Section 3.1
Air Quality and Meteorology

SECTION SUMMARY

This section describes existing air quality and meteorology within the Port, potential impacts on air quality and human health associated with construction and operation of the proposed Project and mitigation measures.

Section 3.1, Air Quality and Meteorology, provides the following:

- a description of existing air quality in the Port area;
- a summary of applicable regulations and rules;
- a discussion on the methodology used to determine whether the proposed Project would result in an impact on air quality from air emissions;
- an impact analysis of the proposed Project; and
- a description of mitigation measures proposed to reduce potential impacts, as applicable.

Key Points of Section 3.1:

The proposed Project would serve to comply with the Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) by constructing a new MOTEMS compliant wharf and mooring system for the Shell Marine Oil Terminal at Berths 167-169. Other project elements include piping and related foundation support, topside equipment replacement, and a new 30-year lease.

Construction Impacts

Emissions from proposed Project construction would exceed significance thresholds for NO_x; after mitigation, emissions would remain significant and unavoidable for NO_x. Emissions from the proposed Project's overlapping construction and operations would exceed significance thresholds for NO_X, VOC, and $PM_{2.5}$. Construction of the proposed Project would exceed the federal and state 1-hour NO_2 ambient air concentration thresholds. Concurrent construction and operations of the proposed Project would exceed the federal and state 1-hour NO_2 ambient air concentration thresholds. The proposed Project includes implementation of the measures required in the Port's Sustainable Construction Guidelines (2008), which are required for all LAHD construction projects. The proposed Project also includes the application of mitigation measures (MM) MM AQ-1 through MM AQ-4, summarized below, to reduce construction impacts. The Sustainable Construction Guidelines are included in construction bid specifications. MM AQ-4 is an additional measure which is not part of the guidelines.

MM AQ-1: Fleet Modernization for Harbor Craft Used During Construction

MM AQ-2: Fleet Modernization for On-road Trucks Used During Construction

MM AQ-3: Fleet Modernization for Construction Equipment

MM AQ-4: General Construction Mitigation Measure

After the application of mitigation measures, construction impacts would be reduced; however, emissions from proposed project construction would remain significant and unavoidable for NO_x, and the federal and state 1-hour NO_2 concentrations (during construction, as well as concurrent construction and operation) would remain significant and unavoidable.

Operational Impacts

Operation of the proposed Project would result in significant air quality emissions impacts for NO_x and VOC in 2019 through 2048, but would result in less-than-significant ambient air concentrations. The proposed Project includes application of MM AQ-5 and LM AQ-1, summarized below, to reduce operational impacts. Mitigation measures are described in greater detail in Section 3.1.4.4.

MM AQ-5: Vessel Speed Reduction Program (VSRP)

LAHD's standard lease measure (LM) LM AQ-1 would be included in the tenant lease. In addition, LM AQ-2 would also be included in the tenant lease. Although not quantifiable, these measures would further reduce future air quality emissions and serve to comply with Port air quality planning requirements.

LM AQ-1: Periodic Review of New Technology and Regulations

LM AQ-2: At-Berth Vessel Emissions Capture and Control System Study

After application of MM AQ-5, LM AQ-1, and LM AQ-2, operational emissions would be reduced but would remain significant and unavoidable.

Health Risk Impacts

Project construction and operations would emit toxic air contaminant (TAC) emissions that could affect public health. A health risk assessment (HRA) evaluated four different types of health effects: individual cancer risk, acute noncancer hazard index, chronic noncancer hazard index, and population cancer burden.

Individual cancer risk is the additional chance for a person to contract cancer after long-term exposure (in this case 30 years for a resident and 25 years for a worker) to proposed Project emissions. The maximum incremental CEQA cancer risks associated with construction and operation of the proposed Project would be less than significant.

The acute hazard index is a ratio of the short-term average concentrations of TACs in the air to established reference exposure levels. An acute hazard index below 1.0 indicates that adverse noncancer health effects from short-term exposure (e.g., temporary irritation to the eyes, nose, throats, and lungs) are not expected. Acute hazard index impacts from construction and operation of the proposed Project would be less than significant.

The chronic hazard index is a ratio of long-term average concentrations of TACs in the air to established reference exposure levels. A chronic hazard index below 1.0 indicates that adverse noncancer health effects from long-term exposure (e.g., emphysema) are not expected. Chronic hazard index impacts from construction and operation of the proposed Project would be less than significant.

Population cancer burden is the expected number of additional cancer cases in the exposed population, assuming 70-year lifetime residential exposure. The population cancer burden associated with construction and operation of the proposed Project would be less than significant.

Mitigation of health risk impacts would not be required.

Odor and Air Quality Plan Impacts

Construction and operation of the proposed Project would not create an objectionable odor at the nearest sensitive receptor, and would not conflict with or obstruct implementation of the applicable Air Quality Management Plan (AQMP) or the Clean Air Action Plan (CAAP). Impacts would be less than significant and mitigation would not be required.

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3.1.1 Introduction

Emissions from construction and operation of the proposed Project would affect air quality in the immediate proposed Project area and the surrounding region. This section includes a description of the affected air quality environment, predicted impacts of the proposed Project, and mitigation measures that would reduce significant impacts.

3.1.2 Environmental Setting

The proposed project site is in the Harbor District of the City of Los Angeles, within the South Coast Air Basin (SCAB). The SCAB consists of the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties and all of Orange County. The air basin covers an area of approximately 6,000 square miles and is bounded on the west by the Pacific Ocean; on the north and east by the San Gabriel, San Bernardino, and San Jacinto Mountains; and on the south by the San Diego County line.

3.1.2.1 Regional Climate and Meteorology

The climate of the proposed project region is classified as Mediterranean, characterized by warm, rainless summers and mild, wet winters. The major influence on the regional climate is the Eastern Pacific High (a strong persistent area of high atmospheric pressure over the Pacific Ocean), topography, and the moderating effects of the Pacific Ocean. Seasonal variations in the position and strength of the Eastern Pacific High are a key factor in the weather changes in the area.

The Eastern Pacific High attains its greatest strength and most northerly position during the summer, when it is centered west of northern California. In this location, the Eastern Pacific High effectively shelters Southern California from the effects of polar storm systems. Large-scale atmospheric subsidence associated with the Eastern Pacific High produces an elevated temperature inversion along the West Coast. The base of this subsidence inversion is generally from 1,000 to 2,500 feet (300 to 800 meters) above mean sea level during the summer. Vertical mixing is often limited to the base of the inversion, and air pollutants are trapped in the lower atmosphere. The mountain ranges that surround the Los Angeles Basin constrain the horizontal movement of air and also inhibit the dispersion of air pollutants out of the region. These two factors, combined with the air pollution sources of over 15 million people, are responsible for the high pollutant concentrations that can occur in the SCAB. In addition, the warm temperatures and high solar radiation during the summer months promote the formation of ozone, which has its highest levels during the summer.

The proximity of the Eastern Pacific High and a thermal low pressure system in the desert interior to the east produce a sea breeze regime that prevails within the proposed Project region for most of the year, particularly during the spring and summer months. Sea breezes at the Port typically increase during the morning hours from the southerly direction and reach a peak in the afternoon as they blow from the southwest. These winds generally subside after sundown. During the warmest months of the year, however, sea breezes could persist well into the nighttime hours. Conversely, during the colder months of the year, northerly land breezes increase by sunset and into the evening hours. Sea breezes transport air pollutants away from the coast and towards the interior regions in the afternoon hours for most of the year.

During the fall and winter months, the Eastern Pacific High can combine with high pressure over the continent to produce light winds and extended inversion conditions in the region. These stagnant atmospheric conditions often result in elevated pollutant concentrations in the SCAB. Excessive buildup of high pressure in the Great Basin region can produce a “Santa Ana” condition, characterized by warm, dry, northeast winds in the basin and offshore regions. Santa Ana winds often ventilate the SCAB of air pollutants.

The Palos Verdes Hills have a major influence on wind flow in the Port. For example, during afternoon southwest sea breeze conditions, the Palos Verdes Hills often block this flow and create a zone of lighter winds in the inner harbor area of the Port. During strong sea breezes, this flow can bend around the northern side of the Palos Verdes Hills and end up as a northwest breeze in the inner harbor area. This topographic feature also deflects northeasterly land breezes that flow from the coastal plains to a more northerly direction through the Port.

3.1.2.2 Criteria Pollutants and Air Monitoring

Criteria Pollutants

Air quality at a given location can be characterized by the concentration of various pollutants in the air. Units of concentration are generally expressed as parts per million by volume (ppmv) or micrograms per cubic meter ($\mu g/m^3$) of air. The significance of a pollutant concentration is determined by comparing the concentration to an appropriate national or state ambient air quality standard. These standards represent the allowable atmospheric concentrations at which the public health and welfare are protected. They include a reasonable margin of safety to protect the more sensitive individuals in the population.

Pollutants for which ambient air quality standards have been adopted are known as criteria pollutants. These pollutants can harm human health and the environment, and cause property damage. These pollutants are called "criteria" air pollutants because they are regulated by developing human health-based and/or environmentally based criteria (science-based guidelines) for setting permissible levels. The set of limits based on human health is called the primary standards. Another set of limits intended to prevent environmental and property damage is called the secondary standards. The criteria pollutants of greatest concern in this air quality assessment are ozone, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM_{10} and $PM_{2.5}$). Nitrogen oxides (NO_X) and sulfur oxides (SO_X) refer to generic groups of compounds that include NO_2 and SO_2, respectively, because NO_2 and SO_2 are naturally highly reactive and may change composition when exposed to oxygen, other pollutants, and/or sunlight in the atmosphere. These oxides are produced during combustion.

EPA establishes the National Ambient Air Quality Standards (NAAQS) and defines how to demonstrate whether an area meets the NAAQS. The California Air Resources Board (CARB) establishes the California Ambient Air Quality Standards (CAAQS), which must be equal to or more stringent than the NAAQS when initially adopted. CARB defines how to demonstrate whether an area meets the CAAQS.

As discussed above, one of the main concerns with criteria pollutants is that they contribute directly to regional human health problems. The known adverse effects associated with these criteria pollutants are shown in Table 3.1-1.

Table 3.1-1: Adverse Effects Associated with Criteria Pollutants

Pollutant	Adverse Effects
Ozone (O_3)	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals and (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: (1) Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage
Carbon Monoxide (CO)	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide (NO_2)	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration
Sulfur Dioxide (SO_2)	(a) Broncho-constriction accompanied by symptoms that may include wheezing, shortness of breath, and chest tightness during exercise or physical activity in persons with asthma
Suspended Particulate Matter less than 10 Microns (PM_{10})	(a) Excess deaths from short-term and long-term exposures; (b) Excess seasonal declines in pulmonary function, especially in children; (c) Asthma exacerbation and possibly induction; (d) Adverse birth outcomes including low birth weight; (e) Increased infant mortality; (f) Increased respiratory symptoms in children such as cough and bronchitis; and (g) Increased hospitalization for both cardiovascular and respiratory disease (including asthma) [a]
Suspended Particulate Matter less than 2.5 microns ($PM_{2.5}$)	(a) Excess deaths from short-term and long-term exposures; (b) Excess seasonal declines in pulmonary function, especially in children; (c) Asthma exacerbation and possibly induction; (d) Adverse birth outcomes including low birth weight; (e) Increased infant mortality; (f) Increased respiratory symptoms in children such as cough and bronchitis; and (g) Increased hospitalization for both cardiovascular and respiratory disease (including asthma)[a]
Lead [b]	(a) Increased body burden; (b) Impairment of blood formation and nerve conduction, and neurotoxin.
Sulfates [c]	(a) Decrease in respiratory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardiopulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage

Source: SCAQMD, 2007

Notes:

[a] More detailed discussions on the health effects associated with exposure to suspended particulate matter can be found in the following documents: Office of Environmental Health Hazard Assessment's, Particulate Matter Health Effects and Standard Recommendations (www.oehha.ca.gov/air/toxic_contaminants/PM10notice.html#may), May 9, 2002, and EPA's Air Quality Criteria for Particulate Matter, October 2004 (EPA 2004).

[b] Lead is not a pollutant of concern for the proposed Project. The lead standard was developed to address health impacts primarily associated with lead-acid battery recyclers. The proposed project would not emit appreciable lead emissions.

[c] Sulfates are formed from SO_2 in urban atmospheres. Based on the dispersion modeling results for SO_2 in this document, project-generated concentrations of sulfates are expected to be well below the 24-hour state ambient air quality standard of 25 ug/m3. Therefore, sulfates were not modeled as a criteria pollutant in this document, although they were included as one of the TACs in the health risk assessment.

[d] CAAQS have also been established for hydrogen sulfide, vinyl chloride, and visibility reducing particles. Hydrogen sulfide emissions are typically associated with wastewater treatment. Vinyl chloride emissions are typically associated with polyvinyl chloride plastic and vinyl products manufacturing as well as with landfills, sewage plants, and hazardous waste sites, where microbial breakdown of chlorinated solvents may occur. Visibility reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. SCAQMD has not published an air quality significance threshold for visibility reducing particles, in part because of the complexity and uncertainty in quantifying impacts. Instead, this document quantifies emissions and concentrations of key contributors to visibility reducing particles, namely PM_{10} and $PM_{2.5}$.

Of the criteria pollutants of concern, ozone is unique because it is not directly emitted from proposed project-related sources. Rather, ozone is a secondary pollutant formed from the precursor pollutants volatile organic compounds (VOC) and NO_X. VOC and NO_X react to form ozone in the presence of sunlight through a complex series of photochemical reactions. As a result, unlike inert pollutants, ozone levels usually peak several hours after the precursors are emitted and many miles downwind of the source. Because of the complexity and uncertainty of predicting photochemical pollutant concentrations, ozone impacts are indirectly addressed in this study by comparing proposed Project and alternative-generated emissions of VOC and NO_X to daily emission thresholds set by the South Coast Air Quality Management District (SCAQMD). These emission thresholds are discussed in Section 3.1.4.4.

Generally, concentrations of photochemical pollutants, such as ozone, are highest during the summer months and coincide with the season of maximum solar insolation. Concentrations of inert pollutants, such as CO, tend to be the greatest during the winter months and are a product of light wind conditions and surface-based temperature inversions that are frequent during that time of year and that limit atmospheric dispersion. However, in the case of PM_{10} impacts from fugitive dust sources, maximum concentrations may occur during high wind events or near man-made ground-disturbing activities, such as vehicular activities on roads and earth moving during construction activities.

Because most of the proposed Project-related emission sources would be diesel-powered, diesel particulate matter (DPM) is a key pollutant evaluated in this analysis. DPM is one of the components of ambient PM_{10} and $PM_{2.5}$. DPM is also classified as a TAC by CARB. As a result, DPM is evaluated in this study both as a criteria pollutant (as a component of PM_{10} and $PM_{2.5}$) and as a TAC.

Local Air Monitoring Levels

EPA designates all areas of the United States according to whether they meet the NAAQS. A *nonattainment* designation means that one or more of the six criteria pollutants considered as indicators of air quality exceeds the primary NAAQS in any given area, over a period of time specified by the NAAQS. States with nonattainment areas must prepare a State Implementation Plan (SIP) that demonstrates how those areas will come into attainment. EPA currently designates the SCAB as a nonattainment area for ozone, $PM_{2.5}$ (24-hour standard), $PM_{2.5}$ (annual standard), and lead.[1] The severity of nonattainment has been classified by EPA for several pollutants. EPA classifies the SCAB as extreme nonattainment[2] for the 8-hour ozone, moderate nonattainment for the $PM_{2.5}$ (24-hour standard), and moderate nonattainment for the $PM_{2.5}$ (annual standard) NAAQS. The SCAB is in attainment/maintenance of the NAAQS for CO, SO_2, NO_2, and PM_{10}.

[1] The contributions to the violation of the lead standard are caused by lead-related industrial facilities located within a 15-mile radius in the southern portion of Los Angeles County. The proposed Project is not a source of lead emissions and would not contribute to a violation of the lead standard.

[2] The *extreme* classification for ozone nonattainment means the air quality is worse than areas with a *severe* classification and more time will be needed to bring the area into attainment of the NAAQS.

CARB also designates areas of the state according to whether they meet the CAAQS. A nonattainment designation means that a CAAQS has been exceeded more than once in three years. CARB currently designates the SCAB as a nonattainment area for ozone, PM_{10}, $PM_{2.5}$, and lead. The SCAB is in attainment of the CAAQS for CO, NO_2, SO_2, and sulfates, and is unclassified for hydrogen sulfide and visibility reducing particles (CARB, 2013).

LAHD has been conducting its own air quality monitoring program since February 2005. The main objective of the program is to estimate ambient levels of DPM near the Port. The secondary objective of the program is to estimate ambient particulate matter levels within adjacent communities due to Port emissions. To achieve these objectives, the program measures ambient concentrations of PM_{10}, $PM_{2.5}$, and elemental carbon (which indicates fossil fuel combustion sources) at the following four locations in the Port vicinity (LAHD, 2013):

Wilmington Community Station, at the Saints Peter and Paul School. This station measures aged urban emissions during offshore flows and a combination of marine aerosols (salt spray from the ocean that typically consists of sodium chloride [table salt] and other salts and organic matter), aged urban emissions (man-made and naturally occurring airborne particulates that have been in the atmosphere long enough to have undergone some chemical reaction or accumulation with other airborne compounds or particles), and additional emissions from Port operations during onshore flows. This station also provides information on the relative strengths of these source combinations. In accordance with the *Bay-Wide Sphere of Influence Analysis for Surface Meteorological Stations Near the Ports* (POLA and POLB, 2010), meteorological data from this site was used in this air quality analysis to model human health risks and criteria pollutant impacts associated with the proposed Project.

Coastal Boundary Station, at Berth 47 in the Port Outer Harbor. This station measures aged urban and Port emissions and marine aerosols during onshore flows and aged urban emissions and fresh Port emissions during offshore flows.

Source-Dominated Station, at the Terminal Island Water Reclamation Plant (TIWRP). This site is surrounded by three terminals and has a potential to receive emissions from off-road equipment, on-road trucks, and rail. During onshore flows, this station measures marine aerosols and fresh emissions from several nearby diesel-fired sources (trucks, trains, and ships). During offshore flows, this station measures aged urban emissions and Port emissions.

San Pedro Community Station, along Harbor Boulevard near 3rd Street, adjacent to the San Pedro Waterfront Promenade. This location is near the western edge of Port operational emission sources and adjacent to residential areas in San Pedro. During onshore flows, aged urban emissions, marine aerosols, and fresh Port emissions have the potential to affect this site. During nighttime offshore flows, this site measures aged urban emissions and Port emissions.

LAHD has been collecting PM_{10} data since 2005 at the Wilmington Community station and since 2008 at the Coastal Boundary station, as well as $PM_{2.5}$ and elemental carbon data since 2005 at all four stations. In addition, LAHD is now collecting several gaseous pollutants (ozone, NO_2, SO_2, and CO) data at all four stations. Table 3.1-2 shows the highest pollutant concentrations recorded at the Wilmington Community Station for 2014 through 2016, the most recent complete three-year period of data available.

Table 3.1-2: Maximum Pollutant Concentrations Measured at the Wilmington Community Station

Pollutant	Averaging Period	National Standard	State Standard	Highest Monitored Concentration		
				2014 [a]	2015 [a]	2016 [a]
Ozone (ppm)	1-hour	--	0.09	***0.097***	***0.091***	*0.085*
	8-hour National[b]	0.070	--	0.062	0.066	0.067
	8-hour State	--	0.07	***0.073***	***0.076***	*0.066*
CO (ppm)	1-hour	35	20	3.8	3.9	3.4
	8-hour	9	9	2.5	2.4	2.2
NO_2 (ppm)	1-hour National [c]	0.100	--	0.067	0.068	0.065
	1-hour State	--	0.18	0.085	0.086	0.087
	Annual	0.053	0.030	0.017	0.017	0.015
SO_2 (ppm)	1-hour National[d]	0.075	--	0.016	0.017	0.017
	1-hour State	--	0.25	0.027	0.040	0.038
	24-hour	--	0.04	0.005	0.005	0.004
PM_{10} (µg/m^3)[a]	24-hour	150	50	***51.9***	***56.9***	*48.8*
	Annual	--	20	***25.2***	***24.2***	***23.5***
$PM_{2.5}$ (µg/m^3)	24-hour [e]	35	--	19.5	20.9	17.9
	Annual	12	12	9.4	8.5	7.3

Source:

POLA, 2015; 2016; 2017

Notes:

Exceedances of the standards are shown in ***bold/italic***. All reported values represent the highest recorded concentration during the year unless otherwise noted.

[a] Year 2014 represents the period May 2014-April 2015; year 2015 represents the period May 2015-April 2016, and year 2016 represents the period May 2016-April 2017.

