5th & Sterling

Construction and Operational Health Risk Assessment

City of San Bernardino

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LIST OF ABBREVIATED TERMS

(1)	Reference
µg	Microgram
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AQMD	Air Quality Management District
ARB	Air Resources Board
ASF	Age Sensitivity Factor
CEQA	California Environmental Quality Act
CPF	Cancer Potency Factor
DPM	Diesel Particulate Matter
EMFAC	Emission Factor Model
EPA	Environmental Protection Agency
FAH	Fraction of Time at Home
HHD	Heavy Heavy-Duty
HI	Hazard Index
HRA	Health Risk Assessment
LHD	Light Heavy-Duty
MEIR	Maximally Exposed Individual Receptor
MEIW	Maximally Exposed Individual Worker
MEISC	Maximally Exposed Individual School Child
MHD	Medium Heavy-Duty
NAD	North American Datum
OEHHA	Office of Environmental Health Hazard Assessment
PDF	Project Design Feature
PM_{10}	Particulate Matter 10 microns in diameter or less
Project	5th & Sterling
REL	Reference Exposure Level
SCAQMD	South Coast Air Quality Management District
SRA	Source Receptor Area
TAC	Toxic Air Contaminant
TA	Traffic Analysis
TRU	Transport Refrigeration Unit
URF	Unit Risk Factor
UTM	Universal Transverse Mercator
VMT	Vehicle Miles Traveled

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EXECUTIVE SUMMARY

This report evaluates the potential health risk impacts to sensitive receptors (which are residents) and adjacent workers associated with the development of the Project, more specifically, health risk impacts as a result of exposure to Toxic Air Contaminants (TACs) including diesel particulate matter (DPM) as a result of heavy-duty diesel trucks and equipment associated with on-site and off-site construction and operational activity. This section summarizes the significance criteria and Project health risks.

The results of this *5th & Sterling Construction and Operational Health Risk Assessment* (HRA) indicate that without the incorporation of project design features proposed by the applicant to reduce air pollutant emissions and increase construction efficiency of the project, SCAQMD thresholds would not be exceeded for construction operational health risks. With incorporation of the project design features, construction and operational health risks are further reduced resulting in a less than significant impact.

The results of the health risk assessment from Project-generated DPM emissions are provided in Table ES-1, ES-2, and ES-3 below for the Project.

CONSTRUCTION IMPACTS

The land use with the greatest potential exposure to Project construction-source DPM emissions is Location R1 which is located approximately 123 feet west of the Project site at an existing residence located at 7926 Sterling Avenue. Since there are no private outdoor living areas (backyards) facing the Project site, R1 is placed at the building façade.

Without implementation of project design feature (PDF) AQ-1, at the maximally exposed individual receptor (MEIR), the maximum incremental cancer risk attributable to Project construction-source DPM emissions is estimated at 3.99 in one million, which is less than the South Coast Air Quality Management District (SCAQMD) significance threshold of 10 in one million. With implementation of PDF AQ-1, the maximum incremental cancer risk at the MEIR would be reduced to 0.51 in one million. At this same location, with and without implementation of PDF AQ-1, non-cancer risks were estimated to be ≤0.01, which would not exceed the applicable threshold of 1.0. Location R1 is the nearest receptor to the Project site and would experience the highest concentrations of DPM during Project construction due to its location and meteorological conditions at the site. Because all other modeled receptors would experience lower concentrations of DPM during Project construction, all other receptors in the vicinity of the Project would be exposed to less emissions and therefore less risk than the MEIR identified herein. As such, the Project will not cause a significant human health or cancer risk to adjacent land uses as a result of Project construction activity. All other receptors during construction activity would experience less risk than what is identified for this location.

OPERATIONAL IMPACTS

Residential Exposure Scenario:

The residential land use with the greatest potential exposure to Project operational-source DPM emissions is Location R1 which is located approximately 123 feet west of the Project site at an existing residence located at 7926 Sterling Avenue. R1 is placed in the private outdoor living area (backyard) facing the Project site.

Without implementation of project design feature (PDF) AQ-4, the maximum incremental cancer risk attributable to Project operational-source DPM emissions is estimated at 2.96 in one million, which would not exceed the SCAQMD's significance threshold of 10 in one million. Without implementation of project design feature (PDF) AQ-4, the maximum incremental cancer risk attributable to Project operational-source DPM emissions is estimated at 0.49 in one million, which would not exceed the SCAQMD's significance threshold of 10 in one million. At this same location, with and without implementation of PDF AQ-4, non-cancer risks were estimated to be ≤0.01, which would not exceed the applicable significance threshold of 1.0.

Location R1 is the nearest receptor to the Project site and would experience the highest concentrations of DPM from Project operation due to its location and meteorological conditions at the Project site. Because all other modeled receptors would be exposed to lower concentrations of DPM, all other receptors in the vicinity of the Project would be exposed to less emissions and therefore less risk than the MEIR identified herein. As such, the Project will not cause a significant human health or cancer risk to nearby residences. The modeled receptors are illustrated on Exhibit 2-D.

Worker Exposure Scenario[1]*:*

The worker receptor land use with the greatest potential exposure to Project operational -source DPM emissions is Location R7, which represents the potential worker receptor located approximately 170 feet south of the Project site.

The maximally exposed individual worker (MEIW) is the worker receptor location that would experience the highest modeled concentrations of DPM, and thus the highest risk. Without implementation of project design feature (PDF) AQ-4, the maximum incremental cancer risk impact is 0.75 in one million, which is less than the SCAQMD's threshold of 10 in one million. With implementation of project design feature (PDF) AQ-4, the maximum incremental cancer risk impact is 0.06 in one million, which is less than the SCAQMD's threshold of 10 in one million. At this same location, with and without implementation of PDF AQ-4, the maximum non-cancer risk was estimated to be ≤0.01, which would not exceed the applicable significance threshold of 1.0. Because all other modeled worker receptors would be exposed to lower concentrations of DPM, all other worker receptors in the vicinity of the Project would be exposed to less emissions and therefore less risk than the MEIW identified herein. As such, the Project will not cause a

1 SCAQMD guidance does not require assessment of the potential health risk to on-site workers. Excerpts from the document OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines—The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2003), also indicate that it is not necessary to examine the health effects to on-site workers unless required by RCRA (Resource Conservation and Recovery Act) / CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) or the worker resides on-site.

significant human health or cancer risk to adjacent workers. The modeled receptors are illustrated on Exhibit 2-D.

School Child Exposure Scenario:

The nearest school is Indian Springs High School, located approximately 2,731 feet west of the Project site and represented by Location R8. Without implementation of project design feature (PDF) AQ-4, the maximally exposed individual school child (MEISC) cancer risk impact attributable to the Project is calculated to be 0.04 in one million, which is less than the significance threshold of 10 in one million. With implementation of project design feature (PDF) AQ-4, the maximally exposed individual school child (MEISC) cancer risk impact attributable to the Project is calculated to be 0.01 in one million, which is less than the significance threshold of 10 in one million At this same location, with and without implementation of PDF AQ-4, non-cancer risks attributable to the Project were calculated to be ≤0.01, which would not exceed the applicable significance threshold of 1.0. Because all other modeled school receptors would be exposed to lower concentrations of DPM, all other school receptors in the vicinity of the of the Project would be exposed to less emissions and therefore less risk than the MEISC identified herein. As such, the Project will not cause a significant human health or cancer risk to nearby school children.

CONSTRUCTION AND OPERATIONAL IMPACTS

This analysis considers a conservative scenario in which a child at a nearby residence is exposed to Project construction-related DPM emissions from birth for the expected 1.93 years of Project construction, and is then exposed to Project operational emissions for the remaining 28.07 years of the 30 year residential exposure scenario. It should be noted that in many cases the combined construction and operational risk is less than the operational risk alone due to varying DPM concentrations at receptors for the construction and operational phases of the Project, as well as the assumed exposure durations and scenarios, which place a greater emphasis on pollutant exposures that occur early in life.

The land use with the greatest potential exposure to Project construction-source and operational-source DPM emissions is Location R1. At the MEIR, without implementation of PDF AQ-1 and AQ-4, the maximum incremental cancer risk attributable to Project construction-source and operational-source DPM emissions is estimated at 5.55 in one million, which is less than the threshold of 10 in one million. At this same location, non-cancer risks were estimated to be ≤0.01, which would not exceed the applicable threshold of 1.0.

With implementation of PDF AQ-1 and AQ-4, the land use with the greatest potential exposure to Project construction-source and operational-source DPM emissions is Location R1. At the MEIR, with implementation of PDF AQ-1, the maximum incremental cancer risk is estimated at 0.77 in one million, and non-cancer risks are estimated to be ≤0.01. As such, the Project will not cause a significant human health or cancer risk to adjacent land uses as a result of Project construction and operational activity. All other receptors during construction and operational activity would experience less risk than what is identified for this location. The modeled receptors are illustrated on Exhibit 2-D.

