4.1 Air Quality

4.1.1 Introduction

This air quality analysis examines potential air quality impacts that could result from the proposed Project. The analysis addresses the change in criteria pollutant emissions from construction and operational activities, as well as the emission of toxic air contaminants (TAC) from construction activities associated with the proposed Project. Greenhouse gas emissions are discussed separately in Section 4.2, *Greenhouse Gas Emissions*, of this Draft Environmental Impact Report (EIR).

The air quality impact analyses presented below include development of emission inventories for the proposed Project (i.e., the quantities of specific pollutants, typically expressed in pounds per day or tons per year) based on emission modeling and assessment of localized concentrations (i.e., the concentrations of specific pollutants within ambient air, typically expressed in terms of micrograms per cubic meter) and based on screening criteria and dispersion modeling. The criteria pollutant emissions inventories and localized concentrations were developed using standard industry software/models and federal, state, and locally approved methodologies. Concentrations of TAC were used with federal and state health risk parameters to estimate cancer risks and non-cancer health hazard indices for maximally exposed individuals (MEI). Results of the emission inventories were compared to daily emissions thresholds established by the South Coast Air Quality Management District (SCAQMD) for the South Coast Air Basin (Basin).[1] Results of the risk calculations were compared to the health risk thresholds also established by the SCAQMD for the Basin. This section is based in part on the detailed information contained in Appendix B, *Air Quality, Greenhouse Gas,* and *Human Health Risk Assessment.*

4.1.1.1 Pollutants of Interest

Six criteria pollutants were evaluated for the proposed Project, including ozone (O_3) using as surrogates volatile organic compounds (VOCs)[2] and oxides of nitrogen (NO_X), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}), and particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers ($PM_{2.5}$). These pollutants were analyzed consistent with guidelines set forth by the SCAQMD for the preparation of California Environmental Quality Act (CEQA) documents[3] and are considered to be pollutants of concern based on the type of emission sources associated with construction and operation of the proposed Project, and are thus included in this assessment. Although lead (Pb) is a criteria pollutant, it was not evaluated in this EIR because the proposed Project would have a negligible impact on Pb levels in the Basin. The only source of Pb emissions from the Los Angeles

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1 South Coast Air Quality Management District, CEQA Air Quality Handbook, 1993; as updated by SCAQMD Air Quality Significance Thresholds, March 2011, Available: http://www.aqmd.gov/CEQA/handbook/signthres.pdf.

2 The emissions of volatile organic compounds (VOC) and reactive organic gases (ROG) are essentially the same for the combustion emission sources that are considered in this EIR. This EIR will typically refer to organic emissions as VOC.

3 South Coast Air Quality Management District, CEQA Air Quality Handbook, 1993; as updated by SCAQMD Air Quality Significance Thresholds, March 2011, Available: http://www.aqmd.gov/CEQA/handbook/signthres.pdf.

International Airport (LAX) is from aviation gasoline (AvGas) associated with piston-engine general aviation aircraft; however, due to the low number of piston-engine general aviation aircraft operations at LAX, AvGas quantities are low and emissions from these sources would not be materially affected by the Project. Sulfate compounds (e.g., ammonium sulfate) are generally not emitted directly into the air but are formed through various chemical reactions in the atmosphere; thus, sulfate is considered a secondary pollutant. All sulfur emitted by airport-related sources included in this analysis was assumed to be released and to remain in the atmosphere as SO_2. Therefore, no sulfate inventories or concentrations were estimated.

Following standard industry practice, the evaluation of O_3 was conducted by evaluating emissions of VOCs and NO_X, which are precursors in the formation of O_3. O_3 is a regional pollutant and ambient concentrations can only be predicted using regional photochemical models that account for all sources of precursors, which is beyond the scope of this analysis. Therefore, no photochemical O_3 modeling was conducted for the proposed Project. Additional information regarding the six criteria pollutants that were evaluated in the air quality analysis is presented below.

In addition, a number of TAC were analyzed to estimate potential exposure concentrations and associated health risks to MEI. The contaminants selected were those commonly emitted from airport equipment, vehicles, and activities. These contaminants are specific compounds or elements in the organic vapor or particulate matter emissions from engine exhaust, evaporation, and fugitive dust.

4.1.1.1.1 Ozone (O_3)

O_3, a component of smog, is formed in the atmosphere rather than being directly emitted from pollutant sources. O_3 forms as a result of VOCs and NO_X reacting in the presence of sunlight in the atmosphere. O_3 levels are highest in warm-weather months. VOCs and NO_X are termed "O_3 precursors" and their emissions are regulated in order to control the creation of O_3.

O_3 damages lung tissue and reduces lung function. Scientific evidence indicates that ambient levels of O_3 not only affect people with impaired respiratory systems (e.g., asthmatics), but also healthy children and adults. O_3 can cause health effects such as chest discomfort, coughing, nausea, respiratory tract and eye irritation, and decreased pulmonary functions.

4.1.1.1.2 Nitrogen Dioxide (NO_2)

NO_2 is a reddish-brown to dark brown gas with an irritating odor. NO_2 forms when nitric oxide reacts with atmospheric oxygen. Most sources of NO_2 are man-made; the primary source of NO_2 is high-temperature combustion. Significant sources of NO_2 at airports are boilers, aircraft operations, and vehicle movements. NO_2 emissions from these sources are highest during high-temperature combustion, such as aircraft takeoff mode.

NO_2 may produce adverse health effects such as nose and throat irritation, coughing, choking, headaches, nausea, stomach or chest pains, and lung inflammation (e.g., bronchitis, pneumonia).

4.1.1.1.3 Carbon Monoxide (CO)

CO is an odorless, colorless gas that is toxic. It is formed by the incomplete combustion of fuels. The primary sources of this pollutant in Los Angeles County are automobiles and other mobile sources. The health effects associated with exposure to CO are related to its interaction with hemoglobin once it enters the bloodstream. At high concentrations, CO reduces the amount of oxygen in the blood, causing heart difficulties in people with chronic diseases, reduced lung capacity, and impaired mental abilities.

4.1.1.1.4 Particulate Matter (PM_{10}) and Fine Particulate Matter ($PM_{2.5}$)

Particulate matter consists of solid and liquid particles of dust, soot, aerosols, and other matter small enough to remain suspended in the air for a long period of time. PM_{10} refers to particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (microns, um or µm) and $PM_{2.5}$ refers to particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers. Particles smaller than 10 micrometers (i.e., PM_{10} and $PM_{2.5}$) represent that portion of particulate matter thought to represent the greatest hazard to public health.[4] PM_{10} and $PM_{2.5}$ can accumulate in the respiratory system and are associated with a variety of negative health effects. Exposure to particulate matter can aggravate existing respiratory conditions, increase respiratory symptoms and disease, decrease long-term lung function, and possibly cause premature death. The segments of the population that are most sensitive to the negative effects of particulate matter in the air are the elderly, individuals with cardiopulmonary disease, and children. Aside from adverse health effects, particulate matter in the air causes a reduction of visibility and damage to paints and building materials.

A portion of the particulate matter in the air comes from natural sources such as windblown dust and pollen. Man-made sources of particulate matter include fuel combustion, automobile exhaust, field burning, cooking, tobacco smoking, factories, and vehicle movement on, or other man-made disturbances of, unpaved areas. Secondary formation of particulate matter may occur in some cases where gases like sulfur oxides (SO_X)[5] and NO_X interact with other compounds in the air to form particulate matter. In the Basin, both VOCs and ammonia are also considered precursors to $PM_{2.5}$. Fugitive dust generated by construction activities is a major source of suspended particulate matter.

The secondary creators of particulate matter, SO_X and NO_X, are also major precursors to acidic deposition (acid rain). While SO_X is a major precursor to particulate matter formation, NO_X has other environmental effects. NO_X reacts with ammonia, moisture, and other compounds to form nitric acid and related particles. Human health concerns include effects on breathing and the respiratory system, damage to lung tissue, and premature death. Small particles penetrate into sensitive parts of the lungs and can cause or worsen respiratory disease. NO_X has the potential to change the composition of some species of vegetation in wetland and terrestrial systems, to create the acidification of freshwater bodies, impair aquatic visibility, create eutrophication of estuarine and coastal waters, and increase the levels of toxins harmful to aquatic life.

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4 U.S. Environmental Protection Agency, Particle Pollution and Your Health, September 2003.

5 The term SO_X accounts for distinct but related compounds, primarily SO_2 and, to a far lesser degree, sulfur trioxide. As a conservative assumption for this analysis, it was assumed that all SO_X is emitted as SO_2, therefore SO_X and SO_2 are considered equivalent in this document and only the latter term is used henceforth.

4.1.1.1.5 Sulfur Dioxide (SO_2)

Sulfur oxides are formed when fuel containing sulfur (typically, coal and oil) is burned, and during other industrial processes. The term "sulfur oxides" accounts for distinct but related compounds, primarily SO_2 and sulfur trioxide. As a conservative assumption for this analysis, it was assumed that all SO_X are emitted as SO_2; therefore, SO_X and SO_2 are considered equivalent in this document. Higher SO_2 concentrations are usually found in the vicinity of large industrial facilities.

The physical effects of SO_2 include temporary breathing impairment, respiratory illness, and aggravation of existing cardiovascular disease. Children and the elderly are most susceptible to the negative effects of exposure to SO_2.

4.1.1.2 Scope of Analysis

The air quality analysis conducted for the proposed Project addresses construction-related impacts, with peak construction occurring between 2014 and 2015, and operational-related impacts. The basic steps involved in performing the analysis are listed below.

Construction:

- Identify construction-related emissions sources for the identified sources.
- Develop peak daily construction emissions inventories.
- Compare emissions inventories with appropriate CEQA thresholds for construction.
- Conduct dispersion modeling for the peak year of Project construction emissions.
- Obtain background concentration data from SCAQMD and estimate future concentrations with the proposed Project.
- Conduct risk assessment calculations for exposure to TAC.
- Identify potential construction-related mitigation measures if warranted beyond what is already required through Los Angeles World Airports (LAWA) air quality control measures including, but not limited to, LAX Master Plan commitments and mitigation measures.

Operations:

- Identify operational-related emission sources.
- Develop peak daily operational emissions inventories for the identified sources.
- Compare emissions inventories with appropriate CEQA thresholds for operations.
- Develop health risk estimates for operational impacts based on SCAQMD Tier 2 Risk Assessment Methodology.
- Identify potential operations-related mitigation measures if warranted beyond what is already required through LAX Master Plan commitments and mitigation measures.

4.1.2 Methodology

The air quality assessment for the proposed Project was conducted in accordance with the City of Los Angeles *L.A. CEQA Thresholds Guide*[6] and the SCAQMD's 1993 *CEQA Air Quality Handbook*.[7] The City of Los Angeles has not adopted specific City-wide significance thresholds for air quality impacts; however, its *L.A. CEQA Thresholds Guide* references the thresholds and methodologies contained in the SCAQMD *CEQA Air Quality Handbook* for evaluating proposed projects in the City. Thus, the determinations and assessments contained herein are based on the SCAQMD's *CEQA Air Quality Handbook* as well as information presented in the following documents:

- *LAX Master Plan Final EIR,* Chapter 4.6, *Air Quality*, April 2004;
- *LAX Master Plan Final EIR, Chapter 4.24.1, Human Health Risk Assessment,* April 2004;
- *LAX Master Plan Final EIR, Section 4.20, Construction Impacts*, April 2004;
- *LAX Master Plan Final EIR, Appendix F-B, Air Quality Appendix*, April 2004; and
- *Report of Screening-Level Sampling and Analyses of Selected Stockpiles: West Aircraft Maintenance Area* by Geosyntec Consultants, June 2013.

4.1.2.1 Construction

Daily emissions during construction were forecast by assuming a conservative estimate of construction (i.e., assuming all construction occurs at the earliest feasible date) and applying the mobile-source and fugitive dust emissions factors derived from the California Emissions Estimator Model (CalEEMod), Version 2013.2, an emissions inventory software program recommended by the SCAQMD. CalEEMod is based on outputs from OFFROAD2011 and EMFAC2011, which are emissions estimation models developed by the California Air Resources Board (CARB) to calculate emissions from construction activities. The output values used in this analysis were adjusted to be Project-specific, based on equipment usage rates, type of fuel, and construction schedule. These values were then applied to the construction phasing assumptions used in the criteria pollutant analysis to generate criteria pollutant emissions values for each construction year.

Emissions estimates for the proposed Project's construction activities included the application of emission reduction measures required by LAWA air quality control measures including the LAX Master Plan Mitigation Monitoring and Reporting Program (MMRP), the LAX Master Plan-Mitigation Plan for Air Quality (LAX MP-MPAQ) and SCAQMD rules, as well as additional control measures set forth in the LAX Master Plan Community Benefits Agreement. These measures are applicable to NO_X, PM_{10} and $PM_{2.5}$ emissions. The measures that would result in reductions of NO_X, PM_{10} and $PM_{2.5}$ are discussed in Section 4.1.5 below.

In order to estimate construction emissions, resource requirements and activity schedules were developed by the LAWA project team, an integrated team of the LAWA and consultant staff responsible for oversight and program management. Monthly estimates of equipment usage (in

6 City of Los Angeles, L.A. CEQA Thresholds Guide, (2006) B-1.

7 South Coast Air Quality Management District, CEQA Air Quality Handbook, 1993, as updated by SCAQMD Air Quality Significance Thresholds, March 2011, Available: http://www.aqmd.gov/CEQA/handbook/signthres.pdf.

hours) were also developed for each piece of equipment expected to be used during construction of the proposed Project. From the resource information provided, peak daily emissions estimates were developed for the construction period.

As further described in Chapter 2, *Project Description*, of this EIR, construction of the proposed Project is expected to occur within three construction sequences over the next five years, with peak construction occurring during an approximate 20-month period, beginning in 2014 and ending in 2015. The first two sequences, Site Clearing and Infrastructure Development and First Hangar Development, would overlap, thereby resulting in peak construction during the 2014 to 2015 timeframe. The third sequence, Additional Hangar Development, would occur on its own after completion of the first two sequences. Demolition of concrete and asphalt would be nominal, and the demolition debris may be reused on-site. Mass grading is expected to occur during development of the aircraft apron area as well as during site preparation for future aircraft maintenance hangar areas. Hauling activities would include debris removal and the export of approximately 295,000 cubic yards of soil. Concrete pouring would take approximately six months to complete and would overlap with the hangar construction, which would take approximately 18 to 20 months. A complete listing of the construction equipment by phase, construction phase duration, emissions estimation model and dispersion model input assumptions used in this analysis is included within the emissions calculation worksheets that are provided in Appendix B of this EIR.

4.1.2.1.1 Emission Source Types

Off-Road and On-Road Equipment

Emissions estimates for CO, VOC, NO_X, SO_2, PM_{10}, and $PM_{2.5}$ were developed using CalEEMod for off-road construction equipment that remain on-site and on-road construction equipment which can travel on- and off-site. Emissions from off-road equipment (dozers, loaders, sweepers, and other heavy-duty construction equipment) and on-road vehicles (tractor trailers, light duty trucks, employee vehicles, etc., which can travel on highways and local roads) were evaluated separately to account for the CARB's published emissions factors for both categories of equipment. Off-road equipment types, models, and horsepower ratings were determined based on Project-specific construction schedule and needs.

Emission factors for CO, VOC, NO_X, PM_{10}, and $PM_{2.5}$ for off-road vehicles (i.e., vehicles not licensed to travel on public roadways) used in the analysis were based on calendar year 2014 and later emission rates from CalEEMod. Emissions for off-road equipment were then calculated by multiplying an emission factor by the horsepower, load factor, and operational hours for each type of equipment. Select equipment were assumed to be equipped with CARB verified Level 3 diesel particulate filters (DPFs) achieving PM_{10} and $PM_{2.5}$ emissions reductions of approximately 85 percent,[8] as required by the LAX Master Plan mitigation program (see Section 4.1.5 for additional details).

On-road equipment emissions are generated from pick-up trucks, water trucks, dump trucks, haul trucks, cement trucks,[9] and other on-road vehicles (i.e., vehicles licensed to travel on public

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8 California Air Resources Board, Diesel Certifications, Verification Procedure - Currently Verified, Available: http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm.

9 While it is anticipated that much, if not most, of the concrete needs associated with the proposed Project

roadways). Exhaust emissions from on-road on-site sources were calculated using emission factors for CO, VOC, NO_X, PM_{10}, and $PM_{2.5}$ from CalEEMod. The emission factors correspond to fleet average factors for calendar year 2014 and later.[10] Select on-road equipment, such as certain types of haul trucks, would meet more stringent (i.e., less polluting) emission standards for newer engines and were modeled with these more stringent emission factors. For example, soil export haul trucks and concrete trucks were assumed to comply with United States Environmental Protection Agency (USEPA) 2007 on-road emissions standards for PM_{10} and NO_X, as prescribed by the LAX Master Plan Mitigation Measures described in detail below.

Emissions for heavy-duty diesel vehicles and trucks were calculated separately based on EMFAC2011 emission factors for the vehicle classification "heavy-heavy-duty diesel single construction truck (T7 single construction)."[11] The EMFAC factors account for start-up, running, and idling. In addition, the VOC emission factors include diurnal, hot soak, running, and resting emissions, and the PM_{10} and $PM_{2.5}$ factors include tire and brake wear.

Fugitive Dust

An additional source of PM_{10} and $PM_{2.5}$ emissions associated with construction activities is fugitive dust. Fugitive dust emissions resulting from soil handling (i.e. excavation), wind erosion of dirt piles, and dust entrainment from vehicle travel on paved and unpaved roadways were also quantified as part of the construction emissions inventories. Fugitive dust emissions were calculated using the USEPA's *Compilation of Air Pollutant Emission Factors (AP-42)*[12] and SCAQMD's *CEQA Air Quality Handbook*.[13] Watering, as required under LAWA construction contracts and standard air quality control measures, and also being one of the main dust suppression measures recommended in SCAQMD Rule 403, was applied in the modeling calculations, which reduces fugitive dust emissions by 61 percent according to the SCAQMD.[14]

Fugitive VOCs

Fugitive VOC emissions were quantified as part of this analysis. Types of activities that would emit VOCs and included in this analysis include VOC emissions from architectural coatings, solvents, and hot-mix asphalt paving. Most surface coatings by 2015 are assumed to be water-based (as many of them are today) and coating manufacturers would continue to be required to comply with SCAQMD rules and regulations governing the use of coatings and solvents while CARB continues to regulate the VOC content of consumer products such as aerosol spray paint.[15]

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improvements would be provided by an on-site concrete batch plant, for which LAWA currently has the necessary SCAQMD and USEPA (Clean Air Act Title V) permits, it is likely that some amount of concrete (i.e., specialty concrete) would come from off-site plants and be delivered by truck.