[b] The monitored concentrations reported for the national 8-hour ozone standard represent the 3-year average (including the reported year and the prior 2 years) of the fourth-highest 8-hour concentration each year.

[c] The monitored concentrations reported for the national 1-hour NO_2 standard represent the 3-year average (including the reported year and the prior 2 years) of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations.

[d] The monitored concentrations reported for the national 1-hour SO_2 standard represent the 3-year average (including the reported year and the prior 2 years) of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations.

[e] The monitored concentrations reported for the national 24-hour $PM_{2.5}$ standard represent the 3-year average (including the reported year and the prior 2 years) of the 98th percentile of the annual distribution of daily average concentrations.

Toxic Air Contaminants

The California Office of Environmental Health Hazard Assessment (OEHHA) identifies and studies TAC toxicity. TACs include air pollutants that can produce adverse human health effects, including carcinogenic effects, and non-carcinogenic effects after short-term (acute) or long-term (chronic) exposure. Examples of TAC sources within the SCAB include industrial processes, dry cleaners, gasoline stations, paint and solvent operations, and fossil fuel combustion sources.

SCAQMD determined in the 2015 *Multiple Air Toxics Exposure Study IV* (MATES IV) that about 68 percent of the background airborne carcinogenic risk in the SCAB is due to diesel exhaust. MATES IV reported that carcinogenic risk is particularly high in areas surrounding the Port, near Central Los Angeles, and near major transportation corridors and freeways. However, MATES IV also showed that regional TAC levels have been declining. Between 2005 and 2012, DPM levels in the SCAB dropped by about 70 percent[3], and average carcinogenic risks dropped by 57 percent (LAHD, 2012). Carcinogenic risk near the Ports dropped by an even greater 66 percent over this period (SCAQMD, 2015).

As discussed in Section 3.1.3.5, LAHD, in conjunction with the Port of Long Beach, developed the San Pedro Bay CAAP in 2006 (POLA and POLB, 2006), which set forth strategies to reduce San Pedro Bay port-related emissions and associated health risks. In 2010 and 2017 the ports released CAAP updates to further strengthen the strategies. The 2017 CAAP reported that, since 2005, San Pedro Bay port-related emissions of DPM have dropped 87 percent (POLA and POLB, 2017).

Secondary $PM_{2.5}$ Formation

Within the SCAB, $PM_{2.5}$ particles are both directly emitted into the atmosphere (e.g., primary particles) and formed through atmospheric chemical reactions from precursor gases (e.g., secondary particles). Primary $PM_{2.5}$ includes diesel soot, combustion products, road dust, and other fine particles. Secondary $PM_{2.5}$, which includes products such as sulfates, nitrates, and complex carbon compounds, are formed from reactions with directly emitted NO_X, SO_X, VOCs, and ammonia (SCAQMD, 2006). Project and alternative-generated emissions of NO_X, SO_X, and VOCs would contribute toward secondary $PM_{2.5}$ formation some distance downwind of the emission sources. However, the air quality analysis in this document focuses on the effects of direct $PM_{2.5}$ emissions generated by the proposed Project and alternatives and their ambient impacts. This approach is consistent with the recommendations of the SCAQMD (SCAQMD, 2006).

Ultrafine Particles

Although EPA and the State of California currently monitor and regulate PM_{10} and $PM_{2.5}$, research is being done on ultrafine particles (UFP), particles classified as less than 0.1 micron in diameter. UFPs are usually formed during combustion, independent of fuel type. When diesel fuel is used, UFPs can be formed directly from fuel combustion. With gasoline and natural gas (liquefied or compressed), UFPs are formed mostly from the burning of lubricant oils. UFPs are emitted directly from the tailpipe as solid particles (soot: elemental carbon and metal oxides) and semi-volatile particles (sulfates and hydrocarbons) that coagulate to form particles.

Research regarding UFPs suggests they might be more dangerous to human health than the larger PM_{10} and $PM_{2.5}$ particles (termed *fine particles*) due to size and shape. Because of their smaller size, UFPs are able to travel more deeply into the lung and are deposited

[3]The 70 percent reduction is the average of measurements taken at the 10 monitoring sites used in the MATES studies.

in the deep lung regions (the alveoli) more efficiently than fine particles. UFPs are inert; therefore, normal bodily defense does not recognize the particles. Additionally, UFPs might have the ability to travel across cell layers and enter into the bloodstream and/or into individual cells. With a large surface area-to-volume ratio, other chemicals might attach to the particle and travel into the cell as a kind of "hitchhiker." Recent studies have found that UFPs may also pose a risk to cardiovascular health, particularly in at-risk individuals, and may be a risk-factor for heart arrhythmias (UCLA, 2010).

The University of Southern California, in collaboration with CARB and the California Environmental Protection Agency (CalEPA), released a study in April 2011 investigating UFP concentrations within communities in Los Angeles, including the port area of San Pedro and Long Beach (USC, 2011). The study found that UFP concentrations vary significantly near the ports (a major UFP source), thereby substantiating concerns about the applicability of using centrally located UFP concentrations for estimating population exposure.

Additional UFP research primarily involves roadway exposure. Studies suggest that over 50 percent of an individual's daily exposure is from driving on highways (Fruin et al., 2004). Levels appear to drop off rapidly as one moves away from major roadways (Zhu et al., 2002a and 2002b). Little research has been done directly on ships and off-road vehicles. Work is being done on filter technology, including filters for ships, which appears promising. LAHD began collecting UFP data at its four air quality monitoring stations in late 2007 and early 2008. LAHD actively participates in the CARB testing at the Port and will comply with all future regulations regarding UFPs. Finally, measures included in the CAAP aim to reduce all emissions Port-wide.

At this time, UFP regulatory efforts are not robust. EPA is developing UFP measurement techniques, considering metrics to better integrate emissions and ambient measurements with future exposure and health studies, and considering expansion of existing ambient monitoring networks (EPA, 2015). However, UFP regulations or standards have not yet been developed.

Atmospheric Deposition

The fallout of air pollutants to the surface of the earth is known as *atmospheric deposition*. Atmospheric deposition occurs in both wet and dry forms. Wet deposition occurs in the form of precipitation or cloud water and is associated with the conversion in the atmosphere of directly emitted pollutants into secondary pollutants such as acids. Dry deposition occurs in the form of directly emitted pollutants or the conversion of gaseous pollutants into secondary PM. Atmospheric deposition can produce watershed acidification, aquatic toxic pollutant loading, deforestation, damage to building materials, and respiratory problems.

CARB and the California Water Resources Control Board are in the process of examining the need to regulate atmospheric deposition for the purpose of protecting both fresh and saltwater bodies from pollution. Port emissions deposit into both local waterways and regional land areas. Emission sources from the proposed Project would produce DPM, which contains trace amounts of toxic chemicals. Through the CAAP, LAHD will reduce air pollutants from the Port's future operations, which will work towards the goal of reducing atmospheric deposition for purposes of water quality protection. The CAAP will reduce air pollutants that generate both acidic and toxic compounds, including emissions of NO_X, SO_X, and DPM.

The effects of atmospheric deposition associated with proposed Project emissions are included in the health risk assessment (Impact AQ-6) for those TACs with noninhalation toxicity factors. The health risk assessment assumes deposition of TACs and subsequent human exposure through dermal contact, soil ingestion, and homegrown plant ingestion.

3.1.2.3 Sensitive Receptors

The impact of air emissions on sensitive members of the population is a special concern. Sensitive receptor groups include children, the elderly, and the acutely and chronically ill. The locations of these groups include residences, schools, daycare centers, convalescent homes, and hospitals. The nearest sensitive receptors to the proposed Project site are residences west of Harbor Blvd. in San Pedro, approximately 0.9 mile southwest of the proposed Project site. The nearest schools are the Gang Alternatives Program on Island Avenue in Wilmington, about 1.1 miles north of the proposed Project site, and Harbor Occupational Center on Pacific Avenue in San Pedro, about 1.1 miles west of the proposed Project site. The nearest daycare center is the World Tots LA Daycare Center on 5th Street in San Pedro, about 1.1 miles southwest of the proposed Project site. The nearest convalescent home is Grandma's House on D Street in Wilmington, about 1.2 miles north of the proposed Project site. The nearest hospitals are the San Pedro Peninsula Hospital and Providence Little Company of Mary San Pedro Hospital, both on 7th Street in San Pedro, about 2.4 miles southwest of the proposed Project site. Figure B3-3 in Appendix B3 includes a map of the sensitive receptor locations within two miles of the proposed Project site that were included in the air quality analysis.

3.1.3 Applicable Regulations

The Federal Clean Air Act of 1970 and its subsequent amendments established air quality regulations and the NAAQS, and delegated enforcement of these standards to the states. In California, CARB is responsible for enforcing air pollution regulations. CARB has, in turn, delegated the responsibility of regulating stationary emission sources to the local air agencies. In the SCAB, the local air agency is SCAQMD.

The following is a summary of the key federal, state, and local air quality rules, policies, and agreements that potentially apply to the proposed Project.

3.1.3.1 International Regulations

International Maritime Organization International Convention for the Prevention of Pollution from Ships Annex VI

The International Maritime Organization (IMO) International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI, which came into force in May 2005, set new international NO_X emission limits on marine engines over 130 kilowatts (kW) installed on new vessels retroactive to the year 2000. In October 2008, IMO adopted amendments to international requirements under MARPOL Annex VI, which introduced NO_X emission standards for new engines and more stringent fuel quality requirements (DieselNet, 2013a; IMO, 2008). The Annex VI North American Emission Control Area (ECA) requirements applicable to the vessels that would serve the proposed Project include:

Caps on the sulfur content of fuel as a measure to control SO_X emissions and, indirectly, PM emissions. For ECAs, the sulfur limits are capped at 1.0 percent starting in 2012 and 0.1 percent starting in 2015[4]. The proposed Project and alternatives assume full compliance with MARPOL Annex VI SO_X limits.

NO_X engine emission rate limits for new engines. Tier I and Tier II limits effective 2000 and 2011 are global limits, whereas Tier III limits, effective in 2016, apply only in NO_X ECAs. NO_X emission reductions from these engine limits were conservatively excluded from the analysis because they apply to newly built engines, and the number of newly built Tier III vessels associated with the proposed Project would not be guaranteed (IMO, 2014).

Annex VI also stipulates a mandatory Energy Efficiency Design Index (EEDI) for new ships and a Ship Energy Efficiency Management Plan (SEEMP) for all ships at the 62nd Session of the IMO for the Marine Environmental Protection Committee (MEPC 62) (July 2011). The EEDI promotes the use of more energy efficient (less polluting) equipment and engines for new ships starting in 2013. The SEEMP is an operational measure that establishes a mechanism to improve the energy efficiency of a ship in a cost-effective manner. The SEEMP also provides an approach for shipping companies to manage ship and fleet efficiency performance over time (IMO, 2011).

3.1.3.2 Federal Regulations

State Implementation Plan

In federal nonattainment areas, the Federal Clean Air Act (CAA) requires preparation of a SIP detailing how the state will attain the NAAQS within mandated timeframes. In response to this requirement, SCAQMD, in collaboration with other agencies, such as CARB and Southern California Association of governments (SCAG), periodically prepares an Air Quality Management Plan (AQMP) designed to bring the South Coast Air Basin (SCAB) into attainment with federal requirements and/or to incorporate the latest technical planning information. The AQMP is then incorporated into the SIP, which is submitted by CARB to EPA for approval. SCAQMD prepared AQMPs in 1997, 2003, 2007, and 2012. Each iteration of the AQMP is an update of the previous AQMP.

The focus of the 2007 AQMP was to demonstrate compliance with the NAAQS for $PM_{2.5}$ and 8-hour ozone and other planning requirements, including compliance with the NAAQS for PM_{10} (SCAQMD, 2007). The 2007 AQMP proposed attainment demonstration of the federal $PM_{2.5}$ standards through a focused control of SO_X, directly emitted $PM_{2.5}$, and NO_X, supplemented with VOCs by 2015.

The 2012 AQMP focused on $PM_{2.5}$ control measures designed to attain the federal 24-hour $PM_{2.5}$ standard and contingency measures in case the targeted attainment date is missed (SCAQMD, 2013). The 2012 AQMP also contains proposed actions to reduce ozone.

The most recent 2016 AQMP was adopted and submitted to the EPA in March 2017. The 2016 AQMP focuses on attainment of the ozone and $PM_{2.5}$ NAAQS through the reduction of ozone and $PM_{2.5}$ precursor NOx, as well as through direct control of $PM_{2.5}$.

[4]The sulfur requirements in ECA's are 1.0 percent as of July 2010 and 0.1 percent starting in January 2015. North America's designated as ECA in August 2012, and the sulfur requirements became applicable as of the time of designation.

The 2016 AQMP identifies control measures and strategies to demonstrate the region's attainment of the revoked 1997 8-hour ozone NAAQS (80 ppb) by 2024; the 2008 8-hour ozone standard (75 ppb) by 2032; the 2012 annual $PM_{2.5}$ standard (12 ug/m3) by 2025; the 2006 24-hour $PM_{2.5}$ standard (35 ug/m3) by 2019; and the revoked 1979 1-hour ozone standard (120 ppb) by 2023.

SIP approval lags the development and implementation of AQMPs. EPA often approves portions and disapproves other portions of submitted SIPs. CARB, and in turn SCAQMD, act to correct the deficiencies identified by EPA and resubmit the disapproved SIP portions to EPA for approval. For example, EPA approved California's 1997 SIP in 2011, excepting contingency measures. The contingency measures for the 1997 $PM_{2.5}$ SIP were finally approved by EPA in September 2013.

EPA Non-Road Diesel Fuel Rule

With this rule, EPA set sulfur limitations for non-road diesel fuel, including locomotives and marine vessels (though not for the marine residual fuel used by very large engines on oceangoing vessels).

The California Diesel Fuel Regulation (described below) (CARB, 2005) restricts sulfur content of diesel to 15 ppm for yard locomotives, construction equipment, terminal equipment, and harbor craft.

EPA Emission Standards for Large Marine Diesel Engines—Category 3 Engines

To reduce emissions from large marine diesel engines, EPA established 2003 NO_X emission standards for large Category 3 marine propulsion engines on U.S. flagged ocean-going vessels (40 CFR Part 9 and 94) (68 FR 9745-9789). Category 3 engines have engine displacements per cylinder greater than 30 liters and are typically propulsion engines on oceangoing vessels (OGVs).

The standards went into effect for new engines built in 2004 and later. Tier 1 NOx emission limits were achieved by engine-based controls, without the need for exhaust gas after-treatment.

In December 2009, EPA adopted Tier 2 and Tier 3 emission standards for newly built Category 3 engines installed on U.S. flagged vessels, as well as marine fuel sulfur limits. The Tier 2 and 3 engines standards and fuel limits are equivalent to the amendments to MARPOL Annex VI. Tier 2 NO_X standards for newly built engines apply beginning in 2011 and require the use of engine-based controls, such as engine timing, engine cooling, and advanced electronic controls.

Tier 3 standards apply beginning in 2016 in ECAs and would be met with the use of high efficiency emission control technology, such as selective catalytic reduction. The Tier 2 standards are anticipated to result in a 15 to 25 percent NO_X reduction below the Tier 1 levels; Tier 3 standards are expected to achieve NO_X reductions 80 percent below the Tier 1 levels (DieselNet, 2013). In addition to the Tier 2 and Tier 3 NO_X standards, the final regulation established standards for hydrocarbons (HC) and CO.

EPA Emissions Standards for Marine Diesel Compression Ignition Engines—Category 1 and 2 Engines

Category 1 engines have engine displacements per cylinder of less than 5 liters, whereas Category 2 engines have engine displacements of between 5 and 30 liters. Category 1 and 2 engines are often the auxiliary engines on large OGVs as well as auxiliary and propulsion engines on harbor craft. To reduce emissions from these marine diesel engines, EPA established 1999 emission standards for newly-built engines, referred to as Tier 2 marine engine standards. These standards were based on the land-based standard for non-road engines. The Tier 2 standards were phased in from 2004 to 2007 (year of manufacture), depending on the engine size.

On March 14, 2008, EPA finalized a program to reduce emissions from marine diesel Category 1 and 2 engines (73 FR 88 25098-25352). The regulations introduced Tier 3 and Tier 4 standards, which apply to both new and remanufactured diesel engines. The phase-in of Tier 3 standards began in 2009 for new Category 1 engines and continued through 2014. The phase-in of Tier 3 standards for new Category 2 engines began in 2013 and continued through 2014. Tier 4 standards will be phased in for new Category 1 and 2 engines above 600 kW from 2014 to 2017. For remanufactured engines, standards apply only to commercial marine diesel engines above 600 kW when the engines are remanufactured and as soon as certified systems are available.

For the proposed Project, this rule is assumed to affect harbor craft but not oceangoing vessel auxiliary engines because the latter would likely be manufactured overseas and, therefore, would not be subject to the rule.

EPA Emission Standards for On-Road Trucks

Heavy-duty trucks are subdivided into three categories by the vehicle's gross vehicle weight rating (GVWR): light heavy-duty engines (8,500 to 19,500 pounds), medium heavy-duty engines (19,500 to 33,000 pounds), and heavy heavy-duty engines (greater than 33,000 pounds).

To reduce emissions from on-road, heavy-duty diesel trucks, EPA established a series of increasingly strict emission standards for new truck engines. The 1988 through 2003 emission standards applied to trucks manufactured between 1988 and 2003. In 1997, EPA adopted new emission standards for model year 2004 and later heavy-duty trucks. The goal of the 1997 regulation was to reduce NO_X engine emissions to approximately2.0 g/bhp-hr. In 2000, EPA adopted standards for PM, NO_X and nonmethane hydrocarbon (NMHC) for model year 2007 and later heavy-duty highway engines and a 15 ppm limit on the sulfur content of diesel fuel. The NO_X and NMHC standards were phased in between 2007 and 2010; the PM standard applied to 2008 and newer engines. The 15 ppm sulfur limit was required starting in 2006.

EPA and National Highway Traffic Safety Administration Light-Duty Vehicle GHG Emission Standards and Corporate Average Fuel Economy Standards

In May 2010, EPA, in conjunction with the Department of Transportation's National Highway Traffic Safety Administration (NHTSA), finalized the Light-Duty Vehicle Rule that establishes a national program consisting of greenhouse gas (GHG) emissions standards and Corporate Average Fuel Economy standards for light-duty vehicles (EPA, 2010). Light-Duty Vehicle Rule standards first apply to new cars and trucks starting with model year 2012. Although the rule is primarily designed to address GHG emissions, the fuel economy standards portion of the rule would serve to also reduce criteria pollutant emissions. On August 28, 2012, EPA and NHTSA extended the National Program of harmonized GHG and fuel economy standards to model year 2017 through 2025 passenger vehicles (EPA, 2012). The 2010 and 2012 rules affect passenger vehicles (i.e., terminal workers) and other light-duty vehicles traveling to the terminal.

EPA Emission Standards for Non-Road Diesel Engines

To reduce emissions from non-road diesel equipment, EPA established a series of increasingly strict emission standards for new non-road diesel engines. Tier 1 standards were phased in on newly manufactured equipment from 1996 through 2000 (year of manufacture), depending on the engine horsepower category. Tier 2 standards were phased in on newly manufactured equipment from 2001 through 2006. Tier 3 standards were phased in on newly manufactured equipment from 2006 through 2008. Tier 4 standards, which require advanced emission control technology to attain them, were phased in between 2008 to 2015. These standards apply to construction equipment and cargo handling equipment.

3.1.3.3 State Regulations and Agreements

California Clean Air Act

The California Clean Air Act of 1988, as amended in 1992, outlines a program to attain the CAAQS by the earliest practical date. Because the CAAQS are more stringent than the NAAQS, attainment of the CAAQS requires more emissions reductions than what would be required to show attainment of the NAAQS. Consequently, the main focus of attainment planning in California has shifted from the federal to state requirements. Similar to the federal system, the state requirements and compliance dates are based upon the severity of the ambient air quality standard violation within a region.

CARB California Diesel Fuel Regulation

With this rule, CARB set sulfur limitations for diesel fuel sold in California for use in on-road and off-road motor vehicles (CCR Title 13, Sections 2281–2285; CCR Title 17, Section 93114). The rule limits the content of sulfur fuel to 15 ppm.

CARB On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation—Truck and Bus Regulation

In December 2011, CARB amended the 2008 Statewide Truck and Bus Regulation to modernize in-use heavy-duty vehicles operating throughout the state. Under this regulation, existing heavy-duty trucks are required to be replaced with trucks meeting the latest NO_X and PM Best Available Control Technology (BACT) or retrofitted to meet these levels.

