberNoFireplace | 10.20 | 109.00 |
| tblFireplaces | NumberWood | 5.10 | 0.00 |
| tblGrading | AcresOfGrading | 0.00 | 1.24 |
| tblGrading | MaterialExported | 0.00 | 23,348.00 |
| tblLandUse | LandUseSquareFeet | 102,000.00 | 83,158.00 |
| tblLandUse | LotAcreage | 1.14 | 0.00 |
| tblLandUse | LotAcreage | 2.68 | 0.72 |
| tblLandUse | Population | 292.00 | 245.00 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 41.00 |
| tblTripsAndVMT | HaulingTripLength | 20.00 | 41.00 |
| tblTripsAndVMT | HaulingTripNumber | 2,919.00 | 3,335.00 |
| tblVehicleTrips | HO_TTP | 40.60 | 41.00 |
| tblVehicleTrips | HS_TTP | 19.20 | 19.00 |
| tblVehicleTrips | HW_TTP | 40.20 | 40.00 |
| tblVehicleTrips | ST_TR | 6.39 | 5.29 |
| tblVehicleTrips | SU_TR | 5.86 | 5.29 |
| tblVehicleTrips | WD_TR | 6.65 | 5.29 |
| tblWoodstoves | NumberCatalytic | 5.10 | 0.00 |
| tblWoodstoves | NumberNoncatalytic | 5.10 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 107.9181 | 788.2575 | 219.1560 | 2.4979 | 62.8002 | 3.5705 | 66.3707 | 17.1446 | 3.4075 | 20.5521 | 0.0000 | 270,572.9257 | 270,572.9257 | 18.1194 | 0.0000 | 271,025.9115 |
| **Maximum** | **107.9181** | **788.2575** | **219.1560** | **2.4979** | **62.8002** | **3.5705** | **66.3707** | **17.1446** | **3.4075** | **20.5521** | **0.0000** | **270,572.9257** | **270,572.9257** | **18.1194** | **0.0000** | **271,025.9115** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2021 | 107.9181 | 788.2575 | 219.1560 | 2.4979 | 41.8766 | 3.5705 | 45.4471 | 12.0088 | 3.4075 | 15.4163 | 0.0000 | 270,572.9257 | 270,572.9257 | 18.1194 | 0.0000 | 271,025.9115 |
| **Maximum** | **107.9181** | **788.2575** | **219.1560** | **2.4979** | **41.8766** | **3.5705** | **45.4471** | **12.0088** | **3.4075** | **15.4163** | **0.0000** | **270,572.9257** | **270,572.9257** | **18.1194** | **0.0000** | **271,025.9115** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 33.32 | 0.00 | 31.53 | 29.96 | 0.00 | 24.99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 2.0666 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | 0.0000 | 15.1801 | 15.1801 | 0.0147 | 0.0000 | 15.5474 |
| Energy | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |
| Mobile | 0.9441 | 4.7710 | 12.5486 | 0.0458 | 3.9184 | 0.0390 | 3.9575 | 1.0486 | 0.0364 | 1.0850 | | 4,667.7926 | 4,667.7926 | 0.2443 | | 4,673.9005 |
| **Total** | **3.0385** | **5.1057** | **21.0868** | **0.0478** | **3.9184** | **0.1048** | **4.0232** | **1.0486** | **0.1022** | **1.1508** | **0.0000** | **4,985.9954** | **4,985.9954** | **0.2648** | **5.5600e-003** | **4,994.2714** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 2.0666 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | 0.0000 | 15.1801 | 15.1801 | 0.0147 | 0.0000 | 15.5474 |
| Energy | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |
| Mobile | 0.9441 | 4.7710 | 12.5486 | 0.0458 | 3.9184 | 0.0390 | 3.9575 | 1.0486 | 0.0364 | 1.0850 | | 4,667.7926 | 4,667.7926 | 0.2443 | | 4,673.9005 |
| **Total** | **3.0385** | **5.1057** | **21.0868** | **0.0478** | **3.9184** | **0.1048** | **4.0232** | **1.0486** | **0.1022** | **1.1508** | **0.0000** | **4,985.9954** | **4,985.9954** | **0.2648** | **5.5600e-003** | **4,994.2714** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 6/15/2021 | 6/28/2021 | 5 | 10 | |
| 2 | Site Preparation | Site Preparation | 6/29/2021 | 6/29/2021 | 5 | 1 | |
| 3 | Grading | Grading | 6/30/2021 | 7/1/2021 | 5 | 2 | |
| 4 | Building Construction | Building Construction | 7/2/2021 | 11/18/2021 | 5 | 100 | |
| 5 | Paving | Paving | 11/19/2021 | 11/25/2021 | 5 | 5 | |
| 6 | Architectural Coating | Architectural Coating | 11/26/2021 | 12/2/2021 | 5 | 5 | |

**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Grading (Grading Phase): 1.24**

**Acres of Paving: 0**

**Residential Indoor: 168,395; Residential Outdoor: 56,132; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 3,048 (Architectural Coating – sqft)**