10 Year 2014 is the assumed date for the start of construction and represents a conservative assumption for later years.

11 California Air Resources Board, Research Division, EMFAC2011 On-Road Emissions Inventory Estimation Model, Available: http://www.arb.ca.gov/msei/modeling.htm.

12 U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors AP-42, Fifth Ed, 1995.

13 South Coast Air Quality Management District, CEQA Air Quality Handbook, 1993, as updated by SCAQMD Air Quality Significance Thresholds, March 2011, Available: http://www.aqmd.gov/CEQA/handbook/signthres.pdf.

14 South Coast Air Quality Management District, Fugitive Dust, Table XI-A: Construction & Demolition, Available: http://www.aqmd.gov/ceqa/handbook/mitigation/fugitive/MM_fugitive.html.

15 South Coast Air Quality Management District, Rules and Regulations, Available: http://www.aqmd.gov/rules.

Worker Commute Trips

Emissions from worker commute trips were calculated using emission factors and assumed default commute distances, as provided in CalEEMod. The number of workers during each construction phase was provided by LAWA. Construction-worker vehicle emissions were calculated using SCAQMD default assumptions for vehicle fleet mix, travel distance, and average travel speeds.[16]

4.1.2.1.2 Localized Construction

The localized effects from the on-site portion of daily emissions from the sources described above were evaluated at nearby sensitive receptor locations potentially impacted by the proposed Project according to the SCAQMD's localized significance threshold (LST) methodology,[17] which uses on-site mass emission rate look-up tables with Project-specific daily construction site areas (acres) and receptor distances. LSTs are only applicable to on-site emissions of the following criteria pollutants: NO_X, CO, PM_{10}, and $PM_{2.5}$. LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area (SRA) and distance to the nearest sensitive receptor. The mass rate look-up tables were developed for each SRA and can be used to determine whether or not a project may generate significant adverse localized air quality impacts. The LST mass rate look-up tables apply to projects that are less than or equal to five acres. If the project exceeds five acres or any applicable LST when the mass rate look-up tables are used as a screening analysis, then project-specific air quality modeling may be performed. The SCAQMD recommends that lead agencies perform project-specific air quality modeling for larger projects.[18] The Project site exceeds five acres in total size; therefore, Project-specific dispersion modeling was used to assess localized construction impacts rather than the mass emission rate look-up tables.

The Project-specific air quality modeling of localized construction impacts were done in a manner consistent with the way in which the SCAQMD developed the mass emission rate look-up tables as described in Chapter 2 of its *Final Localized Significance Threshold Methodology* (June 2008). The USEPA and SCAQMD-approved dispersion model, American Meteorological Society (AMS)/USEPA Regulatory Model (AERMOD),[19] was used to model the air quality impacts of NO_X, CO, PM_{10}, and $PM_{2.5}$ emissions. AERMOD can estimate the air quality impacts of single or multiple point, area, or volume sources using historical meteorological conditions. Volume sources were used to represent the emissions from trucks and heavy-duty construction equipment. Volume sources are three-dimensional sources of emissions that can be used to model releases from a variety of industrial uses, including moving diesel trucks and equipment.[20] Area sources were used to model fugitive dust emissions of PM_{10} and $PM_{2.5}$. Area sources are

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16 ENVIRON International Corporation, CalEEMod Appendix A - Calculation Details, February 2011, Section 4.5, pages 13-15. Available: http://caleemod.com/.

17 South Coast Air Quality Management District, Final Localized Significance Threshold Methodology, (2008). Available: http://www.aqmd.gov/ceqa/handbook/LST/Method_final.pdf.

18 South Coast Air Quality Management District, Final Localized Significance Threshold Methodology, (2008) 1-5.

19 Lakes Environmental, AERMOD VIEW Software.

20 California Air Resources Board, ARB Health Risk Assessment Guidance for Rail Yards and Intermodal Facilities, (2006) 3.

two-dimensional surface-based sources of emissions that can be used to model releases from emissions that occur over a wide area, such as fugitive dust. Although the SCAQMD calculated PM_{10} deposition when it developed its mass emission LSTs, this analysis did not model PM_{10} deposition as a conservative approach. For the purpose of the dispersion modeling, the maximum daily emissions that could occur due to construction activities from any construction phase were selected for the LST analysis. As a conservative approach, it was assumed that an average workday would result in 8 hours of emissions-generating activity. Therefore, the maximum daily emissions were divided by 8 to convert the maximum daily emissions into emission rates in units of pounds per hour.

The models were used to identify concentrations at various receptors in the vicinity of the Project site. Field receptors were placed at 50-meter intervals at the boundary of LAX and outside of LAX to cover the nearby portions of the communities of El Segundo, Playa del Rey, and Westchester. Due to the size of the Project site and the number of model runs required, this receptor grid was determined to provide a balanced approach with respect to receptor coverage and model run times. This receptor grid is also consistent with SCAQMD recommended guidance for AERMOD.[21]

The meteorological data from the monitoring station located at LAX was used in the analysis. The meteorological data were obtained from the SCAQMD website and have been preprocessed using AERMET.[22] AERMET is a meteorological preprocessor for organizing available meteorological data into a format suitable for use in AERMOD air quality dispersion model. These files were also developed by the SCAQMD using site specific surface characteristics obtained using AERSURFACE. AERSURFACE is a tool that provides realistic and reproducible surface characteristic values, including albedo, Bowen ratio, and surface roughness length, for input into AERMET.

The Project area is generally characterized by flat terrain. Thus, for modeling purposes, the flat terrain option was used in the modeling run.

The SCAQMD requires that AERMOD be run using USEPA regulatory default options, unless non-default options are justified. AERMOD was run using USEPA regulatory default options. As noted above, the flat terrain option was modeled. Additional modeling options are listed below:

- Urban dispersion (Los Angeles County population of 9,862,049, as per SCAQMD guidance);
- Averaging periods: 1-hour (CO and NO_2), 8-hour (CO), 24-hour (PM_{10} and $PM_{2.5}$); Annual (NO_2 and PM_{10});
- Flagpole receptor heights: 0 meter (corresponding to ground-level concentrations); and
- No building downwash (no point sources modeled).

AERMOD contains the Ozone Limiting Method (OLM) and Plume Volume Molar Ratio Method (PVMRM) options, which are used to model the conversion of NO_X to NO_2. The PVMRM option was used in this modeling analysis. The SCAQMD provides hourly O_3 data for modeling

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21 Refer to the SCAQMD AERMOD modeling guidance website: http://www.aqmd.gov/smog/metdata/AERMOD_ModelingGuidance.html

22 South Coast Air Quality Management District, AQMD Meteorological Data for AERMOD, http://www.aqmd.gov/smog/metdata/AERMOD.html. 2010.

conversion of NO_X to NO_2 using the PVMRM option. In addition, the following values were used in the analysis:

- Ambient Equilibrium NO_2/NO_X Ratio: 0.90 (default);
- In-stack NO_2/NO_X Ratio: 0.10 (default);[23] and
- Default O_3 Value: 40 parts per billion (used only for missing data in the hourly O_3 data file provided by the SCAQMD).

The LSTs for NO_2 were developed based on the 1-hour NO_2 California Ambient Air Quality Standards (CAAQS) of 0.18 parts per million (ppm). An exceedance of the 1-hour NO_2 California Ambient Air Quality Standard (NAAQS) is determined based on the USEPA standard, which is the 3-year average of the 98th percentile of the daily maximum 1-hour average. Because the 1-hour NO_2 NAAQS is evaluated over a three-year period, it is appropriately considered for construction activities that could last for multiple years. The 1-hour NO_2 NAAQS was considered in this analysis because of the duration of construction of the proposed Project. The LSTs for CO were developed based on the 1-hour and 8-hour CAAQS of 20 ppm and 9.0 ppm, respectively. With respect to CO, the CAAQS are more stringent than the NAAQS; therefore, the NAAQS need not be specifically addressed. For PM_{10} and $PM_{2.5}$, the LSTs were derived based on requirements in SCAQMD Rule 403, Fugitive Dust.

4.1.2.1.3 Human Health Risk Assessment for Inhalation of TAC During Construction

The LAX Master Plan Final EIR[24] previously examined incremental health risks due to inhalation of TAC from operational sources associated with four build alternatives and the No Action/No Project Alternative. Because project level details were not available regarding construction phasing, the program-level LAX Master Plan Final EIR did not address health risk associated with construction activities of any of the individual LAX Master Plan components, including the proposed Project. Health risk associated with construction activities were addressed in the Final EIRs prepared for the LAX Master Plan projects that have been or are being constructed, including the South Airfield Improvement Project (SAIP),[25] Crossfield Taxiway Project (CFTP),[26] and Bradley West Project[27] Based on the nature and characteristics of the proposed Project, releases of TAC during proposed construction activities would occur and need to be evaluated;

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23 USEPA, "NO_2/NO_X In-Stack Ratio (ISR) Database," http://www.epa.gov/ttn/scram/no2_isr_database.htm. Accessed April 2013. If no equipment-specific information is available, the default NO_2/NO_X In-Stack Ratio is 0.10. Data provided in the "NO_2_ISR_alpha_database.xlsx" file downloaded from the website does not include information specifically for construction equipment. Values for diesel internal combustion engines (ICE) for a water pump indicate ratios ranging from 0.0 to 0.5. However, the upper and lower-end ratios are based on very low average NO_X values and were considered not representative of the project. Two of the ICE water pumps with higher average NO_X values had ratios of approximately 0.09 and 0.16. Given that none of the data specifically applies to construction equipment, a default value of 0.10 was used in the analysis.

24 City of Los Angeles, Final Environmental Impact Report for Los Angeles International Airport (LAX) Proposed Master Plan Improvements, April 2004.

25 City of Los Angeles, Los Angeles World Airports, Final Environmental Impact Report for South Airfield Improvement Project, Los Angeles International Airport (LAX), October 2005.

26 City of Los Angeles, Los Angeles World Airports, Final Environmental Impact Report for Crossfield Taxiway Project, Los Angeles International Airport (LAX), January 2009.

27 City of Los Angeles, Los Angeles World Airports, Final Environmental Impact Report for Bradley West Project, Los Angeles International Airport (LAX), September 2009.

therefore, human health risks associated with construction activities associated with the proposed Project are evaluated in this EIR.

The construction Human Health Risk Assessment (HHRA) is based on estimates for construction TAC emissions associated with the proposed Project. Baseline construction emissions are assumed to be zero, so no baseline year is used in the analysis. The HHRA was developed as required under State of California statutes and regulations[28], and was conducted in four steps as defined in SCAQMD, California Environmental Protection Agency (CalEPA), and USEPA guidance[29,30,31] consisting of:

- Identification of chemicals (in this case, TAC) that may be released in sufficient quantities to present a public health risk (Hazard Identification);
- Analysis of ways in which people might be exposed to chemicals (i.e., TAC) (Exposure Assessment);
- Evaluation of the toxicity of chemicals (i.e., TAC) that may present public health risks (Toxicity Assessment); and
- Characterization of the magnitude of health risks for the exposed community, and of locations in the community where the greatest risks or hazards may be realized (Risk Characterization).

Hazard Identification

In general, TAC of concern used in the HHRA are based on TAC identified under California Assembly Bill AB2588 and for which the CalEPA, Office of Environmental Health Hazard Assessment (OEHHA) has developed cancer slope factors, chronic reference levels, and/or acute reference levels.

The list of TAC of concern used in this HHRA was developed using regulatory lists, emissions estimates, human toxicity information, results of the LAX Master Plan HHRA, and a review of

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28 California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Information and Assessment Act of 1987, Section 44300; California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, August 2003.

29 South Coast Air Quality Management District, Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics Hot Spots Information and Assessment Act (AB2588), July 2005.

30 California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program Risk Assessment Guidelines, Part I: Technical Support Document for the Determination of Acute Reference Exposure Levels for Airborne Toxicants, March 1999. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Air Toxic Hot Spots Program Risk Assessment Guidelines, Part IV: Technical Support Document for Exposure Assessment and Stochastic Analysis, September 2000. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program Risk Assessment Guidelines, Part III: The Determination of Chronic Reference Exposure Levels for Airborne Toxicants, February 23, 2000. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II: Technical Support Document for Describing Available Cancer Potency Factors, updated August 2003. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, August 2003.

31 U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Risk Assessment Guidance for Superfund, Vol. I, Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002, December, 1989.

health risk assessments for construction activities included in the SAIP Final EIR,[32] CFTP Final EIR,[33] LAX Bradley West Project Final EIR,[34] LAX Central Utility Plant Replacement Project (CUP-RP) Final EIR,[35] and LAX Master Plan Final EIR.[36] This list of TAC was further refined to include only TAC with chronic Reference Exposure Levels (RELs), acute RELs, and cancer potency values identified by the California OEHHA. The resulting list of TAC of concern evaluated in this HHRA is provided in **Table 4.1-1**.

Exposure Assessment

The exposure assessment includes identification of exposed populations, selection of exposure pathways, and calculation of exposure concentrations and total dose. For this HHRA, the following receptors were identified for quantitative evaluation: non-Project workers (on and off-airport), off-airport resident adults, off-airport resident children, and off-airport school children. In addition, quantification of exposure to on-site Project workers was conducted for comparison to California Occupational Safety and Health thresholds. An exposure pathway consists of four basic parts: a TAC source (e.g., diesel engines); a release mechanism (e.g., diesel engine exhaust); a means of transport from the release point to the receptor (e.g., local winds); and a route of exposure (e.g., inhalation). Numerous possibly complete exposure pathways exist for receptors at or near LAX, but most are anticipated to make minimal to negligible contribution to total risks and hazards. For this HHRA, the inhalation pathway is the most important complete exposure pathway, contributing the majority of risk associated with the proposed Project, and was therefore quantitatively evaluated for all receptors. Exposure concentrations were developed from construction TAC emissions (based on PM10 and VOC emissions) incorporated into air dispersion modeling with AERMOD.

In the LAX Master Plan EIS/EIR and other tiered LAX EIRs (SAIP EIR, CFTP EIR, Bradley West Project EIR, and CUP-RP EIR), average long-term daily intakes were used to estimate risk and hazards for cancer and non-cancer risk assessment in accordance with Risk Assessment Guidance for Superfund (RAGS), Part A[37] (hereafter referred to as RAGS Part A). RAGS Part A methodology estimated intake of a contaminant in air via inhalation using inhalation rate and body weight. This calculation resulted in an exposure expressed as milligrams of chemical per kilogram of body weight per day (mg/kg-day). This estimate was then used along with a slope factor that predicted the risk of cancer for each mg/kg-day intake to provide a cancer risk estimate. In 2009, the EPA released RAGS, Part F[38] (hereafter referred to as RAGS Part F),

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32 City of Los Angeles, Los Angeles World Airports, Final Environmental Impact Report for Los Angeles International Airport (LAX) South Airfield Improvement Project, August 2005.

33 City of Los Angeles, Los Angeles World Airports, Final Environmental Impact Report for Los Angeles International Airport (LAX) Crossfield Taxiway Project, January 2009.

34 City of Los Angeles, Los Angeles World Airports, Final Environmental Impact Report for Los Angeles International Airport (LAX) Bradley West Project, September 2009.

35 City of Los Angeles, Los Angeles World Airports, Draft Environmental Impact Report for Los Angeles International Airport (LAX) Central Utility Plant Replacement Project, October 2009.

36 City of Los Angeles, Final Environmental Impact Report for Los Angeles International Airport (LAX) Proposed Master Plan Improvements, April 2004.

37 U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Risk Assessment Guidance for Superfund, Vol. I, Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002, December, 1989.

38 U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Risk Assessment Guidance for Superfund, Vol. I, Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation

Table 4.1-1

Toxic Air Contaminants (TAC) of Concern for the Proposed Project

Toxic Air Contaminant	Type
Acetaldehyde	VOC
Acrolein	VOC
Benzene	VOC
1,3-Butadiene	VOC
Ethylbenzene	VOC
Formaldehyde	VOC
n-Hexane	VOC
Methyl alcohol	VOC
Methyl ethyl ketone	VOC
Propylene	VOC
Styrene	VOC
Toluene	VOC
Xylene (total)	VOC
Naphthalene	PAH
Arsenic	PM-Metal
Cadmium	PM-Metal
Chromium VI	PM-Metal
Copper	PM-Metal
Lead	PM-Metal
Manganese	PM-Metal
Mercury	PM-Metal
Nickel	PM-Metal
Selenium	PM-Metal
Vanadium	PM-Metal
Diesel PM	Diesel Exhaust
Chlorine	PM-Inorganics
Silicon	PM-Inorganics
Sulfates	PM-Inorganics

Notes:
PAH = Polycyclic aromatic hydrocarbons
PM = Particulate matter
VOC = Volatile organic compounds

Sources: CDM Smith 2013

which recommends that risk assessors should use inhalation dosimetry methodology. In this approach, the concentration of the chemical in air is the exposure metric (e.g., milligrams per cubic meter, mg/m^3), and risks are estimated using a unit risk that predicts cancer risk for each mg/m^3. Inhalation rate and body weight are no longer used in the calculations. The health risk assessment conducted for this project used the RAGS Part F methodology. The exposure pathway parameters used to estimate inhalation pathway exposure dose are presented in Appendix B.3 of this EIR.

Risk Assessment), Final, EPA-540-R-070-002, OSWER 9285.7-82, January 2009.

Toxicity Assessment

Risks from exposure to TAC are calculated by combining estimates of potential exposure with chemical-specific toxicity criteria developed by CalEPA, USEPA, or both. The toxicity assessment initially examined quantitative toxicity criteria for TAC selected from regulatory lists.