TABLE ES-1: SUMMARY OF CONSTRUCTION CANCER AND NON-CANCER RISKS

Scenario	Time Period	Location	Maximum Lifetime Cancer Risk (Risk per Million)	Significance Threshold (Risk per Million)	Exceeds Significance Threshold
Without PDF AQ-1	1.93 Year Exposure	Maximum Exposed Sensitive Receptor (Location R1)	3.99	10	NO
With PDF AQ-1	1.93 Year Exposure	Maximum Exposed Sensitive Receptor (Location R1)	0.51	10	NO
Scenario	**Time Period**	**Location**	**Maximum Hazard Index**	**Significance Threshold**	**Exceeds Significance Threshold**
Without PDF AQ-1	Annual Average	Maximum Exposed Sensitive Receptor (Location R1)	≤0.01	1.0	NO
With PDF AQ-1	Annual Average	Maximum Exposed Sensitive Receptor (Location R1)	≤0.01	1.0	NO

TABLE ES-2: SUMMARY OF OPERATIONAL CANCER AND NON-CANCER RISKS

Scenario	Time Period	Location	Maximum Lifetime Cancer Risk (Risk per Million)	Significance Threshold (Risk per Million)	Exceeds Significance Threshold
Without PDF AQ-4	30 Year Exposure	Maximum Exposed Sensitive Receptor (Location R1)	2.96	10	NO
Without PDF AQ-4	25 Year Exposure	Maximum Exposed Worker Receptor (Location R7)	0.75	10	NO
Without PDF AQ-4	9 Year Exposure	Maximum Exposed Individual School Child (Location R8)	0.04	10	NO
Scenario	**Time Period**	**Location**	**Maximum Hazard Index**	**Significance Threshold**	**Exceeds Significance Threshold**
Without PDF AQ-4	Annual Average	Maximum Exposed Sensitive Receptor (Location R1)	≤0.01	1.0	NO
Without PDF AQ-4	Annual Average	Maximum Exposed Worker Receptor (Location R7)	≤0.01	1.0	NO
Without PDF AQ-4	Annual Average	Maximum Exposed Individual School Child (Location R8)	≤0.01	1.0	NO

Scenario	Time Period	Location	Maximum Lifetime Cancer Risk (Risk per Million)	Significance Threshold (Risk per Million)	Exceeds Significance Threshold
With PDF AQ-4	30 Year Exposure	Maximum Exposed Sensitive Receptor (Location R1)	0.49	10	NO
With PDF AQ-4	25 Year Exposure	Maximum Exposed Worker Receptor (Location R7)	0.06	10	NO
With PDF AQ-4	9 Year Exposure	Maximum Exposed Individual School Child (Location R8)	0.01	10	NO
Scenario	**Time Period**	**Location**	**Maximum Hazard Index**	**Significance Threshold**	**Exceeds Significance Threshold**
With PDF AQ-4	Annual Average	Maximum Exposed Sensitive Receptor (Location R1)	≤0.01	1.0	NO
With PDF AQ-4	Annual Average	Maximum Exposed Worker Receptor (Location R7)	≤0.01	1.0	NO
With PDF AQ-4	Annual Average	Maximum Exposed Individual School Child (Location R8)	≤0.01	1.0	NO

TABLE ES-3: SUMMARY OF CONSTRUCTION AND OPERATIONAL CANCER AND NON-CANCER RISKS

Scenario	Time Period	Location	Maximum Lifetime Cancer Risk (Risk per Million)	Significance Threshold (Risk per Million)	Exceeds Significance Threshold
Without PDF AQ-1 & AQ-4	30 Year Exposure	Maximum Exposed Sensitive Receptor (Location R1)	5.55	10	NO
With PDF AQ-1& AQ-4	30 Year Exposure	Maximum Exposed Sensitive Receptor (Location R1)	2.07	10	NO
Scenario	**Time Period**	**Location**	**Maximum Hazard Index**	**Significance Threshold**	**Exceeds Significance Threshold**
Without PDF AQ-1 & AQ-4	Annual Average	Maximum Exposed Sensitive Receptor (Location R1)	≤0.01	1.0	NO
With PDF AQ-1 & AQ-4	Annual Average	Maximum Exposed Sensitive Receptor (Location R1)	≤0.01	1.0	NO

ES.3 PROJECT DESIGN FEATURES

The following project design features were identified in the *5th & Sterling Air Quality Impact Analysis* (*AQIA*) report (1). Although these measures are designed to reduce Project air quality emissions, they would also assist in the reduction of DPM emissions. Only PDF AQ-1 and AQ-4 have the potential to reduce DPM emissions and have been presented accordingly. Because these project design features are incorporated into the Project, they are not considered to be mitigation measures:

PDF AQ-1

The Project will implement a Construction Management Plan to ensure that off-road diesel construction equipment would meet at least CARB Tier 4 Interim emissions standards and shall ensure that all construction equipment is tuned and maintained in accordance with the manufacturer’s specifications.

PDF AQ-4

As a condition of certificates of occupancy, all on-site outdoor cargo handling equipment (including yard trucks, hostlers, yard goats, pallet jacks, forklifts, and other on-site equipment) and all indoor cargo handling equipment shall be required to be powered by electricity.

1 INTRODUCTION

This HRA has been prepared in accordance with the document Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis (2) and is comprised of all relevant and appropriate procedures presented by the United States Environmental Protection Agency (U.S. EPA), California EPA and SCAQMD. Cancer risk is expressed in terms of expected incremental incidence per million population. The SCAQMD has established an incidence rate of ten (10) persons per million as the maximum acceptable incremental cancer risk due to TAC exposure from a project such as the proposed Project. This threshold serves to determine whether or not a given project has a potentially significant development-specific and cumulatively considerable impact.

The AQMD has published a report on how to address cumulative impacts from air pollution: *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (3). In this report the AQMD states (Page D-3):

"…the AQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR. The only case where the significance thresholds for project specific and cumulative impacts differ is the Hazard Index (HI) significance threshold for toxic air contaminant (TAC) emissions. The project specific (project increment) significance threshold is HI > 1.0 while the cumulative (facility-wide) is HI > 3.0. It should be noted that the HI is only one of three TAC emission significance thresholds considered (when applicable) in a CEQA analysis. The other two are the maximum individual cancer risk (MICR) and the cancer burden, both of which use the same significance thresholds (MICR of 10 in 1 million and cancer burden of 0.5) for project specific and cumulative impacts.

Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant."

The SCAQMD has also established non-carcinogenic risk parameters for use in HRAs. Non-carcinogenic risks are quantified by calculating a "hazard index," expressed as the ratio between the ambient pollutant concentration and its toxicity or Reference Exposure Level (REL). A REL is a concentration at or below which health effects are not likely to occur. A hazard index less of than one (1.0) means that adverse health effects are not expected. In this HRA, non-carcinogenic exposures of less than 1.0 are considered less-than-significant. Both the cancer risk and non-carcinogenic risk thresholds are applied to the nearest sensitive receptors below.

1.1 SITE LOCATION

The proposed project is located on the northeast corner of Sterling Avenue and 5th Street in the City of San Bernardino as shown on Exhibit 1-A.

1.2 PROJECT DESCRIPTION

The Project consists of the development of a 557,000 square foot warehouse building, as shown on Exhibit 1-B. The anticipated Project opening year is 2026.

As summarized in the *5th & Sterling Traffic Analysis* prepared by Urban Crossroads, Inc., the Project is expected to generate a total of approximately 782 two-way trips per day which include 658 two-way passenger car trips per day and 124 two-way truck trips per day (4).