**OffRoad Equipment**

1331 South Pacific Avenue Future - Los Angeles-South Coast County, Winter

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Dumpers/Tenders | 5 | 8.00 | 16 | 0.38 |
| Demolition | Excavators | 1 | 8.00 | 158 | 0.38 |
| Demolition | Rubber Tired Dozers | 1 | 1.00 | 247 | 0.40 |
| Demolition | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Site Preparation | Dumpers/Tenders | 2 | 8.00 | 16 | 0.38 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Grading | Bore/Drill Rigs | 1 | 8.00 | 221 | 0.50 |
| Grading | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Grading | Dumpers/Tenders | 5 | 8.00 | 16 | 0.38 |
| Grading | Excavators | 2 | 8.00 | 158 | 0.38 |
| Grading | Rubber Tired Dozers | 1 | 1.00 | 247 | 0.40 |
| Grading | Tractors/Loaders/Backhoes | 2 | 6.00 | 97 | 0.37 |
| Building Construction | Air Compressors | 2 | 8.00 | 78 | 0.48 |
| Building Construction | Cement and Mortar Mixers | 2 | 8.00 | 9 | 0.56 |
| Building Construction | Cranes | 1 | 4.00 | 231 | 0.29 |
| Building Construction | Forklifts | 2 | 6.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Building Construction | Tractors/Loaders/Backhoes | 2 | 8.00 | 97 | 0.37 |
| Paving | Cement and Mortar Mixers | 4 | 6.00 | 9 | 0.56 |
| Paving | Pavers | 1 | 7.00 | 130 | 0.42 |
| Paving | Rollers | 1 | 7.00 | 80 | 0.38 |
| Paving | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Architectural Coating | Generator Sets | 2 | 8.00 | 84 | 0.74 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 10 | 25.00 | 0.00 | 347.00 | 14.70 | 6.90 | 41.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 4 | 10.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 12 | 30.00 | 0.00 | 3,335.00 | 14.70 | 6.90 | 41.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 10 | 95.00 | 19.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 18.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 3 | 19.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Clean Paved Roads

## 3.2 Demolition - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 7.5132 | 0.0000 | 7.5132 | 1.1376 | 0.0000 | 1.1376 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.3930 | 11.7296 | 12.0950 | 0.0209 | | 0.5992 | 0.5992 | | 0.5721 | 0.5721 | | 1,952.3273 | 1,952.3273 | 0.4083 | | 1,962.5353 |
| **Total** | **1.3930** | **11.7296** | **12.0950** | **0.0209** | **7.5132** | **0.5992** | **8.1124** | **1.1376** | **0.5721** | **1.7096** | | **1,952.3273** | **1,952.3273** | **0.4083** | | **1,962.5353** |

## 3.2 Demolition - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.5423 | 16.0495 | 4.1746 | 0.0512 | 1.2431 | 0.0577 | 1.3007 | 0.3407 | 0.0552 | 0.3959 | | 5,553.8035 | 5,553.8035 | 0.3589 | | 5,562.7750 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1192 | 0.0815 | 0.9206 | 2.6900e-003 | 0.2794 | 2.2600e-003 | 0.2817 | 0.0741 | 2.0800e-003 | 0.0762 | | 268.0628 | 268.0628 | 7.8900e-003 | | 268.2600 |
| **Total** | **0.6615** | **16.1310** | **5.0953** | **0.0539** | **1.5225** | **0.0600** | **1.5824** | **0.4148** | **0.0573** | **0.4721** | | **5,821.8663** | **5,821.8663** | **0.3668** | | **5,831.0350** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 7.5132 | 0.0000 | 7.5132 | 1.1376 | 0.0000 | 1.1376 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.3930 | 11.7296 | 12.0950 | 0.0209 | | 0.5992 | 0.5992 | | 0.5721 | 0.5721 | 0.0000 | 1,952.3273 | 1,952.3273 | 0.4083 | | 1,962.5353 |
| **Total** | **1.3930** | **11.7296** | **12.0950** | **0.0209** | **7.5132** | **0.5992** | **8.1124** | **1.1376** | **0.5721** | **1.7096** | **0.0000** | **1,952.3273** | **1,952.3273** | **0.4083** | | **1,962.5353** |

## 3.2 Demolition - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.5423 | 16.0495 | 4.1746 | 0.0512 | 0.8104 | 0.0577 | 0.8681 | 0.2345 | 0.0552 | 0.2897 | | 5,553.8035 | 5,553.8035 | 0.3589 | | 5,562.7750 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1192 | 0.0815 | 0.9206 | 2.6900e-003 | 0.1677 | 2.2600e-003 | 0.1700 | 0.0467 | 2.0800e-003 | 0.0488 | | 268.0628 | 268.0628 | 7.8900e-003 | | 268.2600 |
| **Total** | **0.6615** | **16.1310** | **5.0953** | **0.0539** | **0.9781** | **0.0600** | **1.0381** | **0.2812** | **0.0573** | **0.3384** | | **5,821.8663** | **5,821.8663** | **0.3668** | | **5,831.0350** |

## 3.3 Site Preparation - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.5303 | 0.0000 | 0.5303 | 0.0573 | 0.0000 | 0.0573 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.7872 | 8.7497 | 4.5291 | 0.0112 | | 0.3344 | 0.3344 | | 0.3105 | 0.3105 | | 1,064.4648 | 1,064.4648 | 0.3179 | | 1,072.4132 |
| **Total** | **0.7872** | **8.7497** | **4.5291** | **0.0112** | **0.5303** | **0.3344** | **0.8647** | **0.0573** | **0.3105** | **0.3677** | | **1,064.4648** | **1,064.4648** | **0.3179** | | **1,072.4132** |