A toxicity assessment for TAC of concern was conducted for the LAX Master Plan Final EIR, as described in Technical Report 14a of that EIR. Conclusions of that assessment have not changed materially. Both the CalEPA OEHHA, and USEPA continually update toxicity values as new studies are completed, and all toxicity information provided in Technical Report 14a was reviewed and updated as appropriate by researching recent information available from USEPA, CalEPA OEHHA, World Health Organization (WHO), and Agency for Toxic Substance and Disease Registry (ATSDR).

Acute RELs developed by the State of California were used in the characterization of potential acute non-cancer health hazards associated with the proposed Project. Other sources of acute toxicity criteria (e.g., ATSDR) were also evaluated as a source of acute criteria as part of this re-assessment of toxicity information.

Cancer unit risk factors, cancer slope factors, and chronic RELs developed by the State of California were used to characterize cancer risks and chronic non-cancer health hazards associated with longer term inhalation of emissions from construction activities. Both types of toxicity criteria are based on studies of chronic exposure in animals or, in some cases, to people. Acute RELs developed by the State of California were used in characterization of potential hazards associated with short-term exposure (usually from exposures on the order of 1-hour). RELs are based on the most sensitive, relevant, adverse health effect reported in the medical and toxicological literature. Since margins of safety[39] are incorporated to address data gaps and uncertainties, exceeding an REL does not automatically indicate an adverse health impact. Acute RELs are applicable to all receptors, children and adults, and hazards are the ratio of estimated or measured concentrations and the REL. Cancer unit risk factors, cancer sloped factors, chronic RELs, and acute RELs are presented in Appendix B.3 of this EIR.

Risk Characterization

Concentrations of TAC of concern in air, locations of potentially exposed populations, including locations for MEI exposure scenarios (worker, resident, student), and toxicity criteria were used to calculate incremental human health risks associated with the proposed Project. Risks for people recreating near the airport would be lower than those for workers, residents, and students, and no risks were calculated for this population.

For the proposed Project, grid points were analyzed along the airport fence-line and within the study area. These locations are anticipated to represent MEI, based on previous dispersion modeling for LAX. Concentrations of each TAC at these nodes were used in calculating cancer risk, and chronic and acute non-cancer health hazard estimates. These calculations were used

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[39] Margin of safety is a ratio of the no-observed-effect level to the estimated exposure dose. Margins of safety are incorporated in the development of toxicity values to account for differences in dose-response among individuals. For example, the same dose of alcohol may have a greater effect on a woman than a man, not only because a woman is smaller in body size but also because men and women metabolize alcohol at different rates.

to identify locations with maximum cancer risks and maximum non-cancer health hazards and serve as the basis for significance determinations.

MEI estimates were partially land use specific. On-airport locations were used to identify commercial and on-worker locations. For off-airport locations, all land uses and associated receptors (commercial, residential, etc.) were evaluated for all fence-line grid points under the assumption that such land use could be present now or in the future. Risk and hazard calculations were based on receptors appropriate for land use designations. For example, at each grid node, exposure parameters appropriate for adult commercial workers, for both adult and child residential receptors and for school children were used to estimate exposures, cancer risks, and non-cancer health hazards at that grid point location.

Fence-line concentrations of TAC represent the highest or near-highest concentrations that could be considered "off-airport." Concentrations in areas where people actually work, live, or attend school are predicted to be lower. Thus, impacts for residents, workers, and school children are likely to provide protective estimates for risks and hazards that may occur as a result of implementing the proposed Project.

Cancer risks were estimated by multiplying exposure estimates for carcinogenic chemicals by corresponding cancer slope factors. Results were risk estimates expressed as the odds of developing cancer. Cancer risks were based on an exposure duration of 70 years.

Chronic non-cancer health hazard estimates were calculated by dividing exposure estimates by reference doses. Reference doses are estimates of highest exposure levels that would not cause adverse health effects even if exposures continue over a lifetime. The ratio of exposure concentration to reference concentration is termed the hazard quotient (HQ). A HQ greater than one indicates an exposure concentration greater than that considered safe. A ratio that is less than one indicates that Project-related (incremental) exposure was less than the highest exposure level that would not cause an adverse health effect and, hence, no impact to human health would be expected. Risks or odds of adverse effects cannot be estimated using reference doses. However, because reference concentrations are developed in a conservative fashion, HQs only slightly higher than one are generally accepted as being associated with low risks (or even no risk) of adverse effects, and that potential for adverse effects increases as the HQ gets larger.

Impacts of exposure to multiple chemicals were accounted for by adding cancer risk estimates for exposure to all carcinogenic chemicals, and by adding estimated HQs for non-carcinogenic chemicals that affect the same target organ or tissue in the body. Addition of HQs for TAC that produce effects in similar organs and tissues results in a Hazard Index (HI) that reflects possible total hazards. Several TAC have effects on the respiratory system including acetaldehyde, acrolein, formaldehyde, xylenes, and diesel particulates. Non-cancer health hazards for the proposed Project were calculated for the respiratory system which accounted for essentially all potential non-cancer health hazards.

Acute non-cancer risk estimates were calculated by dividing estimated maximum 1-hour TAC concentrations in air by acute RELs. An acute REL is a concentration in air below which adverse effects are unlikely for people, including sensitive subgroups, exposed for a short time on an intermittent basis. In most cases, RELs are estimated on the basis of a 1-hour exposure duration. RELs do not distinguish between adults and children, but are established at levels that are considered protective of sensitive populations. Since margins of safety are incorporated to address data gaps and uncertainties, exceeding the REL does not automatically indicate an adverse health impact.

Short-term concentrations for TAC associated with Project construction were estimated using the same air dispersion model (AERMOD) used to estimate annual average concentrations, but with the model option for 1-hour maximum concentrations selected. These concentrations represent the highest predicted concentrations of TAC. Acute non-cancer health hazards were then estimated at each grid point by dividing estimated maximum 1-hour TAC concentrations in air by acute RELs. A hazard index equal to or greater than 1, the threshold of significance for acute non-cancer health impacts, indicates some potential for adverse acute non-cancer health impacts. A hazard index less than 1 suggests that adverse acute non-cancer health impacts are not expected.

To determine whether releases of TAC during airport construction for the proposed Project would be significant, incremental human health risks for the proposed Project were compared to appropriate thresholds of significance identified in SCAQMD or CalEPA guidance or policy. The comparisons to off-site risks will use the SCAQMD risk thresholds, while on-site occupational exposures will be compared to occupational thresholds developed by CalEPA (specifically by California Occupational Safety and Health Administration (CalOSHA)).

4.1.2.2 Operations

The operational air quality assessment was conducted in accordance with the *L.A. CEQA Thresholds Guide*[40] and the SCAQMD's *CEQA Air Quality Handbook*[41] for evaluating air quality impacts. The methodology for determining baseline conditions, estimating airport-related emissions, and assessing the significance of impacts followed standard practices for determining impacts of aviation sources that have been found acceptable by USEPA, CARB, and SCAQMD; this methodology is summarized below.

Regional and localized operational air quality impacts were assessed based on the net new incremental increase in emissions compared to existing conditions. In accordance with the *CEQA Guidelines* and the *L.A. CEQA Thresholds Guide*, the impacts of the proposed Project were compared to baseline conditions to determine significance under CEQA.

4.1.2.2.1 Emission Source Types

The incremental increase in regional daily air pollutant emissions of CO, VOC, NO_X, SO_2, PM_{10}, and $PM_{2.5}$ were compared to the existing airport uses. Sources of emissions are generally divided into two categories: mobile and stationary. Examples of LAX-related mobile sources include aircraft, ground support equipment (GSE), and on-road motor vehicles. Examples of LAX-related stationary sources include hangar utility equipment such as air conditioning and water heating/cooling units.

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[40] City of Los Angeles, L.A. CEQA Thresholds Guide, (2006) B-1.

[41] South Coast Air Quality Management District, CEQA Air Quality Handbook, 1993, as updated by SCAQMD Air Quality Significance Thresholds, March 2011, Available: http://www.aqmd.gov/CEQA/handbook/signthres.pdf.

Mobile Sources

As discussed in Chapter 2, *Project Description*, the intent of the proposed Project is to consolidate, relocate, and modernize some of the existing aircraft maintenance facilities at LAX consistent with the LAX Master Plan. Operation of the proposed Project would not result in additional or increased operational or maintenance activities and would not result in net new trips to LAX. The proposed Project is not expected to increase the number of run-ups from aircraft engine testing compared to the current condition. Improvements associated with the LAX Master Plan would consolidate, relocate, and modernize existing maintenance operations and run-ups in the western area of LAX. The proposed Project would relocate an estimated 60 annual (five monthly) existing run-ups in the western area of LAX to the Project site, also located in the western area of LAX. Thus, the proposed Project would not result in net new emissions from run-ups. The proposed Project would not increase passenger or gate capacity and would not increase flights and/or aircraft operations at LAX. Thus, on-road motor vehicle emissions were not included in the inventory, since there would be no new vehicle trips associated with the proposed Project. In addition, emissions from aircraft landing and takeoff operations (LTO) would not increase and were not included in this inventory. The future operation of the proposed Project would not result in long-term operational changes to traffic activity and traffic flows within the airport study area as the proposed Project would not increase the number of employees or airline passengers traveling to/through LAX.

However, compared to baseline conditions, the distance between the terminal gates and maintenance area is further under the proposed Project. Aircraft being maintained at the proposed Project facilities would need to taxi or be towed further; thus, some incremental emissions would be generated from either aircraft engines for those taxiing or from the aircraft tugs that tow the aircraft to and from maintenance.[42] The use of the existing maintenance areas that would be replaced with the proposed Project uses were reviewed, and the following assumptions and methodology was developed to calculate these incremental emissions:

- On a daily basis, 26 aircraft would move between the gates and the maintenance areas:
  - 20 aircraft would be towed per day, using a towbarless aircraft tractor represented by a model year 2005, 400 HP wide body aircraft tug, at an average speed of 15 miles per hour (mph); and
  - 6 aircraft per day would taxi at an average speed of 17 mph. These aircraft were represented by a Boeing 737-300 with CFM56-3-B1 engines, a Boeing 757-300 with RB211-535E4B Phase 5 engines, and a Boeing 767-300 with CF6-80A2 engines. For each pollutant, the engine with the highest emission factor was assumed for all 6 daily aircraft movements.
- Incremental distances (proposed Project minus baseline) ranged from 1.0 to 2.4 miles, one way.
- Aircraft engine emission factors were obtained from FAA's Emissions and Dispersion Modeling System (i.e., EDMS model), version 5.1.4.

[42] As discussed in Section 5.6.2, the anticipated increase in aircraft taxiing distances is not an exclusive outcome of the proposed Project, as the future development of new aircraft maintenance facilities in the southwest portion of the airport, in areas proximate to the Project site, is contemplated in the LAX Master Plan.

- Aircraft tug emission factors and load factors were obtained from CARB's OFFROAD 2011 and OFFROAD 2007[43] emission models.
- The modeling of emissions associated with towing activities is based on the use of diesel-fueled GSE, which provides for a conservative analysis. LAX has committed to converting GSE to low and ultra-low emission technology (e.g., electric, fuel cell, and other future low-emission technologies). The program to convert the LAX GSE fleet is currently being implemented. Thus, future actual emissions associated with towing are likely to be lower as this program is implemented.

Stationary Sources

While the proposed Project would develop the site with taxiways and aircraft parking apron areas, maintenance hangars, and related facilities, and consolidate and modernize existing aircraft maintenance activities, these activities already occur at LAX. Since the activities that would occur in the new modernized maintenance area already generate emissions through current activities, any net change in such emissions due to their relocation to the site would be negligible in comparison to the emissions that occur from existing maintenance activities. For the purposes of this assessment, the proposed aircraft maintenance hangar building is assumed to result in no net new (no additional) emissions. Therefore, no incremental stationary source emissions were included in the operational impact analysis.

4.1.2.2.2 Localized Operations

Traffic-congested roadways and intersections have the potential to generate localized high levels of CO. CO is produced in greatest quantities from vehicle combustion and is usually concentrated at or near ground level because it does not readily disperse into the atmosphere.

As stated previously, existing maintenance would be consolidated and replaced with new maintenance facilities; therefore, operation of the proposed Project would not result in additional or increased operational or maintenance activities and would not result in net new trips to LAX. The SCAQMD recommends an evaluation of potential localized CO impacts when vehicle to capacity (V/C) ratios are increased by two percent or more at intersections with a level of service (LOS) of C or worse or when LOS declines from A through C to D or worse. The proposed Project would not cause an increase in vehicular traffic compared to existing conditions and would not result in long-term operational changes to traffic activity and traffic flows within the airport study area. Therefore, a CO hotspots modeling analysis is not required and is not included in this assessment as the proposed Project would not cause or contribute to the formation of CO hotspots.

The on-site portion of daily emissions from the sources described above would not result in localized effects at off-site sensitive receptors. Operation of the proposed Project would not result in additional or increased operational or maintenance activities at LAX. The Project is not expected to increase the number of run-ups from aircraft engine testing compared to the current condition and would not result in net new emissions from run-ups. As discussed previously, the Project would relocate a limited number of existing run-ups (i.e., an estimated 60 annual or five

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43 OFFROAD 2007 emission factors were used in the greenhouse gas analysis as CARB's 2011 Inventory Model for Off-Road Diesel Equipment does not provide emission factors for GHG emissions (see Chapter 4.2, *Greenhouse Gas Emissions*, of this EIR).

monthly) in the western area of LAX to the Project site, also located in the western area of LAX. In addition, the future operation of the proposed Project would not result in long-term operational changes to traffic activity and traffic flows within the airport study area as, in the long-term, the proposed Project would not increase the number of employees or airline passengers traveling to/through LAX. Only the difference in travel distance for towing or taxiing aircraft to the maintenance area(s) changes between the existing conditions and the proposed Project. Therefore, impacts will be determined based on the net new emissions from taxiing/towing emissions associated with this incremental increase in distance between the gates and the Project area.

4.1.2.2.2 Toxic Air Contaminants

The operational health risk impacts due to potential exposure to TAC were evaluated using SCAQMD's Tier 2 methodology and calculator.[44] TAC emissions were developed from operational VOC and PM10 emissions calculated as described in the Mobile Source methodology under Section 4.1.2.2.1. The speciated TAC emissions were based on CARB Organic Speciation Profile Nos. 818 (Diesel Equipment) and 5861 (Aircraft Exhaust - Jet Fuel); and PM Speciation Profile Nos. 6159 (Offroad Diesel Vehicle Exhaust – 2015) and 1413 (Aircraft Jet Fuel – CFM56-3B).

4.1.2.3 Odor Impacts (Construction and Operations)

Potential odor impacts were evaluated by conducting a screening-level analysis; if necessary this would be followed by a more detailed analysis (i.e., dispersion modeling). The screening-level analysis consisted of reviewing the Project site plan and proposed Project elements to identify new or modified odor sources. If it is determined that the proposed Project would introduce a potentially significant new odor source, or significantly modify an existing odor source, then downwind sensitive receptor locations would be identified and site-specific dispersion modeling conducted to determine proposed Project impacts.

4.1.3 Existing Conditions

4.1.3.1 Climatological Conditions

The airport is located within the Basin, a 6,745 square-mile area encompassing all of Orange County and the urban, non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The meteorological conditions at the airport are heavily influenced by the proximity of the airport to the Pacific Ocean to the west and the mountains to the north and east. This location tends to produce a regular daily reversal of wind direction: onshore (from the west) during the day and offshore (from the east) at night. Comparatively warm, moist Pacific air masses drifting over cooler air resulting from coastal upwelling of cooler water often form a bank of fog that is generally swept inland by the prevailing westerly (i.e., from the west) winds. The "marine layer" is generally 1,500 to 2,000 feet deep, extending only a short distance inland and rising during the morning hours producing a deck of low clouds. The air above is usually

[44] South Coast Air Quality Management District (SCAQMD). 2012. Risk Assessment Tool for Rule 1401 and 212, Version 7.0. http://www.aqmd.gov/permit/r1401_risk_assessment.htm. Accessed August 2013.

relatively warm, dry, and cloudless. The prevalent temperature inversion in the Basin tends to prevent vertical mixing of air through more than a shallow layer.

A dominating factor in the weather of California is the semi-permanent high-pressure area of the North Pacific Ocean. This pressure center moves northward in summer, holding storm tracks well to the north, and minimizing precipitation. Changes in the circulation pattern allow storm centers to approach California from the southwest during the winter months and large amounts of moisture are carried ashore. The Los Angeles region receives on average 10 to 15 inches of precipitation per year, of which 83 percent occurs during the months of November through March. Thunderstorms are light and infrequent, and on very rare occasions, trace amounts of snowfall have been reported at the airport.

The annual minimum mean, maximum mean, and overall mean temperatures at the airport are 55 degrees Fahrenheit (°F), 70°F, and 63°F, respectively. The prevailing wind direction at the airport is from the west-southwest with an average wind speed of roughly 6.4 knots (7.4 mph or 3.3 meters per second [m/s]). Maximum recorded gusts range from 27 knots (31 mph or 13.9 m/s) in July to 54 knots (62 mph or 27.8 m/s) in March. The monthly average wind speeds range from 5.7 knots (6.5 mph or 2.9 m/s) in December to 7.4 knots (8.5 mph or 3.8 m/s) in April.[45]

4.1.3.2 Regulatory Context

Air quality is regulated by federal, state, and local laws. In addition to rules and standards contained in the federal Clean Air Act (CAA) and the California Clean Air Act (CCAA), air quality in the Los Angeles region is subject to the rules and regulations established by CARB and SCAQMD with oversight provided by the USEPA, Region IX.

4.1.3.2.1 Federal

The USEPA is responsible for implementation of the CAA. The CAA was first enacted in 1970 and has been amended numerous times in subsequent years (1977, 1990, and 1997). Under the authority granted by the CAA, USEPA has established NAAQS for the following criteria pollutants: O_3, NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, and Pb. **Table 4.1-2** presents the NAAQS that are currently in effect for criteria air pollutants. As discussed previously, O_3 is a secondary pollutant, meaning that it is formed from reactions of “precursor” compounds under certain conditions. The primary precursor compounds that can lead to the formation of O_3 are VOCs and NO_X.

The CAA also specifies future dates for achieving compliance with the NAAQS and mandates that states submit and implement a State Implementation Plan (SIP) for local areas not meeting these standards. These plans must include pollution control measures that demonstrate how the standards will be met. The 1990 amendments to the CAA identify specific emission reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones.