Trucks with GVWR less than 26,000 (most construction trucks) are required to replace engines with 2010 or newer engines, or equivalent, by January 2023. Trucks with GVWR greater than 26,000 (most drayage trucks) must meet PM BACT and upgrade to a 2010 or newer model year emissions equivalent engine pursuant to the compliance schedule set forth by the rule. By January 1, 2023, all model year 2007 class 8 drayage trucks are required to meet NO_X and PM BACT (i.e., EPA 2010 and newer standards) (CARB, 2011b).

CARB Heavy Duty Diesel Vehicle Idling Emission Reduction Regulation

This CARB rule has been in effect for heavy-duty diesel trucks in California since 2008. The rule requires that heavy-duty trucks be equipped with a non-programmable engine shutdown system that shuts down the engine after five minutes or optionally meet a stringent NO_X idling emission standard (CCR Title 13, Section 1956.8 and 2485). This regulation applies to trucks used during construction and operation.

CARB In-Use Off-road Diesel Vehicle Regulation

In 2007, CARB adopted a rule that requires owners of off-road mobile equipment powered by diesel engines 25 hp or larger to meet the fleet average or BACT requirements for NO_X and PM emissions. The rule is structured by fleet size: large, medium, and small fleets. Performance requirements for large fleets must be met annually from 2014 through 2023, for medium fleets from 2017 through 2023, and for small fleets from 2019 through 2028. For the purposes of this analysis, the regulation was applied to construction activities.

CARB Regulations for Fuel Sulfur and Other Operational Requirements for OGVs within California Waters and 24 Nautical Miles of the California Baseline

In July 2008, CARB approved the Regulation for Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels within California Waters and 24 Nautical Miles of the California Baseline (CCR Title 13, Section 2299.2). These regulations have required ship main engines, auxiliary engines, and auxiliary boilers operating in California waters since July 2009 to either use marine diesel oil (MDO) with a maximum sulfur content of 0.5 percent or marine gas oil (MGO) with a maximum sulfur content of 1.5 percent. By August 1, 2012, these source activities were required to meet an MDO limit of 0.5 percent or MGO limit of 1.0 percent. By January 1, 2014, these source activities were required to meet an MDO or MGO sulfur limit of 0.1 percent.

CARB Regulation Related to Ocean Going Ship Onboard Incineration

CARB adopted this regulation in 2005 and amended it in 2006. As of November 2007, the regulation has prohibited all OGVs greater than 300 registered gross tons from conducting on-board incineration within 3nautical miles (nm) of the California coast.

CARB Regulation to Reduce Emissions from Diesel Engines on Commercial Harbor Craft

In November 2007, CARB adopted a regulation to reduce DPM and NO_X emissions from new and in-use commercial harbor craft. Under CARB's definition, commercial harbor craft include tugboats, tow boats, ferries, excursion vessels, work boats, crew boats, and fishing vessels. The regulation implemented stringent emission limits on harbor craft auxiliary and propulsion engines. In 2010, CARB amended the regulation to add specific in-use requirements for barges, dredges, and crew/supply vessels.

The regulation requires that all in-use, newly purchased, or replacement engines meet EPA's most stringent emission standards per a compliance schedule set forth by CARB. For harbor craft with home ports in the SCAQMD jurisdiction, the compliance schedule is accelerated by two years, as compared to statewide requirements.

CARB Statewide Portable Equipment Registration Program

The Portable Equipment Registration Program (PERP) establishes a uniform program to regulate portable engines and portable engine-driven equipment units (CARB, 2011c). Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts. Equipment subject to the PERP must meet weighted fleet average PM emission requirements, per CARB's phased-in compliance schedule, based on engine size. The PERP generally would apply to construction-related dredging and barge equipment.

3.1.3.4 Local Regulations and Agreements

SCAQMD develops Rules and Regulations to regulate sources of air pollution in the SCAB. SCAQMD's regulatory authority applies primarily to stationary sources. The emission sources associated with the proposed Project and alternatives are mobile sources and as such are, for the most part, not subject to the SCAQMD rules that apply to stationary sources, such as Regulation XIII (New Source Review), Rule 1401 (New Source Review of Toxic Air Contaminants), or Rule 431.2 (Sulfur Content of Liquid Fuels). However, several of SCAQMD's prohibition rules do apply to the proposed Project and alternatives as listed below.

SCAQMD Rule 402—Nuisance

This rule prohibits discharge of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or that endanger the comfort, repose, health, or safety of any such persons or the public; or that cause, or have a natural tendency to cause, injury or damage to business or property.

SCAQMD Rule 403—Fugitive Dust

This rule prohibits emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area that remains visible beyond the emission source property line. During proposed construction, best available control measures identified in the rule would be required to minimize fugitive dust emissions from proposed earth-moving and grading activities. These measures would include site watering as necessary to maintain sufficient soil moisture content. Additional requirements apply to construction projects on property with 50 or more acres of disturbed surface area, or for any earth-moving operation with a daily earth-moving or throughput volume of 5,000 cubic yards or more three times during the most recent 365-day period. These requirements include submitting a dust control plan, maintaining dust control records, and designating a SCAQMD-certified dust control supervisor.

SCAQMD Rule 1142– Marine Tank Vessel Operations

This rule applies to filling marine tank vessels (tankers and barges) with an organic liquid and limits emissions to 2 pounds of VOC per 1,000 barrels' liquid loaded. In addition, the equipment associated with loading must be maintained free of liquid or gaseous leaks.

Use of a portable thermal oxidizer system during loading activities will ensure compliance with this requirement. In accordance with this regulation, a vapor recovery unit would be utilized for tank vessel reloading at this facility.

3.1.3.5 LAHD Emission Reduction Programs

LAHD has developed several programs designed to reduce pollution from mobile sources associated with Port operations. Programs pertinent to the proposed Project are listed below.

San Pedro Bay Ports Clean Air Action Plan

The Ports of Los Angeles and Long Beach, with the participation and cooperation of the staff of the EPA, CARB, and SCAQMD, prepared the San Pedro Bay Port Complex CAAP, a planning and policy document that sets goals and implementation strategies to reduce air emissions and health risks associated with Port operations while allowing Port development to continue (POLA and POLB, 2006). In addition, the CAAP sought the reduction of criteria pollutant emissions to the levels that assure Port-related sources decrease their "fair share" of regional emissions to enable the South Coast Air Basin to attain state and federal ambient air quality standards. Each individual CAAP measure is a proposed strategy for achieving these emissions reductions goals. The Ports approved the first CAAP in November 2006. Specific strategies to significantly reduce the health risks posed by air pollution from Port-related sources include:

- aggressive milestones with measurable goals for air quality improvements;
- specific goals set forth as standards for individual source categories to act as a guide for decision-making;
- recommendations to eliminate emissions of ultrafine particulates;
- technology advancement programs to reduce GHGs; and,
- public participation processes with environmental organizations and the business communities.

The CAAP focuses primarily on reducing DPM, along with NO_X and SO_X. Reducing emissions, and therefore health risk, allows for future Port growth while progressively controlling the impacts associated with growth. The CAAP includes emission control measures as proposed strategies that are designed to further these goals. The goals are expressed as Source-Specific Performance Standards that may be implemented through the environmental review process or could be included in new leases or Port-wide tariffs, Memoranda of Understanding (MOU), voluntary action, grants, or incentive programs.

The 2010 CAAP Update, adopted in November 2010, includes updated and new emission control measures as proposed strategies that support the goals expressed as the Source Specific Performance Standards and the Project-Specific Standards. In addition, the 2010 CAAP Update includes the recently developed San Pedro Bay Standards, which establish emission and health risk reduction goals to assist the Ports in their planning for adopting and implementing strategies to significantly reduce the effects of cumulative Port-related operations.

The goals set forth as the San Pedro Bay Standards are the most significant addition to the CAAP and include both a Bay-wide health risk reduction standard and a Bay-wide mass emission reduction standard. Ongoing Port-wide CAAP progress and effectiveness are measured against these Bay-wide Standards, which consist of the following reductions as compared to 2005 emissions levels:

- Health Risk Reduction Standard: 85 percent reduction in DPM by 2020
- Emission Reduction Standards:
  - By 2014, reduce emissions by 72 percent for DPM, 22 percent for NO_X, and 93 percent for SO_X
  - By 2023, reduce emissions by 77 percent for DPM, 59 percent for NO_X, and 92 percent for SO_X.

The Project-Specific Standard remains as adopted in the original CAAP in 2006, that new projects meet the 10 in 1,000,000 excess residential cancer risk threshold, as determined by health risk assessments conducted in accordance with CEQA statutes, regulations, and guidelines, and implemented through required CEQA mitigations and/or lease negotiations. Although each Port has adopted the Project-Specific Standard as a policy, the Board of Harbor Commissioners retain the discretion to consider and approve projects that exceed this threshold if the Board deems it necessary by adoption of a statement of overriding considerations at the time of project approval.

This Draft EIR analysis assumes compliance with the CAAP in its current form, as updated in 2010. Proposed Project specific mitigation measures applied to reduce air emissions and public health impacts are consistent with, and in some cases exceed, the emission-reduction strategies of the 2010 CAAP.

The CAAP 2017 Update aligns with the California Sustainable Freight Action Plan, supports the zero-emissions and freight efficiency targets set by the state and other agencies, and contains a new focus on GHG reductions with a 2050 emission-reduction target. The CAAP 2017 Emission Reduction Targets include:

- Reduce population-weighted residential cancer risk of Port-related DPM emissions by 85 percent by 2020;
- Reduce port-related emissions by 59 percent for NOx, 93 percent for SOx, and 77 percent for DPM by 2023; and
- Reduce GHGs from port-related sources to 80 percent below 1990 levels by 2050.

While the CAAP has been very successful at encouraging substantial emission reductions, further reductions are needed as Port throughput continues to increase in the coming years. Furthermore, important GHG reduction deadlines approaching in the next few years, the LAHD has identified zero emission equipment as a critical element to be integrated into marine related goods movement in the future.

In 2011, the LAHD and the Port of Long Beach released a Zero Emission Technologies Roadmap to establish an initial plan for identifying technologies to pursue demonstrations to advance zero emission technology development. In September 2015 the LAHD released a draft Zero Emission White Paper (White Paper). The White Paper was developed to assist LAHD in moving toward the adoption of zero emission technologies utilized for the purpose of moving cargo on and off marine terminals to a final destination. The White Paper contains information on various types of zero-emission and near-zero-emission technologies, the status of those technologies (as of

September 2015), proposed testing plans for future demonstrations, infrastructure planning, and a business case study. The paper concluded with a series of specific recommendations, which were designed to guide the LAHD in its decisions regarding the advancement of technology in and around the Port towards zero-emission and near-zero-emissions.

The LAHD has provided over $7 million in funding for projects aimed at developing zero emission technology for short-haul drayage trucks and on-terminal yard tractors. Initial zero emission vehicle testing has shown mixed results, but more recent progress has been made that reinforces the LAHD's belief that zero emission container movement technologies show great promise for helping to reduce criteria pollutant and greenhouse gas emissions in the future. The LAHD, working collaboratively with the Port of Long Beach and several stakeholders and partnerships, is committed to expanded development and testing of zero emission technologies, identification of new strategic funding opportunities to support these expanded activities, and new planning for long-term infrastructure development to sustain developed programs, all while ensuring competitiveness among the maritime goods movement businesses.

CAAP Measure—SPBP-OGV1, Vessel Speed Reduction Program

Under this voluntary program, LAHD has requested that ships coming into the Port reduce their speed to 12 knots or less within 20 nm of the Point Fermin Lighthouse. Reduction in speed demands less power from the main engine, which in turn reduces fuel usage and emissions. This reduction of 3 to 10 knots per ship (depending on the ship's cruising speed) can substantially reduce emissions from the main propulsion engines of the ships. The program started in May 2001. The CAAP adopted the VSRP as control measure OGV-1 and expanded the program out to 40 nm from the Point Fermin Lighthouse in 2008.

CAAP Measures—SPBP-OGV3 and 4, OGV Low Sulfur Fuel for Auxiliary Engines, Auxiliary Boilers, and Main Engines

This measure required the use of 0.2 percent or lower sulfur distillate fuels in the auxiliary engines, auxiliary boilers, and main engines of OGVs within 40 nm of Point Fermin and while at berth. For vessel calls that are subject to these measures, due to new lease agreements or renewal, the fuel switch emission benefits initially surpassed the benefits of CARB's regulation. However, in January 2014, CARB's regulation surpassed these CAAP measures by requiring the use of MGO and MDO with a sulfur fuel content of 0.1 percent within 24 nm of the California coastline. The analysis assumes compliance with CARB's regulation.

CAAP Measure—SPBP-OGV5 and 6, Cleaner OGV Engines and OGV Engine Emissions Reduction Technology Improvements and Environmental Ship Index Program

Measure OGV5 seeks to maximize the early introduction and preferential deployment of vessels to the San Pedro Bay Ports with cleaner/newer engines meeting the new IMONO_X standard for ECAs. Measure OGV6 focuses on reducing DPM and NO_X from the legacy fleet through identification and deployment of effective emission reduction technologies.

In order to advance the goals of OGV5 and 6, LAHD approved the voluntary Environmental Ship Index (ESI) Program in May 2012. The ESI Program is an international clean ship indexing program developed through the International Association of Ports and Harbors' World Ports Climate Initiative. Operators registered under this program earn an ESI score for their vessels by using cleaner technology and practices that reduce emissions beyond the regulatory requirements set by IMO. The ESI Program rewards vessel operators for reducing NO_X, SO_X, and GHG emissions in advance of regulatory requirements. The ESI Program also rewards vessel operators for bringing their newest and cleanest vessels to the Port and demonstrating technologies onboard their vessels. This program became effective in July 2012.

CAAP Measure—SPBP-HC1, Performance Standards for Harbor Craft

The measure calls for repowering all harbor craft home-based in the San Pedro Bay to Tier 3 within five years after Tier 3 engines become available. The measure also requires the use of shore power. In addition, LAHD plans to accelerate harbor craft emission reductions through emerging technologies, such as hybrid tugs, more efficient engine configurations, and alternative fuels, through incentives or voluntary measures.

3.1.3.6 LAHD Sustainable Construction Guidelines

In February 2008, the LAHD Board of Harbor Commissioners adopted the Los Angeles Harbor Department Sustainable Construction Guidelines for Reducing Air Emissions (LAHD Construction Guidelines). The LAHD Construction Guidelines reinforce and require sustainability measures during performance of the contracts, balancing the need to protect the environment, be socially responsible, and provide for the economic development of the Port.

The LAHD Construction Guidelines, Specific Environmental Measures, address a variety of emission sources that operate at the Port during construction, such as ships and barges used to deliver construction-related materials, harbor craft, dredging equipment, haul and delivery trucks used during construction, and off-road construction equipment. In addition, the LAHD Construction Guidelines include BMPs, based largely on CARB-verified BACT, designed to reduce air emissions from construction sources.

This Draft EIR analysis assumes that the proposed Project would adopt applicable Specific Environmental Measures of the LAHD Sustainable Construction Guidelines as mitigation measures (MM AQ-1 through MM AQ-3 herein are adopted from the Sustainable Construction Guidelines). MM AQ-4 and LM AQ-1 are additional general measures, which require review of other potentially available technologies.

3.1.4 Impacts and Mitigation Measures

This section presents a discussion of the potential air quality impacts associated with the construction and operation of the proposed Project. Mitigation measures are provided, where feasible, for impacts found to be significant.

3.1.4.1 Methodology

This section summarizes the methodologies used to assess air quality impacts. The following types of impacts were analyzed.

- Air pollutant emissions of CO, VOC, NOX, SOX, PM10, and PM2.5 within the SCAB were estimated for construction and operation of the proposed Project. To determine their significance, the proposed Project emissions minus the appropriate baseline emissions were compared to SCAQMD's significance thresholds for construction and operational activities (significance criterion AQ-1 and AQ-2, respectively).

- Dispersion modeling of CO, NOX, SOX, PM10, and PM2.5 emissions was performed to estimate maximum off-site air pollutant concentrations from emission sources attributed to the proposed Project. The predicted ambient concentrations during the construction period and during Project operation (without a contribution from construction) were compared to Significance Criteria AQ-2 and AQ-4, respectively. A summary of the dispersion modeling methodology is presented in this section, while the complete dispersion modeling report is presented in Appendix B2.
- The potential for proposed Project-generated odors at sensitive receptors in the Project vicinity was assessed qualitatively and compared to Significance Criterion AQ-5.
- An HRA of toxic air contaminant emissions associated with construction and operation of the proposed Project was conducted in accordance with OEHHA's Guidance Manual for Preparation of Health Risk Assessments (OEHHA, 2015). Maximum predicted health risk values in the communities adjacent to the proposed project site were compared to Significance Criterion AQ-6. The HRA includes an evaluation of individual cancer risk, population cancer burden, chronic noncancer hazard index, and acute noncancer hazard index.
- To better apprise the public and decision makers of the proposed Project's environmental impacts under CEQA, the predicted cancer risk for the proposed Project was compared to both a CEQA baseline and a future CEQA baseline. The CEQA baseline cancer risk was evaluated using average 2011 – 2015 activity levels and 2015 emission factors. The future CEQA baseline cancer risk also uses average 2011-2015 activity levels, but the emission factors vary by year throughout the long exposure periods (2015-2044 for residential and 2015-2039 for occupational) to account for the future beneficial effects of existing air quality regulations. The future CEQA baseline cancer risk is typically lower than the CEQA baseline cancer risk, resulting in a higher project increment, because emission factors for port-related equipment generally decline in the future in response to existing air quality regulations and assumptions regarding equipment fleet turnover. The future CEQA baseline was used only for cancer risk because of the decades-long exposure periods that are unique to the cancer risk evaluation. All other emissions, ambient air concentrations, and health risk values modeled in this document are based on durations of a year or less, and therefore are adequately represented by the CEQA baseline. The complete HRA Report is presented in Appendix B3. A description of the CEQA baseline is included in Section 3.1.4.2.
- LAHD has developed a methodology for assessing mortality and morbidity in CEQA documents based on the health effects associated with changes in PM2.5 concentrations. Because mortality and morbidity studies represent major inputs used by CARB and EPA to set CAAQS and NAAQS, project-level mortality and morbidity is presented in LAHD CEQA documents as a further elaboration of local PM2.5impacts, which are already addressed in Impact AQ-4. Per LAHD policy, mortality and morbidity are quantified if dispersion modeling of ambient air quality concentrations during proposed Project operation (Significance

Criterion AQ-4) identify a significant impact for 24-hour PM2.5. If quantified, mortality and morbidity effects would be calculated for the population living inside the 2.5 µg/m3 proposed Project increment isopleth identified during the dispersion modeling.

- Consistency of the proposed Project with the AQMP and CAAP was addressed in accordance with Significance Criterion AQ-7.
- Mitigation measures were applied to proposed project activities that would exceed a significance criterion prior to mitigation, and then evaluated as to their effectiveness in reducing proposed project impacts.

The emission estimates, dispersion modeling, and health risk estimates presented in this document were calculated using the latest available data, assumptions, and emission factors at the time this document was prepared. The numerical results presented in the tables of this report were rounded, often to the nearest whole number, for presentation purposes. As a result, the sum of tabular data in the tables could differ slightly from the reported totals. For example, if emissions from Source A equal 1.2 pounds per day (lbs/day) and emissions from Source B equal 1.4 lbs/day, the total emissions from both sources would be 2.6 lbs/day. However, in a table, the emissions would be rounded to the nearest lbs/day, such that Source A would be reported as 1 lbs/day, Source B would be reported as 1 lbs/day, and the total emissions from both sources would be reported as 3 lbs/day. Although the rounded numbers create an apparent discrepancy in the table, the underlying addition is accurate.

Methodology for Determining Construction Emissions

Proposed Project construction activities would involve the use of off-road land-side construction equipment, in-water equipment such as dredgers and pile drivers, on-road trucks, tugboats, and worker vehicles. Because these sources would primarily use diesel fuel, they would generate emissions of diesel exhaust in the form of CO, VOC, NO_X, SO_X, PM_{10} and $PM_{2.5}$. In addition, off-road construction equipment traveling over unpaved surfaces and performing earthmoving activities, such as site clearing or grading, would generate fugitive dust emissions in the form of PM_{10} and $PM_{2.5}$. Worker commute trips would also generate vehicle exhaust and paved road dust emissions.

The equipment utilization and scheduling data needed to calculate emissions for the proposed construction activities were obtained from the Project applicant and LAHD Engineering staff and are included in Appendix B1.

To estimate peak daily construction emissions for comparison to SCAQMD emission thresholds, emissions were first calculated for the individual construction activities (for example, pile driving or trestle and catwalk construction). Peak daily emissions were then determined by summing emissions from construction activities by phase. SCAQMD's emission thresholds are listed in Section 3.1.4.3.

Table 3.1-3 includes a summary of the regulations and agreements that were assumed as part of the proposed Project in the construction calculations.

The specific approaches to calculating emissions for the various emission sources during construction of the proposed Project are discussed below. Construction emission calculations are presented in Appendix B1.