EXHIBIT 1-A: LOCATION MAP

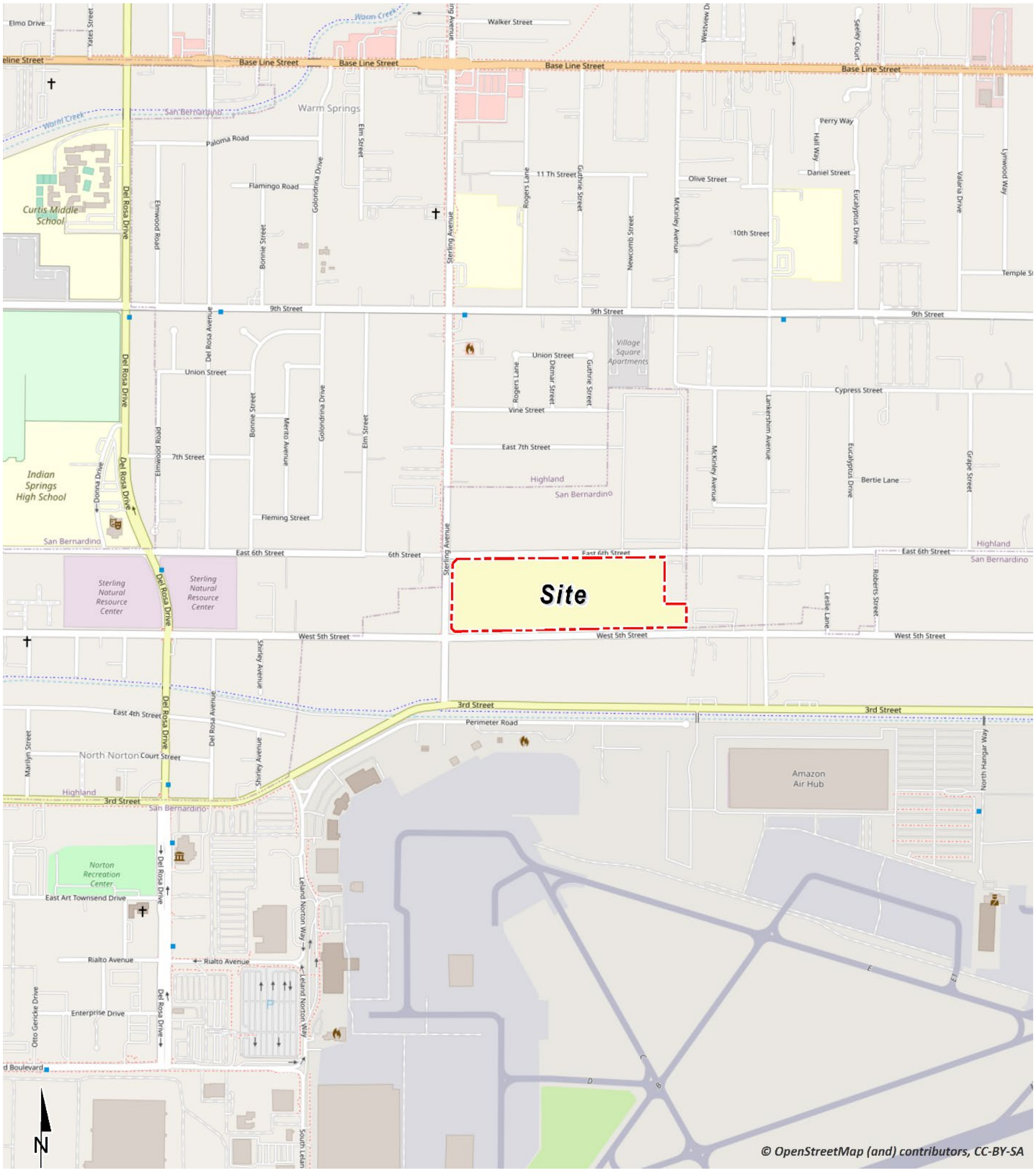
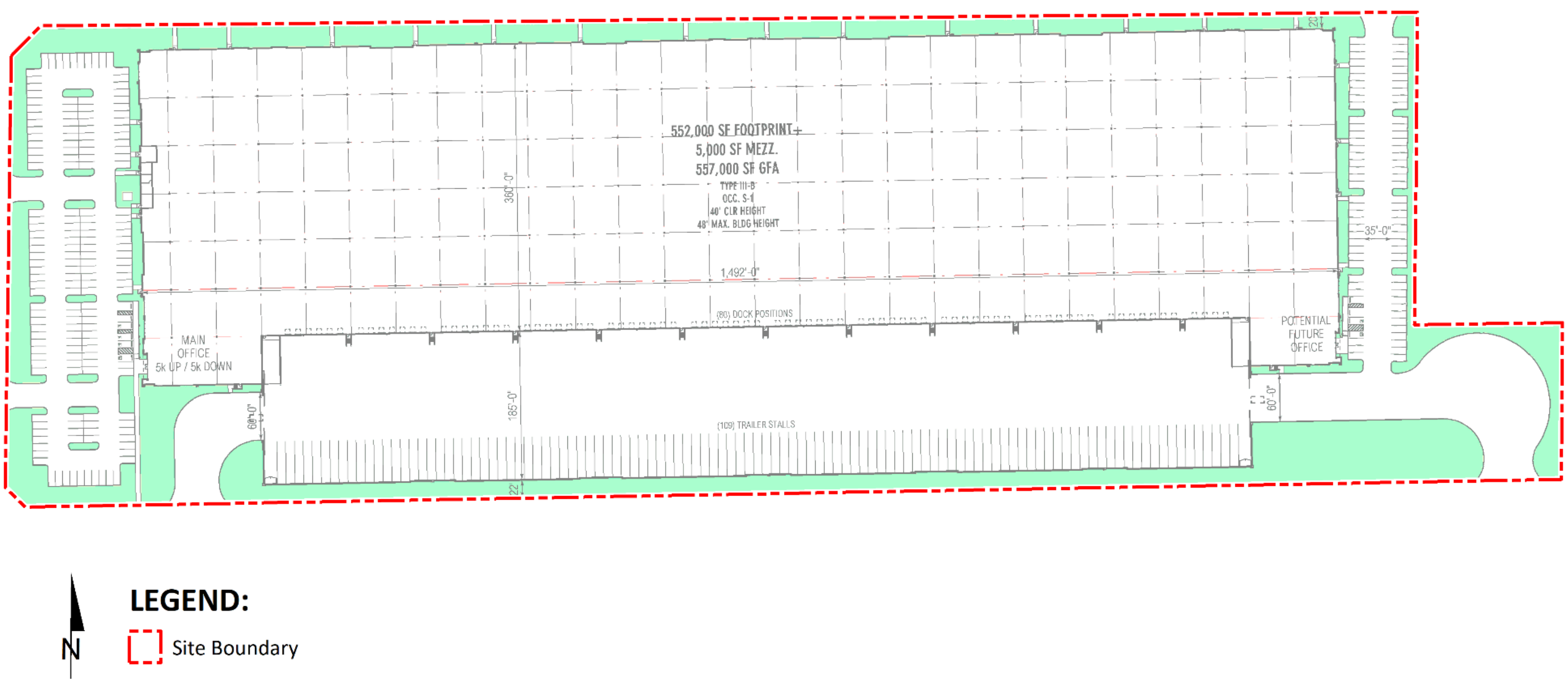


EXHIBIT 1-B: SITE PLAN



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2 BACKGROUND

2.1 BACKGROUND ON RECOMMENDED METHODOLOGY

This HRA is based on applicable guidelines to produce conservative estimates of human health risk posed by exposure to DPM. The conservative nature of this analysis is due primarily to the following factors:

- The ARB-adopted diesel exhaust Unit Risk Factor (URF) of 300 in one million per µg/m^3 is based upon the upper 95 percentile of estimated risk for each of the epidemiological studies utilized to develop the URF. Using the 95^{th} percentile URF represents a very conservative (health-protective) risk posed by DPM because it represents breathing rates that are high for the human body.
- The emissions derived assume that every truck accessing the Project site will idle for 15 minutes under the unmitigated scenario, and this is an overestimation of actual idling times and thus conservative.[2] The California Air Resources Board (CARB's) anti-idling requirements impose a 5-minute maximum idling time and therefore the analysis conservatively overestimates DPM emissions from idling by a factor of 3.

2.2 CONSTRUCTION HEALTH RISK ASSESSMENT

2.2.1 EMISSIONS CALCULATIONS

The emissions calculations for the construction HRA component are based on an assumed mix of construction equipment and hauling activity as presented in the *5th & Sterling Air Quality Impact Analysis* ("technical study") prepared by Urban Crossroads, Inc. (1).

Construction related DPM emissions are expected to occur primarily as a function of the operation of heavy-duty construction equipment.

As discussed in the technical study, the Project would result in approximately 505 total working-days of construction activity. The construction duration by phase is shown on Table 2-1. A detailed summary of construction equipment assumptions by phase is provided at Table 2-2. The CalEEMod emissions outputs are presented in Appendix 2.1. The modeled emission sources for construction activity are illustrated on Exhibit 2-A.

[2] Although the Project is required to comply with ARB's idling limit of 5 minutes at any location, staff at SCAQMD recommends that the on-site idling emissions should be estimated for 15 minutes of truck idling (personal communication, in person, with Jillian Wong, December 22, 2016), which would take into account on-site idling which occurs while the trucks are waiting to pull up to the truck bays, idling at the bays, idling at check-in and check-out, etc.