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45 Ruffner, J.A., Climates of the States: National Oceanic and Atmospheric Administration Narrative Summaries, Table, and Maps for Each State with Overview of State Climatologist Programs, Third Edition, Volume 1: Alabama-New Mexico, Gale Research Company, 1985.

Table 4.1-2

National and California Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS	NAAQS Primary	NAAQS Secondary
Ozone (O_3)	8-Hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	Same as Primary
	1-Hour	0.09 ppm (180 µg/m^3)	N/A	N/A
Nitrogen Dioxide (NO_2)	Annual	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary
	1-Hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3)	N/A[1]
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	N/A
	1-Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	N/A
Sulfur Dioxide (SO_2)[2]	Annual	N/A	0.030 ppm (80 µg/m^3)	N/A
	24-Hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	N/A
	3-Hour	N/A	N/A	0.5 ppm (1,300 µg/m^3)
	1-Hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	N/A[1]
Respirable Particulate Matter (PM_{10})	AAM	20 µg/m^3	N/A	N/A
	24-Hour	50 µg/m^3	150 µg/m^3	Same as Primary
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
	24-Hour	N/A	35 µg/m^3	Same as Primary
Lead (Pb)	Rolling 3-month Average	N/A	0.15 µg/m^3	Same as Primary
	Monthly	1.5 µg/m^3	N/A	N/A
Visibility Reducing Particles	8-Hour (State)	Extinction of 0.23 per km	N/A	N/A
	8-Hour (Lake Tahoe)	Extinction of 0.07 per km	N/A	N/A
Sulfates	24-Hour	25 µg/m^3	N/A	N/A

Table 4.1-2

National and California Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS	NAAQS	
			Primary	Secondary
Hydrogen Sulfide	1-Hour	0.03 ppm ($42\ \mu g/m^3$)	N/A	N/A
Vinyl Chloride	24-Hour	0.01 ppm ($26\ \mu g/m^3$)	N/A	N/A

Notes:
NAAQS = National Ambient Air Quality Standards
CAAQS = California Ambient Air Quality Standards
ppm = parts per million (by volume)
$\mu g/m^3$ = micrograms per cubic meter
N/A = Not applicable
mg/m^3 = milligrams per cubic meter
AAM = Annual arithmetic mean

1 On March 20, 2012, the USEPA took final action to retain the current secondary NAAQS for NO_2 (0.053 ppm averaged over a year) and SO_2 (0.5 ppm averaged over three hours, not to be exceeded more than once per year) (77 Federal Register [FR] 20264).

2 On June 22, 2010, the 1-hour SO2 NAAQS was updated and the previous 24-hour and annual primary NAAQS were revoked. The previous 1971 SO2 NAAQS (24-hour: 0.14 ppm; annual: 0.030 ppm) remain in effect until one year after an area is designated for the 2010 NAAQS (75 FR 35520). On August 5, 2013, the USEPA finalized area designations for the 2010 SO_2 primary NAAQS. The USEPA designated as nonattainment most areas in locations where existing monitoring data from 2009 to 2011 indicate violations of the 1-hour SO_2 NAAQS. The USEPA intends to address in separate future actions the designations for all other areas, including California, for which it is not yet prepared to issue designations (78 FR 47191).

Source: California Air Resources Board, Ambient Air Quality Standards Chart, Available: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf, accessed April 12, 2013.

LAX is located in the Basin, which is designated as a federal nonattainment area for O_3, $PM_{2.5}$, and Pb. Nonattainment designations under the CAA for O_3 are classified into levels of severity based on the level of concentration above the standard, which is also used to set the required attainment date. The Basin was reclassified on September 22, 1998 to attainment/maintenance for NO_2 and on June 11, 2007 for CO since concentrations of these pollutants dropped below the NO_2 and CO NAAQS for several years. More recently, the Basin was reclassified to attainment/maintenance for PM_{10} on July 26, 2013.[46] Attainment/maintenance means that the pollutant is currently in attainment and that measures are included in the SIP to ensure that the NAAQS for that pollutant are not exceeded again (maintained). The attainment status with regard to the NAAQS is presented in Table 4.1-2 for each criteria pollutant.

46 U.S. Environmental Protection Agency, "Approval and Promulgation of Implementation Plans; Designation of Areas for Air Quality Planning Purposes; California; South Coast Air Basin; Approval of PM_{10} Maintenance Plan and Redesignation to Attainment for the PM_{10} Standard," *Federal Register,* Vol. 78, No. 123, June 26, 2013, pp. 38223-38226.

4.1.3.2.2 State

The CCAA, signed into law in 1988, requires all areas of the state to achieve and maintain the CAAQS by the earliest practicable date. The CAAQS are generally as stringent as, and in several cases more stringent than, the NAAQS; however, in the case of short-term standards for NO_2 and SO_2, the CAAQS are less stringent than the NAAQS. The currently applicable CAAQS are presented with the NAAQS in Table 4.1-2. The attainment status with regard to the CAAQS is presented in **Table 4.1-3** for each criteria pollutant. CARB has been granted jurisdiction over a number of air pollutant emission sources that operate in the state. Specifically, CARB has the authority to develop emission standards for on-road motor vehicles, as well as for stationary sources and some off-road mobile sources. In turn, CARB has granted authority to the regional air pollution control and air quality management districts to develop stationary source emission standards, issue air quality permits, and enforce permit conditions.

Table 4.1-3

South Coast Air Basin Attainment Status

Pollutant (Status as of December 28, 2012)	National Standards	California Standards
Ozone	Nonattainment - Extreme	Nonattainment
Carbon Monoxide	Attainment - Maintenance	Attainment
Nitrogen Dioxide	Attainment - Maintenance	Nonattainment
Sulfur Dioxide	Attainment	Attainment
PM10	Attainment - Maintenance	Nonattainment
PM2.5	Nonattainment	Nonattainment
Lead	Nonattainment	Nonattainment

Sources: California Air Resources Board, Area Designations Maps/State and National, Available: http://www.arb.ca.gov/desig/adm/adm.htm, accessed September 12, 2013; USEPA, The Green Book Nonattainment Areas for Criteria Pollutants, Available: http://www.epa.gov/oaqps001/greenbk/index.html, accessed September 12, 2013.

Toxic Air Contaminant Regulations

The CARB's statewide comprehensive air toxics program was established in the early 1980's. The Toxic Air Contaminant Identification and Control Act (Assembly Bill [AB] 1807) created California's program to reduce exposure to air toxics. The SCAQMD has jurisdiction over the air quality of the Basin and has released a draft final Basin-wide air toxics study (MATES III, Multiple Air Toxics Exposure Study, May 2008). As part of the MATES III study, a series of maps showing regional trends in estimated outdoor inhalation cancer risk from toxic emissions was prepared and indicates that the City of Los Angeles is exposed to an inhalation cancer risk of 500 – 3,692 persons per million. These risk maps depict inhalation cancer risk due to modeled outdoor TAC pollutant levels, and do not account for cancer risk due to other types of exposure. The largest contributors to inhalation cancer risk are diesel engines.

In September 1987, the California Legislature established the AB 2588 air toxics "Hot Spots" program. It requires facilities to report their air toxics emissions, ascertain health risks, and to notify nearby residents of significant risks. The SCAQMD has determined that the significance criterion for cancer health risks is a ten in one million increase in the chance of developing cancer. The SCAQMD has also adopted a significance criterion for cancer burden. The cancer burden is the estimated increase in the occurrence of cancer cases in a population as a result of exposures to TAC emissions. The SCAQMD has determined that the significance criterion for cancer burden is greater than 0.5 excess cancer cases in areas with an incremental increase in cancer risk greater than or equal to 1 in 1 million. The significance of non-cancer (acute and chronic) risks is evaluated in terms of HI for different endpoints. The SCAQMD threshold for non–cancer risk for both acute and chronic HI is 1.0. In September 1992, the "Hot Spots" Act was amended by Senate Bill 1731 which required facilities that pose a significant health risk to the community to reduce their risk through a risk management plan. Beginning In 2000, the CARB has adopted diesel risk reduction plans and measures to reduce DPM emissions and the associated health risk. These are discussed in more detail in the following section.

California Air Resources Board Air Toxics Control Measure

In 2004, CARB adopted a control measure to limit commercial heavy duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter (DPM) and other TAC. The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. In general, it prohibits idling for more than 5 minutes at any location.

In addition to limiting exhaust from idling trucks, CARB promulgated emission standards for off-road diesel construction equipment such as bulldozers, loaders, backhoes and forklifts, as well as many other self-propelled off-road diesel vehicles. A CARB regulation that became effective on June 15, 2008, aims to reduce emissions by installation of diesel soot filters and encouraging the replacement of older, dirtier engines with newer emission controlled models. The regulation requires that fleets limit their unnecessary idling to 5 minutes; there are exceptions for vehicles that need to idle to perform work (such as a crane providing hydraulic power to the boom), vehicles being serviced, or in a queue waiting for work. A prohibition against acquiring certain vehicles (e.g., Tier 0 and Tier 1) began on March 1, 2009; however, CARB is not enforcing this part of the regulation until "it receives authorization from USEPA."[47] Implementation of the fleet averaging emission standards is staggered based on fleet size, with the largest operators to begin compliance in 2014.[48] By 2020, CARB estimates that DPM will be reduced by 74 percent and smog forming NO_X (an O_3 precursor emitted from diesel engines) by 32 percent, compared to what emissions would be without the regulation.[49]

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47 Office of Administrative Law, "California Regulatory Notice Register, February 26, 2010," http://www.oal.ca.gov/res/docs/pdf/notice/9z-2010.pdf. Accessed March 2013.

48 CARB, In-Use Off-Road Diesel Vehicle Regulation, Overview, Revised May 2012, http://www.arb.ca.gov/msprog/ordiesel/faq/overview_fact_sheet_dec_2010-final.pdf. Accessed June 2013.

49 CARB, "Emissions and Health Benefits of Regulation for In-Use Off-Road Diesel Vehicles," http://www.arb.ca.gov/msprog/ordiesel/documents/OFRDDIESELhealthFS.pdf. Accessed March 2013.

4.1.3.2.3 South Coast Air Quality Management District

SCAQMD has jurisdiction over an area of 10,743 square miles consisting of Orange County and the urban, non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, and the Riverside County portions of the Salton Sea Air Basin and Mojave Desert Air Basin. The Basin is a sub-region of SCAQMD's jurisdiction and covers an area of 6,745 square miles. While air quality in this area has improved, the Basin requires continued diligence to meet air quality standards.

The SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the CAAQS and NAAQS. SCAQMD and CARB have adopted the 2012 AQMP which incorporates the latest scientific and technological information and planning assumptions, including the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), and updated emission inventory methodologies for various source categories.[50] The Final 2012 AQMP was adopted by the AQMD Governing Board on December 7, 2012. Therefore, the 2012 AQMP is the most appropriate plan to use for consistency analysis. The AQMP builds upon other agencies' plans to achieve federal standards for air quality in the Basin. It incorporates a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, and on-road and off-road mobile sources. The 2012 AQMP builds upon improvements in previous plans, and includes new and changing federal requirements, implementation of new technology measures, and the continued development of economically sound, flexible compliance approaches. In addition, it highlights the significant amount of emission reductions needed and the urgent need to identify additional strategies, especially in the area of mobile sources, to meet all federal criteria pollutant standards within the timeframes allowed under the federal CAA.

The 2012 AQMP's key undertaking is to bring the Basin into attainment with NAAQS for 24-hour $PM_{2.5}$ by 2014. It also intensifies the scope and pace of continued air quality improvement efforts toward meeting the 2023 8-hour O_3 standard deadline with new measures designed to reduce reliance on the CAA Section 182(e)(5) long-term measures for NO_X and VOC reductions. SCAQMD expects exposure reductions to be achieved through implementation of new and advanced control technologies as well as improvement of existing technologies.

The control measures in the 2012 AQMP consist of four components: 1) Basin-wide and Episodic Short-term $PM_{2.5}$ Measures; 2) Contingency Measures; 3) 8-hour O_3 Implementation Measures; and 4) Transportation and Control Measures provided by the Southern California Association of Governments (SCAG). The AQMP includes eight short-term $PM_{2.5}$ control measures, 16 stationary source 8-hour O_3 measures, 10 early action measures for mobile sources and seven early action measures are proposed to accelerate near-zero and zero emission technologies for goods movement related sources, and five on-road and five off-road mobile source control measures. In general, the SCAQMD's control strategy for stationary and mobile sources is based on the following approaches: 1) available cleaner technologies; 2) best management practices; 3) incentive programs; 4) development and implementation of zero-near-zero technologies and vehicles and control methods; and 5) emission reductions from mobile sources.

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50 http://www.aqmd.gov/aqmp/2012aqmp/index.htm

The SCAQMD also adopts rules to implement portions of the AQMP. At least one of these rules is applicable to the construction phase of the proposed Project. Rule 403 requires the implementation of best available fugitive dust control measures during active construction activities capable of generating fugitive dust emissions from on-site earth-moving activities, construction/demolition activities, and construction equipment travel on paved and unpaved roads. Also, SCAQMD Rule 1113 limits the amount of VOCs from architectural coatings and solvents, which lowers the emissions of odorous compounds.

4.1.3.2.4 Southern California Association of Governments

SCAG is the metropolitan planning organization (MPO) for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties and serves as a forum for the discussion of regional issues related to transportation, the economy, community development, and the environment. As the federally-designated MPO for the Southern California region, SCAG fulfills federal requirements to research and develop plans for transportation, hazardous waste management, and air quality. Pursuant to California Health and Safety Code 40460(b), SCAG has the responsibility for preparing and approving the portions of the AQMP relating to regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures and strategies. SCAG is also responsible under the CAA for determining conformity of transportation projects, plans, and programs with applicable air quality plans. With regard to air quality planning, SCAG has prepared the 2012-2035 RTP/SCS, which addresses regional development and growth forecasts.

4.1.3.2.5 Other Related Rules and Policies

In the Basin, the City of Los Angeles, CARB, and the SCAQMD have adopted or proposed additional rules and policies governing the use of cleaner fuels in public vehicle fleets. The City of Los Angeles Policy CF#00-0157 requires that City-owned or operated diesel-fueled vehicles be equipped with particulate traps and that they use ultra-low-sulfur diesel fuel. CARB has adopted a Risk Reduction Plan for diesel-fueled engines and vehicles. The SCAQMD has proposed a series of rules that would require the use of clean fuel technologies in on-road school buses, on-road heavy-duty public fleets, and street sweepers. This analysis includes the use of diesel particulate traps.

4.1.3.3 Existing Ambient Air Quality

In an effort to monitor the various concentrations of air pollutants throughout the Basin, the SCAQMD has divided the region into 38 SRAs in which monitoring stations operate. The monitoring station that is most representative of existing air quality conditions in the Project area is the Southwest Coastal Los Angeles Monitoring Station located at 7201 W. Westchester Parkway (referred to as the LAX Hastings site), less than 0.5-mile from Runway 6L-24R (northernmost LAX runway). This station monitors O_3, CO, SO_2, NO_2, and PM_{10}. The nearest representative monitoring station that monitors $PM_{2.5}$ is the South Coastal Los Angeles County 1 Station, which is located at 1305 E. Pacific Coast Highway (North Long Beach). The most recent data available from these monitoring stations encompassed the years 2008 to 2012. In general, the measured concentrations at these locations are below concentrations measured at many of the other monitors around the Basin. The existing ambient air quality data from these monitoring locations are provided in **Table 4.1-4**.

Table 4.1-4

Southwest Coastal Los Angeles and South Coastal Los Angeles County Monitoring Station Ambient Air Quality Data

Pollutant[1,2]	2008	2009	2010	2011	2012
Ozone (O_3)					
Maximum Concentration 1-hr period, ppm	0.086	0.077	0.089	0.078	0.106
Days over State Standard (0.09 ppm)	0	0	0	0	1
Maximum Concentration 8-hr period, ppm	0.075[3]	0.070	0.070	0.067	0.075
Days over State Standard (0.070 ppm)	1	0	0	0	1
Days over Federal Standard (0.075 ppm)	0	0	0	0	0
Nitrogen Dioxide (NO_2)					
Maximum Concentration 1-hr period, ppm	0.094	0.077	0.076	0.098	0.077
98^{th} Percentile Concentration 1-hr period, ppm	0.076	0.069	0.061	0.065	0.055
Days over State Standard (0.18 ppm)	0	0	0	0	0
Annual Arithmetic Mean (AAM), ppm	0.014	*	0.012	0.013	*
Exceed State Standard? (0.030 ppm)	No	No	No	No	No
Carbon Monoxide (CO)					
Maximum Concentration 1-hr period, ppm	4	3	3	2	3
Exceed State Standard? (20.0 ppm)	0	0	0	0	0
Maximum Concentration 8-hr period, ppm	3	2	2	2	2
Exceed State Standard? (9.0 ppm)	0	0	0	0	0
Sulfur Dioxide (SO_2)					
Maximum Concentration 1-hr period, ppb	15	12	16	8	5
Days over Federal Standard (75 ppb)	0	0	0	0	0
Maximum Concentration 24-hr period, ppb	4	6	2	2	1
Days over State Standard (40 ppb)	0	0	0	0	0
Respirable Particulate Matter (PM_{10})[3,4]					
Maximum Concentration 24-hr period, $\mu g/m^3$	50	52	37	41	31
Days over State Standard (50 $\mu g/m^3$)	0	6	*	0	0
Days over Federal Standard (150 $\mu g/m^3$)	0	0	0	0	0
Annual Concentration, $\mu g/m^3$	25.5	25.5	*	21.4	19.6
Exceed State Standard? (20 $\mu g/m^3$)	Yes	Yes	*	Yes	No

Table 4.1-4

Southwest Coastal Los Angeles and South Coastal Los Angeles County Monitoring Station Ambient Air Quality Data

Pollutant[1,2]	2008	2009	2010	2011	2012
Fine Particulate Matter ($PM_{2.5}$)[3,4]					
Maximum Concentration 24-hr period, μg/m^3	57.2	63.0	35.0	39.7	49.8
Days over Federal Standard (150 μg/m^3)	8	6	0	2	4
Annual Concentration, μg/m^3	14.1	12.8	10.3	11.3	10.6
Exceed State Standard? (12 μg/m^3)	Yes	Yes	No	No	No

Notes:
μg/m^3 = micrograms per cubic meter
PM_{10} = particulate matter equal to less than 10 microns in diameter
$PM_{2.5}$ = particulate matter equal to less than 2.5 microns in diameter
ppm = parts per million
ppb = parts per billion
* Insufficient data to determine the value
1 Monitoring data from the Los Angeles-Westchester Parkway Station (located at 7201 W Westchester Parkway) was used for O_3, CO, NO_2, SO_2, and PM_{10} concentrations. Monitoring Data from the North Long Beach Station (located at 3648 N Long Beach Boulevard) was used for $PM_{2.5}$ concentrations.
2 An exceedance is not necessarily a violation. Violations are defined in 40 Code of Federal Regulations 50 for NAAQS and 17 California Code of Regulations 70200 for CAAQS.
3 State and federal statistics may differ for the following reasons: State statistics are based on California-approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers. In 2008, the federal method resulted in an ozone concentration of 0.075 ppm (which does not exceed the federal standard); the State method resulted in an ozone concentration of 0.076 and there is 1 day that exceeded the State standard.
4 Statistics may include data that are related to an exceptional event.