Table 3.1-3: Regulations and Agreements Assumed in the Unmitigated Construction Emissions

Off-road Construction Equipment	On-Road Trucks	Tugboats/Harbor Craft		Fugitive Dust
EPA Emission Standards for Non-road Diesel Engines: Tier 1, 2, 3, and 4 standards gradually phased in over all years due to normal construction equipment fleet turnover. **CARB In-Use Off-road Diesel Vehicle Regulation:** Off-road mobile equipment powered by diesel engines 25 hp or larger are required to meet the fleet average or BACT requirements for NO_X and PM emissions. **California Diesel Fuel Regulation**: 15-ppm sulfur. **CARB Regulation to Reduce Emissions from Diesel Engines on Commercial Harbor Craft**: Harbor craft are subject to engine replacement/retrofit schedule set forth by CARB. **CARB Portable Diesel-Fueled Engines Air Toxic Control Measure (ATCM)**: Portable engines having a maximum rated horsepower of 50 bhp and greater and fueled with diesel must meet weighted fleet average PM emission standards.	**EPA Emission Standards for On-Road Trucks**: Increasingly stringent engine standards phased in due to truck turnover. **CARB Heavy Duty Diesel Vehicle Idling Emission Reduction**: Diesel trucks are subject to idling limits when not being used to power concrete mixing, water pumps, etc. **CARB Statewide Truck and Bus Regulation**: Trucks less than 26,000 GVWR are required to replace engines with 2010+ engines by January 2023. Trucks with GVWR greater than 26,000 must meet PM BACT and upgrade to a 2010+ model year emissions equivalent engine pursuant to the rule compliance schedule. **California Diesel Fuel Regulation**: 15-ppm sulfur.	**California Diesel Fuel Regulation:** 15-ppm sulfur. **CARB Regulation to Reduce CARB Emissions from Diesel Engines on Commercial Harbor Craft**: Harbor craft are subject to engine replacement/retrofit schedule set forth by CARB.		**SCAQMD Rule 403 Compliance**: Compliance with Rule 403.

Note: This table is not a comprehensive list of all applicable regulations; rather, the table lists key regulations and agreements that substantially affect the emission calculations for the proposed Project. A description of each regulation or agreement is provided in Section 3.1.3.

Off-Road Construction Equipment

Emissions of VOC, NO_X, PM_{10}, and $PM_{2.5}$ from diesel-powered construction equipment were calculated using emission factors derived from the CARB Off-road 2011 Emissions Inventory Database for equipment representative of the SCAB (CARB, 2011). Emission factors were calculated for each type of equipment based on the horsepower rating of the equipment and corresponding equipment activity levels. The CARB database output shows that, on a per-horsepower-hour basis, emission factors will steadily decline in future years as older equipment is replaced with newer, cleaner equipment that meets the already-adopted future state and federal off-road engine emission standards. CO emission factors were derived from CARB's Off-road 2007, based on equipment operating in the SCAB because CARB's Off-road 2011 inventory database does not provide CO estimates. SO_X emission factors were calculated based on 15 ppm sulfur fuel content and on the brake-specific fuel consumption (BSFC) provided by the 2011 Off-road inventory database. Barge-mounted construction equipment engines were assumed to be Tier 3 based on LAHD discussions with equipment operators. This is a conservative assumption as the CARB's Off-road 2011 inventory database projects emissions factors cleaner than Tier 3.

Off-road construction equipment activity and scheduling data needed to calculate emissions were provided by the Project applicant and LAHD Engineering staff and are included in Appendix B1.

On-Road Trucks

Emissions from on-road, heavy-duty diesel trucks during proposed Project and alternatives construction were calculated using emission factors generated by the EMFAC2014 on-road mobile source emission factor model for a truck fleet representative of the SCAB (CARB, 2014). The EMFAC2014 model output shows that, on a per-mile basis, emission factors will steadily decline in future years as older trucks are replaced with newer, cleaner trucks that meet the required state and federal on-road engine emission standards.

On-road construction trucks would include haul trucks, concrete delivery trucks, pile delivery trucks, and support pick-up trucks. On-road construction truck activity and scheduling data needed to calculate emissions were provided by the Project applicant and LAHD Engineering staff and are included in Appendix B1.

Tugboats

Tugboats and workboats would be used during construction to assist dredging barges and scows. Tugboat and workboat main and auxiliary engine sizes and load factors were obtained from the 2016 Port Emissions Inventory (LAHD, 2017). Emission factors were derived based on the EPA standards for marine compression-ignition engines.

Tugboat and workboat activity and scheduling data needed to calculate emissions were provided by the Project applicant and LAHD Engineering staff (LAHD, 2015b) and are included in Appendix B1.

Fugitive Dust

Fugitive dust emissions (PM_{10} and $PM_{2.5}$) from disposal of soils and material loading/handling activities could occur during construction. Large-scale earthmoving and bulldozing activities are not anticipated for proposed Project construction. Emission factors for these fugitive dust sources were derived from EPA's compilation of emission factors, AP-42 Section 11.9 (EPA, 1998) and CalEEMod (CAPCOA, 2017). The activity information necessary to quantify fugitive dust emissions from grading and material loading/handling was provided by LAHD's Engineering Division (LAHD, 2017b).

In addition, fugitive dust in the form of PM_{10} and $PM_{2.5}$ would result from vehicles traveling on paved roads. These emissions were calculated using Section 13.2.1 of EPA's AP-42 (EPA, 2011). Because the existing Project site and surrounding areas are paved, no transit on unpaved roads is anticipated. Uncontrolled fugitive dust emissions were assumed to comply with SCAQMD Rule 403.

Worker Commute Trips

Emissions from worker trips during construction of the proposed Project were calculated using EMFAC2014 emission factors, which are based on SCAQMD default assumptions for vehicle fleet mix and average travel speeds.

Worker activity data needed to calculate worker vehicle emissions was provided by the Project applicant and LAHD Engineering staff and are included in Appendix B1. It was assumed that each worker would travel a distance of 12.7 miles one-way (CAPCOA, 2017).

Methodology for Determining Operational Emissions

Operational emission sources include tanker ships (hereafter referred to as 'tankers' or 'ships'), integrated barges (ITBs or hereafter referred to as 'barges'), fugitive on-site petroleum storage tank emissions and vapor recovery equipment emissions. No trucks, rail or additional employee trips are associated with the proposed Project operation. Information regarding the activity and characteristics of proposed operational emission sources was obtained primarily from LAHD and Shell staff, and assumes two percent annual increase in throughput starting in 2016 relative to the 2011 – 2015 average and a future vessel mix of 50 percent tankers and 50 percent ITBs/barges (LAHD, 2016).

Table 3.1-4 summarizes the regulations assumed in the unmitigated operational emissions calculations. Current in-place regulations are treated as project elements rather than mitigation because they represent enforceable rules with or without Project approval. Only current regulations and agreements were assumed as part of the unmitigated proposed project emissions for the various analysis years. One CAAP measure planned for future implementation at a Project-level was applicable and treated as mitigation.

Table 3.1-4: Regulations and Agreements Assumed in the Unmitigated Operational Emissions

Ships	Tugboats
MARPOL Annex VI: 0.1 percent sulfur limit for fuels, beginning in 2015 (200 nm of CA coast). NO_X engine emission limits for new engines. **EPA Engine Standards for Marine Diesel Engines:** NO_X, HC, and CO engine emission standards for new engines. **CARB Airborne Toxic Control Measure for Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels Within California Waters and 24 Nautical Miles of the California Coast:** Limits sulfur content for marine gas oil or marine diesel oil to 0.1 percent sulfur. **CAAP Vessel Speed Reduction Program:** 95 percent compliance to 20 nm.	**EPA Engine Standards for Marine Diesel Engines:** NO_X, HC, and CO engine emission standards for new engines. **CARB Regulation to Reduce Emissions from Diesel Engines on Commercial Harbor Craft:** Requires that harbor craft engines meet EPA's most stringent emission standards per an accelerated, rule-specified compliance schedule. **California Diesel Fuel Regulation:** 15 ppm sulfur.

The methodology for calculating emissions for emission sources during proposed project operations is discussed below. Because the proposed Project is within the SCAB, the analysis scope is also limited to the SCAB and to the thresholds established by SCAQMD for that jurisdiction. The SCAQMD thresholds are discussed in Section 3.1.4.4. The operational emission calculations are presented in Appendix B1.

Tanker Vessels and Barges

Emissions from tanker vessel and barge main engines, auxiliary engines, and boilers were calculated using emission factors reported in the 2014 Port Emissions Inventory (LAHD, 2015) and activity provided by LAHD. The assumptions below were applied to estimate unmitigated peak day and annual emissions.

Emission Factor Assumptions:

- Emission factors for propulsion engines, auxiliary engines, and auxiliary boilers were obtained from the 2014 Port Emissions Inventory (LAHD, 2015). The 2014 Port Emissions Inventory provided emission factors based on vessel engine sizes and engine tiers for baseline operations (2011-2015).
- Emission factors for propulsion and auxiliary engines are dependent upon engine tier, which in turn is dependent upon engine age. Ships Registry provided the age of vessels that called on the Shell Marine Oil Terminal from 2011 through 2015. (LAHD, 2014b).
- Sulfur fuel content (0.1 percent for ships and 15 ppm for tugboats) and emission factors from the 2014 Port Emissions Inventory (LAHD, 2015) were applied throughout the 2011 – 2015 baseline and future years to conform to IMO and CARB requirements. Emissions from use of higher sulfur content fuel allowed earlier in the baseline period were discounted to the levels required at the end of the baseline period; therefore, the calculated baseline emissions are conservative because they result in a greater Project increment.

Engine and Boiler Load Assumptions:

- Main engine, auxiliary engine, and boiler loads were obtained from the 2014 Port Inventory (LAHD, 2015).
- Ship auxiliary boilers were assumed to operate during maneuvering at engine loads less than or equal to 20 percent (LAHD, 2014), while at anchorage, and while at berth to operate pumps for tanker unloading.
- During transit, main engine load factors were determined using the propeller law, which states that the engine load factor is proportional to the speed of the ship cubed. At low loads, the emission factors for main engines were adjusted higher, on a per kWh basis, using low-load adjustment factors (LAHD, 2014).

VSRP Assumptions:

- Annual VSRP compliance between the precautionary zone and 20 nm from 2011 – 2015 was determined to be 83 percent from LAHD's vessel activity data for the Shell-specific tanker vessel calls.[5] Annual VSRP compliance for all analysis years was assumed to be 95 percent with mitigation, which is the required compliance rate for VSRP recognition by LAHD.
- Annual tanker VSRP compliance between 20 nm and 40 nm from 2011 – 2015 was calculated to be 81 percent from LAHD activity data. Annual tanker VSRP compliance for all analysis years was assumed to be 95 percent with mitigation.

Hoteling Assumptions:

- During hoteling, tankers and barges were assumed to turn off main engines but leave the auxiliary engines and boilers (in the case of tankers) running.
- Hoteling times used in annual calculations during the 2011-2015 baseline years were taken from LAHD activity data if available. Otherwise, default hoteling times provided in the 2014 Port Emissions Inventory (LAHD, 2015) were used.
- The average hoteling time (which was averaged from five years of actual data) was assumed not to change in the future.

Additional Assumptions:

- Ship and barge transit emissions were calculated from berth to the edge of the SCAB over-water boundary (roughly a 50-mile one-way trip).
- SCAQMD Regulations require the use of vapor recovery equipment during the loading of specific petroleum products onto tanker vessels. VOC emissions were calculated using a worst-case emission factor (2 pounds per 1,000 bbls loaded) as provided by SCAQMD (Rule 1142).
- Arriving ships and barges may either proceed directly to the berth, or may wait at a designated anchorage point either inside or outside the breakwater until given clearance to proceed to the berth. Average anchorage times were provided in the 2014 Port Emissions Inventory (LAHD, 2015). Similar to hoteling, the main

[5] The assumption only applies to tankers as barges are in 100 percent compliance.

engine is assumed to be turned off during anchorage, while the auxiliary engines and boilers are assumed to remain running.

- Peak day emissions during the 2011 – 2015 baseline period are based on a tanker arriving to anchorage, a barge arriving to berth, and a tanker departing berth, with all three transits occurring during the same 24 hours. This peak day scenario was determined to be the worst-case event based on a review of actual vessel arrival and departure records over the 2011-2015 baseline period.
- Peak day emissions during future years are based on a tanker departing from berth, a tanker arriving to berth, a panamax tanker departing anchorage, and a barge arriving to anchorage, with all four transits occurring during the same 24 hours. Although it would occur infrequently, this scenario represents a reasonable worst-case combination of events based on the number of available berths and the expected future vessel fleet composition.

Activity Assumptions:

Table 3.1-5 shows the number of annual vessel (tanker and barge) calls for baseline (2011 - 2015 average) and projected for each future analysis year through 2048.

Table 3.1-5: Annual Ship Calls

	CEQA Baseline	Proposed Project Peak Operation during Construction Year	Proposed Project Operation during Future Analysis Years	
	2011-2015 Annual Average	2019	2031	2048
Barges	60	65	59	83
Tankers	25	27	59	83

Note: During the baseline years the majority of ship calls were barges. By 2031, a 50 percent mix of barges and tankers is assumed. This results in barge calls dropping between 2019 to 2031, while tanker calls increase.

Assist Tugboats

During proposed Project operations, tugboats would be used to assist tankers and barges while maneuvering and docking. The assumptions below were applied to estimate peak day and annual unmitigated emissions.

- Two tugboats were assumed for each arrival/departure assist of a vessel.
- Tugboat transit time was assumed to equal the average of vessel transit times in the harbor, multiplied by 1.3 to account for tug movement and assist time. The resulting tugboat transit times are two hours per trip within the harbor and 0.9 hour per trip outside the breakwater. Time at anchorage may add approximately one hour per trip within the harbor and 1.35 hours per trip outside the breakwater.
- Tugboat main and auxiliary engine sizes were obtained from the 2014 Port Emissions Inventory (LAHD, 2015).
- Tugboat main and auxiliary engine load factors were obtained from the 2013 Port Emissions Inventory (LAHD, 2014).

- Tugboat emission factors were derived based on EPA standards for marine compression-ignition engines. The applicable engine tiers were determined based on EPA requirements for new engines, average age and size of tugboats operating in the Port, and CARB harbor craft compliance schedule (CARB, 2010). The unmitigated scenario assumes that harbor tugboats will implement Tier 4 main engines and Tier 3 auxiliary engines by 2023.
- The fuel sulfur content was assumed to be 15 ppm for all analysis years, in accordance with California Diesel Fuel Regulation (CARB, 2005).
- SOX emission factors were determined from the fuel consumption rate and the 15 ppm sulfur content of diesel fuel.

Dispersion Modeling Methodology

The EPA dispersion model AERMOD was used to predict maximum ambient pollutant concentrations at or beyond the Project site boundary. The most current versions of AERMOD were used at the time of the modeling analyses. AERMOD version 16216r (EPA, 2017) was used to model emissions during the construction period. Operational emissions were modeled at an earlier time; hence, AERMOD version 15181 (EPA, 2015b) was used. Some of the operational emissions were subsequently updated, resulting in a re-modeling of the vapor destruction unit (VDU) using version 16216r. The operational emissions from other sources changed only slightly, enabling a simple scaling factor adjustment to the original AERMOD results without the need to re-model.

To test the similarity of AERMOD versions 15181 and 16216r, baseline emissions were modeled with both versions of AERMOD, and the resulting concentrations differed by 0.0 to 0.8 percent depending on the pollutant and averaging time. Therefore, the use of either AERMOD version would produce essentially the same predicted concentrations.

The following presents a brief summary of the dispersion modeling methodology and assumptions; the complete dispersion modeling report is included in Appendix B2.

- The analysis modeled peak 1-hour and annual NOX emissions, peak 1-hour and peak daily SOX emissions, peak 1-hour and peak 8-hour CO emissions, peak daily and annual PM10 emissions, and peak daily PM2.5 emissions.
- Construction emissions were modeled both alone and together with concurrent terminal operational emissions. For NOx, PM10, and PM2.5, the various combinations of overlapping construction activities were modeled individually, and the highest modeled concentration was determined at each modeled receptor. Because prior Port projects have shown that SO2 and CO are unlikely to exceed the significance thresholds, a conservative screening approach was used for SO2 and CO where all AERMOD sources were modeled with their maximum emissions even if they would not occur simultaneously.
- Operational emissions were modeled for the CEQA baseline and, for the proposed Project and Reduced Project Alternative, analysis years 2019, 2031, and 2048. The No Project Alternative was modeled for analysis years 2019 and 2023 (the final year of No Project operation). Operational emission sources included propulsion engine, auxiliary engine, and boiler emissions from tankers; propulsion and auxiliary engine emissions from ITBs/ATBs; propulsion and auxiliary engine emissions from assist tugboats; and VDU combustion emissions from future vessel loading. NOx, PM10, and PM2.5 emissions were modeled for each

analysis year. Because prior Port projects have shown that SO2 and CO are unlikely to exceed the significance thresholds, a conservative screening approach was used for SO2 and CO where all AERMOD sources were modeled with their maximum emissions even if they would occur in different analysis years.

- Valid receptors include locations along and outside the proposed Project footprint boundary on land or within marinas. Locations in the vacant land adjacent to the eastern boundary of the proposed Project footprint were considered valid for project operation but not construction since no public access would be available during construction. Locations over open water were not considered in the determination of maximum concentrations since any human exposure would be brief and transient (SCAQMD, 2008).
- Significance concentration thresholds for PM10 and PM2.5 are incremental thresholds. Therefore, impacts were determined by subtracting baseline modeled concentrations from proposed project modeled concentrations (i.e., proposed Project minus baseline) at each receptor. Significance was determined by comparing the modeled receptors with the greatest increments to the thresholds.
- Significance concentration thresholds for NO2, SO2, and CO are absolute thresholds based on the ambient air quality standards. Therefore, the change in modeled proposed project concentrations relative to existing conditions (i.e., proposed Project minus baseline) was determined at each receptor, and the greatest concentration was added to the ambient background concentration to yield a total concentration. Significance was determined by comparing the total concentrations to the thresholds. This approach was approved by the SCAQMD for San Pedro Bay port projects (SCAQMD, 2012; 2012b).
- Ambient background concentrations were obtained from the Wilmington Community Station at Saints Peter and Paul School, in accordance with the Bay-Wide Sphere of Influence Analysis for Surface Meteorological Stations Near the Ports (POLA and POLB, 2010). The background concentrations are intended to represent the highest ambient pollutant concentrations that would exist in the project vicinity excluding the contribution from the proposed Project.

Health Risk Assessment Methodology

An HRA was conducted in accordance with OEHHA's *Guidance Manual for Preparation of Health Risk Assessments* (OEHHA, 2015) and the SCAQMD's *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act* (SCAQMD, 2015c). The HRA was used to evaluate potential health impacts on the public from TACs generated by construction and operation of the proposed Project. The following presents a brief summary of the HRA methodology and assumptions; the complete HRA report is included in Appendix B3.

- The HRA evaluated four different types of health effects: individual cancer risk, population cancer burden, chronic noncancer hazard index, and acute noncancer hazard index.
- Individual cancer risk is the additional chance for a person to contract cancer after long-term exposure to proposed Project emissions. The HRA assumed exposure durations of 30 years for residential and sensitive receptors; and 25 years for occupational receptors. For all receptor types, the first year of exposure was assumed to be 2019 for the proposed Project and alternatives, and 2015 for the

CEQA baseline. For the proposed Project and Reduced Project Alternative, all of the construction emissions were conservatively assumed to occur within the cancer risk exposure period, even those construction emissions that may begin prior to 2019. For the proposed Project, project alternatives, and future CEQA baseline, yearly emission factors were allowed to change with time in accordance with normal fleet turnover rates and existing regulations and agreements listed in Table 3.1-3 and Table 3.1-4. For the CEQA baseline, emission factors were held constant at their 2015 values for the entire exposure period.