TABLE 2-1: CONSTRUCTION DURATION

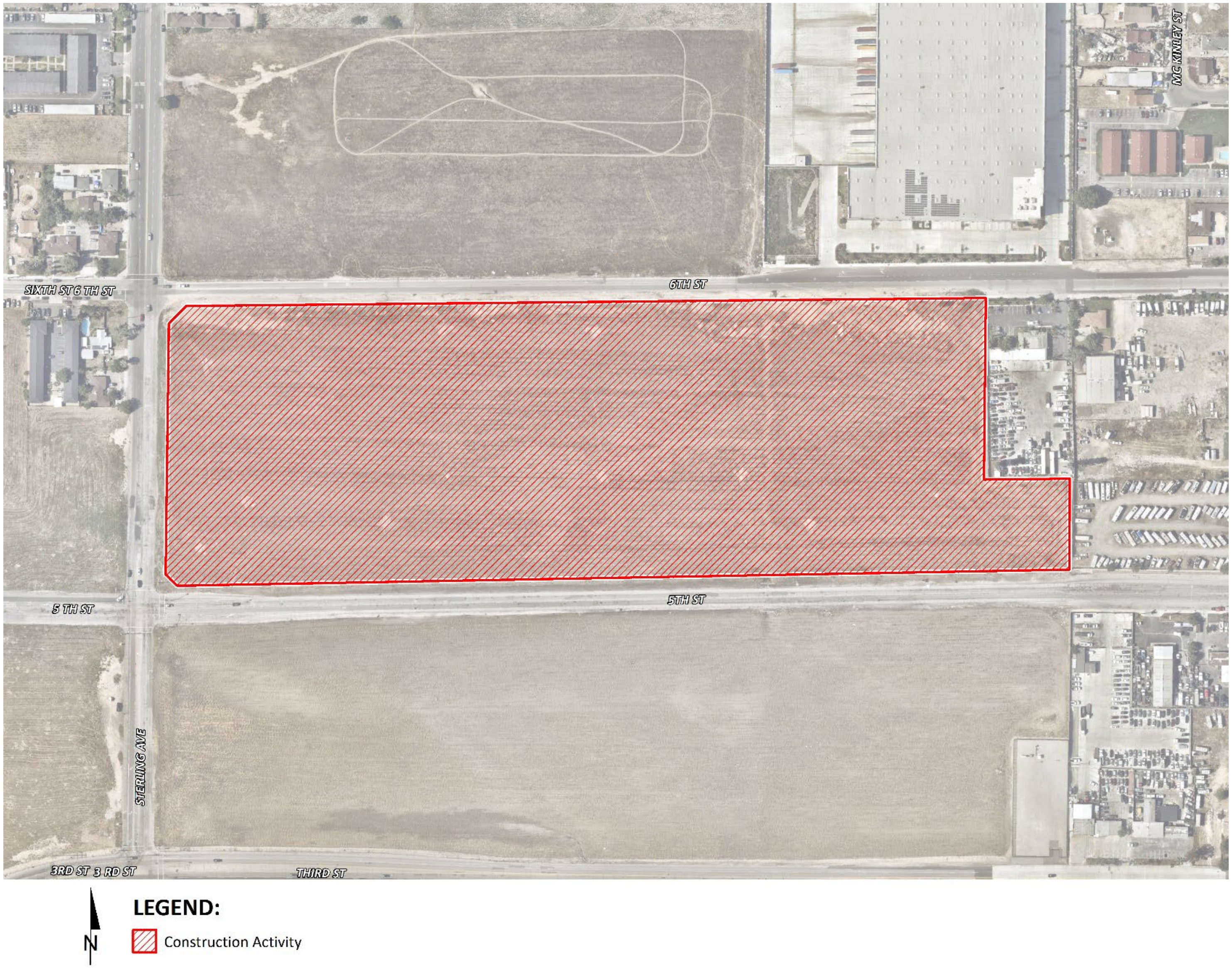
Construction Activity	Start Date[1]	End Date	Days
Site Preparation	12/1/2024	12/27/2024	20
Grading	12/30/2024	2/28/2025	45
Building Construction	3/3/2025	11/6/2026	440
Paving	9/21/2026	11/6/2026	35
Architectural Coating	9/21/2026	11/6/2026	35

[1] At the time the original modeling was prepared for this analysis, the start date was anticipated to be July 2024. Since that time the construction schedule has been revised and a new start date of December 2024 is anticipated. The underlying modeling which is based on the July 2024 start date is more conservative and is worst-case because overall construction equipment emissions are reduced over time as older pieces of construction equipment are phased out of fleets and replaced with newer, cleaner equipment.

TABLE 2-2: CONSTRUCTION EQUIPMENT ASSUMPTIONS

Construction Activity	Equipment	Amount	Hours Per Day
Site Preparation	Rubber Tired Dozers	3	8
	Crawler Tractors	4	8
Graders	Excavators	2	8
	Graders	1	8
	Rubber Tired Dozers	1	8
	Scrapers	4	8
	Crawler Tractors	2	8
Building Construction	Cranes	1	8
	Forklifts	3	8
	Generator Sets	1	8
	Tractors/Loaders/Backhoes	3	8
	Welders	1	8
Paving	Pavers	2	8
	Paving Equipment	2	8
	Rollers	2	8
Architectural Coating	Air Compressors	1	8

EXHIBIT 2-A: MODELED CONSTRUCTION EMISSION SOURCES



2.3 OPERATIONAL HEALTH RISK ASSESSMENT

2.3.1 ON-SITE AND OFF-SITE TRUCK ACTIVITY

Vehicle DPM emissions were calculated using emission factors for particulate matter less than 10µm in diameter (PM_{10}) generated with the 2021 version of the EMission FACtor model (EMFAC) developed by the CARB. EMFAC 2021 is a mathematical model that CARB developed to calculate emission rates from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by the ARB to project changes in future emissions from on-road mobile sources (6). The most recent version of this model, EMFAC 2021, incorporates regional motor vehicle data, information and estimates regarding the distribution of vehicle miles traveled (VMT) by speed, and number of starts per day.

Several distinct emission processes are included in EMFAC 2021. Emission factors calculated using EMFAC 2021 are expressed in units of grams per vehicle miles traveled (g/VMT) or grams per idle-hour (g/idle-hr), depending on the emission process. The emission processes and corresponding emission factor units associated with diesel particulate exhaust for this Project are presented below.

For this Project, annual average PM_{10} emission factors were generated by running EMFAC 2021 in EMFAC Mode for vehicles in the San Bernardino County jurisdiction. The EMFAC Mode generates emission factors in terms of grams of pollutant emitted per vehicle activity and can calculate a matrix of emission factors at specific values of temperature, relative humidity, and vehicle speed. The model was run for speeds traveled in the vicinity of the Project. The vehicle travel speeds for each segment modeled are summarized below.

- Idling – on-site loading/unloading and truck gate
- 5 miles per hour – on-site vehicle movement including driving and maneuvering
- 25 miles per hour – off-site vehicle movement including driving and maneuvering.

It is expected that minimal idling would occur at nearby intersections during truck travel on study area roadways (e.g., at an intersection during a red light, or yielding to make a turn). Notwithstanding, the analysis conservatively utilizes a reduced off-site average speed of 25 miles per hour (below the posted speed limit) for travel on study area roadways, use of a lower average speed for off-site travel results in a higher emission factor and therefore any negligible idling that would occur during truck travel along the study area is accounted for.

Calculated emission factors are shown at Table 2-3. As a conservative measure, a 2026 EMFAC 2021 run was conducted and a static 2026 emissions factor data set was used for the entire duration of analysis herein (e.g., 30 years). Use of 2026 emission factors would overstate potential impacts since this approach assumes that emission factors remain “static” and do not change over time due to fleet turnover or cleaner technology with lower emissions that would be incorporated into vehicles after 2026. Additionally, based on EMFAC 2021, Light-Heavy-Duty Trucks are comprised of 52.3% diesel, Medium-Heavy-Duty Trucks are comprised of 91.8% diesel, and Heavy-Heavy-Duty Trucks are comprised of 85.1% diesel. Trucks fueled by diesel are accounted for by these percentages accordingly in the emissions factor generation. Appendix 2.2 includes additional details on the emissions estimates from EMFAC.