## 3.3 Site Preparation - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0477 | 0.0326 | 0.3683 | 1.0800e-003 | 0.1118 | 9.0000e-004 | 0.1127 | 0.0296 | 8.3000e-004 | 0.0305 | | 107.2251 | 107.2251 | 3.1600e-003 | | 107.3040 |
| **Total** | **0.0477** | **0.0326** | **0.3683** | **1.0800e-003** | **0.1118** | **9.0000e-004** | **0.1127** | **0.0296** | **8.3000e-004** | **0.0305** | | **107.2251** | **107.2251** | **3.1600e-003** | | **107.3040** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.5303 | 0.0000 | 0.5303 | 0.0573 | 0.0000 | 0.0573 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.7872 | 8.7497 | 4.5291 | 0.0112 | | 0.3344 | 0.3344 | | 0.3105 | 0.3105 | 0.0000 | 1,064.4648 | 1,064.4648 | 0.3179 | | 1,072.4132 |
| **Total** | **0.7872** | **8.7497** | **4.5291** | **0.0112** | **0.5303** | **0.3344** | **0.8647** | **0.0573** | **0.3105** | **0.3677** | **0.0000** | **1,064.4648** | **1,064.4648** | **0.3179** | | **1,072.4132** |

## 3.3 Site Preparation - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0477 | 0.0326 | 0.3683 | 1.0800e-003 | 0.0671 | 9.0000e-004 | 0.0680 | 0.0187 | 8.3000e-004 | 0.0195 | | 107.2251 | 107.2251 | 3.1600e-003 | | 107.3040 |
| **Total** | **0.0477** | **0.0326** | **0.3683** | **1.0800e-003** | **0.0671** | **9.0000e-004** | **0.0680** | **0.0187** | **8.3000e-004** | **0.0195** | | **107.2251** | **107.2251** | **3.1600e-003** | | **107.3040** |

## 3.4 Grading - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.7305 | 0.0000 | 2.7305 | 0.6847 | 0.0000 | 0.6847 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.8803 | 16.9058 | 17.4408 | 0.0355 | | 0.7952 | 0.7952 | | 0.7525 | 0.7525 | | 3,364.5817 | 3,364.5817 | 0.8651 | | 3,386.2084 |
| **Total** | **1.8803** | **16.9058** | **17.4408** | **0.0355** | **2.7305** | **0.7952** | **3.5257** | **0.6847** | **0.7525** | **1.4372** | | **3,364.5817** | **3,364.5817** | **0.8651** | | **3,386.2084** |

## 3.4 Grading - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 26.0603 | 771.2539 | 200.6104 | 2.4592 | 59.7344 | 2.7725 | 62.5070 | 16.3710 | 2.6525 | 19.0235 | | 266,886.6686 | 266,886.6686 | 17.2449 | | 267,317.7911 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1431 | 0.0978 | 1.1048 | 3.2300e-003 | 0.3353 | 2.7100e-003 | 0.3380 | 0.0889 | 2.5000e-003 | 0.0914 | | 321.6753 | 321.6753 | 9.4700e-003 | | 321.9120 |
| **Total** | **26.2033** | **771.3518** | **201.7152** | **2.4624** | **60.0698** | **2.7753** | **62.8450** | **16.4599** | **2.6550** | **19.1149** | | **267,208.3440** | **267,208.3440** | **17.2544** | | **267,639.7030** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 2.7305 | 0.0000 | 2.7305 | 0.6847 | 0.0000 | 0.6847 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.8803 | 16.9058 | 17.4408 | 0.0355 | | 0.7952 | 0.7952 | | 0.7525 | 0.7525 | 0.0000 | 3,364.5817 | 3,364.5817 | 0.8651 | | 3,386.2084 |
| **Total** | **1.8803** | **16.9058** | **17.4408** | **0.0355** | **2.7305** | **0.7952** | **3.5257** | **0.6847** | **0.7525** | **1.4372** | **0.0000** | **3,364.5817** | **3,364.5817** | **0.8651** | | **3,386.2084** |

## 3.4 Grading - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 26.0603 | 771.2539 | 200.6104 | 2.4592 | 38.9448 | 2.7725 | 41.7174 | 11.2681 | 2.6525 | 13.9206 | | 266,886.6686 | 266,886.6686 | 17.2449 | | 267,317.7911 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1431 | 0.0978 | 1.1048 | 3.2300e-003 | 0.2012 | 2.7100e-003 | 0.2039 | 0.0560 | 2.5000e-003 | 0.0585 | | 321.6753 | 321.6753 | 9.4700e-003 | | 321.9120 |
| **Total** | **26.2033** | **771.3518** | **201.7152** | **2.4624** | **39.1461** | **2.7753** | **41.9213** | **11.3241** | **2.6550** | **13.9791** | | **267,208.3440** | **267,208.3440** | **17.2544** | | **267,639.7030** |

## 3.5 Building Construction - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.8336 | 15.9591 | 16.4119 | 0.0273 | | 0.8948 | 0.8948 | | 0.8590 | 0.8590 | | 2,577.8111 | 2,577.8111 | 0.4506 | | 2,589.0759 |
| **Total** | **1.8336** | **15.9591** | **16.4119** | **0.0273** | | **0.8948** | **0.8948** | | **0.8590** | **0.8590** | | **2,577.8111** | **2,577.8111** | **0.4506** | | **2,589.0759** |