Source: California Air Resources Board, State and Local Air Quality Monitoring Plan, iAdam, Air Quality Data Statistics, http://www.arb.ca.gov/adam/netrpt, 2013; United States Environmental Protection Agency, AirData Monitor Values Report, http://www.epa.gov/airdata/, 2013.

The data shows the following pollutant trends (refer to Table 4.1-2 for NAAQS and CAAQS standards):

Ozone - The maximum 1-hour O_3 concentration recorded during the 2008 to 2012 period was 0.106 ppm, recorded in 2012. During this period, the California standard was exceeded in 2008 and 2012. The maximum 8-hour O_3 concentration was 0.075 ppm recorded in 2008 and 2012. The California standards were exceeded twice during the reporting period, while the NAAQS were not violated.

Nitrogen Dioxide - The highest 1-hour NO_2 concentration recorded was 0.098 ppm in 2011. The maximum 98th percentile 1-hour concentration was 0.076 ppm, recorded in 2008. The highest recorded NO_2 annual arithmetic mean was 0.014 ppm recorded in 2008. As shown, the standards were not exceeded during the five-year period.

Carbon Monoxide - The highest 1-hour CO concentration recorded was 4 ppm, recorded in 2008. The maximum 8-hour CO concentration recorded was 3 ppm recorded in 2008. As demonstrated by the data, the standards were not exceeded during the five-year period.

Sulfur Dioxide - The highest 1-hour concentration of SO_2 was 16 parts per billion (ppb) recorded in 2010. The maximum 24-hour concentration was 6 ppb, recorded in 2009. As shown, the standards were not exceeded during the five-year period.

Respirable Particulate Matter (PM_{10}) - The highest recorded 24-hour PM_{10} concentration recorded was 52 micrograms per cubic meter ($\mu g/m^3$) in 2009. During the period 2008 to 2012, the CAAQS for 24-hour PM_{10} was exceeded for 6 days in 2009; the NAAQS was not exceeded. The maximum annual average recorded was 25.5 $\mu g/m^3$ in 2008 and 2009.

Fine Particulates ($PM_{2.5}$) - The maximum 24-hour $PM_{2.5}$ concentration recorded was 63 $\mu g/m^3$ in 2009. The 24-hour NAAQS was exceeded between 0 and 8 days annually from 2008-2012. The maximum annual average recorded was 14.1 $\mu g/m^3$ in 2008.

Lead (Pb) – The monitored area for the Project site is in compliance with the CAAQS and NAAQS for ambient concentrations of lead. The Los Angeles County portion of the Basin is currently in nonattainment with the California and National standards for Pb primarily as the result of Pb emissions from an industrial lead-acid battery recycling facility in the City of Commerce. The SCAQMD currently maintains a network of three source-oriented Pb monitors around the facility. Monitoring is only conducted periodically elsewhere in the Basin because the primary sources of atmospheric Pb, leaded gasoline and lead-based paint, are no longer available in the Basin.

4.1.3.3.1 Existing Health Risk in the Project Area

In 2008, the SCAQMD released a draft final Basin-wide air toxics study (MATES III, Multiple Air Toxics Exposure Study, May 2008). The MATES III Study represents one of the most comprehensive air toxics studies ever conducted in an urban environment. The Study was aimed at estimating the cancer risk from TAC emissions throughout the Basin by conducting a comprehensive monitoring program, an updated emissions inventory of TACs, and a modeling effort to fully characterize health risks for those living in the Basin. The Study concluded that the average carcinogenic risk from air pollution in the Basin is approximately 1,200 in one million. Mobile sources (e.g., cars, trucks, trains, ships, aircraft, etc.) represent the greatest contributors. Approximately 85 percent of the risk is attributed to DPM emissions, approximately 10 percent to other toxics associated with mobile sources (including benzene, butadiene, and formaldehyde), and approximately 5 percent of all carcinogenic risk is attributed to stationary sources (which include industries and other certain businesses, such as dry cleaners and chrome plating operations).

As part of the MATES III Study, the SCAQMD has prepared a series of maps that show regional trends in estimated outdoor inhalation cancer risk from toxic emissions, as part of an ongoing effort to provide insight into relative risks. The maps' estimates represent the number of potential cancers per million people associated with a lifetime of breathing air toxics (24 hours per day outdoors for 70 years) in parts of the area. The MATES III Los Angeles County map, which is the most recently available map to represent existing conditions near the Project area, is provided in **Figure 4.1-1**. As shown, the estimated lifetime cancer risk from exposure to TACs for those residing within the vicinity of the proposed Project is estimated at 884 cancers per million, while the vast majority of the area surrounding LAX ranges between 500 to 1,200 cancers per million.[51] However, the visual resolution available in the map is 1 kilometer by 1

[51] http://www3.aqmd.gov/webappl/matesiii/

kilometer and, thus, impacts for individual neighborhoods are not discernible on this map. In general, the risk of the Project site is comparable with other areas in the Los Angeles area; the risk from air toxics is lower near the coastline, and increases inland, with higher risks concentrated near large diesel sources (e.g., freeways, airports, and ports).

The CARB also prepares a series of maps that show regional trends in estimated outdoor inhalable cancer risk from air toxic emissions. The Year 2010 Los Angeles County Central map, which is the most recently available map to represent existing conditions, shows cancer risk ranging from 500 to 1,500 cancers per million in the Project area, which is generally consistent with the SCAQMD's risk maps.[52]

The data from the SCAQMD and CARB provide a slightly different range of risk. This difference is primarily related to the fact that the SCAQMD risk is based on monitored pollutant concentrations and the CARB risk is based on dispersion modeling and emission inventories. Regardless, the SCAQMD and CARB data shows that there is an inherent health risk associated with living in urbanized areas of the Basin, where mobile sources (e.g., cars, trucks, trains, ships, aircraft, etc.) represent the greatest contributors to the overall risk.

4.1.3.4 Sensitive Receptors and Locations

Residential areas are located to the north and south of the Project area and, typical of residential areas in urban settings, are likely to contain populations that are sensitive to air pollution. These population groups include children, elderly, and acutely and chronically ill persons (especially those with cardio-respiratory diseases).

Sensitive land uses in close proximity to the Project site are shown in **Figure 4.1-2** and include the following:

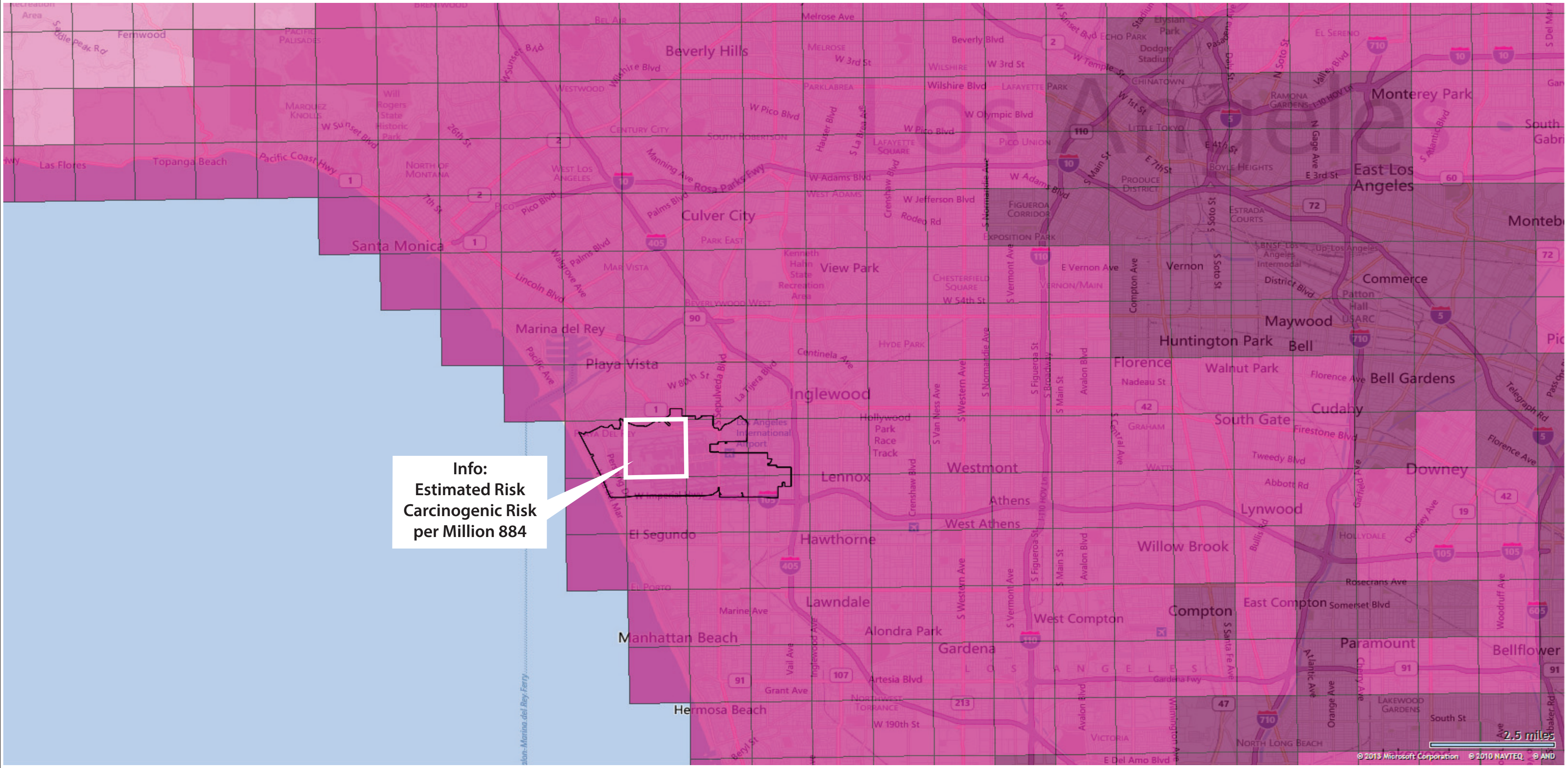
- The El Segundo residential neighborhood located approximately 1,550 feet to the south of the Project site boundary.
- The Playa del Rey/Westchester residential neighborhood located approximately 4,800 feet to the north of the Project site boundary.
- St. Bernard High School located approximately 4,500 feet to the north of the Project site boundary.

4.1.4 Thresholds of Significance

Based on thresholds of significance established by the LAX Master Plan EIS/EIR, which are consistent with those found in the *L.A. CEQA Thresholds Guide*, a significant air quality impact would occur if the direct and indirect changes in the environment that may be caused by the proposed Project would potentially result in one or more of the following future conditions:

- Conflict with or obstruct the implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

[52] http://www.arb.ca.gov/ch/communities/hlthrisk/cncrinhl/rskmapvwtrend.htm.400



Source: South Coast AQMD -
Multiple Air Toxics Exposure Study III
(Model Estimated Carcinogenic Risk), 2010
Prepared by: PCR Services Corporation, 2013.

Legend

Airport Boundary

Estimated Risk
- 0
- 1 to 25
- 26 to 50
- 51 to 250
- 251 to 500
- 501 to 1200
- 1201 to 3692

West Aircraft Maintenance Area Project
Draft EIR

Total Cancer Risk for Los Angeles International Airport Area

Figure
4.1-1

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Source: PCR Services Corporation, 2013.
Prepared by: PCR Services Corporation, 2013.

West Aircraft Maintenance Area Project Draft EIR	**Closest Sensitive Receptor Locations**	Figure **4.1-2**

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- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for O_3 precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

The *CEQA Guidelines* (Section 15064.7) provide that, when available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make determinations of significance. The potential air quality impacts of the Project are evaluated according to thresholds and methodologies developed by the SCAQMD. The SCAQMD has developed CEQA operational and construction-related thresholds of significance for air pollutant emissions from projects proposed in the Basin. Construction and operational emission thresholds are summarized in **Table 4.1-5**. In accordance with the SCAQMD *CEQA Air Quality Handbook*, a significant air quality impact would occur if the estimated incremental increase in construction-related or operations-related emissions attributable to the proposed Project would be greater than the daily emission thresholds presented in Table 4.1-5.

Table 4.1-5

SCAQMD CEQA Thresholds of Significance for Air Pollutant Emissions in the South Coast Air Basin

	Mass Emission Thresholds lbs/day	
Pollutant	**Construction**	**Operation**
VOC[a]	75	55
NO_X	100	55
CO	550	550
SO_2	150	150
PM10	150	150
PM2.5	55	55
Pb[b]	3	3

Notes:

[a] The emissions of VOCs and reactive organic gases are essentially the same for the combustion emission sources that are considered in this EIR. This EIR will typically refer to organic emissions as VOCs.

[b] The only source of lead emissions from LAX is from aviation gasoline (AvGas) associated with piston-engine general aviation aircraft; however, due to the low number of piston-engine general aviation aircraft operations at LAX, AvGas quantities are low and emissions from these sources would not be materially affected by the Project.

Source: SCAQMD, 1993, 2011.

The SCAQMD has also developed operational and construction-related thresholds of significance[53] for air pollutant concentration impacts from projects proposed in the Basin. These thresholds are summarized in **Table 4.1-6**. In accordance with the SCAQMD *CEQA Air Quality Handbook*, a significant air quality impact would occur if the estimated incremental ambient concentrations due to construction-related or operations-related emissions would be greater than the concentration thresholds presented in Table 4.1-6. The SCAQMD's recommended thresholds for the evaluation of localized air quality impacts are based on the difference between the maximum monitored ambient pollutant concentrations in the area and the CAAQS or NAAQS.

Therefore, the thresholds depend upon the concentrations of pollutants monitored locally with respect to a Project site. For pollutants that already exceed the CAAQS or NAAQS (e.g., PM_{10} and $PM_{2.5}$), the thresholds are based on SCAQMD Rule 403 for construction and Rule 1303, Table A-2 for operations as described in the *Final Localized Significance Threshold Methodology*. The methodology requires that the anticipated increase in ambient air concentrations, determined using a computer-based air quality dispersion model, be compared to localized significance thresholds for PM_{10}, $PM_{2.5}$, NO_2, and CO.[54] The significance threshold for PM_{10} represents compliance with Rule 403 (Fugitive Dust) and Rule 1303 (New Source Review Requirements), while the thresholds for NO_2 and CO represent the allowable increase in concentrations above background levels in the vicinity of the Project site that would not cause or contribute to an exceedance of the relevant ambient air quality standards. The significance thresholds for $PM_{2.5}$ are intended to constrain emissions so as to aid in the progress toward attainment of the ambient air quality standards.[55] The applicable thresholds are shown below in Table 4.1-6. For the purposes of this analysis, the localized construction emissions resulting from development of the proposed Project are assessed with respect to the thresholds in Table 4.1-6 using detailed dispersion modeling (i.e., AERMOD).

The SCAQMD provides mass rate look-up tables in Appendix C of the *Final Localized Significance Threshold Methodology*, which allows a lead agency to readily determine if the daily emissions for proposed construction or operational activities could result in significant localized air quality impacts that could exceed the concentration-based thresholds in Table 4.1-6. For the purposes of this analysis, the incremental localized operational emissions resulting from the difference in travel distance for towing or taxiing aircraft to the maintenance area(s) between the existing conditions and the proposed Project are assessed with respect to the mass rate look-up tables in Appendix C of the *Final Localized Significance Threshold Methodology*.

Finally, the health risk thresholds established by SCAQMD used in this evaluation are a maximum incremental cancer risk greater than or equal to 10 in one million people, as well as chronic and acute non-cancer hazard indices greater than or equal to 1.

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[53] South Coast Air Quality Management District, CEQA Air Quality Handbook, 1993; as updated by SCAQMD Air Quality Significance Thresholds, March 2011, Available: http://www.aqmd.gov/CEQA/handbook/signthres.pdf.

[54] South Coast Air Quality Management District, Final Localized Significance Threshold Methodology, (2008).

[55] South Coast Air Quality Management District, Final Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, (2006).

Table 4.1-6

SCAQMD CEQA Thresholds of Significance for Air Pollutant Concentrations in the South Coast Air Basin

Pollutant	Project-Related Concentration Thresholds			
	Averaging Period	**Construction**	**Operation**	**Project Only or Total[a]**
PM_{10}	Annual	1.0 µg/m^3	1.0 µg/m^3	Project Only
PM_{10}	24-hour	10.4 µg/m^3	2.5 µg/m^3	Project Only
$PM_{2.5}$	24-hour	10.4 µg/m^3	2.5 µg/m^3	Project Only
CO	1-hour	20 ppm (23 mg/m^3)	20 ppm (23 mg/m^3)	Total incl. Background
CO	8-hour	9.0 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)	Total incl. Background
NO_2	1-hour (State)	0.18 ppm (339 µg/m^3)	0.18 ppm (339 µg/m^3)	Total incl. Background
NO_2	1-hour (Federal)[c]	0.100 ppm (188 µg/m^3)	0.100 ppm (188 µg/m^3)	Total incl. Background
NO_2	Annual (State)[b]	0.030 ppm (57 µg/m^3)	0.030 ppm (57 µg/m^3)	Total incl. Background
SO_2	1-hour (State)	0.25 ppm (655 µg/m^3)	0.25 ppm (655 µg/m^3)	Total incl. Background
SO_2	1-hour (Federal)[d]	0.075 ppm (196 µg/m^3)	0.075 ppm (196 µg/m^3)	Total incl. Background
SO_2	24-hour	0.04 ppm (105 µg/m^3)	0.04 ppm (105 µg/m^3)	Total incl. Background

Notes:

[a] The concentration threshold for CO and NO_2 is the CAAQS, which is at least as stringent as the NAAQS. The concentration threshold for PM_{10} and $PM_{2.5}$ has been developed by SCAQMD for construction or operational impacts associated with the proposed Project.