The vehicle DPM exhaust emissions were calculated for running exhaust emissions. The running exhaust emissions were calculated by applying the running exhaust PM_{10} emission factor (g/VMT) from EMFAC over the total distance traveled. The following equation was used to estimate off-site emissions for each of the different vehicle classes comprising the mobile sources (7):

$$Emissions_{Speed\ A} = EF_{Run\ Exhaust} \times Distance \times \frac{Number\ of\ Trips\ per\ Day}{Seconds\ per\ Day}$$

Where:

$Emissions_{Speed\ A}$	=	Vehicle emissions at a given speed A (g/s)
$EF_{Run\ Exhaust}$	=	EMFAC running exhaust PM_{10} emission factor at speed A (g/vmt)
$Distance$	=	Total distance traveled per trip (miles)

Similar to off-site traffic, on-site vehicle running emissions were calculated by applying the running exhaust PM_{10} emission factor (g/VMT) from EMFAC and the total vehicle trip number over the length of the driving path using the same formula presented above for on-site emissions. In addition, on-site vehicle idling exhaust emissions were calculated by applying the idle exhaust PM_{10} emission factor (g/idle-hr) from EMFAC and the total truck trip over the total assumed idle time (15 minutes). The following equation was used to estimate the on-site vehicle idling emissions for each of the different vehicle classes (7):

$$Emissions_{Idle} = EF_{Idle} \times Number\ of\ Trips \times Idling\ Time \times \frac{60\ minutes\ per\ hour}{seconds\ per\ day}$$

Where:

$Emissions_{Idle}$	=	Vehicle emissions during Idling (g/s)
EF_{Idle}	=	EMFAC idle exhaust PM_{10} emission factor (g/s)
$Number\ of\ Trips$	=	Number of trips per day
$Idling\ Time$	=	Idling time (minutes per trip)

TABLE 2-3: 2026 WEIGHTED AVERAGE DPM EMISSIONS FACTORS

Speed	Weighted Average
0 (idling)	0.07336 (g/idle-hr)
5	0.01763 (g/mile)
25	0.00754 (g/mile)

Each roadway was modeled as a line source (made up of multiple adjacent volume sources). Due to the large number of volume sources modeled for this analysis, the corresponding coordinates of each volume source have not been included in this report but are included in Appendix 2.3. The DPM emission rate for each line volume source was calculated by multiplying the emission factor (based on the average travel speed along the roadway) by the number of trips and the distance traveled along each roadway segment, as illustrated on Table 2-4. In order to model idling emissions, line sources were modeled at the building loading docks and tractor trailer parking stalls. The modeled emission sources are illustrated on Exhibit 2-B for on-site sources and Exhibit 2-C for off-site sources. The modeling domain is limited to the Project's primary truck route and includes off-site sources in the study area for more than ¾ mile. This modeling domain is more inclusive and conservative than using only a ¼ mile modeling domain which is the distance supported by several reputable studies which conclude that the greatest potential risks occur within a ¼ mile of the primary source of emissions (8) (in the case of the Project, the primary source of emissions is the on-site idling and on-site travel).

On-site truck idling was estimated to occur as trucks enter and travel through the Project site, as well as in truck parking areas. Although the Project's diesel-fueled truck and equipment operators will be required by State law to comply with CARB's idling limit of 5 minutes, staff at SCAQMD recommends that the on-site idling emissions be calculated assuming 15 minutes of truck idling (9), which would take into account on-site idling which occurs while the trucks are waiting to pull up to the truck bays, idling at the bays, idling at check-in and check-out, etc. As such, this analysis calculates truck idling at 15 minutes, consistent with SCAQMD's recommendation.

As summarized in the *5th & Sterling Traffic Analysis* prepared by Urban Crossroads, Inc., the proposed Project is expected to generate a total of approximately 782 actual vehicular trip-ends per day (391 vehicles inbound + 391 vehicles outbound) which includes 658 passenger vehicle trips (329 passenger vehicles inbound + 329 passenger vehicles outbound) and 124 two-way truck trips (62 trucks inbound per day + 62 trucks outbound) per day (4).

2.3.2 ON-SITE CARGO HANDLING EQUIPMENT EMISSIONS

It is common for warehouse buildings to require the operation of exterior cargo handling equipment in the building's truck court areas. For this Project, it was assumed that a total of three pieces[3] of diesel-powered tractors/loaders/backhoes rated at 200 horsepower would operate 8 hours a day[4] for 365 days per year. On-site equipment was modeled as volume sources placed in the truck court area of each building, with a modeled release height of 5 meters and an initial lateral dimension of 1.4 meters.

2.3.3 EMERGENCY FIRE PUMPS

The proposed Project was conservatively assumed to include installation of a 300-horsepower diesel-powered emergency fire pump, which is estimated to operate for up to 1 hour per day, 1

[3] Based on SCAQMD's April 2021 Second Draft Report for Rule 2305, it is estimated that warehouses operate an average of 3.6 yard trucks per million square feet of warehouse space.

[4] Based on Table II-3, Port and Rail Cargo Handling Equipment Demographics by Type, from CARB's Technology Assessment: Mobile Cargo Handling Equipment document, a single piece of equipment could operate up to 2 hours per day (Total Average Annual Activity divided by Total Number Pieces of Equipment). As such, the analysis conservatively assumes that the tractor/loader/backhoe would operate up to 4 hours per day.

day per week for up to 50 hours per year for maintenance and testing purposes. Emissions associated with the emergency fire pump were calculated using CalEEMod and was modeled in AERMOD as point source. Because specific engine data is not known at this time, release parameters from the California Air Pollution Control Officers Association Facility Prioritization Guidelines were utilized (10).