## 3.5 Building Construction - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0606 | 1.8409 | 0.5335 | 4.7500e-003 | 0.1216 | 3.8900e-003 | 0.1255 | 0.0350 | 3.7200e-003 | 0.0388 | | 507.9565 | 507.9565 | 0.0328 | | 508.7763 |
| Worker | 0.4530 | 0.3098 | 3.4984 | 0.0102 | 1.0619 | 8.5800e-003 | 1.0705 | 0.2816 | 7.9000e-003 | 0.2895 | | 1,018.6385 | 1,018.6385 | 0.0300 | | 1,019.3879 |
| **Total** | **0.5136** | **2.1507** | **4.0319** | **0.0150** | **1.1835** | **0.0125** | **1.1960** | **0.3166** | **0.0116** | **0.3283** | | **1,526.5950** | **1,526.5950** | **0.0628** | | **1,528.1642** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.8336 | 15.9591 | 16.4119 | 0.0273 | | 0.8948 | 0.8948 | | 0.8590 | 0.8590 | 0.0000 | 2,577.8111 | 2,577.8111 | 0.4506 | | 2,589.0759 |
| **Total** | **1.8336** | **15.9591** | **16.4119** | **0.0273** | | **0.8948** | **0.8948** | | **0.8590** | **0.8590** | **0.0000** | **2,577.8111** | **2,577.8111** | **0.4506** | | **2,589.0759** |

## 3.5 Building Construction - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0606 | 1.8409 | 0.5335 | 4.7500e-003 | 0.0818 | 3.8900e-003 | 0.0857 | 0.0252 | 3.7200e-003 | 0.0290 | | 507.9565 | 507.9565 | 0.0328 | | 508.7763 |
| Worker | 0.4530 | 0.3098 | 3.4984 | 0.0102 | 0.6372 | 8.5800e-003 | 0.6458 | 0.1774 | 7.9000e-003 | 0.1853 | | 1,018.6385 | 1,018.6385 | 0.0300 | | 1,019.3879 |
| **Total** | **0.5136** | **2.1507** | **4.0319** | **0.0150** | **0.7190** | **0.0125** | **0.7315** | **0.2026** | **0.0116** | **0.2142** | | **1,526.5950** | **1,526.5950** | **0.0628** | | **1,528.1642** |

## 3.6 Paving - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.7214 | 6.7178 | 7.0899 | 0.0113 | | 0.3534 | 0.3534 | | 0.3286 | 0.3286 | | 1,035.3425 | 1,035.3425 | 0.3016 | | 1,042.8818 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.7214** | **6.7178** | **7.0899** | **0.0113** | | **0.3534** | **0.3534** | | **0.3286** | **0.3286** | | **1,035.3425** | **1,035.3425** | **0.3016** | | **1,042.8818** |

## 3.6 Paving - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.2012 | 1.6300e-003 | 0.2028 | 0.0534 | 1.5000e-003 | 0.0549 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| **Total** | **0.0858** | **0.0587** | **0.6629** | **1.9400e-003** | **0.2012** | **1.6300e-003** | **0.2028** | **0.0534** | **1.5000e-003** | **0.0549** | | **193.0052** | **193.0052** | **5.6800e-003** | | **193.1472** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.7214 | 6.7178 | 7.0899 | 0.0113 | | 0.3534 | 0.3534 | | 0.3286 | 0.3286 | 0.0000 | 1,035.3425 | 1,035.3425 | 0.3016 | | 1,042.8818 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **0.7214** | **6.7178** | **7.0899** | **0.0113** | | **0.3534** | **0.3534** | | **0.3286** | **0.3286** | **0.0000** | **1,035.3425** | **1,035.3425** | **0.3016** | | **1,042.8818** |

## 3.6 Paving - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0858 | 0.0587 | 0.6629 | 1.9400e-003 | 0.1207 | 1.6300e-003 | 0.1224 | 0.0336 | 1.5000e-003 | 0.0351 | | 193.0052 | 193.0052 | 5.6800e-003 | | 193.1472 |
| **Total** | **0.0858** | **0.0587** | **0.6629** | **1.9400e-003** | **0.1207** | **1.6300e-003** | **0.1224** | **0.0336** | **1.5000e-003** | **0.0351** | | **193.0052** | **193.0052** | **5.6800e-003** | | **193.1472** |

## 3.7 Architectural Coating - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 106.8938 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.9337 | 7.8592 | 9.1870 | 0.0161 | | 0.4296 | 0.4296 | | 0.4296 | 0.4296 | | 1,527.5172 | 1,527.5172 | 0.0829 | | 1,529.5897 |
| **Total** | **107.8275** | **7.8592** | **9.1870** | **0.0161** | | **0.4296** | **0.4296** | | **0.4296** | **0.4296** | | **1,527.5172** | **1,527.5172** | **0.0829** | | **1,529.5897** |

## 3.7 Architectural Coating - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0906 | 0.0620 | 0.6997 | 2.0400e-003 | 0.2124 | 1.7200e-003 | 0.2141 | 0.0563 | 1.5800e-003 | 0.0579 | | 203.7277 | 203.7277 | 5.9900e-003 | | 203.8776 |
| **Total** | **0.0906** | **0.0620** | **0.6997** | **2.0400e-003** | **0.2124** | **1.7200e-003** | **0.2141** | **0.0563** | **1.5800e-003** | **0.0579** | | **203.7277** | **203.7277** | **5.9900e-003** | | **203.8776** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 106.8938 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.9337 | 7.8592 | 9.1870 | 0.0161 | | 0.4296 | 0.4296 | | 0.4296 | 0.4296 | 0.0000 | 1,527.5172 | 1,527.5172 | 0.0829 | | 1,529.5897 |
| **Total** | **107.8275** | **7.8592** | **9.1870** | **0.0161** | | **0.4296** | **0.4296** | | **0.4296** | **0.4296** | **0.0000** | **1,527.5172** | **1,527.5172** | **0.0829** | | **1,529.5897** |