- Population cancer burden is an estimate of the expected number of additional cancer cases in a population exposed to Project-generated TAC emissions. It is calculated by multiplying the individual cancer risk at each modeled census block centroid by the population of the census block, and summing over all census blocks with a cancer risk greater than or equal to one (1) in a million. A 70-year exposure period is assumed for the cancer burden calculation.
- The chronic hazard index is a ratio of the annual average concentrations of TACs in the air to established reference exposure levels (RELs). A chronic hazard index below 1.0 indicates that adverse noncancer health effects from long-term exposure are not expected. Similarly, the acute hazard index is a ratio of the maximum 1-hour average concentrations of TACs in the air to established reference exposure levels. An acute hazard index below 1.0 indicates that adverse noncancer health effects from infrequent short-term exposure are not expected. Because prior Port projects have shown that the chronic and acute hazard indexes are unlikely to exceed the significance thresholds, a conservative screening approach was used where all AERMOD sources were modeled with their maximum construction and operational emissions even if they would not occur simultaneously.
- The OEHHA HRA guidelines also provide a methodology for determining an 8-hour chronic hazard index, which evaluates repeated 8-hour exposures over a significant fraction of a lifetime (OEHHA, 2015). This health value is applicable primarily to off-site workers with work schedules that align with the emitting facility's operational schedule. Because the proposed Project operates continuously, the average 8-hour concentrations to which off-site workers would be exposed would not be substantially different than the annual concentrations used to calculate the chronic hazard index. Moreover, the RELs for the 8-hour chronic hazard index are generally less stringent and apply to fewer TACs than the chronic RELs. As a result, the 8-hour chronic hazard indices associated with the proposed Project (and alternatives as detailed in Chapter 6) would be consistently less than the chronic hazard indices. Therefore, the air quality analysis does not quantify 8-hour chronic hazard indices, and instead uses chronic hazard indices as a conservative health value for off-site workers.
- The HRA included emissions from both construction and operation of the proposed Project. Operational emission sources included propulsion engine, auxiliary engine, and boiler emissions from tankers; propulsion and auxiliary engine emissions from ITBs/ATBs; propulsion and auxiliary engine emissions from assist tugboats; fugitive VOC emissions from the on-site tank farm and associated piping; and fugitive VOC and VDU combustion emissions from future vessel loading.
- For the determination of significance, this HRA evaluated the incremental change in health effects associated with the proposed Project (and alternatives as detailed

Chapter 6) relative to the CEQA baseline health effects. The incremental health effects values (proposed Project minus CEQA baseline) were compared to the significance thresholds for health risk described in Section 3.1.4.3.

- To evaluate population cancer burden and chronic and acute hazard indices, AERMOD version 16216r was used to predict maximum ambient pollutant concentrations outside the Project site. The Hotspots Analysis and Reporting Program (HARP2), version 17320 (CARB, 2017) was then used to perform health risk calculations based on output from the AERMOD dispersion model. Individual cancer risk was evaluated at an earlier time; hence, AERMOD version 15181 and HARP2 version 16088 (CARB, 2016) were used. Some of the construction and operational emissions were subsequently updated, resulting in the application of a conservative scaling factor adjustment to the original cancer risk results without the need to re-model. A review of the version history of HARP2 (CARB, 2017b) indicates that there would be no difference in the calculated risks between the two HARP2 versions as applied to this project.

Analysis of Health Risk Impacts in Comparison to the CEQA Baseline and the Future CEQA Baseline

The State CEQA Guidelines specify that the baseline for environmental analysis is normally "the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published" (*14 Cal. Code Regs. Section 15125: Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013) 57 Cal.4th 439). Therefore, this document evaluates the significance of air quality impacts in comparison with a static CEQA baseline consisting of conditions existing during the 2011-2015 baseline averaging period ("CEQA baseline"), as described below in Section 3.1.4.2.

However, neither CEQA nor the State CEQA Guidelines mandate a uniform rule for determination of the existing conditions baseline. Rather, a lead agency has the discretion to decide how existing physical conditions without a project can most realistically be measured. For instance, environmental conditions can vary from year to year and in some cases it may be necessary to consider conditions over a range of time periods. In *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013) 57 Cal.4th 439, the California Supreme Court held that in addition to analyzing an "existing conditions" baseline, agencies may also analyze a future conditions scenario as a secondary analysis.

Therefore, in addition to comparing the proposed Project cancer risk to the CEQA baseline, where activity levels and emission factors are held constant for the entire exposure period, this Draft EIR includes a secondary analysis for cancer risk that compares the proposed Project to a Future CEQA baseline. The Future CEQA baseline incorporates emission factors that change during the exposure period to reflect the effects of existing air quality rules and regulations. This secondary analysis provides a conservative exposure scenario for the HRA because it results in a lower baseline and higher proposed project increment compared to the CEQA baseline. Therefore, comparisons to both the CEQA baseline and the Future CEQA baseline are intended to better apprise the public and decision makers of the proposed Project's environmental impacts; significance is determined for both analyses.

Finally, the Future CEQA baseline differs from the No Project Alternative in that it does not include a growth factor for existing site activities and it reflects an earlier exposure period (beginning 2015 instead of 2019). Moreover, the Future CEQA baseline assumes emissions would continue for the entire cancer risk exposure periods, whereas the No Project Alternative assumes emissions would cease after 2023.

Particulates: Morbidity and Mortality

Of great concern to public health are particles that are small enough to be inhaled into the deepest parts of the lung. Respirable particles (PM_{10}) can accumulate in the respiratory system and aggravate health problems such as asthma, bronchitis, cardiovascular disease, and other lung diseases. Children, the elderly, exercising adults, and those suffering from asthma are especially vulnerable to adverse health effects of PM_{10} and $PM_{2.5}$.

Epidemiological studies substantiate the correlation between the inhalation of ambient PM and increased mortality and morbidity (CARB, 2010b). Although epidemiologic studies are numerous, few toxicology studies have investigated the responses of human subjects specifically exposed to DPM, and the available epidemiologic studies have not measured the DPM content of the outdoor pollution mix. In 2006, CARB made quantitative estimates of the public health impacts of DPM from ports and goods movement based on the assumption that DPM is as toxic as the general ambient PM mixture (CARB, 2006; 2006b). CARB's study concluded that there are significant uncertainties involved in quantitatively estimating the health effects of exposure to outdoor air pollution. Uncertain elements include emission and population exposure estimates, concentration-response functions, baseline rates of mortality and morbidity that are entered into concentration response functions, and occurrence of additional not-quantified adverse health effects (CARB, 2010).

It should be noted that PM in ambient air is a complex mixture that varies in size and chemical composition, as well as in space and time. Different types of particles may cause different effects with different time courses, and perhaps only in susceptible individuals. The interaction between PM and gaseous co-pollutants adds additional complexity because in ambient air pollution, a number of pollutants tend to co-occur and have strong interrelationships with each other (e.g., PM, SO_2, NO_2, CO, ozone) (CARB, 2006; 2006b).

Quantifying Morbidity and Mortality

LAHD has developed a methodology for assessing morbidity and mortality in CEQA documents, which generally follows the approach used by CARB to estimate statewide health impacts from ports and goods movement in California (CARB, 2006b), incorporating the methodology for mortality published by CARB (CARB, 2010b). In the 2006 analysis, CARB focused on PM and ozone because these are the criteria pollutants for which sufficient evidence of mortality and morbidity effects exists. Modeling changes in ozone concentrations usually requires information on emissions from all sources within a region (for example, the SCAB) and is therefore not considered appropriate for project-level analyses. Therefore, the methodology for project-level studies conducted for Port CEQA documents focuses on the health effects associated with changes in PM concentrations. Focusing on PM is also consistent with CARB studies of mortality and morbidity impacts from California ports (CARB, 2006a; 2006b; 2010b).

The SCAQMD's localized significance threshold for a 24-hour $PM_{2.5}$ concentration is 2.5 $\mu g/m^3$ for operational impacts (SCAQMD, 2015b). This value is only 7 percent of the 24-hour NAAQS and 21 percent of the annual CAAQS (there is no 24-hour CAAQS for $PM_{2.5}$). This value is based on CARB guidance and epidemiological studies showing significant toxicity (resulting in mortality and morbidity) related to exposure to fine particles. Because mortality and morbidity studies represent major inputs used by CARB and EPA to set CAAQS and NAAQS, project-level mortality and morbidity are presented in LAHD CEQA documents as a further elaboration of local PM impacts that are already addressed. Therefore, mortality and morbidity are quantified only if a $PM_{2.5}$ concentration significance finding is identified as part of the air quality impact analysis for project operation. More specifically, mortality and morbidity are quantified if dispersion modeling of ambient air quality concentrations during proposed project or alternatives operation (Impact AQ-4) identifies a significant impact for 24-hour $PM_{2.5}$. The zone of influence is the 2.5 µg/m^3 isopleth identified during the dispersion modeling.

3.1.4.2 CEQA Baseline

Section 15125 of the CEQA Guidelines requires EIRs to include a description of the physical environmental conditions in the vicinity of a project that exist at the time of the Revised NOP. These environmental conditions normally constitute the baseline conditions by which the CEQA lead agency determines if an impact is significant. The Revised NOP for the proposed Project was published in April 2016.

The Shell Marine Oil Terminal has experienced wide fluctuations in throughput during the past several years (due to supply and demand changes for petroleum products and other unforeseen business changes such as refinery restrictions, etc.). For example, the terminal unloaded 10.2 million barrels in 2014 and 20.6 million barrels in 2015. In order to best represent and evaluate "existing" conditions, five years' worth of data was used to develop a baseline that represented average activity.

Using a five-year average (January 2011 through December 2015) as a baseline for the proposed Project consists of an average annual throughput of approximately 13.25 million barrels and 86 annual vessel calls.

Table 3.1-6 summarizes the peak daily operational emissions associated with the CEQA baseline.

Table 3.1-6: Peak Daily Operational Emissions: CEQA Baseline (lbs/day)

Source Category	PM_{10}	$PM_{2.5}$	NO_X	SO_X	CO	VOC
2011 - 2015 Baseline						
Ships-Transit and Anchoring	23.3	21.5	1,980.2	44.6	185	83.4
Ships-Hoteling	31.7	29.4	364.1	121.4	33.4	13.7
Tugboats	4.4	4.1	231.3	0.0	22.4	8.0
Tanks/Fugitives	-	-	-	-	-	15.8
Product Loading	-	-	-	-	-	-
CEQA Baseline Total	**59.5**	**55.0**	**2,575.6**	**166.1**	**240.8**	**121**

Notes:
1. Emissions might not add precisely due to rounding.
2. The emission estimates presented in this table were calculated using the latest available data, assumptions, and emission factors at the time this document was prepared. Future studies might use updated data, assumptions, and emission factors that were not available at the time of this document.
3. Product loading was not included in the baseline.

3.1.4.3 Thresholds of Significance

The following thresholds were used to determine the significance of air quality impacts of the proposed Project. The thresholds are based on the standards established by the City of Los Angeles in the *L.A. CEQA Thresholds Guide* (City of Los Angeles, 2006). The *L.A. CEQA Thresholds Guide* incorporates, by reference, the CEQA Air Quality Handbook and associated significance thresholds developed by the SCAQMD (SCAQMD, 1993; SCAQMD, 2015b).

Construction Thresholds

The *L.A. CEQA Thresholds Guid*e references the SCAQMD *CEQA Air Quality Handbook* (SCAQMD, 1993) and EPA *AP-42* for calculating and determining the significance of construction emissions. The SCAQMD significance thresholds are updated as necessary on the SCAQMD web page to address new regulations and standards (SCAQMD, 2015b).

Each lead city department has the responsibility to determine the appropriate significance thresholds. The LAHD, as lead agency on the EIR, has adopted the following thresholds for this document.

Construction-related air emissions would be considered significant if:

AQ-1: The proposed Project would result in construction-related peak day emissions that exceed any of the SCAQMD thresholds of significance in Table 3.1-7.

For determining significance, these thresholds are compared to the peak day proposed Project construction emissions (because the CEQA baseline construction emissions are zero).

Table 3.1-7: SCAQMD Thresholds for Construction Emissions

Air Pollutant	Emission Threshold(pounds/day)
Volatile organic compounds (VOC)	75
Carbon monoxide (CO)	550
Nitrogen oxides (NO_X)	100
Sulfur oxides (SO_X)	150
Particulates (PM_{10})	150
Particulates ($PM_{2.5}$)	55

Source: SCAQMD, 2015.

AQ-2: The proposed Project construction would result in off-site ambient air pollutant concentrations that exceed the SCAQMD thresholds of significance in Table 3.1-8.[6]

[6]These ambient concentration thresholds target those pollutants the SCAQMD has determined are most likely to cause or contribute to an exceedance of the NAAQS or CAAQS. Although the thresholds represent the levels at which the SCAQMD considers the impacts to be significant, the thresholds are not necessarily the same as the NAAQS or CAAQS.

Table 3.1-8: SCAQMD Thresholds for Ambient Air Quality Concentrations Associated with Project Construction

Air Pollutant[a]	Construction Ambient Concentration Threshold
Nitrogen Dioxide (NO_2)[b]	
1-hour average (federal)[c]	0.100 ppm (188 μg/m^3)
1-hour average (state)	0.18 ppm (339 μg/m^3)
Annual average (federal)	0.0534 ppm (100 μg/m^3)
Annual average (state)	0.030 ppm (57 μg/m^3)
Sulfur Dioxide (SO_2)	
1-hour average (federal)[d]	0.075 ppm (197 μg/m^3)
1-hour average (state)	0.250 ppm (655 μg/m^3)
24-hour average	0.040 ppm (105 μg/m^3)
Carbon Monoxide (CO)	
1-hour average	20 ppm (23,000 μg/m^3)
8-hour average	9.0 ppm (10,000 μg/m^3)
Particulates (PM_{10} or $PM_{2.5}$)[e]	
24-hour average (PM_{10} and $PM_{2.5}$)	10.4 μg/m^3
Annual average (PM_{10} only)	1.0 μg/m^3

Notes:
[a] The SCAQMD has also established concentration thresholds for sulfates and lead, but construction emissions of these pollutants would be negligible; thus, concentration standards would not be exceeded. The NO_2, SO_2, and CO thresholds are absolute thresholds; the maximum predicted impact from proposed Project and alternatives operations is added to the background concentration and compared to the threshold.
[b] To evaluate proposed project impacts on ambient NO_2 levels, the analysis included the use of both the current SCAQMD NO_2 threshold (0.18 ppm) and the newer, more stringent 1-hour federal ambient air quality standard (0.100 ppm).
[c] To attain the federal NO_2 1-hour standard, the three-year average of the 98th percentile of the daily maximum 1-hour averages at a receptor must not exceed 0.100 ppm.
[d] To attain the federal SO_2 1-hour standard, the three-year average of the 99th percentile of the daily maximum 1-hour averages at a receptor must not exceed 0.075 ppm.
[e] The PM_{10} and $PM_{2.5}$ thresholds are incremental thresholds; the maximum predicted impact from construction activities (without adding the background concentration) is compared to these thresholds.
Sources: SCAQMD, 2015b; EPA, 2013.

Operation Thresholds

The *L.A. CEQA Thresholds Guide* provides specific significance thresholds for operational air quality impacts that also are based on SCAQMD standards (City of Los Angeles, 2006). For the purposes of this study, a project would create a significant impact if:

AQ-3: The proposed Project would result in operational emissions that exceed the SCAQMD peak day emission thresholds of significance in Table 3.1-9.

Construction and operational emissions overlap during certain analysis years and the combined emissions are evaluated in this document. For determining significance, these thresholds are compared to the net change in proposed Project or alternative emissions relative to CEQA baseline emissions.

Table 3.1-9: SCAQMD Thresholds for Operational Emissions

Air Pollutant	Peak Day Emission Threshold(pounds/day)
Volatile organic compounds (VOC)	55
Carbon monoxide (CO)	550
Nitrogen oxides (NO_X)	55
Sulfur oxides (SO_X)	150
Particulates (PM_{10})	150
Particulates ($PM_{2.5}$)	55

Source: SCAQMD, 2015b.

AQ-4: Project operations would result in off-site ambient air pollutant concentrations that exceed any of the SCAQMD thresholds of significance in Table 3.1-10.[7]

Table 3.1-10: SCAQMD Thresholds for Ambient Air Quality Concentrations Associated with Project Operation

Air Pollutant[a]	Operation Ambient Concentration Threshold
Nitrogen Dioxide (NO_2)[b]	
1-hour average (federal)[c]	0.100 ppm (188 μg/m^3)
1-hour average (state)	0.18 ppm (339 μg/m^3)
Annual average (federal)	0.0534 ppm (100 μg/m^3)
Annual average (state)	0.030 ppm (57 μg/m^3)
Sulfur Dioxide (SO_2)	
1-hour average (federal)[d]	0.075 ppm (197 μg/m^3)
1-hour average (state)	0.250 ppm (655 μg/m^3)
24-hour average	0.040 ppm (105 μg/m^3)
Carbon Monoxide (CO)	
1-hour average	20 ppm (23,000 μg/m^3)
8-hour average	9.0 ppm (10,000 μg/m^3)
Particulates (PM_{10} or $PM_{2.5}$)[e]	
24-hour average (PM_{10} and $PM_{2.5}$)	2.5 μg/m^3
Annual average (PM_{10} only)	1.0 μg/m^3

Notes:

[7] These ambient concentration thresholds target those pollutants the SCAQMD has determined are most likely to cause or contribute to an exceedance of the NAAQS or CAAQS. Although the thresholds represent the levels at which the SCAQMD considers the impacts to be significant, the thresholds are not necessarily the same as the NAAQS or CAAQS.

Table 3.1-10: SCAQMD Thresholds for Ambient Air Quality Concentrations Associated with Project Operation

Air Pollutant[a]	Operation Ambient Concentration Threshold

[a]The NO_2, SO_2, and CO thresholds are absolute thresholds; the maximum predicted impact from proposed project and alternatives operations is added to the background concentration and compared to the threshold.

[b]To evaluate proposed project impacts to ambient NO_2 levels, the analysis included the use of both the current SCAQMD NO_2 threshold (0.18 ppm) and the newer, more stringent 1-hour federal ambient air quality standard (0.100 ppm).

[c]To attain the federal NO_2 1-hour standard, the three-year average of the 98th percentile of the daily maximum 1-hour averages at a receptor must not exceed 0.100 ppm.

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

[e]The PM_{10} and $PM_{2.5}$ thresholds are incremental thresholds; the maximum predicted impact from operational activities (without adding the background concentration) is compared to these thresholds.

Sources: SCAQMD, 2015b; EPA, 2013.

AQ-5: The proposed Project would create an objectionable odor at the nearest sensitive receptor.

AQ-6: The proposed Project would expose receptors to significant levels of toxic air contaminants. SCAQMD requires that the determination of significance will be made as follows:

- Maximum Incremental Cancer Risk is greater than or equal to 10 in 1 million.
- Cancer Burden is greater than 0.5 excess cancer cases in areas where the incremental cancer risk is greater than 1 in one million.
- Noncancer Hazard Index is greater than or equal to 1.0 (project increment).

AQ-7: The proposed Project would conflict with or obstruct implementation of an applicable air quality plan.

3.1.4.4 Impact Determination

Impact AQ-1: The proposed Project would result in construction-related emissions that exceed an SCAQMD threshold of significance in Table 3.1-7.

Table 3.1-11 presents the peak day criteria pollutant emissions associated with construction of the proposed Project, before mitigation. Maximum emissions for each construction phase were determined by adding the daily emissions from each activity.

The terminal would continue to operate during construction of the proposed Project; construction and operational activities would overlap during this time. SCAQMD has requested that total proposed project emissions be estimated during a peak year when construction and operational activities substantially overlap. Table 3.1-12 presents the overlap of project-related construction and operations during Year 3, the peak year of construction emissions.