[b] The state standard is more stringent than the federal standard.

[c] To evaluate impacts of the proposed Project to ambient 1-hour NO_2 levels, the analysis includes both the current SCAQMD 1-hour state NO_2 threshold and the more stringent revised 1-hour federal ambient air quality standard of 188 µg/m^3. To attain the federal standard, the 3-year average of 98th percentile of the daily maximum 1-hour average at a receptor must not exceed 0.100 ppm.

[d] To attain the SO_2 federal 1-hour standard, the 3-year average of the 99th percentile of the daily maximum 1-hour averages at a receptor must not exceed 0.075 ppm.

Source: SCAQMD, 1993, 2011; USEPA, 2010a (75 FR 6474, Primary National Ambient Air Quality Standards for Nitrogen Dioxide, Final Rule, February 9, 2010) and 2010b (75 FR 35520, Primary National Ambient Air Quality Standard for Sulfur Dioxide, Final Rule, June 22, 2010).

4.1.5 Applicable LAX Master Plan Commitments and Mitigation Measures

As part of the LAX Master Plan, LAWA adopted commitments and mitigation measures pertaining to air quality (denoted with "AQ") in the LAX Master Plan MMRP. Those Master Plan commitments and mitigation measures were later integrated with additional air quality measures for projects at LAX to form a comprehensive list of LAWA Air Quality Control Measures. Of the LAWA Air Quality Control Measures, three of the control measures are applicable to the proposed Project and were considered in the air quality analysis herein (denoted below as LAX-AQ-1, LAX-AQ-2, and LAX-AQ-4). The transportation-related control measure (denoted as LAX-AQ-3) is not applicable to the proposed Project because the Project does not include ground transportation access components; thus LAX-AQ-3 was not considered in the air quality analysis herein. The portions of the three air quality control measures that would be applicable to the proposed Project are summarized below in **Table 4.1-7**, **Table 4.1-8**, and **Table 4.1-9**.

LAX-AQ-1 – General Air Quality Control Measures

- This measure describes a variety of specific actions to reduce air quality impacts associated with projects at LAX, and applies to all projects. Some components of LAX-AQ-1 are not readily quantifiable, but would be implemented as part of LAX Master Plan projects. Specific measures applicable to the Project are identified in Table 4.1-7.

Table 4.1-7

General Air Quality Control Measures [a]

Measure Number	Measure	Type of Measure	Quantified Emissions Reductions
1a	Watering (per SCAQMD Rule 403 and CalEEMod default) – twice daily.	Fugitive Dust	55% PM_{10} and $PM_{2.5}$
1b	Ultra-low sulfur diesel (ULSD) fuel will be used in construction equipment.	On- and Off-Road Mobile	Assumed in modeling
1c	Post a publicly visible sign with the telephone number and person to contact regarding dust complaints; this person shall respond and take corrective action within 24 hours.	Fugitive Dust	NQ
1d	Prior to final occupancy, the applicant demonstrates that all ground surfaces are covered or treated sufficiently to minimize fugitive dust emissions.	Fugitive Dust	NQ
1e	All roadways, driveways, sidewalks, etc., being installed as part of the project should be completed as soon as possible; in addition, building pads should be laid as soon as possible after grading.	Fugitive Dust	NQ

Table 4.1-7

General Air Quality Control Measures [a]

1f	Prohibit idling or queuing of diesel-fueled vehicles and equipment in excess of five minutes. This requirement will be included in specifications for any LAX projects requiring on-site construction.[b]	On- and Off-Road Mobile	NQ
1g	Require that all construction equipment working on-site is properly maintained (including engine tuning) at all times in accordance with manufacturers' specifications and schedules.	Mobile and Stationary	NQ

NQ = Not Quantified

[a] These measures are from LAX Master Plan Mitigation Measure MM-AQ-2, unless otherwise noted.

[b] From LAX Master Plan Mitigation Measure MM-AQ-2 and Community Benefits Agreement Measure X.M and LAWA's Design and Construction Handbook, Section 1.31.9.

Source: PCR Services Corporation, 2013

LAX-AQ-2 – LAX Master Plan - Mitigation Plan for Air Quality; Construction-Related Measures

- This measure describes numerous specific actions to reduce fugitive dust emissions and exhaust emissions from on-road and off-road mobile and stationary sources used in construction. Some components of LAX-AQ-2 are not readily quantifiable, but would be implemented as part of LAX Master Plan projects. These control strategies are expected to reduce construction-related emissions. Specific measures applicable to the Project are identified in Table 4.1-8.

Table 4.1-8

Construction-Related Control Measures[a]

Measure Number	Measure	Type of Measure	Quantified Emissions Reductions
2a	All diesel-fueled equipment used for construction will be outfitted with the best available emission control devices, where technologically feasible, primarily to reduce emissions of diesel particulate matter (PM), including fine PM ($PM_{2.5}$), and secondarily, to reduce emissions of NO_X. This requirement shall apply to diesel-fueled off-road equipment (such as construction machinery), diesel-fueled on-road vehicles (such as trucks), and stationary diesel-fueled engines (such as electric generators). (It is unlikely that this measure will apply to equipment with Tier 4	Off-Road Mobile	85% PM_{10} and $PM_{2.5}$, adjusted for compatibility

Table 4.1-8

Construction-Related Control Measures[a]

Measure Number	Measure	Type of Measure	Quantified Emissions Reductions
	engines.) The emission control devices utilized in construction equipment shall be verified or certified by California Air Resources Board or US Environmental Protection Agency for use in on-road or off-road vehicles or engines. For multi-year construction projects, a reassessment shall be conducted annually to determine what constitutes a best available emissions control device.[b]		
2b	Watering (per SCAQMD Rule 403 and CalEEMod default) – three times daily.	Fugitive Dust	61% PM_{10} and $PM_{2.5}$
2c	Pave all construction access roads at least 100 feet onto the site from the main road.	Fugitive Dust	NQ
2d	To the extent feasible, have construction employees' work/commute during off-peak hours.	On-Road Mobile	NQ
2e	Make available on-site lunch trucks during construction to minimize off-site worker vehicle trips.	On-Road Mobile	NQ
2f	Utilize on-site rock crushing facility, when feasible, during construction to reuse rock/concrete and minimize off-site truck haul trips.	On-Road Mobile	NQ
2g	Specify combination of electricity from power poles and portable diesel- or gasoline-fueled generators using "clean burning diesel" fuel and exhaust emission controls.[c]	Stationary Point Source Controls	NQ
2h	Suspend use of all construction equipment during a second- stage smog alert in the immediate vicinity of LAX.	Mobile and Stationary	NQ
2i	Utilize construction equipment having the minimum practical engine size (i.e., lowest appropriate horsepower rating for intended job).	Mobile and Stationary	NQ
2j	Prohibit tampering with construction equipment to increase horsepower or to defeat emission control devices.	Mobile and Stationary	NQ
2k	The contractor or builder shall designate a person or persons to ensure the implementation of all components of the construction-related measure through direct inspections, record reviews, and investigations of complaints.	Administrative	NQ

Table 4.1-8

Construction-Related Control Measures[a]

Measure Number	Measure	Type of Measure	Quantified Emissions Reductions
2l	LAWA will locate rock-crushing operations and construction material stockpiles for all LAX-related construction in areas away from LAX-adjacent residents, to the extent possible, to reduce impacts from emissions of fugitive dust.[d]	Stationary	Can be quantified in modeling assumptions
2m	LAWA will ensure that there is available and sufficient infrastructure on-site, where not operationally or technically infeasible, to provide fuel to alternative-fueled vehicles to meet all requests for alternative fuels from contractors and other users of LAX. This will apply to construction equipment and to operations-related vehicles on-site. This provision will apply in conjunction with construction or modification of passenger gates related to implementation of the LAX Master Plan relative to the provision of appropriate infrastructure for electric GSE.[e]	Mobile	NQ
2n	On-road trucks used on LAX construction projects with a gross vehicle weight rating of at least 19,500 pounds shall, at a minimum, comply with USEPA 2007 on-road emissions standards for PM10 and NO_X.[f]	On-Road Mobile	Assumed in modeling
2o	Prior to January 1, 2015, all off-road diesel-powered construction equipment greater than 50 horsepower shall meet USEPA Tier 3 off-road emission standards. After December 31, 2014, all off-road diesel-power construction equipment greater than 50 horsepower shall meet USEPA Tier 4 off-road emissions standards. Tier 4 equipment shall be considered based on availability at the time the construction bid is issued. LAWA will encourage construction contractors to apply for SCAQMD “SOON” funds to accelerate clean-up of off-road diesel engine emissions.[g]	Off-Road Mobile	Assumed in modeling

NQ = Not Quantified

a These measures are from LAX Master Plan Mitigation Measure MM-AQ-2, unless otherwise noted.

b From LAX Master Plan Mitigation Measure MM-AQ-2 and Community Benefits Agreement Measure X.F.

c From LAX Master Plan Mitigation Measure MM-AQ-2 and LAWA’s Design and Construction Handbook, Section 1.31.9.

d From Community Benefits Agreement Measure X.L.

e From Community Benefits Agreement Measure X.N.

f From LAX Specific Plan Amendment Study Measure MM-AQ (SPAS)-1.

g From LAX Specific Plan Amendment Study Measure MM-AQ (SPAS)-1.

Source: PCR Services Corporation, 2013

LAX-AQ-4 – Operations-Related Control Measures

- The principal feature of this measure is the conversion of LAX GSE to low and ultra-low emission technology (e.g., electric, fuel cell, and other future low-emission technologies). It should be noted that no estimate of the air quality benefit (i.e., emission reductions) of other secondary measures is made in this analysis. Specific operations-related control measures applicable to the Project are identified in Table 4.1-9.

Table 4.1-9

Operations-Related Air Quality Control Measures[a]

Measure Number	Measure	Type of Measure
4a	LAX GSE will be converted to low- and ultra-low emission technology (e.g., electric, fuel cell, and other future low-emission technologies). Both LAWA- and tenant-owned equipment will be included in this conversion program, which will be implemented in phases. LAWA will assign a GSE coordinator whose responsibility it will be to ensure the successful conversion of GSE in a timely manner. This coordinator will have adequate authority to negotiate on behalf of the City and have sufficient technical support to evaluate technical issues that arise during the implementation of this measure.[b]	Airside Operations
4d	LAWA will require the use of electric lawn mowers and leaf blowers, as these units become available for commercial use, for landscape maintenance associated with the proposed project.[c]	General
4e	LAWA will require the conversion of sweepers to alternative fuels or electric power for ongoing airfield and roadway maintenance. In the 2006 GSE inventory, two of ten sweepers were electric powered and one was either CNG or LPG fueled. HEPA filters will be installed on airport sweepers where the use of HEPA filters is technologically and financially feasible and does not pose a safety hazard to airport operations.[d]	General
4f	LAWA will ensure that there is available and sufficient infrastructure on-site, where not operationally or technically infeasible, to provide fuel to alternative-fueled vehicles to meet all requests for alternative fuels from contractors and other users of LAX. This will apply to construction equipment and to operations-related vehicles on-site. This provision will apply in conjunction with construction or modification of passenger gates related to implementation of the LAX Master Plan relative to the provision of appropriate infrastructure for electric GSE.[e]	Operational Vehicles.

Table 4.1-9

Operations-Related Air Quality Control Measures[a]

NQ = Not Quantified
[a] These measures are from LAX Master Plan Mitigation Measure MM-AQ-4, unless otherwise noted.
[b] From Community Benefits Agreement Measure X.F.
[c] From LAX Specific Plan Amendment Study Measure MM-AQ (SPAS)-3.
[d] From LAX Specific Plan Amendment Study Measure MM-AQ (SPAS)-3.
[e] From Community Benefits Agreement Measure X.N.

Source: PCR Services Corporation, 2013

4.1.6 Impact Analysis

4.1.6.1 Construction Emissions

4.1.6.1.1 Regional Construction Impacts

The peak daily emissions were calculated for each phase of construction, and are presented in **Table 4.1-10** for all criteria and precursor pollutants studied (VOC, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$). As shown therein, construction-related daily (short-term) emissions of NO_X would exceed SCAQMD significance thresholds for unmitigated construction emissions. These calculations include reductions achieved with implementation of mandated dust control measures, as required by SCAQMD Rule 403 (Fugitive Dust).

Table 4.1-10

Estimate Maximum Unmitigated Construction Emissions [a]
(pounds/day)

Quarter/Activity	VOC	NO_X	CO	SO_X	PM_{10} [b]	$PM_{2.5}$ [b]
Qtr. 1, Fencing/Mass Grading						
On-site	10	170	200	<1	11	6
Off-site	9	164	43	<1	11	3
Total	**19**	**334**	**243**	**1**	**22**	**10**
Qtr. 2, Mass Grading/Hangar #1 Utilities						
On-site	9	148	175	<1	11	6
Off-site	9	164	44	<1	11	3
Total	**18**	**312**	**244**	**1**	**22**	**10**
Qtr. 3, Hangar #1/Utilities/Apron						
On-site	42	429	489	1	16	9
Off-site	9	7	30	<1	4	1
Total	**52**	**436**	**518**	**1**	**19**	**10**

Table 4.1-10

Estimate Maximum Unmitigated Construction Emissions [a]
(pounds/day)

Quarter/Activity	VOC	NO_X	CO	SO_X	PM_{10} [b]	$PM_{2.5}$ [b]
Qtr. 4, Hangar #1/Apron/Infrastructure						
On-site	30	383	433	1	16	10
Off-site	9	7	29	<1	4	1
Total	**39**	**390**	**462**	**1**	**20**	**11**
Qtr. 5, Hangar #1/Apron/Infrastructure						
On-site	34	208	360	1	14	7
Off-site	6	6	27	<1	4	1
Total	**40**	**213**	**386**	**1**	**17**	**8**
Qtr. 6, Hangar #1/Apron/Lighting and Signage						
On-site	22	121	229	<1	6	4
Off-site	3	1	16	<1	2	1
Total	**26**	**122**	**245**	**<1**	**8**	**4**
Qtr. 7, Hangar #1/Apron						
On-site	22	79	137	<1	5	4
Off-site	3	1	11	<1	2	<1
Total	**25**	**81**	**148**	**<1**	**7**	**4**
Qtr. 8 – Qtr. 11	No Project-Related Construction Activity					
Qtr. 12, Hangar #2 Foundation						
On-site	3	37	73	<1	10	5
Off-site	2	1	5	<1	1	<1
Total	**5**	**37**	**78**	**<1**	**11**	**6**
Qtr. 13, Hangar #2 Superstructure						
On-site	3	20	34	<1	3	2
Off-site	2	1	5	<1	1	<1
Total	**5**	**21**	**39**	**<1**	**4**	**2**
Qtr. 14, Hangar #2 Enclosure						
On-site	3	20	34	<1	3	2
Off-site	2	1	5	<1	1	<1
Total	**5**	**21**	**39**	**<1**	**4**	**2**
Qtr. 15, Hangar #2 Roof/Interior						
On-site	5	25	40	<1	4	2
Off-site	2	1	7	<1	1	<1
Total	**7**	**26**	**46**	**<1**	**5**	**3**
Qtr. 16, Hangar #2 Interior						
On-site	5	36	60	<1	4	2
Off-site	4	1	10	<1	2	<1
Total	**9**	**37**	**69**	**<1**	**5**	**3**

Table 4.1-10

Estimate Maximum Unmitigated Construction Emissions [a]
(pounds/day)

Quarter/Activity	VOC	NO_X	CO	SO_X	PM_{10} [b]	$PM_{2.5}$ [b]
Qtr. 17, Hangar #2 Finalize/Parking						
On-site	5	36	58	<1	4	2
Off-site	3	1	9	<1	2	<1
Total	**8**	**36**	**66**	**<1**	**5**	**3**
Maximum Project Emissions	**52**	**436**	**518**	**1**	**22**	**11**
Regional Significance Threshold	75	100	550	150	150	55
Over (Under)	(23)	336	(32)	(149)	(128)	(44)
Exceed Threshold?	No	Yes	No	No	No	No

Notes:

[a] Compiled using the CalEEMod emissions inventory model. Totals may not add up exactly due to rounding. The equipment mix and use assumption for each phase is provided in Appendix B of this EIR.

[b] PM_{10} emissions estimates are based on compliance with SCAQMD Rule 403 requirements for fugitive dust suppression.

Source: PCR Services Corporation, 2013.

These calculations also include reductions achieved with implementation of exhaust controls. The proposed Project would implement measures to reduce emissions from the combustion of fossil fuels. The proposed Project would use equipment that meet stringent emission standards for NO_X, PM_{10}, and $PM_{2.5}$, which would result in emission reductions compared to fleet-wide average emissions for heavy-duty construction equipment and trucks in the southern California region. As discussed in Section 4.1.5, on-road trucks would comply with the USEPA 2007 on-road emissions standards for NO_2 and DPM (primarily $PM_{2.5}$). Compliance with the USEPA 2007 on-road emission standards result in a reduction of NO_2 and DPM by approximately 40 percent and 22 percent, respectively, compared to fleet-wide average emissions for heavy-duty trucks. Due to the high number of trucks needed for the export of on-site stockpiles, the proposed Project has additionally committed to using only haul trucks that would comply with the USEPA 2007 on-road emissions standards for NO_2 and DPM during the mass grading phase of construction. Off-road diesel-powered construction equipment greater than 50 horsepower (hp) would meet USEPA Tier 3 off-road emissions standards prior to January 1, 2015, and Tier 4 standards after December 31, 2014. Compliance with the USEPA Tier 3 and Tier 4 off-road emissions standards would also result in substantial reduction in emissions of NO_2 and DPM compared to fleet-wide average emissions for heavy-duty construction equipment.