### 3.7 Architectural Coating - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0906 | 0.0620 | 0.6997 | 2.0400e-003 | 0.1274 | 1.7200e-003 | 0.1292 | 0.0355 | 1.5800e-003 | 0.0371 | | 203.7277 | 203.7277 | 5.9900e-003 | | 203.8776 |
| **Total** | **0.0906** | **0.0620** | **0.6997** | **2.0400e-003** | **0.1274** | **1.7200e-003** | **0.1292** | **0.0355** | **1.5800e-003** | **0.0371** | | **203.7277** | **203.7277** | **5.9900e-003** | | **203.8776** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.9441 | 4.7710 | 12.5486 | 0.0458 | 3.9184 | 0.0390 | 3.9575 | 1.0486 | 0.0364 | 1.0850 | | 4,667.7926 | 4,667.7926 | 0.2443 | | 4,673.9005 |
| Unmitigated | 0.9441 | 4.7710 | 12.5486 | 0.0458 | 3.9184 | 0.0390 | 3.9575 | 1.0486 | 0.0364 | 1.0850 | | 4,667.7926 | 4,667.7926 | 0.2443 | | 4,673.9005 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Apartments Mid Rise | 539.58 | 539.58 | 539.58 | 1,842,711 | 1,842,711 |
| Enclosed Parking with Elevator | 0.00 | 0.00 | 0.00 | | |
| Total | 539.58 | 539.58 | 539.58 | 1,842,711 | 1,842,711 |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Apartments Mid Rise | 14.70 | 5.90 | 8.70 | 40.00 | 19.00 | 41.00 | 86 | 11 | 3 |
| Enclosed Parking with Elevator | 16.60 | 8.40 | 6.90 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apartments Mid Rise | 0.546501 | 0.044961 | 0.204016 | 0.120355 | 0.015740 | 0.006196 | 0.020131 | 0.030678 | 0.002515 | 0.002201 | 0.005142 | 0.000687 | 0.000876 |
| Enclosed Parking with Elevator | 0.546501 | 0.044961 | 0.204016 | 0.120355 | 0.015740 | 0.006196 | 0.020131 | 0.030678 | 0.002515 | 0.002201 | 0.005142 | 0.000687 | 0.000876 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |
| NaturalGas Unmitigated | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |

## 5.2 Energy by Land Use - NaturalGas

### Unmitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Mid Rise | 2575.69 | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0278** | **0.2374** | **0.1010** | **1.5200e-003** | | **0.0192** | **0.0192** | | **0.0192** | **0.0192** | | **303.0227** | **303.0227** | **5.8100e-003** | **5.5600e-003** | **304.8234** |

### Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Apartments Mid Rise | 2.57569 | 0.0278 | 0.2374 | 0.1010 | 1.5200e-003 | | 0.0192 | 0.0192 | | 0.0192 | 0.0192 | | 303.0227 | 303.0227 | 5.8100e-003 | 5.5600e-003 | 304.8234 |
| Enclosed Parking with Elevator | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0278** | **0.2374** | **0.1010** | **1.5200e-003** | | **0.0192** | **0.0192** | | **0.0192** | **0.0192** | | **303.0227** | **303.0227** | **5.8100e-003** | **5.5600e-003** | **304.8234** |

## 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 2.0666 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | 0.0000 | 15.1801 | 15.1801 | 0.0147 | 0.0000 | 15.5474 |
| Unmitigated | 2.0666 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | 0.0000 | 15.1801 | 15.1801 | 0.0147 | 0.0000 | 15.5474 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.1464 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 1.6645 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.2557 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | | 15.1801 | 15.1801 | 0.0147 | | 15.5474 |
| **Total** | **2.0666** | **0.0973** | **8.4372** | **4.5000e-004** | | **0.0466** | **0.0466** | | **0.0466** | **0.0466** | **0.0000** | **15.1801** | **15.1801** | **0.0147** | **0.0000** | **15.5474** |

### 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.1464 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 1.6645 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Hearth | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.2557 | 0.0973 | 8.4372 | 4.5000e-004 | | 0.0466 | 0.0466 | | 0.0466 | 0.0466 | | 15.1801 | 15.1801 | 0.0147 | | 15.5474 |
| **Total** | **2.0666** | **0.0973** | **8.4372** | **4.5000e-004** | | **0.0466** | **0.0466** | | **0.0466** | **0.0466** | **0.0000** | **15.1801** | **15.1801** | **0.0147** | **0.0000** | **15.5474** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

Attachment C

Start date and time 05/28/21 12:58:25

AERSCREEN 16216

1331 S Pacific Ave Operation

1331 S Pacific Ave Operation

---------- DATA ENTRY VALIDATION ----------

| | METRIC | ENGLISH |
|---|---|---|
| ** AREADATA ** | --- | --- |
| Emission Rate: | 0.472E-03 g/s | 0.375E-02 lb/hr |
| Area Height: | 3.00 meters | 9.84 feet |
| Area Source Length: | 65.00 meters | 213.25 feet |
| Area Source Width: | 45.00 meters | 147.64 feet |
| Vertical Dimension: | 1.50 meters | 4.92 feet |
| Model Mode: | URBAN | |
| Population: | 3967000 | |
| Dist to Ambient Air: | 1.0 meters | 3. feet |

** BUILDING DATA **

No Building Downwash Parameters

** TERRAIN DATA **

No Terrain Elevations

Source Base Elevation:  0.0 meters  0.0 feet

Probe distance:  5000. meters  16404. feet

No flagpole receptors

No discrete receptors used

** FUMIGATION DATA **

No fumigation requested

** METEOROLOGY DATA **

Min/Max Temperature:  250.0 / 310.0 K  -9.7 /  98.3 Deg F

Minimum Wind Speed:  0.5 m/s

Anemometer Height:  10.000 meters

Dominant Surface Profile: Urban

Dominant Climate Type:  Average Moisture

Surface friction velocity (u*): not adjusted

DEBUG OPTION ON

AERSCREEN output file:

2021.05.28_1331SPacificAve_Response_Operation.out

*** AERSCREEN Run is Ready to Begin

No terrain used, AERMAP will not be run

**********

SURFACE CHARACTERISTICS & MAKEMET

Obtaining surface characteristics...