Table 3.1-11: Peak Daily Construction Emissions without Mitigation—Proposed Project (lbs/day)

Source Category	PM_{10}	$PM_{2.5}$	NOX	SOX	CO	VOC
Construction Year 1						
Off-road Construction Equipment Exhaust	2.0	2.0	31.8	0.1	36.8	9.1
Marine Source Exhaust	3.0	2.7	59.2	0.0	33.5	3.3
On-road Construction Vehicles	3.8	1.6	38.5	0.1	8.4	1.7
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Construction Year 1	**13.6**	**7.0**	**129.5**	**0.2**	**78.7**	**14.0**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Construction Year 2						
Off-road Construction Equipment Exhaust	2.9	2.9	42.2	0.1	60.9	10.8
Marine Source Exhaust	7.6	6.9	145.4	0.1	89.2	8.8
On-road Construction Vehicles	4.6	1.8	37.0	0.1	11.3	1.9
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Construction Year 2	**19.9**	**12.3**	**224.6**	**0.3**	**161.5**	**21.6**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Construction Year 3						
Off-road Construction Equipment Exhaust	2.9	2.9	42.2	0.1	60.9	10.8
Marine Source Exhaust	7.6	6.9	145.4	0.1	89.2	8.8
On-road Construction Vehicles	4.6	1.8	37.0	0.1	11.3	1.9
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Construction Year 3	**19.9**	**12.3**	**224.6**	**0.3**	**161.5**	**21.6**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Construction Year 4						
Off-road Construction Equipment Exhaust	1.5	1.5	25.3	0.1	37.2	8.3
Marine Source Exhaust	1.5	1.3	29.6	0.0	16.7	1.6
On-road Construction Vehicles	2.6	1.2	26.7	0.1	5.8	1.3
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Construction Year 4	**10.3**	**4.8**	**81.7**	**0.2**	**59.8**	**11.2**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**No**	**No**	**No**	**No**	**No**
Construction Year 5						
Off-road Construction Equipment Exhaust	1.9	1.9	28.1	0.1	12.4	7.4

Table 3.1-11: Peak Daily Construction Emissions without Mitigation—Proposed Project (lbs/day)

Source Category	PM_{10}	$PM_{2.5}$	NOX	SOX	CO	VOC
Marine Source Exhaust	5.4	4.8	106.5	0.1	84.9	8.8
On-road Construction Vehicles	3.9	1.5	30.9	0.1	5.5	1.2
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Construction Year 5	**16.0**	**9.0**	**165.5**	**0.3**	**102.8**	**17.4**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Construction Year 6						
Off-road Construction Equipment Exhaust	1.2	1.2	19.4	0.1	12.4	7.4
Marine Source Exhaust	0.0	0.0	0.0	0.0	0.0	0.0
On-road Construction Vehicles	2.5	1.2	26.2	0.1	5.1	1.2
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Construction Year 6	**8.3**	**3.1**	**45.6**	**0.1**	**17.5**	**8.6**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**No**	**No**	**No**	**No**	**No**

Notes:

- The CEQA impact equals total Project construction emissions minus CEQA baseline construction emissions, which are zero.
- Off-road Construction Equipment Exhaust includes: construction equipment, tank degassing / thermal oxidizer combustion emissions.
- Marine Source Exhaust includes exhaust emissions from tugboat and workboat engines.
- On-road construction vehicle emissions include exhaust, road dust, tire wear, and brake wear emissions. On-road vehicle emissions include emissions from construction vehicles and construction worker vehicles.
- Fugitive emissions include construction dust.
- Emissions might not add precisely due to rounding.
- The emission estimates presented in this table were calculated using the latest available data, assumptions, and emission factors at the time this document was prepared. Future studies might use updated data, assumptions, and emission factors that are not currently available.
- For analysis purposes, Years 1 through 6 represent the anticipated start of construction in 2018 through the anticipated end of construction in 2023.

Table 3.1-12: Peak Daily Combined Construction and Operational Emissions without Mitigation—Proposed Project (lbs/day)

Source Category	PM_{10}	$PM_{2.5}$	NO_X	SO_X	CO	VOC
Maximum Construction Emissions						
Off-road Construction Equipment Exhaust	2.9	2.9	42.2	0.1	60.9	10.8
Marine Source Exhaust	7.6	6.9	145.4	0.1	89.2	8.8
On-road Construction Vehicles	4.6	1.8	37.0	0.1	11.3	1.9
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Max. Construction Emissions	**19.9**	**12.3**	**224.6**	**0.3**	**161.5**	**21.6**
Concurrent Operation						
Ships—Transit and Anchoring	78.4	72.4	4,455.6	129.2	384.3	172.8
Ships—Hoteling	26.8	24.8	1,057.7	71.8	87.0	34.8
Tugboats	5.2	4.8	254.6	0.1	24.7	8.8
Tanks/Fugitives	-	-	-	-	-	15.8
Product Loading	1.0	1.0	45.0	14.6	10.8	47.0
Total Concurrent Operation	**111.4**	**102.9**	**5,812.9**	**215.9**	**506.8**	**279.2**
Total For Combined Construction and Operation	131.3	115.2	6037.5	216.2	668.3	300.8
CEQA Impacts						
CEQA Baseline Emissions	59.5	55.0	2,575.6	166.1	240.8	121.0
Project Minus CEQA Baseline	71.8	60.2	3461.9	50.1	427.5	179.8
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**Yes**	**Yes**	**No**	**No**	**Yes**

Notes:

- Emissions assume the simultaneous occurrence of maximum daily emissions for each source category. Such levels would rarely occur during day-to-day terminal operations.
- Emissions might not precisely add due to rounding.
- The emission estimates presented in this table were calculated using the latest available data, assumptions, and emission factors at the time this document was prepared. Future studies might use updated data, assumptions, and emission factors that are not currently available.

Impact Determination

Table 3.1-11 shows that unmitigated peak daily construction emissions would exceed the SCAQMD daily emission thresholds for NO_X during Years 1, 2, 3 and 5 of construction. Therefore, unmitigated proposed Project construction emissions would be significant for NO_X prior to mitigation. The largest contributors to peak day NOx construction emissions are marine sources (including dredging equipment and tugboats).

Table 3.1-12 shows that overlapping construction and operational emissions during Year 3, the peak year of construction, would exceed the SCAQMD daily emission thresholds for construction for $PM_{2.5}$, NO_X, and VOC. Therefore, impacts would be significant during the peak year of construction and operational overlap.

Mitigation Measures

The following mitigation measures would reduce criteria pollutant emissions associated with proposed Project construction. These mitigation measures are based on, the 2008 LAHD Sustainable Construction Guidelines and would be implemented by the responsible parties identified in Section 3.1.4.6. Although based on the 2008 LAHD Sustainable Construction Guidelines, the mitigation measures go above and beyond regulatory requirements promulgated since adoption of the 2008 LAHD Sustainable Construction Guidelines. Table 3.1-13 presents the peak day criteria pollutant emissions associated with construction of the proposed Project after the application of MM AQ-1 through MM AQ-4. Table 3.1-14 presents the peak day combined construction and operational emissions, during the time of peak construction, after the application of MM AQ-1 through MM AQ-4.

MM AQ-1: Fleet Modernization for Harbor Craft Used During Construction. Harbor craft must use U.S. Environmental Protection Agency (EPA) Tier 3 or cleaner engines.

MM AQ-2: Fleet Modernization for On-road Trucks Used During Construction. Trucks with a Gross Vehicle Weight Rating of 19,500 pounds (lbs) or greater, including import haulers and earth movers, must comply with EPA 2010 on-road emission standards.

MM AQ-3: Fleet Modernization for Construction Equipment. All diesel-fueled construction equipment greater than 50 horsepower (hp) must meet EPA Tier 4 off-road emission standards (excluding vessels, harbor craft, on-road trucks, and dredging equipment).

MM AQ-4: General Construction Mitigation Measure. For MM AQ-1 through MM AQ-3, if a California Air Resources Board (CARB)-certified technology becomes available and is shown to be as good as, or better than, the existing measure in terms of emissions performance, the technology could replace the existing measure pending approval by LAHD. Measures will be set at the time a specific construction contract is advertised for bid**.**

Table 3.1-13: Peak Daily Construction Emissions with Mitigation—Proposed Project (lbs/day)

Source Category	PM_{10}	$PM_{2.5}$	NOX	SOX	CO	VOC
Construction Year 1						
Off-road Construction Equipment Exhaust	2.9	2.0	30.7	0.1	34.4	9.1
Marine Source Exhaust	0.0	1.4	52.6	0.0	33.5	2.9
On-road Construction Vehicles	4.1	0.9	15.6	0.1	5.2	0.6
Fugitive Sources	5.0	0.7	0.0	0.0	0.0	0.0
Total Construction Year 1	**12.0**	**5.0**	**98.9**	**0.2**	**73.1**	**12.5**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**No**	**No**	**No**	**No**	**No**
Construction Year 2						
Off-road Construction Equipment Exhaust	2.9	2.9	41.2	0.1	51.5	10.8
Marine Source Exhaust	4.4	4.0	130.0	0.1	89.2	8.0
On-road Construction Vehicles	3.7	1.0	16.3	0.1	7.6	0.6
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Construction Year 2	**15.7**	**8.6**	**187.4**	**0.3**	**148.3**	**19.4**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Construction Year 3						
Off-road Construction Equipment Exhaust	2.6	2.6	41.2	0.1	51.5	10.8
Marine Source Exhaust	4.7	4.5	130.0	0.1	89.2	8.0
On-road Construction Vehicles	4.3	1.1	16.3	0.1	7.6	0.6
Fugitive Sources	4.7	0.	0.0	0.0	0.0	0.0
Total Construction Year 3	**16.3**	**8.9**	**187.4**	**0.3**	**148.3**	**19.4**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Construction Year 4						
Off-road Construction Equipment Exhaust	1.5	1.5	24.5	0.1	27.8	8.3
Marine Source Exhaust	0.8	0.7	26.3	0.0	16.7	1.5
On-road Construction Vehicles	1.9	0.6	10.7	0.1	3.0	0.3
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Construction Year 4	**8.9**	**3.5**	**61.4**	**0.2**	**47.6**	**10.1**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**No**	**No**	**No**	**No**	**No**
Construction Year 5						
Off-road Construction Equipment Exhaust	1.9	1.2	27.8	0.1	11.9	7.4
Marine Source Exhaust	2.9	4.5	94.6	0.1	84.9	8.4
On-road Construction Vehicles	3.3	0.6	14.5	0.1	2.7	0.3
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Construction Year 5	**12.8**	**6.9**	**136.8**	**0.3**	**99.6**	**16.1**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75

Table 3.1-13: Peak Daily Construction Emissions with Mitigation—Proposed Project (lbs/day)

Source Category	PM_{10}	$PM_{2.5}$	NOX	SOX	CO	VOC
Significant?	**No**	**No**	**Yes**	**No**	**No**	**No**
Construction Year 6						
Off-road Construction Equipment Exhaust	1.2	1.2	19.1	0.1	11.9	7.4
Marine Source Exhaust	0.0	0.0	0.0	0.0	0.0	0.0
On-road Construction Vehicles	1.8	0.6	10.2	0.1	2.4	0.3
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Construction Year 6	**7.7**	**2.4**	**29.3**	**0.1**	**14.3**	**7.7**
CEQA Impacts						
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**No**	**No**	**No**	**No**	**No**

Notes:

- The CEQA impact equals total Project construction emissions minus CEQA baseline construction emissions, which are zero.
- Off-road Construction Equipment Exhaust includes: construction equipment, tank degassing / thermal oxidizer combustion emissions.
- Marine Source Exhaust includes exhaust emissions from tugboat and workboat engines.
- On-road construction vehicle emissions include exhaust, road dust, tire wear, and brake wear emissions. On-road vehicle emissions include emissions from construction vehicles and construction worker vehicles.
- Fugitive emissions include construction dust.
- Emissions might not add precisely due to rounding.
- The emission estimates presented in this table were calculated using the latest available data, assumptions, and emission factors at the time this document was prepared. Future studies might use updated data, assumptions, and emission factors that are not currently available.
- For analysis purposes, Years 1 through 6 represent the anticipated start of construction in 2018 through the anticipated end of construction in 2023.
- In some cases, individual source categories may appear higher in the mitigated scenario than in the unmitigated scenario. The total peak day reflects a true peak day as opposed to a peak day for each source category. Therefore, although the contribution of source categories to the total peak day may change, the total peak day mitigated emissions are lower than the unmitigated scenario.

Table 3.1-14: Peak Daily Combined Construction and Operational Emissions with Mitigation—Proposed Project (lbs/day)

Source Category	PM_{10}	$PM_{2.5}$	NO_X	SO_X	CO	VOC
Maximum Construction Emissions						
Off-road Construction Equipment Exhaust	2.6	2.6	41.2	0.1	51.5	10.8
Marine Source Exhaust	4.7	4.5	130.0	0.1	89.2	8.0
On-road Construction Vehicles	4.3	1.1	16.3	0.1	7.6	0.6
Fugitive Sources	4.7	0.7	0.0	0.0	0.0	0.0
Total Max. Construction Emissions	16.3	8.9	187.5	0.3	148.3	19.4
Concurrent Operation						
Ships: Transit and Anchoring	78.4	72.4	4,455.6	129.2	384.3	172.8
Ships: Hoteling	26.8	24.8	1,057.7	71.8	87.0	34.8
Tugboats	5.2	4.8	254.6	0.1	24.7	8.8
Tanks/Fugitives	-	-	-	-	-	15.8
Product Loading	1.0	1.0	44.0	14.6	10.8	47.0
Total Concurrent Operation	**111.4**	**102.9**	**5,812.9**	**215.9**	**506.8**	**279.2**
Total For Combined Construction and Operation	127.7	111.8	6000.0	216.24	655.05	298.65
CEQA Impacts						
CEQA Baseline Emissions	59.5	55.0	2,575.6	166.1	240.8	121.0
Project Minus CEQA Baseline	**67.7**	**56.7**	**3,424.7**	**50.1**	**414.2**	**177.6**
Significance Threshold	150	55	100	150	550	75
Significant?	**No**	**Yes**	**Yes**	**No**	**No**	**Yes**

Notes:

- Emissions assume the simultaneous occurrence of maximum daily emissions for each source category. Such levels would rarely occur during day-to-day terminal operations.
- Emissions might not precisely add due to rounding.
- The emission estimates presented in this table were calculated using the latest available data, assumptions, and emission factors at the time this document was prepared. Future studies might use updated data, assumptions, and emission factors that are not currently available.

Residual Impacts

Emissions from construction of the proposed Project would be reduced with mitigation but would remain significant and unavoidable for NO_X during Years 2, 3 and 5 of construction. Overlapping construction and operation emissions would remain significant and unavoidable for $PM_{2.5}$, NO_X and VOC during Year 3, the peak construction year.

Impact AQ-2: Proposed Project construction would result in off-site ambient air pollutant concentrations that exceed a SCAQMD threshold of significance in Table 3.1-8.

Dispersion modeling of proposed Project construction emissions was performed to assess the impact of the proposed Project on local ambient air concentrations. A summary of the dispersion modeling results is presented here. The complete dispersion modeling report is included in Appendix B2. Modeled concentrations of SO_2, CO, PM_{10} and $PM_{2.5}$ are all below SCAQMD significance thresholds. The only pollutant above its thresholds is NO_2 (maximum hourly).

Table 3.1-15 presents the maximum off-site total concentrations of NO_2, SO_2, and CO from construction without mitigation. The total concentrations represent the project concentrations plus background concentrations.

Table 3.1-16 presents the maximum off-site CEQA increment concentrations (project minus baseline) of PM_{10} and $PM_{2.5}$ from construction without mitigation. Because the thresholds for PM_{10} and $PM_{2.5}$ are incremental thresholds, background concentrations are not added to the PM_{10} and $PM_{2.5}$ increment concentrations.

Table 3.1-17 presents the maximum off-site total concentrations of NO_2, SO_2, and CO from concurrent construction and terminal operations without mitigation. The concentrations represent the increment concentrations (project construction and operation minus baseline operation) plus background concentrations. Depending on the receptor location, the concentrations from concurrent construction and operation (Table 3.1-17) can sometimes be less than the concentrations from construction alone (Table 3.1-15) because the operational component (project minus baseline) in Table 3.1-17 may be either greater than or less than zero.

Table 3.1-18 presents the maximum off-site CEQA increment concentrations of PM_{10} and $PM_{2.5}$ from concurrent construction and terminal operations without mitigation. The concentrations represent project construction and operation minus baseline operation. Because the thresholds for PM_{10} and $PM_{2.5}$ are incremental thresholds, background concentrations are not added to the increment concentrations. Depending on the receptor location, the concentrations from concurrent construction and operation (Table 3.1-18) can sometimes be less than the concentrations from construction alone (Table 3.1-16) because the operational component (project minus baseline) in Table 3.1-18 may be either greater than or less than zero.

Table 3.1-15: Maximum Off-site NO_2, SO_2, and CO Concentrations—Proposed Project Construction without Mitigation

Pollutant	Averaging Time	Background Concentration (µg/m³)[b]	Maximum Modeled Concentration of Proposed Project (µg/m³)	Total Concentration (µg/m³)[c]	SCAQMD Threshold (µg/m³)	Total Concentration above Threshold?
NO_2	Federal 1-hour[a]	123	198	***321***	188	***Yes***
	State 1-hour	164	346	***510***	339	***Yes***
	Annual	32	5.2	37	57	No
SO_2	Federal 1-hour	45	1.7	47	197	No
	State 1-hour	105	1.7	107	655	No
	24-hour	13	0.1	13	105	No
CO	1-hour	4,477	1,515	5,992	23,000	No
	8-hour	2,870	394	3,264	10,000	No

Notes:

[a] The federal 1-hour NO_2 modeled concentration represents the 98th percentile of the daily maximum 1-hour average concentrations. All other 1-hour, 8-hour, and 24-hour modeled concentrations represent the maximum concentrations.

[b] The background concentrations for NO_2, SO_2, and CO were obtained from the Wilmington Community Monitoring Station (Saints Peter and Paul School).

[c] The *Total Concentration* equals the *Background Concentration* plus the *Maximum Modeled Concentration of Proposed Project*. Exceedances of the thresholds are indicated in ***bold/italic***.

Table 3.1-16: Maximum Off-site PM_{10} and $PM_{2.5}$ Concentrations—Proposed Project Construction without Mitigation

Pollutant	Averaging Time	Maximum Modeled Concentration of Proposed Project (µg/m³)[a]	SCAQMD Threshold (µg/m³)	Concentration above Threshold?
PM_{10}	24-hour	8.4	10.4	No
	Annual	0.3	1.0	No
$PM_{2.5}$	24-hour	5.4	10.4	No

Notes:

[a] Because the thresholds for PM_{10} and $PM_{2.5}$ are incremental thresholds, background concentrations are not added to the *Maximum Modeled Concentration of Proposed Project*.

Table 3.1-17: Maximum Off-site NO_2, SO_2, and CO Concentrations—Proposed Project Combined Construction and Operation without Mitigation

Pollutant	Averaging Time	Background Concentration (µg/m³)[b]	Maximum Modeled Project Concentration Increment (µg/m³)[c]	Total Concentration (µg/m³)[d]	SCAQMD Threshold (µg/m³)	Total Concentration above Threshold?
NO_2	Federal 1-hour[a]	123	158	***281***	188	***Yes***
	State 1-hour	164	306	***470***	339	***Yes***
	Annual	32	4.3	36	57	No
SO_2	Federal 1-hour[b]	45	5.6	51	197	No
	State 1-hour	105	5.6	111	655	No
	24-hour	13	0.1	13	105	No
CO	1-hour	4,477	1,513	5,990	23,000	No
	8-hour	2,870	391	3,261	10,000	No

Notes:

[a] The federal 1-hour NO_2 modeled concentration represents the 98th percentile of the daily maximum 1-hour average concentrations. All other 1-hour, 8-hour, and 24-hour modeled concentrations represent the maximum concentrations.

[b] The background concentrations for NO_2, SO_2, and CO were obtained from the Wilmington Community Monitoring Station (Saints Peter and Paul School).

[c] The *Modeled Project Concentration Increment* represents the modeled concentration of the proposed Project (construction and operation during the construction period) minus the modeled concentration of existing terminal operations (i.e., CEQA baseline operations).

[d] The *Total Concentration* equals the *Background Concentration* plus the *Maximum Modeled Project Concentration Increment*. Exceedances of the thresholds are indicated in ***bold/italic.***

Table 3.1-18: Maximum Off-site PM_{10} and $PM_{2.5}$ Concentrations—Proposed Project Combined Construction and Operation without Mitigation

Pollutant	Averaging Time	Maximum Concentration CEQA Increment ($\mu g/m^3$)[a,b]	SCAQMD Threshold ($\mu g/m^3$)	CEQA Increment above Threshold?
PM_{10}	24-hour	8.0	10.4	No
	Annual	0.3	1.0	No
$PM_{2.5}$	24-hour	5.2	10.4	No

Notes:

[a] The *Concentration CEQA Increment* represents the modeled concentration of the proposed Project (construction and operation during the construction period) minus the modeled concentration of the CEQA baseline (operations only).

[b] Because the thresholds for PM_{10} and $PM_{2.5}$ are incremental thresholds, background concentrations are not added to the *Maximum Concentration CEQA Increment*.

Impact Determination

Table 3.1-15 shows that the maximum off-site federal and state 1-hour NO_2 concentrations from construction activities would exceed SCAQMD thresholds. All other modeled impacts in Table 3.1-15 would be less than significant. Table 3.1-16 shows that the maximum off-site incremental PM_{10} and $PM_{2.5}$ concentrations from construction activities would be less than significant. Therefore, without mitigation, maximum off-site ambient pollutant concentrations associated with construction of the proposed Project would be significant for 1-hour NO_2 (federal and state averages).

Table 3.1-17 shows that the maximum off-site federal and state 1-hour NO_2 concentrations from concurrent construction and operational activities would exceed SCAQMD thresholds. All other modeled impacts in Table 3.1-17 would be less than significant. Table 3.1-18 shows that the maximum off-site incremental PM_{10} and $PM_{2.5}$ concentrations from concurrent construction and operational activities would be less than significant. Therefore, without mitigation, maximum off-site ambient pollutant concentrations associated with concurrent construction and operation of the proposed Project would be significant for 1-hour NO_2 (federal and state averages).

Mitigation Measures

To reduce the level of NO_2 impact during construction, mitigation measures MM AQ-1 through MM AQ-4 would be applied. These mitigation measures would be implemented by the responsible parties identified in Section 3.1.4.6.