In order to characterize the change in construction emissions over time, the construction emissions calculations were estimated by performing emissions modeling runs using CalEEMod for each type of construction activity (e.g., grading, excavation, utility installation, hangar interior construction, etc.) and calculating the sum of the emissions from all activities that would occur simultaneously throughout the construction schedule. This allows the assessment to capture the changes in maximum daily construction emissions over time. The results of the construction emissions analysis are presented in Table 4.1-10, which shows the maximum daily emissions by calendar quarter, with the first quarter representing the maximum daily emissions that would occur in the first three months of construction activity. It should be noted that the maximum daily emissions are predicted values for the peak day within that quarter and do not represent the emissions that would occur for every day within that quarter. The peak day is calculated based on the assumption that construction activities that could overlap would, in fact, overlap. Therefore, days in which the construction activities do not overlap would have lower emissions than those shown in Table 4.1-10.

As shown in Table 4.1-10, construction of the proposed Project is predicted to result in maximum daily emissions that exceed the SCAQMD regional construction thresholds for NO_X during six quarters and is not predicted to exceed the thresholds during the other seven quarters of construction activity. Construction of the proposed Project is not predicted to exceed the SCAQMD regional construction thresholds for VOC, CO, SO_X, PM_{10}, or $PM_{2.5}$ during any quarter with construction activity. As shown, the NO_X exceedance is limited to the initial and middle stages of construction, when grading and hangar construction would occur. As the maximum daily construction emissions are projected to exceed the SCAQMD threshold for NO_X during the initial and middle stages of construction, the NO_X impact would be significant.

As discussed in Chapter 2*, Project Description*, the proposed Project includes the development of taxiways, aircraft parking apron areas, aircraft maintenance hangars, and related structures. The proposed construction schedule was designed to enable the consolidation and modernization of existing aircraft maintenance facilities at LAX to occur at the earliest possible time. Due to the large size of development and the intensity of the proposed construction schedule, the initial and middle stages of construction would respectively exceed significance thresholds for NO_X, as shown in Table 4.1-10. These phases require a large equipment fleet or entail intensive earthmoving activities such as the export of on-site stockpiles. It is important to note that these emission forecasts reflect a specific set of conservative assumptions in which the proposed apron areas, hangar, and related facilities would be built out over approximately 18-21 months. However, construction rarely proceeds at this optimized manner, and delays may occur. This may allow for the availability of a more modern, cleaner burning, construction equipment fleet mix as time progresses, which may reduce emissions from the construction fleet, or a less intensive build-out schedule may result in lower daily emissions occurring over a longer time interval. Thus, actual daily emissions could be less than those forecasted.

4.1.6.1.2 Localized Construction Impacts

As discussed in Section 4.1.2, Methodology, above, the localized effects from the on-site portion of daily emissions are evaluated at nearby sensitive receptor locations potentially impacted by the proposed Project consistent with the methodologies in the SCAQMD's *Final Localized Significance Threshold Methodology.* The SCAQMD recommends that lead agencies perform project-specific air quality modeling for larger projects.[56] The Project area exceeds five acres in total size; therefore, Project-specific dispersion modeling was used to assess localized construction impacts rather than the mass emission rate look-up tables. The Project-specific air quality modeling of localized construction impacts was done in a manner consistent with the mass emission rate look-up tables in the SCAQMD's *Final Localized Significance Threshold Methodology* (June 2008). The results of the LST dispersion modeling are summarized in

[56] South Coast Air Quality Management District, Final Localized Significance Threshold Methodology, (2008) 1-5.

Table 4.1-11A and **Table 4.1-11B**. As shown therein, emissions from construction activities would not result in exceedances of the localized concentration-based thresholds for NO_2, CO, PM_{10}, or $PM_{2.5}$ at nearby sensitive receptors.[57] It should be noted that the dispersion modeling of localized impacts resulting from construction emissions from the proposed Project was performed using conservative assumptions, which included modeling impacts for the peak day emissions, and actual impacts are likely to be less than those predicted by this analysis.

Table 4.1-11A

Construction Localized Significance Threshold Analysis (Maximum Daily Emissions)

Stage	NO2 1-hour µg/m3	NO2 1-hour ppm	CO 1-hour µg/m3	CO 1-hour ppm	CO 8-hour µg/m3	CO 8-hour ppm	PM10 24-hour µg/m3	PM2.5 24-hour µg/m3
Maximum Daily On-Site Emissions (Construction Stage - Finish Hangar Retaining Walls/Utilities for Apron Areas/Infrastructure)								
El Segundo Sensitive Receptor Area (Residential)	40.12	0.02	60.16	0.05	10.27	0.01	0.42	0.20
Playa del Rey/Westchester Sensitive Receptor Area (Residential)	11.34	0.006	19.35	0.02	3.45	0.003	0.30	0.14
St. Bernard High School Sensitive Receptor Area (School)	13.40	0.007	21.43	0.02	4.18	0.004	0.31	0.14
Peak Background [a]	113.24	0.060	3,433	3	2,506	2.19	n/a	n/a
Maximum Project + Background	**153.36**	**0.082**	**3,493**	**3.05**	**2,516**	**2.20**	**0.42**	**0.20**
CAAQS/NAAQS	**188 [b]**	**0.100 [b]**	**23,000**	**20**	**10,000**	**9.0**	**10.4**	**10.4**
Over (Under)	(34.64) [b]	(0.018) [b]	(19,507)	(16.95)	(7,484)	(6.80)	(9.98)	(10.20)
Exceed Threshold?	No	No	No	No	No	No	No	No

57 California Air Resources Board, Ambient Air Quality Standards Chart, June 2012, Available: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf, accessed April 12, 2013.

Table 4.1-11A

Construction Localized Significance Threshold Analysis (Maximum Daily Emissions)

Stage	NO2 1-hour		CO 1-hour		CO 8-hour		PM10 24-hour	PM2.5 24-hour
	µg/m3	ppm	µg/m3	ppm	µg/m3	ppm	µg/m3	µg/m3

[a] The peak background concentration for NO_2 is based on the highest 3-year average of the 98th-percentile of the annual distribution of daily maximum 1-hour concentrations for the past three years of data (2010 - 2012). The peak background concentrations for CO are based on the maximum 1-hour and 8-hour concentrations between 2010 and 2012.

[b] The data presented above for NO_2 is based on the federal standards (i.e., NAAQS). With respect to the state standards, the CAAQS for NO_2 is 339 µg/m^3 or 0.18 ppm. The maximum background concentration for the period of 2010 – 2012 is 183.49 µg/m^3 or 0.098 ppm (see Table 4.1-4). Based on this, construction of the proposed Project would be under the threshold by approximately 115.39 µg/m^3 or 0.061 ppm. Thus, the proposed Project would not exceed the SCAQMD LST for NO_2 based on the CAAQS.

Source: PCR Services Corporation, (2013).

Table 4.1-11B

Construction Localized Significance Threshold Analysis (Maximum Annual Emissions)

Stage	NO_2 Annual		PM_{10} Annual
	µg/m^3	ppm	µg/m^3
Maximum Annual On-Site Emissions (Year 2014)			
El Segundo Sensitive Receptor Area (Residential)	0.21	0.0001	0.0059
Playa del Rey/Westchester Sensitive Receptor Area (Residential)	0.10	0.00005	0.0052
St. Bernard High School Sensitive Receptor Area (School)	0.06	0.00003	0.0020
Peak Background	24.44	0.013	n/a
Maximum Project + Background	**24.65**	**0.013**	**0.006**
CAAQS/NAAQS [a]	**57.00**	**0.030**	**1.0**
Over (Under)	(32.35)	(0.017)	(0.99)
Exceed Threshold?	No	No	No

[a] The SCAQMD Final Localized Significance Threshold Methodology (2008) does not provide a concentration-based localized annual threshold for construction emissions of PM_{10} pursuant to Rule 403. Therefore, the annual concentration threshold from Rule 1303, Table A-2, which is applicable to operational emissions, is used. This is a conservative (i.e., health protective) approach because operational thresholds are typically lower than construction thresholds, as is the case with the 24-hour PM_{10} concentration-based thresholds (e.g., 10.4 µg/m^3 for construction vs. 2.5 µg/m^3 for operations).

Source: PCR Services Corporation, (2013).

As shown in Table 4.1-10, emissions of SO_2 from construction would be minimal and well below the SCAQMD mass emission thresholds; therefore, SO_2 emissions were not further analyzed through dispersion modeling. Thus, given minimal SO_2 emissions, the proposed Project would result in a less than significant localized impact during construction.

4.1.6.1.3 Construction TAC Human Health Risk Assessment

Cancer risk estimates from exposure to construction sources are presented below for on-airport workers (occupational exposure), and off-airport workers, residents, and school children. Acute and chronic non-cancer health hazards are also presented.

On-Site Worker Concentrations Compared to OSHA Limits

Impacts to on-site workers were evaluated by comparing estimated maximum 1-hour air concentrations of TAC to the CalOSHA 8-hour Permissible Exposure Limits - Time-Weighted Average (PEL-TWAs)[58]. Estimated on-site air concentrations and PEL-TWAs for TAC of concern for the proposed Project are presented in **Table 4.1-12**.

Table 4.1-12

Comparison of CalOSHA Permissible Exposure Limits to Maximum Estimated 8-Hour On-Site Air Concentrations

Toxic Air Contaminant[a]	Controlled Project Concentrations (mg/m^3) [b]	CalOSHA PEL TWA (mg/m^3) [c]
acetaldehyde	0.017	45
acrolein (2-propenal)	0.000058	0.25
benzene	0.0046	0.32[d]
Butadiene, 1-3-	0.00045	2.2
ethylbenzene	0.00076	435
formaldehyde	0.034	0.37[d]
hexane, n-	0.00044	180
methanol	0.000071	260
methyl ethyl ketone (mek) (2-butanone)	0.0033	590
naphthalene	0.00021	50
propylene	0.0060	NA[e]
styrene	0.00014	215
toluene	0.0036	37
xylene (total)	0.0027	435
arsenic	0.000002	0.01
cadmium	0.000004	0.005
chlorine	0.00043	1.5
Chromium VI	0.000001	0.005
copper	0.000015	1
lead	0.000071	0.05
manganese	0.00012	0.2

58 California Occupational Safety and Health Administration, Permissible Exposure Limits for Chemical Contaminants, Table AC 1, Available: http://www.dire.ca.gov/title8/5155.html.

Table 4.1-12

Comparison of CalOSHA Permissible Exposure Limits to Maximum Estimated 8-Hour On-Site Air Concentrations

Toxic Air Contaminant[a]	Controlled Project Concentrations (mg/m^3) [b]	CalOSHA PEL TWA (mg/m^3) [c]
mercury	0.000002	0.025
nickel	0.000008	0.5
selenium	0.0000004	0.2
silicon	0.025	6
sulfates	0.00085	NA[e]
vanadium	0.000033	0.05

Notes:

a All TACs for which PEL-TWAs are available are listed. PEL-TWAs are not available for diesel exhaust, propylene, and sulfates.

b Maximum 1-hour concentrations at on-airport location converted to 8-hour averages by multiplying by a factor of 0.7.

c California Occupational Safety and Health Administration. Permissible Exposure Limits for Chemical Contaminants, Table AC-1, 2008, http://www.dir.ca.gov/title8/5155table_ac1.html.

d CalOSHA does not have a value; value is from American Conference of Governmental Industrial Hygienists (ACGIH), Documentation of the Threshold Limit Values and Biological Exposure Indices, 8th ed., Cincinnati, Ohio, 1998.

e NA = Not Available

Source: CDM Smith 2013

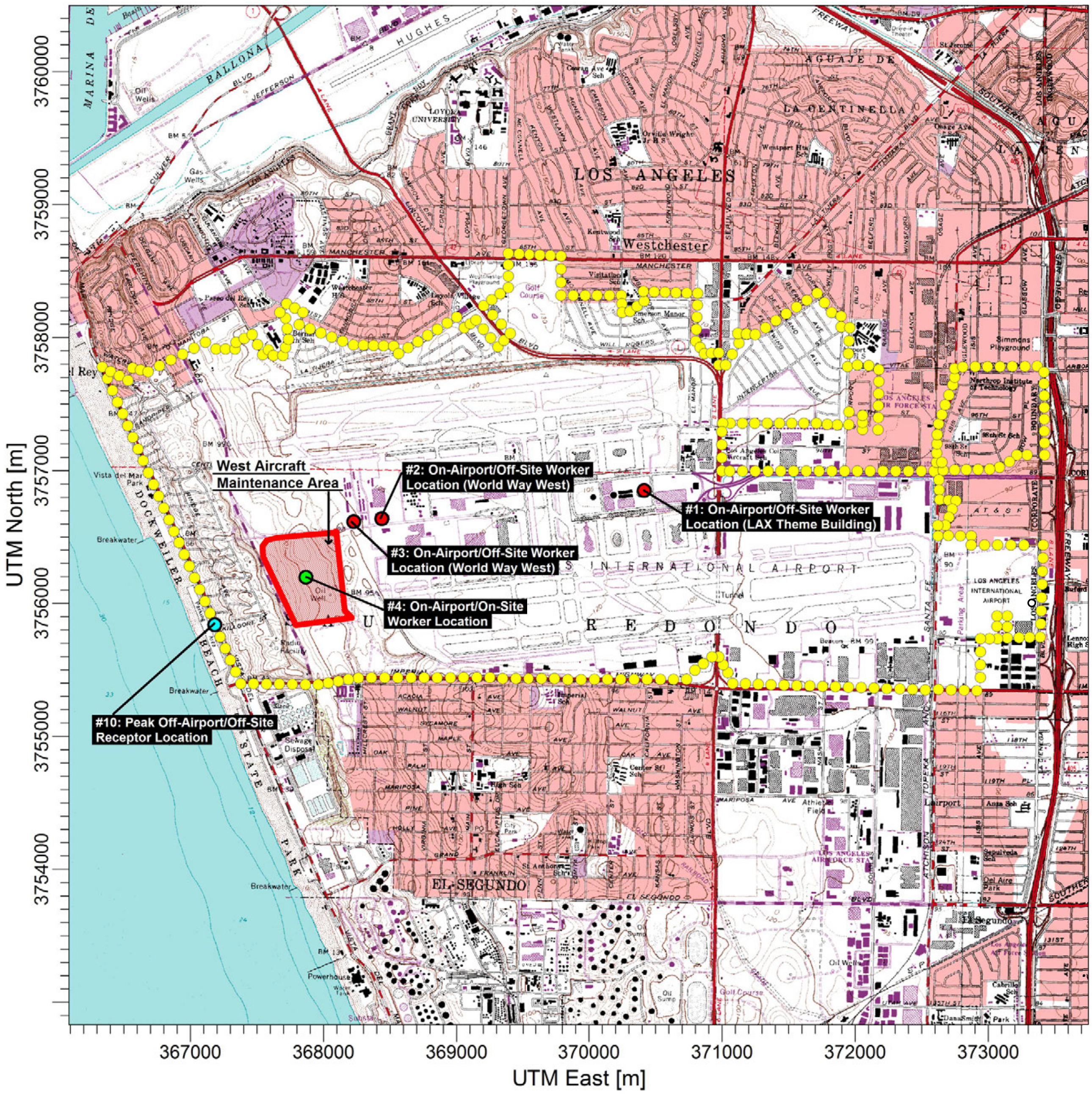
Estimated maximum 1-hour air concentrations at the on-site location under the proposed Project for controlled[59] construction were converted to 8-hour averages by multiplying the 1-hour average by a factor of 0.7.[60] The resulting 8-hour averages are a few to several orders of magnitude below PELs for all TAC. This result suggests that air concentrations from airport emissions with implementation of the proposed Project would not exceed those considered "acceptable" by CalOSHA standards; hence, the proposed Project impacts related to on-site worker concentrations would be less than significant.

Cancer Risks and Chronic Non-Cancer Hazards

For the proposed Project, 330 grid points were analyzed along the airport fence-line and in the vicinity of the airport. These locations are shown on **Figure 4.1-3**. Concentrations at the 326 fence-line locations represent maximum concentrations of TAC predicted by the air dispersion modeling that can be used to evaluate exposure to a MEI, and provide a ceiling for risks and hazards for off-airport residential, commercial, and student receptors. In essence, these calculations assumed that people live, work, and go to school at the LAX fence-line. Although this assumption is unrealistic, it is intended to provide a very conservative analysis.

59 Emission estimates for the proposed Project assume that mitigation measures identified in the LAX Master Plan EIR are in place. These measures are now part of all plans for renovation of the airport.

60 California Air Resources Board. 2003. HARP User Guide: Appendix H Recommendations for Estimating Concentrations of Longer Averaging Periods from the Maximum One-Hour Concentration for Screening Purposes. December. Available: http://www.arb.ca.gov/toxics/harp/harpug.htm.



0 1 km

Scale

north

Source: CDM Smith

Prepared by: PCR Services Corporation, 2013

Legend

- Modeled Grid Point (Theoretical Receptor Locations)
- Airport Boundary

West Aircraft Maintenance Area Project Draft EIR	Peak Impact Receptor Locations	Figure 4.1-3

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Air concentrations for TAC from construction sources were developed using emissions estimates and dispersion modeling as described above and in Appendix B.3 of this EIR. Using these emission estimates, exposure parameters for potential receptors and current toxicity values, cancer risks and chronic non-cancer health hazards were calculated for adult residents, resident children ages 0 to 6 years, and for elementary-aged school children at fence-line locations where air concentrations for TAC were predicted. Off-site worker risks and hazards were estimated at the fence-line receptors, and at three on-airport locations to represent LAWA, tenant, and contractor personnel. Peak cancer risks and chronic non-cancer health hazards for MEI at the fence-line and on-airport locations are summarized in **Table 4.1-13**.