EXHIBIT 2-B: MODELED ON-SITE EMISSION SOURCES

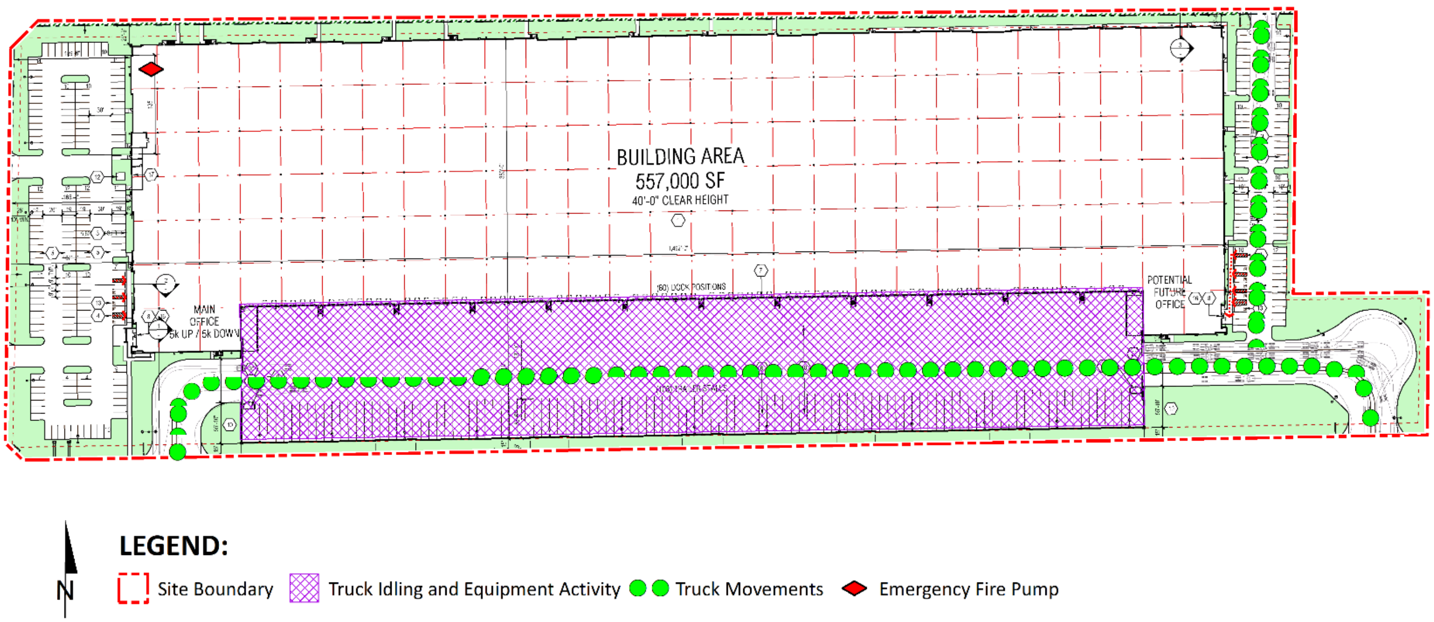
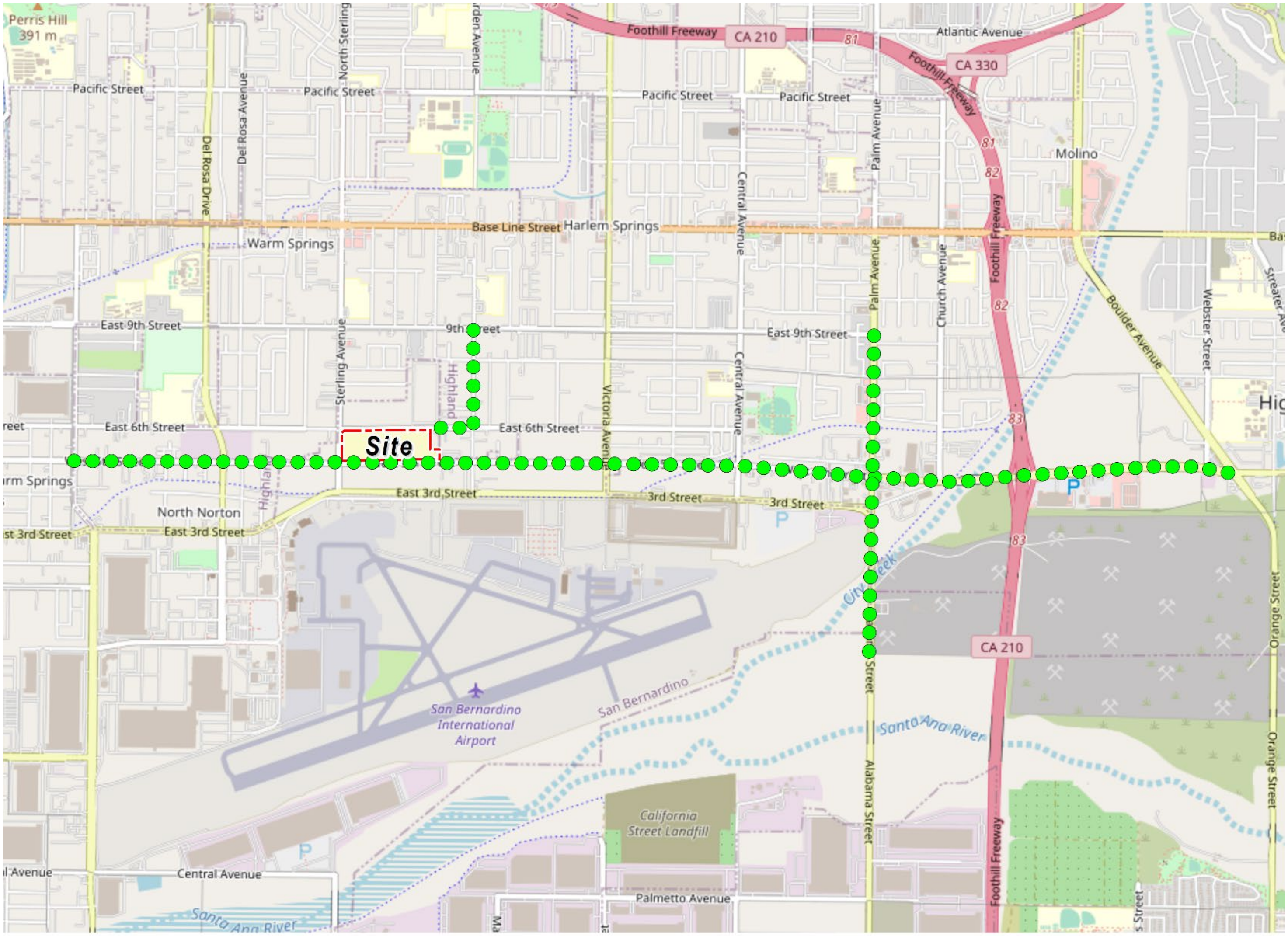


EXHIBIT 2-C: MODELED OFF-SITE EMISSION SOURCES



LEGEND:

N

Site Boundary
Truck Movements

TABLE 2-4: DPM EMISSIONS FROM PROJECT TRUCKS

Truck Emission Rates						
Source	Trucks Per Day	VMT [a] (miles/day)	Truck Emission Rate [b] (grams/mile)	Truck Emission Rate [b] (grams/idle-hour)	Daily Truck Emissions [c] (grams/day)	Modeled Emission Rates (g/second)
On-Site Idling - Loading Docks	62			0.0734	1.14	1.316E-05
On-Site Idling - Parking Area	62			0.0734	1.14	1.316E-05
On-Site Travel 100%	124	42.12	0.0176		0.74	8.594E-06
On-Site Travel 5%	6	0.55	0.0176		0.01	1.113E-07
Off-Site Travel - 5th St. 15% W. Inbound/Outbound	19	19.33	0.0075		0.15	1.688E-06
Off-Site Travel - Lankershim Ave. 5% Inbound/Outbound	6	2.62	0.0075		0.02	2.288E-07
Off-Site Travel - 5th St. 15% Inbound/Outbound	19	5.75	0.0075		0.04	5.017E-07
Off-Site Travel - 5th St. 80% W. Inbound/Outbound	99	64.07	0.0075		0.48	5.593E-06
Off-Site Travel - 5th St. 80% E. Inbound/Outbound	99	98.44	0.0075		0.74	8.594E-06
Off-Site Travel - 5th St. 67% Inbound/Outbound	83	50.64	0.0075		0.38	4.421E-06
Off-Site Travel - 5th St. 5% Inbound/Outbound	6	4.63	0.0075		0.03	4.042E-07
Off-Site Travel - Palm Ave. 8% Inbound/Outbound	10	4.06	0.0075		0.03	3.540E-07
Off-Site Travel - Palm Ave. 8% Inbound/Outbound	6	2.26	0.0075		0.02	1.970E-07

[a] Vehicle miles traveled are for modeled truck route only.

[b] Emission rates determined using EMFAC 2021. Idle emission rates are expressed in grams per idle hour rather than grams per mile.

[c] This column includes the total truck travel and truck idle emissions. For idle emissions this column includes emissions based on the assumption that each truck idles for 15 minutes.

2.4 EXPOSURE QUANTIFICATION

The analysis herein has been conducted in accordance with the guidelines in the Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis (2). The Environmental Protection Agency's (U.S. EPA's) AERMOD model has been utilized. For purposes of this analysis, the Lakes AERMOD View (Version 11.2.0) was used to calculate annual average particulate concentrations associated with site operations. Lakes AERMOD View was utilized to incorporate the U.S. EPA's latest AERMOD Version 22112 (11).

The model offers additional flexibility by allowing the user to assign an initial release height and vertical dispersion parameters for mobile sources representative of a roadway. For this HRA, the roadways were modeled as adjacent volume sources. Roadways were modeled using the U.S. EPA's haul route methodology for modeling of on-site and off-site truck movement. More specifically, the Haul Road Volume Source Calculator in Lakes AERMOD View has been utilized to determine the release height parameters. Based on the US EPA methodology, the Project's modeled sources would result in a release height of 3.49 meters and an initial lateral dimension of 4.0 meters, and an initial vertical dimension of 3.25 meters.

Model parameters are presented in Table 2-5 (11). The model requires additional input parameters including emission data and local meteorology. Meteorological data from the SCAQMD's Redlands monitoring station was used to represent local weather conditions and prevailing winds (12).

TABLE 2-5: AERMOD MODEL PARAMETERS

Dispersion Coefficient (Urban/Rural)	Urban (population 2,035,210)
Terrain (Flat/Elevated)	Elevated (Regulatory Default)
Averaging Time	1 year (5-year Meteorological Data Set)
Receptor Height	0 meters (Regulatory Default)

Universal Transverse Mercator (UTM) coordinates for World Geodetic System (WGS) 84 were used to locate the Project site boundaries, each volume source location, and receptor locations in the Project vicinity. The AERMOD dispersion model summary output files for the Project are presented in Appendix 2.3. Modeled sensitive receptors were placed at residential and non-residential locations.

Receptors may be placed at applicable structure locations for residential and worker property and not necessarily the boundaries of the properties containing these uses because the human receptors (residents and workers) spend a majority of their time at the residence or in the workplace's building, and not on the property line. It should be noted that the primary purpose of receptor placement is focused on long-term exposure. For example, the HRA evaluates the potential health risks to residents, workers, and school children over a period of 30, 25, or 9 years of exposure, respectively. Notwithstanding, as a conservative measure, receptors were placed at either the outdoor living area or the building façade, whichever is closer to the Project site.

Discrete receptors were placed in all directions nearest to the Project site and Project truck routes in order to account for the predominant wind directions in the Project vicinity.

For purposes of this HRA, receptors include both residential and non-residential (school children and worker) land uses in the vicinity of the Project. These receptors are included in the HRA since residents, workers, and school children may be exposed at these locations over a long-term duration of 30, 25, and 9 years, respectively. This methodology is consistent with SCAQMD and OEHHA recommended guidance.