Residual Impacts

Table 3.1-19 shows that the maximum off-site federal and state 1-hour NO_2 concentrations from construction activities would be reduced with mitigation but would remain significant. All other modeled pollutant impacts in Table 3.1-19 are less than significant.

Table 3.1-20 shows that the maximum off-site federal and state 1-hour NO_2 concentrations from concurrent construction and operational activities would be reduced with mitigation but would remain significant. All other modeled pollutant impacts in Table 3.1-20 are less than significant.

The maximum 1-hour NO_2 concentrations reported in Tables 3.1-19 and 3.1-20 would occur directly on the northern proposed Project site boundary. They are predicted to occur at sometime within a seven-month period during the construction of Berth 168. The seven-month period was conservatively modeled assuming all construction equipment associated with the worst-case combination of construction activities would operate continuously from 7:00 a.m. to 9:00 p.m. every day for an entire year of meteorological data. The analysis also assumes the NO_2 background concentration would remain at its highest level every hour of the year. This method significantly overstates the number of hours during which the NO_2 concentration thresholds may actually be exceeded.

The predicted concentrations would decrease rapidly as one moves away from the maximum locations. With mitigation, no significant NO_2 concentrations would occur at any residential location during proposed Project construction.

Table 3.1-19: Maximum Off-site NO_2, SO_2, and CO Concentrations—Proposed Project Construction with Mitigation

Pollutant	Averaging Time	Background Concentration (μg/m³)[b]	Maximum Modeled Concentration of Proposed Project (μg/m³)	Total Concentration (μg/m³)[c]	SCAQMD Threshold (μg/m³)	Total Concentration above Threshold?
NO_2	Federal 1-hour[a]	123	187	***310***	188	***Yes***
	State 1-hour	164	320	***484***	339	***Yes***
	Annual	32	4.8	37	57	No
SO_2	Federal 1-hour	45	1.7	47	197	No
	State 1-hour	105	1.7	107	655	No
	24-hour	13	0.1	13	105	No
CO	1-hour	4,477	1,351	5,828	23,000	No
	8-hour	2,870	346	3,216	10,000	No

Notes:

[a] The federal 1-hour NO_2 modeled concentration represents the 98th percentile of the daily maximum 1-hour average concentrations. All other 1-hour, 8-hour, and 24-hour modeled concentrations represent the maximum concentrations.

[b] The background concentrations for NO_2, SO_2, and CO were obtained from the Wilmington Community Monitoring Station (Saints Peter and Paul School).

[c] The *Total Concentration* equals the *Background Concentration* plus the *Maximum Modeled Concentration of Proposed Project*. Exceedances of the thresholds are indicated in ***bold/italic***.

Table 3.1-20: Maximum Off-site NO_2, SO_2, and CO Concentrations—Proposed Project Combined Construction and Operation with Mitigation

Pollutant	Averaging Time	Background Concentration (μg/m³)[b]	Maximum Modeled Project Concentration Increment(μg/m³)[c]	Total Concentration (μg/m³)[d]	SCAQMD Threshold (μg/m³)	Total Concentration above Threshold?
NO_2	Federal 1-hour[a]	123	148	***271***	188	***Yes***
	State 1-hour	164	281	***445***	339	***Yes***
	Annual	32	4.0	36	57	No
SO_2	Federal 1-hour[b]	45	5.6	51	197	No
	State 1-hour	105	5.6	111	655	No
	24-hour	13	0.1	13	105	No
CO	1-hour	4,477	1,349	5,826	23,000	No
	8-hour	2,870	343	3,213	10,000	No

Notes:

[a] The federal 1-hour NO_2 modeled concentration represents the 98th percentile of the daily maximum 1-hour average concentrations. All other 1-hour, 8-hour, and 24-hour modeled concentrations represent the maximum concentrations.

[b] The background concentrations for NO_2, SO_2, and CO were obtained from the Wilmington Community Monitoring Station (Saints Peter and Paul School).

[c] The *Modeled Project Concentration Increment* represents the modeled concentration of the proposed Project (construction and operation during the construction period) minus the modeled concentration of existing terminal operations (i.e., CEQA baseline operations).

[d] The *Total Concentration* equals the *Background Concentration* plus the *Maximum Modeled Project Concentration Increment*. Exceedances of the thresholds are indicated in ***bold/italic.***

Impact AQ-3: The proposed Project would result in operational emissions that exceed an SCAQMD threshold of significance in Table 3.1-9.

Table 3.1-21 presents unmitigated peak daily criteria pollutant emissions associated with operation of the proposed Project. Emissions were estimated for proposed Project study years 2019, 2031, and 2048. Peak daily emissions represent upper-bound estimates of activity levels at the terminal and as such would occur infrequently. Comparisons to the CEQA baseline emissions are presented to determine significance.

Proposed Project source characteristics, activity levels, fuel sulfur content, emission factors, and other parameters assumed in the operational emissions are discussed in detail in Section 3.1.4.1, Methodology.

Table 3.1-21: Peak Daily Operational Emissions without Mitigation—Proposed Project (lbs/day)

Source Category	PM_{10}	$PM_{2.5}$	NO_X	SO_X	CO	VOC
Baseline Year 2011-2015						
Total Year 2011-2015	**59.5**	**55.0**	**2,575.6**	**166.1**	**240.8**	**121.0**
Year 2019						
Ships—Transit and Anchoring	78.4	72.4	4,455.6	129.2	384.3	172.8
Ships—Hoteling	26.8	24.8	1,057.7	71.8	87.0	34.8
Tugboats	5.2	4.8	254.6	0.1	24.7	8.8
Tanks/Fugitives	-	-	-	-	-	15.8
Loading	1.0	1.0	45.0	14.6	10.8	47.0
Total Year 2019	**111.4**	**102.9**	**5,812.9**	**215.9**	**506.8**	**279.2**
CEQA Impacts						
CEQA Baseline Emissions	**59.5**	**55.0**	**2,575.6**	**166.1**	**240.8**	**121.0**
Project Minus CEQA Baseline	51.9	47.9	3,237.3	49.8	266.0	158.2
Significance Threshold	150.0	55.0	55.0	150.0	550.0	55.0
Significant?	**No**	**No**	**Yes**	**No**	**No**	**Yes**
Year 2031						
Ships—Transit and Anchoring	78.4	72.4	3,610.3	129.2	384.3	172.8
Ships—Hoteling	26.8	24.8	680.3	71.8	87.0	34.8
Tugboats	**1.5**	**1.5**	**41.8**	**0.1**	**103.6**	**5.2**
Tanks/Fugitives	**-**	**-**	**-**	**-**	**-**	**15.8**

Table 3.1-21: Peak Daily Operational Emissions without Mitigation—Proposed Project (lbs/day)

Source Category	PM_{10}	$PM_{2.5}$	NO_X	SO_X	CO	VOC
Loading	**1.0**	**1.0**	**45.0**	**14.6**	**10.8**	**47.0**
Total 2031	**107.7**	**99.6**	**4,377.4**	**215.8**	**585.7**	**275.6**
CEQA Impacts						
CEQA Baseline Emissions	**59.5**	**55.0**	**2,575.6**	**166.1**	**240.8**	**121.0**
Project Minus CEQA Baseline	**48.2**	**44.6**	**1,801.8**	**49.7**	**344.9**	**154.6**
Significance Threshold	**150.0**	**55.0**	**55.0**	**150.0**	**550.0**	**55.0**
Significant?	**No**	**No**	**Yes**	**No**	**No**	**Yes**
Year 2048						
Ships—Transit and Anchoring	78.4	72.4	3,601.3	129.2	384.3	172.8
Ships—Hoteling	26.8	24.8	680.3	71.8	87.0	34.8
Tugboats	**1.5**	**1.5**	**41.8**	**0.1**	**103.6**	**5.2**
Tanks/Fugitives	**-**	**-**	**-**	**-**	**-**	**15.9**
Loading	**1.0**	**1.0**	**45.0**	**14.6**	**10.8**	**47.0**
Total 2048	**107.7**	**99.6**	**4,377.4**	**215.8**	**585.7**	**275.6**
CEQA Impacts						
CEQA Baseline Emissions	**59.5**	**55.0**	**2,575.6**	**166.1**	**240.8**	**121.0**
Project Minus CEQA Baseline	**48.2**	**44.6**	**1,801.8**	**49.7**	**344.9**	**154.6**
Significance Threshold	**150.0**	**55.0**	**55.0**	**150.0**	**550.0**	**55.0**
Significant?	**No**	**No**	**Yes**	**No**	**No**	**Yes**

Notes:

- Ships = Tankers and Barges
- Emissions assume the simultaneous occurrence of peak daily equipment activity levels. Such levels would rarely occur during day-to-day terminal operations.
- Emissions might not precisely add due to rounding.
- The emission estimates presented in this table were calculated using the latest available data, assumptions, and emission factors at the time this document was prepared. Future studies might use updated data, assumptions, and emission factors that are not currently available.

Discussion of Project Emissions Trends without Mitigation

Emissions would vary over the life of the proposed Project due to several factors, such as regulatory requirements, activity levels, source (vessel and tugboat,) characteristics, and emission factors. The combination of these factors can result in emissions that do not always decrease or increase consistently over time.

For the proposed Project, terminal activity is assumed to increase by approximately two percent per year over the life of the 30-year lease. Regulatory requirements described in Section 3.1.3 and Table 3.1-4 would serve to decrease emission factors from most proposed Project sources, which is reflected in decreasing peak day emissions over time (see Table 3.1-21).

The main factors influencing the future trends in operational emissions are the following:

- Terminal throughput:

  Terminal throughput in barrels and, hence vessel calls is expected to increase over the next 30 years.

  The annual number of vessel calls would increase from 86 during the baseline period to 166 by year 2048. The peak day vessel activity would remain constant throughout all future analysis years.

- Tugboats:

  Tugboat activity would increase in proportion to the number of vessel calls.

  Tugboat emission factors would decline in compliance with CARB's Regulation to Reduce Emissions from Diesel Engines on Commercial Harbor Craft Operated within California Waters and 24 nm of the California Baseline (CARB, 2010a).

Impact Determination

Table 3.1-21 shows that unmitigated peak daily operational emissions would exceed the SCAQMD daily emission thresholds and would be significant for NO_X and VOCs in all analysis years.

The largest contributor to peak daily operational emissions of NO_x in all analysis years are vessels in transit. The largest contributor to peak daily operational emissions of VOC in all analysis years is from tanker loading.

Mitigation Measures

The following mitigation measure would reduce criteria pollutant emissions associated with proposed project operation. This mitigation measure would be implemented by the responsible parties identified in Section 3.1.4.6. Table 3.1-21 presents the peak daily criteria pollutant emissions associated with operation of the proposed Project, after the application of mitigation measure MM AQ-5.

MM AQ-5: Vessel Speed Reduction Program (VSRP). 95 percent of vessels calling at Shell Marine Oil Terminal will be required to comply with the expanded VSRP at 12 knots between 40 nautical miles (nm) from Point Fermin and the Precautionary Area.

The following lease measures would also potentially reduce future emissions. These measures were not quantified in the analysis because the future technologies that may be implemented through these measures have not yet been identified or proven feasible.

LM AQ-1: Periodic Review of New Technology and Regulations. LAHD will require the tenant to review any LAHD-identified or other new emissions-reduction technology, determine whether the technology is feasible, and report to LAHD. Such technology feasibility reviews will take place at the time of LAHD's consideration of any lease amendment or facility modification for the proposed project site. If the technology is determined by LAHD to be feasible in terms of cost and technical and operational feasibility, the tenant will work with LAHD to implement such technology.

Potential technologies that may further reduce emissions and/or result in cost-savings benefits for the tenant may be identified through future work on the Clean Air Action Plan (CAAP). Over the course of the lease, the tenant and LAHD will work together to identify potential new technology. Such technology will be studied for feasibility, in terms of cost, technical and operational feasibility, and emissions reduction benefits. As partial consideration for the lease amendment, the tenant will implement not less frequently than once every five years following the effective date of the permit, new air quality technological advancements, subject to mutual agreement on operational feasibility and cost sharing, which will not be unreasonably withheld. The effectiveness of this measure depends on the advancement of new technologies and the outcome of commercial availability, future feasibility or pilot studies.

LM AQ-2: At-Berth Vessel Emissions Capture and Control System Study. The Tenant shall evaluate the financial, technical, and operational feasibility of operating barge and land-based vessel emissions capture and control systems and any other systems associated with emission reductions (hereinafter "Control Systems") that are available within three (3) months after the Effective Date. The City of Los Angeles (City) and Tenant will decide which systems should be considered for the reduction of emissions from all vessels calling at the Premises. The evaluation of feasibility shall consider any potential impacts upon navigation, safety, and emission reductions. Cost Effectiveness (as defined below), and any other factors reasonably determined by Tenant to be relevant shall also be considered. For purposes of the feasibility evaluation, "Cost Effectiveness" shall be defined as the annualized cost (in Dollars per year) of the Control Systems ("Annualized Cost") based on an agreed time period (the duration of such period determined with reasonable consideration of the Carl Moyer grant guidelines), divided by the annual net emission reductions (unweighted aggregate of net emissions reduction in tons per year of VOC, NOx, and PM_{10}) over the same time period during use of the Control Systems ("Net Annual Emission Reductions"). Annualized Cost shall include all costs associated with the Control Systems, including without limitation, all capital costs associated with design, permitting and construction of the Control Systems and all costs associated with system evaluation, operations and maintenance. Cost Effectiveness (dollars per ton) may be calculated pursuant to the formulas below.

- Cost Effectiveness ($/ton) = Annualized Cost ($/year) / Net Annual Emission Reductions (tons/year)

- Net Annual Emission Reductions = Annual Vessel Emission Reductions – Annual Emissions Generated by Control System and Associated Equipment Operations

If Cost Effectiveness is greater than Appendix G of the Carl Moyer grant guidelines in effect as of the Effective Date, then implementation of the Control Systems shall not be considered feasible.

Tenant shall provide the Director of Environmental Management Division for the Harbor Department with a written report (the “Report”) documenting the findings and conclusions of the feasibility analysis within one year of the Effective Date. The Report’s feasibility conclusion shall include, but not be limited to, specific findings in the following areas: (1) size constraints; (2) allowance for articulation of the recovery crane/device to service a variety of ship sizes that may reasonably call at the premises during the term of the proposed permit; (3) navigation for terminal operations as well as those of adjacent terminals; (4) compliance with Marine Oil Terminal Engineering and Maintenance Standards; (5) operational safety issues; and (6) compliance with the rules and orders of any applicable regulatory agency. The deadline for Tenant to submit the Report may be extended with the approval of the Board of Harbor Commissioners (Board), provided that such approval shall not be unreasonably withheld. City shall have one year to review and comment on the Report unless the Board reasonably determines that additional time is needed as a result of unanticipated events or any events beyond the reasonable control of the City. The Report and any associated staff comments from the City will be presented by the City to the Board at a public meeting. If the City’s review of the Report is delayed beyond one year, then the City shall present this information to the Board at a public meeting along with a proposed new comment deadline for the City.

If the Board and Tenant agree that implementation of a Control System(s) is/are feasible, then Tenant shall complete a pilot study (“Pilot Study”) within three years of the later of (i) receiving all approvals and permits required by Applicable Laws for such study; (ii) receiving any and all licenses and other intellectual property rights required by Applicable Laws to conduct such study; (iii) commencing with terminal operations upon the completion of all New Improvements and Tenant Constructed Improvements; and (iv) Board providing Tenant with approval to proceed. The deadline for Tenant to complete the Pilot

Study may be extended with approval by the Board, provided that such approval shall not be unreasonably withheld. The Pilot Study shall consist of (i) installation of a test control system (the "Test System") for purposes of testing the performance of a Control System; and (ii) testing of the Test System and the collection of data therefrom. At the conclusion of testing, the Tenant shall submit a report (the "Pilot Study Report") to the Board. The Pilot Study Report shall include the following information: vessels tested, operation and maintenance costs, emission reductions, operational considerations and any other information Tenant reasonably determines to be relevant. The results of the Pilot Study, and any intellectual property rights therein, shall be owned by Tenant. The City and the Board shall use the results and Pilot Study Report only for the evaluation of the Pilot Study. City shall not issue any press releases or make any written public disclosures with respect to the Report or the Pilot Study Report without first providing Tenant with a reasonable opportunity to review such releases or disclosure for accuracy and to ensure that no technical information is disclosed where such public disclosure is not necessary (Tenant understands that nothing herein shall be interpreted to supersede the California Public Records Act and the City's responsibilities thereto).

If, based on the results of the Pilot Study set forth in the Pilot Study Report, the City and Tenant determine that all of the issues relating to feasibility and regulatory requirements of the Control System were adequately addressed, then Tenant shall, as soon as reasonably practicable after such determination, implement the Control System(s) into its operations throughout the remainder of the permit.

Residual Impacts

Emissions from operation of the proposed Project would, with mitigation,[8] remain significant and unavoidable for NO_x and VOC in all analysis years.

Impact AQ-4: Proposed project operations would not result in off-site ambient air pollutant concentrations that exceed a SCAQMD threshold of significance in Table 3.1-10.

As mentioned above, dispersion modeling of proposed Project operational emissions was performed to assess the impact of the proposed Project on local ambient air concentrations in analysis years 2019, 2031, and 2048. A summary of the dispersion modeling results is presented here. The complete dispersion modeling report is included in Appendix B2. None of the regulated pollutants modeled (NO_2, SO_2, CO, PM_{10} or $PM_{2.5}$) would exceed a significance threshold. Please see Tables 3.1-22, 3.1-23, and 3.1-24 below.

[8] VSRP only reduces annual emission; not peak daily emissions. Because of this, Table 3.1-23 also represents peak daily operations with mitigation.

Table 3.1-22: Maximum Off-site NO2 Concentrations—Proposed Project Operation without Mitigation

Pollutant	Averaging Time	Analysis Year	Background Concentration (ug/m3)[b]	Maximum Modeled Project Concentration Increment (ug/m3)[c]	Total Concentration (ug/m3)[d]	SCAQMD Threshold (ug/m3)	Total Concentration Above Threshold?
NO_2	Federal 1-hour[a]	2019	123	23.5	147	188	No
		2031	123	9.8	133	188	No
		2048	123	<0	123	188	No
	State 1-hour[a]	2019	164	25.4	189	339	No
		2031	164	14.5	178	339	No
		2048	164	<0	164	339	No
	Annual	2019	32	1.7	34	57	No
		2031	32	0.9	33	57	No
		2048	32	2.2	34	57	No

Notes:

[a] The federal 1-hour NO_2 modeled concentration represents the 98th percentile of the daily maximum 1-hour average concentrations. The state 1-hour NO_2 modeled concentration represents the maximum concentration.

[b] The background concentrations were obtained from the Wilmington Community Monitoring Station (Saints Peter and Paul School).

[c] The *Modeled Project Concentration Increment* represents the modeled concentration of proposed Project operations minus the modeled concentration of existing terminal operations (i.e., CEQA baseline operations).

[d]The *Total Concentration* equals the *Background Concentration* plus the *Maximum Modeled Project Concentration Increment*.

Table 3.1-23: Maximum Off-site SO2 and CO Concentrations—Proposed Project Operation without Mitigation

Pollutant	Averaging Time	Background Concentration (ug/m^3)[b]	Maximum Modeled Project Concentration Increment (ug/m^3)[a,c]	Total Concentration (ug/m^3)[d]	SCAQMD Threshold (ug/m^3)	Total Concentration Above Threshold?
SO_2	Federal 1-hour	45	6.7	52	197	No
	State 1-hour	105	6.7	112	655	No
	24-hour	13	0.8	14	105	No
CO	1-hour	4,477	16.3	4,493	23,000	No
	8-hour	2,870	2.4	2,872	10,000	No

Notes:

[a]As a conservative screening approach, SO_2 and CO concentrations were modeled using a blend of worst case emissions. Maximum emissions by source were modeled together regardless of the analysis year they represent. For example, one source may have been modeled with 2019 emissions, another may have been the modeled 2031 emissions, etc. This approach yields a conservative total maximum concentration.

[b]The background concentrations were obtained from the Wilmington Community Monitoring Station (Saints Peter and Paul School).

[c] The *Modeled Project Concentration Increment* represents the modeled concentration of proposed Project operations minus the modeled concentration of existing terminal operations (i.e., CEQA baseline operations).

[d] The *Total Concentration* equals the *Background Concentration* plus the *Maximum Modeled Project Concentration Increment*.