Table 4.1-13

Incremental Cancer Risk and Chronic Non-Cancer Human Health Hazards for Maximally Exposed Individuals from Project Construction

Receptor Type	Incremental Cancer Risks[a] (per million people)
Child Resident	0.01
School Child	0.002
Adult Resident	0.1
Adult Worker	0.03
Receptor Type	**Incremental Non-Cancer Chronic Hazards[b]**
Child Resident	0.0004
School Child	0.00007
Adult Resident	0.0004
Adult Worker	0.0002

Notes:

a Values provided are changes in the number of cancer cases per million people exposed as compared to baseline conditions. All estimates are rounded to one significant figure.

b Hazard indices are totals for all TACs that may affect the respiratory system. This incremental hazard index is essentially equal to the total for all TACs.

Source: CDM Smith, 2013

Residents and school children were evaluated at all 326 off-airport grid nodes. Estimated peak incremental cancer risks for adult residents and child residents for the proposed Project range from 0.01 in one million to 0.1 in one million. Estimated incremental cancer risks are higher for adults than for children, because exposure duration for adults is longer. Incremental cancer risk for school children at the peak location was estimated to be 0.004 in one million. Adult worker risks were evaluated at all 326 off-airport grid nodes as well as at three on-airport/off-site grid nodes. The peak adult (non-Project) worker cancer risk would be 0.03 in one million. Exposure to DPM released during construction contributed 89 percent of the peak cancer risks to these receptors. These estimates indicate that Project-related cancer risks for adults and for young children would be below the threshold of significance of 10 in one million for Project construction; hence, the proposed Project impacts related to cancer risks would be less than significant.[61]

Project-related chronic non-cancer hazard indices for construction impacts associated with the Project for adult residents and child residents living at the peak TAC concentration location were estimated to be 0.0004. Project-related chronic non-cancer hazard index for chemicals affecting the same target (i.e., the respiratory system) for MEI school children is 0.00007. The peak adult (non-Project) worker chronic hazard index was estimated to be 0.0002. At the peak hazard index location, hazard indices are primarily attributable to silicon (52 percent) and DPM (18 percent) and to a lesser extent to chlorine (14 percent) and manganese (8 percent). DPM is primarily an emission from diesel construction equipment, haul trucks, and concrete trucks. Silicon, chlorine, and manganese are components of construction dust. The target organ for chronic toxicity of manganese is the nervous system and its actions would not be expected to be additive to the effects of DPM, silicon, and chlorine which target the respiratory system. These estimates indicate that Project-related chronic non-cancer hazards would be less than the hazard index threshold of 1; hence, the proposed Project's impact related to chronic non-cancer hazards would be less than significant.

Acute Hazards

As with cancer risks and chronic non-cancer health hazards, acute health hazards were analyzed at 330 grid points within the study area. Short-term concentrations of TAC for the proposed Project sources were estimated using AERMOD with the model option for 1-hour maximum concentrations selected. Acute health hazards were estimated at each grid point by comparison of the modeled TAC concentration at each grid point with the acute REL. All TAC identified in Project construction emissions and for which CalEPA has developed acute RELs were evaluated for potential acute health hazards. All acute health hazard estimates are specific for airport emissions and are independent of county-wide estimates developed by USEPA.

Land use distinctions and different exposure scenarios are irrelevant for assessment of acute health hazards. For example, someone visiting a commercial establishment would potentially be subject to the same acute health hazards as someone working at the establishment. Fence-line concentrations of TAC are likely to represent the highest concentrations and therefore the greatest impacts for residents, school children, or off-airport workers. The four on-airport grid points were assumed to be commercial receptors (workers). One of the four on-airport receptors is located in the middle of the proposed Project construction site; this grid point was assumed to be the on-site worker location.

Formaldehyde and manganese are the only TAC of concern in construction emissions from the Project that might be present at concentrations approaching the thresholds for acute health hazards. Acute health hazards for other TAC are orders of magnitude below their respective acute RELs and thus would not contribute substantially to health hazards. Formaldehyde and manganese are responsible for 43 to 50 percent and 42 to 48 percent, respectively, of all predicted acute non-cancer health hazards. Maximum acute health hazards associated with

[61] Controlled emissions include emission reductions associated with control measures required by the South Coast Air Quality Management District, as well as mitigation measures required as part of the LAX Master Plan Mitigation Monitoring & Report Program, Community Benefits Agreement, and Stipulated Settlement Agreement.

exposure to these two chemicals from Project construction are summarized in **Table 4.1-14**. Hazards quotients due to acute exposure to formaldehyde and manganese are below 1 for all off-site evaluated grid nodes within the study area under the proposed Project; hence, Project impacts related to acute health hazards would be less than significant.

Table 4.1-14

Maximum Incremental Acute Hazard Indices for Project Construction

Receptor Type	Summary of Incremental Acute Hazard Indices: Manganese	Summary of Incremental Acute Hazard Indices: Formaldehyde
Residential/School		
Maximum HI[a]	0.4	0.5
Minimum HI	0.004	0.003
Average HI	0.09	0.1
Off-Site Worker		
Maximum HI	0.7	0.8
Minimum HI	0.01	0.01
Average HI	0.4	0.5
Overall Off-Site Maximum HI	0.7	0.8

Notes:
[a] HI = Hazard Index

Source: CDM Smith, 2013

4.1.6.1.4 Odors

Potential sources that may emit odors during construction activities include the use of architectural coatings and solvents and from diesel emissions. SCAQMD Rule 1113 limits the amount of VOCs from architectural coatings and solvents. As discussed previously, the proposed Project would comply with DPM reduction strategies such as compliance with USEPA 2007 on-road emission standards for heavy-duty trucks and USEPA Tier 3 and Tier 4 off-road emission standards for heavy-duty construction equipment. Due to mandatory compliance with SCAQMD Rules and compliance with the DPM reduction strategies, no construction activities or materials are proposed which would create objectionable odors affecting a substantial number of people. In addition, the nearest sensitive receptors are located beyond the LAX property line and would be further buffered by the dissipation of odors with distance and prevailing winds. Therefore, no impact would occur and no mitigation measures would be required.

4.1.6.2 Operational Emissions

4.1.6.2.1 Regional Operational Impacts

Operation of the proposed Project is not expected to generate new emissions associated with aircraft maintenance because the proposed Project simply redirects and consolidates existing aircraft maintenance operations. However, the redirection and consolidation of maintenance operations to the Project site does result in longer distances between gates and maintenance with some additional taxi/towing emissions. The modeling of emissions associated with towing activities is based on the use of diesel-fueled GSE, which provides for a conservative analysis. LAX has committed to converting GSE to low and ultra-low emission technology (e.g., electric, fuel cell, and other future low-emission technologies). The program to convert the LAX GSE fleet is currently being implemented. Thus, future actual emissions associated with towing are likely to be lower than the emissions estimated in this EIR.

The number of run-ups from aircraft engine testing is not expected to increase compared to the current condition, nor is additional on-road vehicle traffic expected as a result of the proposed Project. Improvements associated with the LAX Master Plan would consolidate, relocate and modernize existing maintenance operations and run-ups in the western area of LAX. The proposed Project would shift an estimated 60 annual (five monthly) existing run-ups in the western area of LAX to the Project site, also located in the western area of LAX. However, there would no net increase in the number of run-ups or associated emissions. Therefore, only emissions associated with the incremental taxi/tow distance are presented in this emissions inventory.

Estimated operational emissions for the proposed Project are presented in **Table 4.1-15**. Future regional emissions resulting from operation of the proposed Project are substantially below applicable thresholds for VOC, NO_X, CO, SO_X, PM_{10} and $PM_{2.5}$. As a result, impacts related to regional emissions from operation of the proposed Project would be less than significant.

4.1.6.2.2 Localized Operational Impacts

As shown in Table 4.1-15, net on-site operational emissions from taxiing and towing would generally be less than one order-of-magnitude below the SCAQMD operational emission thresholds for VOC, NO_X, CO, SO_x, PM_{10}, and $PM_{2.5}$. Net operational emissions of these low levels would not result in localized impacts to off-site sensitive receptors especially given the distance between the Project site and the nearest sensitive receptors, which was discussed previously as approximately 1,550 feet to the south of the Project boundary for residents in El Segundo, approximately 4,800 feet to the north for residents in Playa del Rey/Westchester, and 4,500 feet to the north for St. Bernard High School (measured relative to the Project site boundary). According to Appendix C of the SCAQMD *Final Localized Significance Threshold Methodology*, the mass rate look-up tables provide the following screening levels for a five acre project site at a distance of 500 meters in the Project area (Southwest Coastal Los Angeles County): (1) 277 pounds per day of NO_X; (2) 9,852 pounds per day of CO; (3) 41 pounds per day of PM_{10}; and (4) 24 pounds per day of $PM_{2.5}$. As shown in Table 4.1-15, the incremental net operational emissions would be less than these screening levels. As a result, operation of the proposed Project would result in less than significant localized operational impacts.

Table 4.1-15

Unmitigated Proposed Project Operational Emissions[a] (Pounds per Day)

Emission Source	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Regional Emissions						
Aircraft Taxi/Tow						
Stage 3 Aircraft (Taxiing)	7	8	36	1	<1	<1
Wide-Body Aircraft Tug (Towing)	<1	4	1	<1	<1	<1
Total Net	7	12	37	1	<1	<1
SCAQMD Significance Threshold	55	55	550	150	150	55
Over/(Under)	(48)	(43)	(513)	(149)	(150)	(55)
Exceed Threshold?	No	No	No	No	No	No

Notes: Numbers may not add up exactly due to rounding.

Source: PCR Services Corporation, 2013.

As the proposed Project is not expected to increase the number of run-ups from aircraft engine testing compared to the current condition and would not result in net new emissions from run-ups. The proposed Project would shift a limited number of existing run-ups (i.e., an estimated 60 annual or five monthly) in the western area of LAX to the Project site, also located in the western area of LAX. As noted above, the distance between the Project site and the nearest sensitive receptors are approximately 1,550 feet to the south of the Project site boundary for residents in El Segundo, approximately 4,800 feet to the north for residents in Playa del Rey/Westchester, and 4,500 feet to the north for St. Bernard High School (measured relative to the Project site boundary). Given the distance between the Project site and nearest sensitive receptors, and given that the proposed Project would not increase the number of run-ups over existing conditions and that the number of relocated run ups in the western area of LAX would be minimal, localized effects from the relocated run-ups would not be substantially different than existing conditions and would not substantially contribute to localized impacts. Thus, localized operational impacts would be less than significant.

4.1.6.2.3 <u>Toxic Air Contaminants</u>

The proposed Project would consolidate, relocate, and modernize existing aircraft maintenance activities occurring at LAX. Operation of the proposed Project would not result in additional or increased operational or maintenance activities at LAX. The future operation of the proposed Project would not result in long-term operational changes to traffic activity and traffic flows within the airport study area as, in the long-term, the proposed Project would not increase the number of employees or airline passengers traveling to/through LAX. A slight increase in taxiing or towing emissions, compared to baseline conditions, would occur due to slightly longer distances between gates and the Project site. Furthermore, according to meteorological data provided by the SCAQMD, the average daily (daytime and nighttime) prevailing winds at LAX are generally directed along a southwest-to-northeast axis. As such, the prevailing winds, relative to the Project site, would generally disperse pollutants over LAX property prior to reaching distant off-site sensitive receptors, or the Pacific Ocean. This dispersion effect would reduce the potential for exposures to TACs at sensitive receptors.

However, the SCAQMD's Tier 2 screening method for assessing potential health risks, which provides conservative results for health risk, was applied to the incremental operational emissions. The Tier 2 method assumes that the wind blows primarily from the emission source to the receptor and considers only the distance between the source and the nearest receptors. The health risk results from the Tier 2 screening analysis for proposed Project increments above the baseline are:

- Cancer risks: 3 per million for residential receptors and 0.6 per million for workers;
- Maximum chronic non-cancer hazard index: 0.03 (respiratory system); and
- Maximum acute hazard index: 0.07 (eye).

Thus, based on the results above, the proposed Project would result in a less than significant impact.

4.1.6.2.4 Odors

According to the SCAQMD *CEQA Air Quality Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed Project does not include any uses identified by the SCAQMD as being associated with odors. As the proposed Project activities would not be a source of odors, potential odor impacts would be less than significant.

4.1.7 Cumulative Impacts

The SCAQMD has provided guidance on an acceptable approach to addressing the cumulative impacts issue for air quality.[62]

> "As Lead Agency, 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 HI significance threshold for TAC emissions. 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."

As shown in Table 4.1-10, construction of the proposed Project would exceed the Project-specific significance threshold for NO_X. As a result, the proposed Project would have a cumulatively considerable contribution for construction emissions and would result in a cumulatively significant construction impact. As shown in Table 4.1-15, operation of the proposed Project would not exceed the Project-specific significance thresholds. Thus, the proposed Project would not have a cumulatively considerable contribution for operational emissions and would result in a cumulatively less than significant operational impact.

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62 Available at: http://www.aqmd.gov/hb/2003/030929a.html. Accessed: March, 2013.

For disclosure purposes, a list of past, present, and probable future LAWA projects that could overlap in time for construction are provided in **Table 4.1-16** along with estimated mass emissions. The projects listed in Table 4.1-16 include other LAWA projects planned on the entire LAX property (3,650 acres) and not just the Project site. Emissions for several of these related LAWA projects were estimated or obtained from publicly available and readily accessible environmental documents. Construction emissions for other projects were estimated based on the ratio of the project costs as compared to other similar type projects at LAX for which detailed construction emissions estimates were available. As shown in Table 4.1-16, the cumulative construction project emissions would exceed the SCAQMD daily thresholds of significance. Calculation details are provided in Appendix B of this EIR. The calculations are considered to be conservative because it assumes overlapping construction emissions from the related LAWA projects listed in Table 4.1-16.

As noted in Section 2.4 of Appendix B.3, cumulative health risks and hazards are expected to be less than significant.

4.1.8 Mitigation Measures

LAWA is committed to mitigating temporary construction-related emissions to the extent practicable and has established some of the most aggressive construction emissions reduction measures in southern California, particularly with regard to requiring construction equipment to be equipped with emissions control devices. The air quality control measures set forth by LAWA for development projects at LAX take into account LAX Master Plan commitments and mitigation measures, Community Benefits Agreement and Stipulated Settlement measures, and measures identified in EIRs for other projects at LAX. In addition, the Los Angeles Green Building Code Tier 1 standards, which are applicable to all projects with a Los Angeles Department of Building and Safety permit-valuation over $200,000, require the proposed Project to implement a number of measures that would reduce criteria pollutant and greenhouse gas emissions. LAWA has not identified any additional feasible mitigation measures that could be adopted at this time. Therefore, no additional Project-specific mitigation measures are recommended in connection with the proposed Project.

4.1.9 Level of Significance After Mitigation

Even with incorporation of feasible construction-related control measures as described above in Section 4.1.5, the maximum peak daily construction-related regional mass emissions resulting from the proposed Project would be significant for NO_X during the initial and middle stages of proposed Project construction, as shown by the emissions inventory. LAWA has not identified any additional feasible mitigation measures that could be adopted at this time to further reduce this impact to below significance.

Dispersion modeling demonstrates that Project construction-related airborne concentrations would remain below the most stringent ambient air quality standards. The HHRA conducted for construction impacts indicates that health risks would be less than the risk thresholds. Operational emissions for all criteria pollutants and precursors are below applicable mass thresholds, resulting in less than significant impacts.

Table 4.1-16

Cumulative Construction Projects Peak Daily Emissions Estimates

	Related LAWA Projects Occurring During Construction[a]	Peak Potentially Overlapping Emissions, (tons/quarter)					
		VOC	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
1	Runway Safety Area Improvements-South Airfield	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]
2	Runway Safety Area Improvements-North Airfield	0.3	1.4	4.9	<1	0.2	0.0
3	LAX Bradley West Project – Remaining Work	1.1	8.1	6.4	<1	2.0	0.7
4	Terminal 3 Connector (Part of Bradley West Project)	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]
5	North Terminals Major Renovation (T-1)	0.1	0.4	--[b]	<1	0.1	0.0
6	South Terminals Major Renovation (T-5 through T-8)	0.3	0.8	0.6	<1	0.1	0.1
7	Midfield Satellite Concourse: Phase 1 - North Concourse Project	1.2	9.0	7.1	<1	2.2	0.7
8	Central Utility Plant Replacement Project – Remaining Work	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]
9	Miscellaneous Projects/Improvements	6.4	32.3	23.9	<1	4.2	1.7
10	LAX Northside Area Development[c]	4.0	5.5	25.3	<1	0.8	0.2
11	LAX Master Plan Alt. D/SPAS Alt. 3[c]	12.2	157.2	61.7	<1	64.5	10.2
12	Metro Crenshaw / LAX Transit Corridor and Station	1.0	8.8	4.9	<1	1.0	0.6
Total from Other Construction Projects, lbs/day		26.7	223.6	134.7	<1	75.0	14.2
Proposed Project Peak Overlapping Daily Emissions, tons/quarter		0.1	1.2	1.8	<1	0.3	0.2
Total Cumulative Construction Project Emissions, tons/quarter		**26.8**	**224.8**	**136.4**	**<1**	**75.3**	**14.4**
SCAQMD Construction Emission Significance Thresholds, converted into tons/quarter[d]		3.42	4.56	25.09	6.84	6.84	2.51
Emissions Exceed SCAQMD Project-Level Threshold?		Yes	Yes	Yes	No	Yes	Yes

Notes:
[a] Project construction is estimated to occur from 2014 to 2018, with the peak Project construction activity occurring in 2014 and 2015.
[b] Project is not anticipated to result in overlapping construction emissions from this related project during the estimated combined peak day.
[c] Improvements contemplated under this Project still require a number of federal and local approvals, including completion of environmental review documents and processes, and are several years away from implementation. For the purposes of this cumulative impacts analysis, conservative assumptions were made relative to construction of such improvements beginning early enough to overlap construction of the proposed Project.
[d] The SCAQMD daily construction emission significance thresholds were converted into tons per quarter by multiplying the daily threshold by 365 days, dividing by 4, and applying the conversion rate of 2,000 pounds per ton.

Sources: CDM Smith (list and characteristics of proposed Project and concurrent projects), September 2013; Crenshaw/LAX Transit Corridor Project FEIR (Metro Crenshaw/LAX Transit Corridor cost), August 2011; www.metro.net/projects/crenshaw_corridor.com (Metro Crenshaw/LAX Transit Corridor schedule), accessed September 2013; Ricondo & Associates, Inc., September 2013.