Using AERMET seasonal surface characteristics for Urban with Average Moisture

| Season | Albedo | Bo | zo |
|---|---|---|---|
| Winter | 0.35 | 1.50 | 1.000 |
| Spring | 0.14 | 1.00 | 1.000 |
| Summer | 0.16 | 2.00 | 1.000 |
| Autumn | 0.18 | 2.00 | 1.000 |

Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl

Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl

Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl

Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl

Buildings and/or terrain present or rectangular area source, skipping probe

FLOWSECTOR started 05/28/21 12:59:38

**********

Running AERMOD

Processing Winter

Processing surface roughness sector 1

```
**************************************************

Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   0

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   5

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  10

    ********   WARNING MESSAGES   ********

               ***  NONE  ***
```

```
**************************************************

Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  15

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  20

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  25

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************
```

```
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  30

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  35

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

 ******************************************

  Running AERMOD

 Processing Spring

Processing surface roughness sector  1

**************************************************

Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   0
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   5


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   3


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  10


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  15
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  25


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   7


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  30


    ********   WARNING MESSAGES   ********
```

```
                ***  NONE  ***

************************************************

Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  35

    ********   WARNING MESSAGES   ********

                ***  NONE  ***

 ******************************************

  Running AERMOD

 Processing Summer

Processing surface roughness sector  1

************************************************

Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   0

    ********   WARNING MESSAGES   ********

                ***  NONE  ***

************************************************
```

```
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   5

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  10

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  15

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   5
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  20

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  25

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  30

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   8
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  35

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

 *****************************************

  Running AERMOD

 Processing Autumn

Processing surface roughness sector  1

**************************************************

Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   0

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   5

    ********   WARNING MESSAGES   ********
```

```
               ***  NONE  ***

**************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
**************************************************

Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  25

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  30

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

**************************************************

Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  35

    ********   WARNING MESSAGES   ********

               ***  NONE  ***
```

```
FLOWSECTOR   ended 05/28/21 12:59:46

REFINE       started 05/28/21 12:59:46

 AERMOD Finishes Successfully for REFINE stage 3 Winter sector   0

    ********   WARNING MESSAGES   ********

               ***  NONE  ***

REFINE       ended 05/28/21 12:59:46

 ********************************************

 AERSCREEN Finished Successfully

 With no errors or warnings

 Check log file for details

 ********************************************

 Ending date and time  05/28/21 12:59:48
```

```
 Concentration     Distance Elevation  Diag  Season/Month   Zo sector       Date
 H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS     HT
REF TA     HT
   0.20115E+01         1.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25820E+01        25.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
*  0.27102E+01        33.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17007E+01        50.00      0.00  30.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.88920E+00        75.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.58535E+00       100.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42597E+00       125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32929E+00       150.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26524E+00       175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22019E+00       200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18684E+00       225.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16140E+00       250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14145E+00       275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12542E+00       300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11225E+00       325.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10133E+00       350.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.92130E-01       375.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.84283E-01       400.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.77546E-01       425.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.71694E-01       450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.66576E-01       475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.62046E-01       500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.58016E-01       525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.54406E-01       550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.51169E-01       575.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.48251E-01       600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.45613E-01       625.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43216E-01       650.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.41031E-01       675.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39028E-01       699.99      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37188E-01       725.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35494E-01       750.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33930E-01       775.00      0.00  15.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32599E-01       800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31248E-01       825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29991E-01       850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28819E-01       875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27724E-01       900.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26700E-01       925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25739E-01       950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.24836E-01       975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.23987E-01      1000.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.23187E-01      1025.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22432E-01      1050.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21719E-01      1075.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21044E-01      1100.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20404E-01      1125.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19798E-01      1150.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19222E-01      1175.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.18674E-01      1200.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18153E-01      1225.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17656E-01      1250.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17183E-01      1275.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16731E-01      1300.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16300E-01      1325.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15887E-01      1350.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15492E-01      1375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15114E-01      1400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14751E-01      1425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14403E-01      1450.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14070E-01      1475.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13749E-01      1500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13441E-01      1525.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13144E-01      1550.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12859E-01      1575.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12584E-01      1600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.12320E-01      1625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12064E-01      1650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11818E-01      1675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11581E-01      1700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11351E-01      1725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11130E-01      1750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10915E-01      1775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10708E-01      1800.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10507E-01      1825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10313E-01      1850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10125E-01      1875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.99432E-02      1899.99      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.97667E-02      1924.99      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.95955E-02      1950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.94294E-02      1975.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.92683E-02      2000.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.91119E-02      2025.00      0.00   5.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.89600E-02      2050.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.88125E-02      2075.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.86691E-02      2100.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.85297E-02      2124.99      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.83941E-02      2150.00      0.00  30.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.82623E-02      2175.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.81340E-02      2200.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.80091E-02      2224.99      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.78875E-02      2250.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.77691E-02      2275.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.76537E-02      2300.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.75413E-02      2325.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.74318E-02      2350.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.73249E-02      2375.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.72208E-02      2399.99      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.71192E-02      2425.00      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.70199E-02      2449.99      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.69230E-02      2475.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.68283E-02      2500.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.67359E-02      2525.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.66457E-02      2550.00      0.00  30.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.65575E-02      2575.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.64713E-02      2600.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.63870E-02      2625.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.63046E-02      2650.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.62241E-02      2675.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.61453E-02      2700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.60683E-02      2725.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.59928E-02      2750.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.59190E-02      2775.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.58468E-02      2800.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.57761E-02      2824.99      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.57068E-02      2850.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.56390E-02      2875.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.55725E-02      2900.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.55074E-02      2925.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.54436E-02      2950.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53811E-02      2975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53198E-02      3000.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52597E-02      3025.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52008E-02      3050.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.51430E-02      3074.99      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.50863E-02      3100.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.50307E-02      3125.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.49761E-02      3150.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.49225E-02      3174.99      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.48700E-02      3199.99      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.48184E-02      3225.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.47677E-02      3250.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.47179E-02      3275.00      0.00  20.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.46691E-02      3300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.46211E-02      3325.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.45740E-02      3350.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.45276E-02      3375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.44822E-02      3400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.44374E-02      3425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43935E-02      3450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43503E-02      3475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43078E-02      3500.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42661E-02      3525.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42250E-02      3550.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.41846E-02      3575.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.41449E-02      3600.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.41058E-02      3625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.40674E-02      3650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.40296E-02      3674.99      0.00  35.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.39923E-02      3700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39557E-02      3725.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39197E-02      3750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38842E-02      3775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38493E-02      3800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38149E-02      3825.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37810E-02      3849.99      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37477E-02      3875.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37148E-02      3900.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36825E-02      3925.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36506E-02      3950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36192E-02      3975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35883E-02      4000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35579E-02      4025.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35278E-02      4050.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34983E-02      4075.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34691E-02      4100.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.34404E-02      4125.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34120E-02      4150.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33841E-02      4175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33566E-02      4200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33294E-02      4225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33027E-02      4250.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32763E-02      4275.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32502E-02      4300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32246E-02      4325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31992E-02      4350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31743E-02      4375.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31496E-02      4400.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31253E-02      4425.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31013E-02      4449.99      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30776E-02      4475.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30542E-02      4500.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30312E-02      4525.00      0.00   0.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30084E-02      4550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29859E-02      4575.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29637E-02      4600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29419E-02      4625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29202E-02      4650.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28989E-02      4675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28778E-02      4700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28570E-02      4725.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28365E-02      4750.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28162E-02      4775.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27961E-02      4800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27763E-02      4825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27567E-02      4850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27374E-02      4875.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27183E-02      4900.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26995E-02      4925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.26808E-02      4950.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26624E-02      4975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26442E-02      5000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
```