Any impacts to residents or workers located further away from the Project site than the modeled residential and workers in a given direction would have a lesser impact than what has already been disclosed in the HRA at the MEIR, MEISC, and MEIW because concentrations dissipate with distance.

All receptors were set to existing elevation height so that only ground-level concentrations are analyzed. United States Geological Survey (USGS) Digital Elevation Model (DEM) terrain data based on a 7.5-minute topographic quadrangle map series using AERMAP was utilized in the HRA modeling to set elevations (13).

Discrete variants for daily breathing rates, exposure frequency, fraction of time at home, and exposure duration were obtained from relevant distribution profiles presented in the 2015 OEHHA Guidelines. Tables 2-6 through 2-9 summarize the Exposure Parameters for residents and workers based on 2015 OEHHA Guidelines. Appendix 2.4 includes the detailed risk calculation.

TABLE 2-6: EXPOSURE ASSUMPTIONS FOR INDIVIDUAL CANCER RISK (CONSTRUCTION ACTIVITY)

Age	Daily Breathing Rate (L/kg-day)	Age Specific Factor	Exposure Duration (years)	Fraction of Time at Home	Exposure Frequency (days/year)	Exposure Time (hours/day)
0 to 2	1,090	10	1.93	1.00	250	8

TABLE 2-7: EXPOSURE ASSUMPTIONS FOR INDIVIDUAL CANCER RISK (30 YEAR RESIDENTIAL)

Age	Daily Breathing Rate (L/kg-day)	Age Specific Factor	Exposure Duration (years)	Fraction of Time at Home	Exposure Frequency (days/year)	Exposure Time (hours/day)
-0.25 to 0	361	10	0.25	0.85	350	24
0 to 2	1,090	10	2	0.85	350	24
2 to 16	572	3	14	0.72	350	24
16 to 30	261	1	14	0.73	350	24

TABLE 2-8: EXPOSURE ASSUMPTIONS FOR INDIVIDUAL CANCER RISK (25 YEAR WORKER)

Age	Daily Breathing Rate (L/kg-day)	Age Specific Factor	Exposure Duration (years)	Exposure Frequency (days/year)	Exposure Time (hours/day)
16 to 41	230	1	25	250	12

TABLE 2-9: EXPOSURE ASSUMPTIONS FOR INDIVIDUAL CANCER RISK (9 YEAR SCHOOL CHILD)

Age	Daily Breathing Rate (L/kg-day)	Age Specific Factor	Exposure Duration (years)	Exposure Frequency (days/year) [a]	Exposure Time (hours/day)
4 to 13	631	3	9	180	12

[a] To represent the unique characteristics of the school-based population, the assessment employed the U.S. Environmental Protection Agency's guidance to develop viable dose estimates based on reasonable maximum exposures (RME). RME's are defined as the "highest exposure that is reasonably expected to occur" for a given receptor population. As a result, lifetime risk values for the student population were adjusted to account for an exposure duration of 180 days per year for nine (9) years. The 9 year exposure duration is also consistent with OEHHA Recommendations and consistent with the exposure duration utilized in school-based risk assessments for various schools within the Los Angeles County Unified School District (LAUSD) that have been accepted by the SCAQMD.

2.5 CARCINOGENIC CHEMICAL RISK

Excess cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens over a specified exposure duration. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF). A risk level of 10 in one million implies a likelihood that up to 10 people, out of one million equally exposed people would contract cancer if exposed continuously (24 hours per day) to the levels of toxic air contaminants over a specified duration of time.

Guidance from CARB and the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA) recommends a refinement to the standard point estimate approach when alternate human body weights and breathing rates are utilized to assess risk for susceptible subpopulations such as children. For the inhalation pathway, the procedure requires the incorporation of several discrete variates to effectively quantify dose. Once determined, contaminant dose is multiplied by the cancer potency factor (CPF) in units of inverse dose expressed in milligrams per kilogram per day $(mg/kg/day)^{-1}$ to derive the cancer risk estimate. Therefore, to assess exposures, the following dose algorithm was utilized.

$$DOSE_{AIR} = \left(C_{AIR} \times \frac{BR}{BW} \times A \times EF\right) \times (1 \times 10^{-6})$$

Where:

$DOSE_{AIR}$ = chronic daily intake (mg/kg/day)

C_{AIR}	=	concentration of contaminant in air (µg/m³)
$\frac{BR}{BW}$	=	daily breathing rate normalized to body weight (L/kg BW-day)
A	=	inhalation absorption factor
EF	=	exposure frequency (days/365 days)
BW	=	body weight (kg)
1×10^{-6}	=	conversion factors (µg to mg, L to m³)

$$RISK_{AIR} = DOSE_{AIR} \times CPF \times ASF \times FAH \times \frac{ED}{AT}$$

Where:

$DOSE_{AIR}$	=	chronic daily intake (mg/kg/day)
CPF	=	cancer potency factor
ASF	=	age sensitivity factor
FAH	=	fraction of time at home
ED	=	number of years within particular age group
AT	=	averaging time

2.6 NON-CARCINOGENIC EXPOSURES

An evaluation of the potential noncarcinogenic effects of chronic exposures was also conducted. Adverse health effects are evaluated by comparing a compound's annual concentration with its toxicity factor or Reference Exposure Level (REL). The REL for diesel particulates was obtained from OEHHA for this analysis. The chronic reference exposure level (REL) for DPM was established by OEHHA as 5 µg/m³ (14).

Non-cancer health effects are expressed as a hazard index (HI), which is calculated using the following equation:

$$HI_{DPM} = \frac{C_{DPM}}{REL_{DPM}}$$

Where:

HI_{DPM}	=	Hazard index (unitless)
C_{DPM}	=	Annual average DPM concentration (µg/m³)

REL_{DPM} = REL for DPM (the DPM concentration at which no adverse health effects are anticipated).

2.7 Potential Project DPM-Source Cancer and Non-Cancer Risks

Construction Impacts

The land use with the greatest potential exposure to Project construction-source DPM emissions is Location R1 which is located approximately 123 feet west of the Project site at an existing residence located at 7926 Sterling Avenue. Since there are no private outdoor living areas (backyards) facing the Project site, R1 is placed at the building façade.

Without implementation of PDF AQ-1, at the MEIR, the maximum incremental cancer risk attributable to Project construction-source DPM emissions is estimated at 3.99 in one million, which is less than the SCAQMD significance threshold of 10 in one million. With implementation of PDF AQ-1, the maximum incremental cancer risk at the MEIR would be reduced to 0.51 in one million. At this same location, with and without implementation of PDF AQ-1, non-cancer risks were estimated to be ≤0.01, which would not exceed the applicable threshold of 1.0. Location R1 is the nearest receptor to the Project site and would experience the highest concentrations of DPM during Project construction due to its location and meteorological conditions at the site. Because all other modeled receptors would experience lower concentrations of DPM during Project construction, all other receptors in the vicinity of the Project would be exposed to less emissions and therefore less risk than the MEIR identified herein. As such, the Project will not cause a significant human health or cancer risk to adjacent land uses as a result of Project construction activity. All other receptors during construction activity would experience less risk than what is identified for this location.

Operational Impacts

Residential Exposure Scenario:

The residential land use with the greatest potential exposure to Project operational-source DPM emissions is Location R1 which is located approximately 123 feet west of the Project site at an existing residence located at 7926 Sterling Avenue. R1 is placed in the private outdoor living area (backyard) facing the Project site.

Without implementation of project design feature (PDF) AQ-4, the maximum incremental cancer risk attributable to Project operational-source DPM emissions is estimated at 2.96 in one million, which would not exceed the SCAQMD's significance threshold of 10 in one million. Without implementation of project design feature (PDF) AQ-4, the maximum incremental cancer risk attributable to Project operational-source DPM emissions is estimated at 0.49 in one million, which would not exceed the SCAQMD's significance threshold of 10 in one million. At this same location, with and without implementation of PDF AQ-4, non-cancer risks were estimated to be ≤0.01, which would not exceed the applicable significance threshold of 1.0.

Location R1 is the nearest receptor to the Project site and would experience the highest concentrations of DPM from Project operation due to its location and meteorological conditions at the Project site. Because all other modeled receptors would be exposed to lower concentrations of DPM, all other receptors in the vicinity of the Project would be exposed to less emissions and therefore less risk than the MEIR identified herein. As such, the Project will not cause a significant human health or cancer risk to nearby residences. The modeled receptors are illustrated on Exhibit 2-D.

Worker Exposure Scenario[5]*:*

The worker receptor land use with the greatest potential exposure to Project operational -source DPM emissions is Location R7, which represents the potential worker receptor located approximately 170 feet south of the Project site.