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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# *Paul Rosenfeld, Ph.D.*

**Chemical Fate and Transport & Air Dispersion Modeling**

*Principal Environmental Chemist*

**Risk Assessment & Remediation Specialist**

## Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Thesis on wastewater treatment.

## Professional Experience

Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from unconventional oil drilling operations, oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, and many other industrial and agricultural sources. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at dozens of sites and has testified as an expert witness on more than ten cases involving exposure to air contaminants from industrial sources.

## Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex $H_2O$ Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

## Publications:

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P.**, (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

**Rosenfeld, P.E.** & Feng, L. (2011). *The Risks of Hazardous Waste.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences*. 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., **Rosenfeld, P.E.** (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health.* 73(6), 34-46.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2010). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries*. Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry*. Amsterdam: Elsevier Publishing.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution,* 123 (17), 319-327.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

**Rosenfeld, P.E.,** J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

**Rosenfeld, P. E.,** M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities.* Boston Massachusetts: Elsevier Publishing

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

**Rosenfeld P. E.,** J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004*. New Orleans, October 2-6, 2004.

**Rosenfeld, P.E.,** and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

**Rosenfeld, P.E.,** and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49( 9), 171-178.

**Rosenfeld, P. E**., Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

**Rosenfeld, P.E.,** Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

**Rosenfeld, P.E**., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

**Rosenfeld, P.E.,** and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality*. 29, 1662-1668.

**Rosenfeld, P.E.,** C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

**Rosenfeld, P.E.,** and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

**Rosenfeld, P.E.,** and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

Chollack, T. and **P. Rosenfeld.** (1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

**Rosenfeld, P. E.** (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

**Rosenfeld, P. E.** (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

**Rosenfeld, P. E.** (1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

**Rosenfeld, P. E.** (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

**Rosenfeld, P. E.** (1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

## Presentations:

**Rosenfeld, P.E.,** Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society.* Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution.* Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution.* Lecture conducted from Boston, MA.

**Rosenfeld, P.E**. (April 19-23, 2009). Perfluoroctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

**Rosenfeld, P.E.** (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting.* Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P.** (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

**Rosenfeld, P. E.** (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water.* Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water.* Platform lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld, P. E.** (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

**Rosenfeld P. E.** (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

**Rosenfeld P. E.** (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting*. Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition*. Lecture conducted from Boston Massachusetts.

**Paul Rosenfeld Ph.D**. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference*. Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

**Paul Rosenfeld Ph.D**. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel in Irvine, California.

**Paul Rosenfeld Ph.D**. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference*. Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

**Paul Rosenfeld Ph.D**. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld Ph.D**. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

**Paul Rosenfeld, Ph.D.** (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

**Paul Rosenfeld, Ph.D.** (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

**Rosenfeld, P. E.**, Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

**Paul Rosenfeld, Ph.D.** and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants.*. Lecture conducted from Hyatt Regency Phoenix Arizona.

**Paul Rosenfeld, Ph.D.** (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

**Paul Rosenfeld, Ph.D**. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E**. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

**Rosenfeld, P.E.** and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington..

**Rosenfeld, P.E**. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conferenc*e. Lecture conducted from Indianapolis, Maryland.

**Rosenfeld. P.E.** (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

**Rosenfeld. P.E.** (October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

**Rosenfeld, P.E.** (2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

**Rosenfeld, P.E**., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings.* Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America.* Lecture conducted from Salt Lake City Utah.

**Rosenfeld, P.E.**, C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

**Rosenfeld, P.E.**, C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

**Rosenfeld, P.E.** C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

**Rosenfeld, P.E.**, C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

## Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

## Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

## Deposition and/or Trial Testimony:

In the United States District Court For The Southern District of Illinois
Duarte et al, *Plaintiffs,* vs. United States Metals Refining Company et. al. *Defendant.*
Case No.: 3:19-cv-00302-SMY-GCS
Rosenfeld Deposition. 2-19-2020

In the Circuit Court of Jackson County, Missouri
Karen Cornwell, *Plaintiff,* vs. Marathon Petroleum, LP, *Defendant.*
Case No.: 1716-CV10006
Rosenfeld Deposition. 8-30-2019

In the United States District Court For The District of New Jersey
Duarte et al, *Plaintiffs,* vs. United States Metals Refining Company et. al. *Defendant.*
Case No.: 2:17-cv-01624-ES-SCM
Rosenfeld Deposition. 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk, *Plaintiffs,* vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" *Defendant.*
Case No.: 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition. 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No.: No. BC615636
Rosenfeld Deposition, 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No.: No. BC646857
Rosenfeld Deposition, 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiff vs. The 3M Company et al., Defendants
Case: No 1:16-cv-02531-RBJ
Rosenfeld Deposition, 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No 1923
Rosenfeld Deposition, 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants
Cause No C12-01481
Rosenfeld Deposition, 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 8-23-2017

In United States District Court For The Southern District of Mississippi
Guy Manuel vs. The BP Exploration et al., Defendants
Case: No 1:19-cv-00315-RHW
Rosenfeld Deposition, 4-22-2020

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No.: LC102019 (c/w BC582154)
Rosenfeld Deposition, 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., *Plaintiffs,* vs. Meritor Inc., et al., *Defendants*
Case Number: 4:16-cv-52-DMB-JVM
Rosenfeld Deposition: July 2017

In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No.: No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial, March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No.: RG14711115
Rosenfeld Deposition, September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No.: LALA002187
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Jerry Dovico, et al., Plaintiffs vs. Valley View Sine LLC, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Doug Pauls, et al.., et al., Plaintiffs vs. Richard Warren, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action N0. 14-C-30000
Rosenfeld Deposition, June 2015

In The Third Judicial District County of Dona Ana, New Mexico
Betty Gonzalez, et al. Plaintiffs vs. Del Oro Dairy, Del Oro Real Estate LLC, Jerry Settles and Deward DeRuyter, Defendants
Rosenfeld Deposition: July 2015

In The Iowa District Court For Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No 4980
Rosenfeld Deposition: May 2015

**SWAPE** Technical Consultation, Data Analysis and Litigation Support for the Environment

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## Matthew F. Hagemann, P.G., C.Hg., QSD, QSP

**Geologic and Hydrogeologic Characterization**
**Investigation and Remediation Strategies**
**Litigation Support and Testifying Expert**
**Industrial Stormwater Compliance**
**CEQA Review**

**Education:**

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

**Professional Certifications:**

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

**Professional Experience:**

Matt has 30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) and directed efforts to improve hydrogeologic characterization and water quality monitoring. For the past 15 years, as a founding partner with SWAPE, Matt has developed extensive client relationships and has managed complex projects that include consultation as an expert witness and a regulatory specialist, and a manager of projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality and greenhouse gas emissions.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2104, 2017;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

**Senior Regulatory and Litigation Support Analyst:**

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 300 environmental impact reports and negative declarations since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at more than 150 industrial facilities.
- Expert witness on numerous cases including, for example, perfluorooctanoic acid (PFOA) contamination of groundwater, MTBE litigation, air toxins at hazards at a school, CERCLA compliance in assessment and remediation, and industrial stormwater contamination.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

**Executive Director:**

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

**Hydrogeology:**

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted

public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

**Policy:**

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9.

Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific

principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

**Geology:**

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

**Teaching:**

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt is currently a part time geology instructor at Golden West College in Huntington Beach, California where he taught from 2010 to 2014 and in 2017.

**Invited Testimony, Reports, Papers and Presentations:**

**Hagemann, M.F.**, 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

**Hagemann, M.F.**, 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

**Hagemann, M.F.**, 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

**Hagemann, M.F.**, 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

**Hagemann, M.F.**, 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

**Hagemann, M.F.**, 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

**Hagemann, M.F.**, 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

**Hagemann, M.F.**, 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

**Hagemann, M.F.**, 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

**Hagemann, M.F.**, 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

**Hagemann, M.F.**, 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

**Hagemann, M.F.**, 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

**Hagemann, M.F.**, 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

**Hagemann, M.F.**, 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

**Hagemann, M.F.**, 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

**Hagemann, M.F.**, 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

**Hagemann, M.F.**, and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F.** 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

**Hagemann, M.F.**, 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

**Hagemann, M.F.**, 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

**Hagemann, M.F.**, and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

**Hagemann, M.F.**, Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

**Hagemann, M. F.**, Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

**Hagemann, M.F.**, 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

**Hagemann, M.F.** and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

**Hagemann, M.F.**, 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

**Hagemann, M.F.**, 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

**Other Experience:**

Selected as subject matter expert for the California Professional Geologist licensing examinations, 2009-2011.