The maximally exposed individual worker (MEIW) is the worker receptor location that would experience the highest modeled concentrations of DPM, and thus the highest risk. Without implementation of project design feature (PDF) AQ-4, the maximum incremental cancer risk impact is 0.75 in one million, which is less than the SCAQMD's threshold of 10 in one million. With implementation of project design feature (PDF) AQ-4, the maximum incremental cancer risk impact is 0.06 in one million, which is less than the SCAQMD's threshold of 10 in one million. At this same location, with and without implementation of PDF AQ-4, the maximum non-cancer risk was estimated to be ≤0.01, which would not exceed the applicable significance threshold of 1.0. Because all other modeled worker receptors would be exposed to lower concentrations of DPM, all other worker receptors in the vicinity of the Project would be exposed to less emissions and therefore less risk than the MEIW identified herein. As such, the Project will not cause a significant human health or cancer risk to adjacent workers. The modeled receptors are illustrated on Exhibit 2-D.

School Child Exposure Scenario:

The nearest school is Indian Springs High School, located approximately 2,731 feet west of the Project site and represented by Location R8. Without implementation of project design feature (PDF) AQ-4, the maximally exposed individual school child (MEISC) cancer risk impact attributable to the Project is calculated to be 0.04 in one million, which is less than the significance threshold of 10 in one million. With implementation of project design feature (PDF) AQ-4, the maximally exposed individual school child (MEISC) cancer risk impact attributable to the Project is calculated to be 0.01 in one million, which is less than the significance threshold of 10 in one million At this same location, with and without implementation of PDF AQ-4, non-cancer risks attributable to the Project were calculated to be ≤0.01, which would not exceed the applicable significance threshold of 1.0. Because all other modeled school receptors would be exposed to lower concentrations of DPM, all other school receptors in the vicinity of the of the Project would be

5 SCAQMD guidance does not require assessment of the potential health risk to on-site workers. Excerpts from the document OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines—The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2003), also indicate that it is not necessary to examine the health effects to on-site workers unless required by RCRA (Resource Conservation and Recovery Act) / CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) or the worker resides on-site.

exposed to less emissions and therefore less risk than the MEISC identified herein. As such, the Project will not cause a significant human health or cancer risk to nearby school children.

CONSTRUCTION AND OPERATIONAL IMPACTS

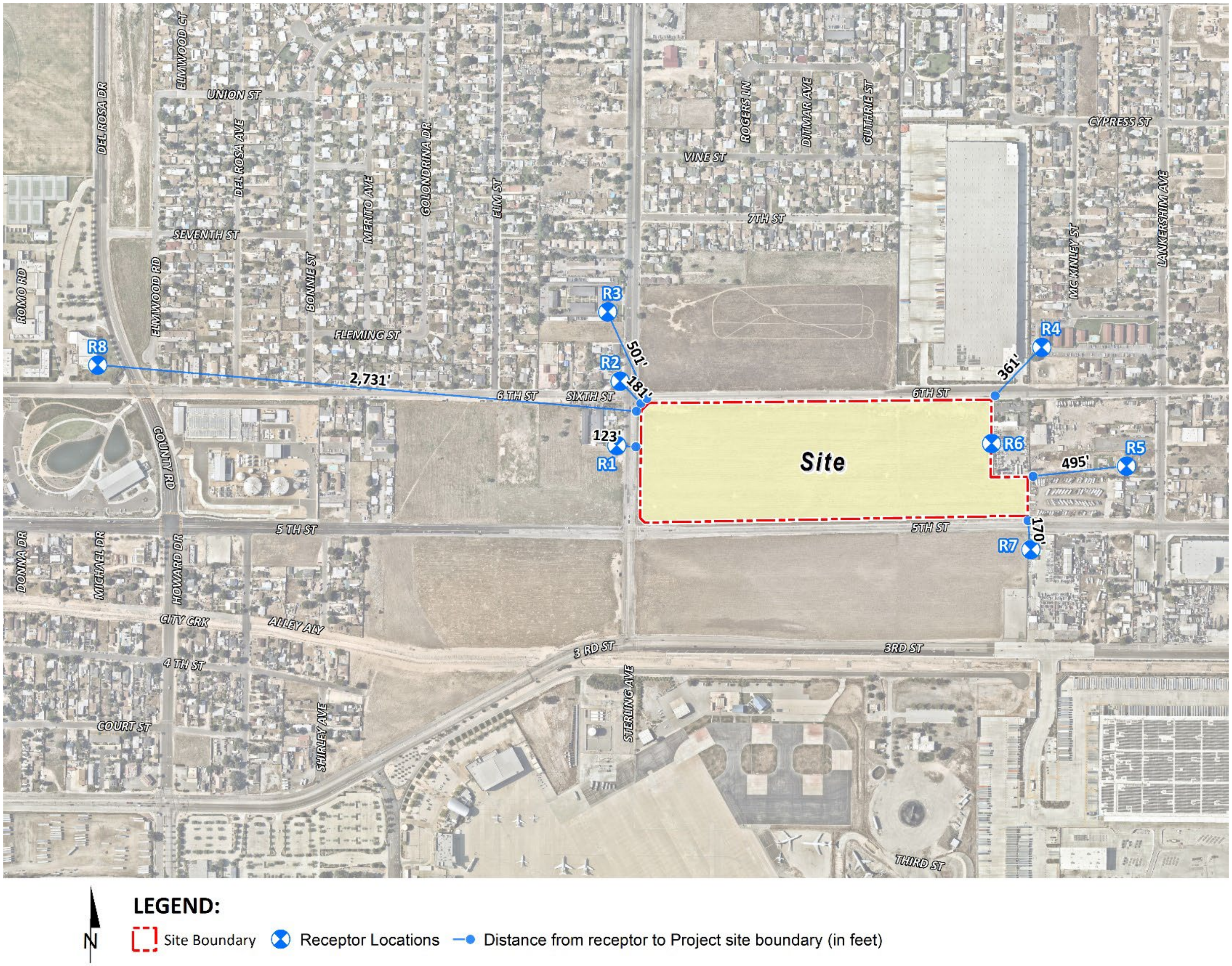
This analysis considers a conservative scenario in which a child at a nearby residence is exposed to Project construction-related DPM emissions from birth for the expected 1.93 years of Project construction, and is then exposed to Project operational emissions for the remaining 28.07 years of the 30 year residential exposure scenario. It should be noted that in many cases the combined construction and operational risk is less than the operational risk alone due to varying DPM concentrations at receptors for the construction and operational phases of the Project, as well as the assumed exposure durations and scenarios, which place a greater emphasis on pollutant exposures that occur early in life.

The land use with the greatest potential exposure to Project construction-source and operational-source DPM emissions is Location R1. At the MEIR, without implementation of PDF AQ-1 and AQ-4, the maximum incremental cancer risk attributable to Project construction-source and operational-source DPM emissions is estimated at 5.55 in one million, which is less than the threshold of 10 in one million. At this same location, non-cancer risks were estimated to be ≤0.01, which would not exceed the applicable threshold of 1.0.

With implementation of PDF AQ-1 and AQ-4, the land use with the greatest potential exposure to Project construction-source and operational-source DPM emissions is Location R1. At the MEIR, with implementation of PDF AQ-1, the maximum incremental cancer risk is estimated at 0.77 in one million, and non-cancer risks are estimated to be ≤0.01. As such, the Project will not cause a significant human health or cancer risk to adjacent land uses as a result of Project construction and operational activity. All other receptors during construction and operational activity would experience less risk than what is identified for this location. The modeled receptors are illustrated on Exhibit 2-D.

It should be noted that the receptors presented in Exhibit 2-D do not represent all modeled receptors.

EXHIBIT 2-D: RECEPTOR LOCATIONS



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4 CERTIFICATIONS

The contents of this health risk assessment represent an accurate depiction of the impacts to sensitive receptors associated with the proposed 5th & Sterling Project. The information contained in this health risk assessment report is based on the best available data at the time of preparation. If you have any questions, please contact me at (949) 660-1994.

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AEP – Association of Environmental Professionals
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PROFESSIONAL CERTIFICATIONS

Environmental Site Assessment – American Society for Testing and Materials • June 2013
Planned Communities and Urban Infill – Urban Land Institute • June 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April 2008
Principles of Ambient Air Monitoring – California Air Resources Board • August 2007
AB2588 Regulatory Standards – Trinity Consultants • November 2006
Air Dispersion Modeling – Lakes Environmental • June 2006

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APPENDIX 2.1:

CALEEMOD OUTPUTS

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APPENDIX 2.2:

EMFAC EMISSIONS SUMMARY

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APPENDIX 2.3:

AERMOD MODEL INPUT/OUTPUT

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APPENDIX 2.4:

RISK CALCULATIONS

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