Table 3.1-24: Maximum Off-site PM10 and PM2.5 Concentrations—Proposed Project Operation without Mitigation

Pollutant	Averaging Time	Analysis Year	Maximum Concentration CEQA Increment (ug/m3)[a,b]	SCAQMD Threshold (ug/m3)	CEQA Increment Above Threshold?
PM_{10}	24-hour	2019	0.06	2.5	No
		2031	0.2	2.5	No
		2048	0.2	2.5	No
	Annual	2019	0.05	1.0	No
		2031	0.03	1.0	No
		2048	0.09	1.0	No
$PM_{2.5}$	24-hour	2019	0.05	2.5	No
		2031	0.2	2.5	No
		2048	0.2	2.5	No

Notes:

[a] The *Concentration CEQA Increment* represents the modeled concentration of proposed Project operations minus the modeled concentration of CEQA baseline operations.

[b] Because the thresholds for PM_{10} and $PM_{2.5}$ are incremental thresholds, background concentrations are not added to the *Maximum Concentration CEQA Increment*.

Impact Determination

Table 3.1-22 shows that the maximum off-site NO_2 concentrations from operational activities would be less than the SCAQMD thresholds for all averaging times and analysis years. Moreover, the expected penetration of Tier 3 vessels into the tanker fleet would result in less-than-zero federal and state 1-hour NO_2 concentration increments by 2048, indicating that the 2048 Project concentrations would be less than the baseline concentrations. Table 3.1-23 shows that the maximum off-site SO_2 and CO concentrations from operational activities would be less than the SCAQMD thresholds for all averaging times and analysis years (since a screening approach was used whereby maximum emissions were modeled for all emission sources even if they would occur in different analysis years). Table 3.1-24 shows that the maximum off-site incremental PM_{10} and $PM_{2.5}$ concentrations from operational activities would be less than the SCAQMD thresholds for all averaging times and analysis years. Therefore, without mitigation, maximum off-site ambient pollutant concentrations associated with operation of the proposed Project would be less than significant.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

Impact AQ-5: The proposed Project would not create an objectionable odor at the nearest sensitive receptor.

Operation of the proposed Project would increase air pollutants primarily due to vessel exhaust. The distance between the Shell Marine Oil Terminal and the nearest residents is expected to be far enough to allow for adequate dispersion of these emissions to below objectionable odor levels. Furthermore, the existing industrial setting of the proposed Project represents an already complex odor environment. For example, existing nearby container terminals include freight and goods movement activities that use diesel trucks and diesel cargo-handling equipment that generate similar odors as would the proposed Project. Within this context, the proposed Project would not likely result in changes to the overall odor environment in the vicinity.

Impact Determination

The potential is low for the proposed Project to produce objectionable odors that would affect a sensitive receptor. Significant odor impacts, therefore, are not anticipated.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

Impact AQ-6: The proposed Project would not expose receptors to significant levels of TACs.

An HRA was conducted to address potential public health effects from TACs generated by the proposed Project. The results of the HRA are summarized below, with impacts shown relative to the CEQA baseline and, for cancer risk, the Future CEQA baseline. The need for a CEQA analysis based on both the CEQA baseline and Future CEQA baseline for the evaluation of cancer risks is discussed in detail in Section 3.1.4.1, Methodology. Details of the analysis, including TAC emission calculations, dispersion modeling, and risk calculations, are presented in Appendix B3.

Table 3.1-25 presents the maximum predicted health impacts associated with the proposed Project without mitigation. The table includes estimates of individual cancer risk, chronic noncancer hazard index, and acute noncancer hazard index at the maximally exposed residential, occupational, and sensitive receptors. Results are presented for the terminal with the proposed Project (before subtracting baseline), the two CEQA baselines, the proposed Project CEQA increment (terminal with proposed Project minus CEQA baseline), and Future CEQA increment (terminal with proposed Project minus Future CEQA baseline). Significance findings are made by comparing the CEQA increments to the significance thresholds.

Table 3.1-25: Maximum CEQA Health Impacts Estimated for Construction and Operation of the Proposed Project without Mitigation

Health Impact	Receptor Type	Terminal with Proposed Project	CEQA Baseline	Proposed Project CEQA Increment[b]	Future CEQA Baseline[c]	Proposed Project Future CEQA Increment[b]	Significance Threshold[a]	Significant?
Individual Cancer Risk	Residential	8.0×10^{-6} 8.0 in a million	5.3×10^{-6} 5.3 in a million	3.3×10^{-6} 3.3 in a million	4.8×10^{-6} 4.8 in a million	3.4×10^{-6} 3.4 in a million	10×10^{-6}	No
	Occupational	13.2×10^{-6} 13.2 in a million	8.2×10^{-6} 8.2 in a million	6.8×10^{-6} 6.8 in a million	8.1×10^{-6} 8.1 in a million	6.9×10^{-6} 6.9 in a million		No
	Sensitive[g]	7.3×10^{-6} 7.3 in a million	4.8×10^{-6} 4.8 in a million	3.0×10^{-6} 3.0 in a million	4.3×10^{-6} 4.3 in a million	3.1×10^{-6} 3.1 in a million		No
Chronic Hazard Index	Residential	0.14	0.04	0.10	n/a	n/a	1.0	No
	Occupational	0.87	0.30	0.65	n/a	n/a		No
	Sensitive	0.15	0.04	0.10	n/a	n/a		No
Acute Hazard Index	Residential	0.08	0.02	0.06	n/a	n/a	1.0	No
	Occupational	0.85	0.18	0.77	n/a	n/a		No
	Sensitive	0.11	0.02	0.09	n/a	n/a		No
Population Cancer Burden			Proposed Project CEQA Increment[b]		Proposed Project Future CEQA Increment[b]		0.5	No
			0.12		0.14			

Notes:

[a] The significance thresholds apply only to the Proposed Project CEQA increment and Proposed Project Future CEQA increment.

[b] The Proposed Project CEQA increment represents the Terminal with proposed Project minus CEQA baseline. The Proposed Project Future CEQA increment represents the Terminal with proposed Project minus Future CEQA baseline.

[c] The Future CEQA baseline (and, therefore, the Proposed Project Future CEQA increment) is applicable only to cancer risk because cancer risk has a uniquely long exposure period (30 years for residential exposure and 70 years for population cancer burden). By contrast, the baseline chronic and acute hazard indices are derived from annual and peak hour emissions, respectively, and therefore reflect the baseline at the time of the NOP (i.e., CEQA baseline).

[d] Each result shown in the table for cancer risk, chronic hazard index, and acute hazard index represents the modeled receptor location with the maximum impact or increment. The impacts or increments at all other receptors would be less than the values in the table.

[e] The displayed values for the proposed project impacts and baseline impacts do not necessarily subtract to equal the displayed CEQA increments because they may occur at different receptor locations. The example given in the text illustrates how the increments are calculated.

[f] Both construction and operational emissions were included in the determination of health impacts.

[g] The sensitive receptor category in this table includes grade schools, child care centers, hospitals, elder care facilities, and recreational areas. The maximum health value from all of these receptor types is presented in the table.

Example for Determining Maximum Risk Increment

The health values for the terminal with proposed Project (before subtracting baseline), CEQA baseline, and proposed Project CEQA increment in Table 3.1-25 often occur at different modeled receptor locations. This means that the former two values do not necessarily subtract to equal the latter value in the table. Instead, an increment must be calculated at each of the hundreds of modeled receptors, and the receptor with the highest increment is presented in the table. The following example shows how the maximum proposed Project CEQA increment for cancer risk at a residential receptor (3.3 in a million), shown in the first row of results in Table 3.1-25, was determined. This result is predicted to occur at modeled Receptor No. 1124, in Wilmington.

- Example—Determine Proposed Project CEQA Increment at Receptor No. 1124:
  - Terminal with Proposed Project cancer risk, Receptor No. 1124 = 8.0 in a million (shown in the table)
  - CEQA baseline cancer risk, Receptor No. 1124 = 4.7 in a million (not shown in the table because Receptor No. 1124 is not the location of the maximum CEQA baseline cancer risk)
  - Proposed Project CEQA increment, Receptor No. 1124 = 8.0 - 4.7 = 3.3 in a million (shown in the table)

After performing an increment calculation similar to the above example at every modeled receptor, it was determined that Receptor No. 1124 has the highest proposed Project CEQA increment of any residential receptor. Therefore, its CEQA increment of 3.3 in a million is reported in Table 3.1-25. However, in this example, Receptor 1124 is *not* the maximum residential receptor for the CEQA baseline by itself (its maximum of 5.3 in a million occurs at Receptor No. 425). The CEQA increment at Receptor No. 425 is 2.3 in a million, which is less than the maximum increment of 3.3 in a million shown in the table.

Although the above example shows the cancer risk increment being calculated at one modeled receptor, the complete determination of the maximum increment involves this same type of calculation at hundreds of modeled receptors. The chronic and acute noncancer hazard index increments, as well as the criteria pollutant concentration increments addressed in Impacts AQ-2 and AQ-4, are determined in the same way.

Impact Determination

Health impacts associated with the unmitigated proposed Project, shown in Table 3.1-25, would result in the following:

- Cancer Risk

  In relation to the CEQA baseline, the maximum incremental cancer risk is predicted to be less than the significance threshold at all receptors. Therefore, the proposed Project would result in a less-than-significant cancer risk impact.

  In relation to the Future CEQA baseline, the maximum incremental cancer risk is predicted to be less than the significance threshold at all receptors. Therefore, the proposed Project would result in a less-than-significant cancer risk impact.

- Population Cancer Burden

  In relation to the CEQA baseline, the cancer burden increment is predicted to be less than the significance threshold. Therefore, the proposed Project would result in a less-than-significant cancer burden.

  In relation to the Future CEQA baseline, the cancer burden increment is predicted to be less than the significance threshold. Therefore, the proposed Project would result in a less-than-significant cancer burden.

- Chronic and Acute Impacts

  Because chronic and acute hazard indices are based on annual and peak hour exposures instead of multiple-year exposures like cancer risk, they are determined by comparing the terminal with proposed Project-related impacts only to the CEQA baseline, which is the baseline at the time of the NOP.

  The maximum chronic hazard index is predicted to be less than significant for all receptor types. Therefore, the proposed Project would result in a less-than-significant chronic noncancer impact.

  The maximum acute hazard index is predicted to be less than significant for all receptor types. Therefore, the proposed Project would result in a less-than-significant acute noncancer impact.

Additional Analysis for Informational Purposes—Particulates: Morbidity and Mortality

Impact AQ-4 indicates that operation of the proposed Project would result in a maximum off-site 24-hour $PM_{2.5}$ concentration increment that would not exceed the SCAQMD significance threshold of 2.5 $\mu g/m^3$ for any analysis year (see Table 3.1-24). Because the operational $PM_{2.5}$ concentrations would be less than significant and would not exceed LAHD's criterion for calculating morbidity and mortality attributable to PM, potential mortality and morbidity effects were not quantified for the proposed Project.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

Impact AQ-7: The proposed Project would not conflict with or obstruct implementation of an applicable AQMP.

Project operations would produce emissions of nonattainment pollutants primarily in the form of diesel exhaust. The SCAQMD prepared AQMPs in 1997, 2003, 2007, 2012, and most recently in 2016. Each iteration of the AQMP is an update of the previous AQMP.

The 2016 AQMP proposed emission reduction measures that are designed to bring the SCAB into attainment of the state and national ambient air quality standards. The attainment strategies in these plans include more stringent standards for new engines and cleanup of existing fleets, including new measures for port trucks, statewide truck fleets, ships traveling and in port, locomotives, and harbor craft that are enforced at the state and federal level on engine manufacturers and petroleum refiners and retailers; as a result, proposed project operation would comply with these control measures. The SCAQMD also adopts AQMP control measures into the SCAQMD rules and regulations, which are then used to regulate sources of air pollution in the SCAB. Therefore, compliance with these requirements would ensure that the proposed Project would not conflict with or obstruct implementation of the AQMP.

Furthermore, LAHD, in conjunction with the Port of Long Beach, implements the 2005 CAAP, and the 2010 and 2017 CAAP Updates, which set goals and implementation strategies that reduce air emissions and health risks from Port operations. In some cases, CAAP measures have produced emission reductions from emission sources identified in the CAAP that are greater than those forecasted in the AQMP. Operational activities associated with the proposed Project would comply with the source-specific performance standards identified in the CAAP and therefore would be consistent with emission reduction goals in the 2016 AQMP.

Impact Determination

The proposed Project would not conflict with or obstruct implementation of the AQMP. Therefore, significant impacts are not anticipated.

Mitigation Measures

No mitigation is required.

Residual Impacts

Impacts would be less than significant.

3.1.4.5 Summary of Impact Determinations

Table 3.1-26 summarizes the impact determinations of the proposed Project related to Air Quality and Meteorology. This table is meant to allow easy comparison of the potential impacts of the proposed Project with respect to this resource. Identified potential impacts may be based on Federal, State, or City of Los Angeles significance criteria, LAHD criteria, and the scientific judgment of the report preparers.

For each type of potential impact, the table describes the impact, notes the impact determinations, describes any applicable mitigation measures, and notes the residual impacts (i.e., the impact remaining after mitigation). All impacts, whether significant or not, are included in this table.

Table 3.1-26: Summary Matrix of Potential Impacts and Mitigation Measures for Air Quality Associated with the Proposed Project

Environmental Impacts	Impact Determination	Mitigation Measures	Impacts after Mitigation
Impact AQ-1: The proposed Project would result in construction-related emissions that exceed an SCAQMD threshold of significance in Table 3.1-7.	Construction would be significant for NO_X in construction Years 1, 2, 3 and 5. Overlapping construction and operations would be significant for $PM_{2.5}$, NO_X, and VOC.	**MM AQ-1: Fleet Modernization for Harbor Craft Used During Construction.** **MM AQ-2: Fleet Modernization for On-Road Trucks Used during Construction.** **MM AQ-3: Fleet Modernization for Construction Equipment.** **MM AQ-4: General Mitigation Measure.**	Construction would be significant and unavoidable for NOx in construction Years 2, 3, and 5. Overlapping construction and operations would be significant and unavoidable for $PM_{2.5}$, NOx, and VOC.
Impact AQ-2: Proposed Project construction would result in off-site ambient air pollutant concentrations that exceed a SCAQMD threshold of significance in Table 3.1-8.	Maximum off-site ambient air pollutant concentrations during construction would be significant for 1-hour NO_2 (federal and state averages). Concurrent construction and operations would be significant for 1-hour NO_2 (federal and state averages).	**MM AQ-1 through MM AQ-4**	Maximum off-site ambient air pollutant concentrations would be significant and unavoidable for 1-hour NO_2 (federal and state averages). Concurrent construction and operations would be significant and unavoidable for 1-hour NO_2 (federal and state averages).

Table 3.1-26: Summary Matrix of Potential Impacts and Mitigation Measures for Air Quality Associated with the Proposed Project

Environmental Impacts	Impact Determination	Mitigation Measures	Impacts after Mitigation
Impact AQ-3: The proposed Project would result in operational emissions that exceed an SCAQMD threshold of significance in Table 3.1-9.	Operations would be significant for NO_X and VOC in 2019, 2031, and 2048.	**MM AQ-5: Vessel Speed Reduction Program (VSRP).** The following lease measures would also be implemented to reduce impacts: **LM AQ-1: Periodic Review of New Technology and Regulations.** **LM AQ-2: At-berth Vessel Emission Capture and Control System Study**	Operations would be significant and unavoidable for NO_X and VOC in 2019, 2031, and 2048.
Impact AQ-4: Proposed project operations would not result in off-site an ambient air pollutant concentration that exceeds a SCAQMD threshold of significance in Table 3.1-10.	Less than significant.	No mitigation is required.	Less than significant.
Impact AQ-5: The proposed Project would not create an objectionable odor at the nearest sensitive receptor.	Less than significant	No mitigation is required	Less than significant.
Impact AQ-6: The proposed Project would not expose receptors to significant levels of TACs.	Less than significant	No mitigation is required	Less than significant.
Impact AQ-7: The proposed Project would not conflict with or obstruct implementation of an applicable AQMP.	Less than significant	No mitigation is required	Less than significant.

3.1.4.6 Mitigation Monitoring

The mitigation monitoring program below is applicable to the proposed Project.

AQ-1: The proposed Project would result in construction-related emissions that exceed the applicable SCAQMD threshold of significance. **AQ-2: Proposed project construction would result in off-site ambient air pollutant concentrations that exceed the applicable SCAQMD threshold of significance.**	
Mitigation Measure	**MM AQ-1. Fleet Modernization for Harbor Craft Used During Construction**. Harbor craft must use U.S. Environmental Protection Agency (EPA) Tier 3 or cleaner engines.
Timing	During specified construction phases.
Methodology	LAHD will include MM AQ-1 in the contract specifications for construction. LAHD will monitor implementation of mitigation measures during construction.
Responsible Parties	LAHD.
Residual Impacts	Significant and unavoidable
Mitigation Measure	**MM AQ-2. Fleet Modernization for On-road Trucks Used During Construction.** Trucks with a Gross Vehicle Weight Rating) of 19,500 pounds (lbs) or greater, including import haulers and earth movers, must comply with EPA 2010 on-road emission standards.
Timing	During specified construction phases.
Methodology	LAHD will include MM AQ-2 in the contract specifications for construction. LAHD will monitor implementation of mitigation measures during construction.
Responsible Parties	LAHD and Shell.
Residual Impacts	Significant and unavoidable
Mitigation Measure	**MM AQ-3. Fleet Modernization for Construction Equipment.** All diesel-fueled construction equipment greater than 50 horsepower (hp) must meet EPA Tier 4 off-road emission standards (excluding vessels, harbor craft, on-road trucks, and dredging equipment).
Timing	During specified construction phases.
Methodology	LAHD will include MM AQ-3 in the contract specifications for construction. LAHD will monitor implementation of mitigation measures during construction.
Responsible Parties	LAHD and Shell.
Residual Impacts	Significant and unavoidable
Mitigation Measure	**MM AQ-4. General Construction Mitigation Measure.** For mitigation measures MM AQ-1 through MM AQ-3, if a CARB-certified technology becomes available and is shown to be as good as, or better than, the existing measure in terms of emissions performance, the technology could replace the existing measure pending approval by LAHD. Measures will be set at the time a specific construction contract is advertised for bid.
Timing	During specified construction phases.
Methodology	LAHD will include MM AQ-4 in the contract specifications for construction. LAHD will monitor implementation of mitigation measures during construction.
Responsible Parties	LAHD.
Residual Impacts	Significant and unavoidable

AQ-3: The proposed Project would result in operational emissions that exceed an SCAQMD threshold of significance.	
Mitigation Measure	**MM AQ-5. Vessel Speed Reduction Program (VSRP).** 95 percent of vessels calling at Shell Marine Oil Terminal will be required to comply with the expanded VSRP at 12 knots between 40 nautical miles (nm) from Point Fermin and the Precautionary Area.
Timing	During operation.
Methodology	LAHD will include this mitigation measure in lease agreements with tenants
Responsible Parties	LAHD.
Residual Impacts	Significant and unavoidable.
Lease Measure	**LM AQ-1. Periodic Review of New Technology and Regulations.** LAHD will require the tenant to review any LAHD-identified or other new emissions-reduction technology, determine whether the technology is feasible, and report to LAHD. Such technology feasibility reviews will take place at the time of LAHD's consideration of any lease amendment or facility modification for the proposed project site. If the technology is determined by LAHD to be feasible in terms of cost and technical and operational feasibility, the tenant will work with LAHD to implement such technology. Potential technologies that may further reduce emissions and/or result in cost-savings benefits for the tenant may be identified through future work on the Clean Air Action Plan (CAAP). Over the course of the lease, the tenant and LAHD will work together to identify potential new technology. Such technology will be studied for feasibility, in terms of cost, technical and operational feasibility, and emissions reduction benefits. As partial consideration for the lease amendment, the tenant will implement not less frequently than once every five years following the effective date of the permit, new air quality technological advancements, subject to mutual agreement on operational feasibility and cost sharing, which will not be unreasonably withheld. The effectiveness of this measure depends on the advancement of new technologies and the outcome of future feasibility or pilot studies.
Timing	During operation.
Methodology	LAHD will include this lease measure in lease agreements with tenants.
Responsible Parties	Shell, LAHD.
Residual Impacts	Significant and unavoidable.

Lease Measure	**LM AQ 2 - At-Berth Vessel Emissions Capture and Control System Study.** The Tenant shall evaluate the financial, technical, and operational feasibility of operating barge and land-based vessel emissions capture and control systems and any other systems associated with emission reductions (hereinafter "Control Systems") that are available within three (3) months after the Effective Date. The City of Los Angeles (City) and Tenant will decide which systems should be considered for the reduction of emissions from all vessels calling at the Premises. The evaluation of feasibility shall consider any potential impacts upon navigation, safety, and emission reductions. Cost Effectiveness (as defined below), and any other factors reasonably determined by Tenant to be relevant shall also be considered. For purposes of the feasibility evaluation, "Cost Effectiveness" shall be defined as the annualized cost (in Dollars per year) of the Control Systems ("Annualized Cost") based on an agreed time period (the duration of such period determined with reasonable consideration of the Carl Moyer grant guidelines), divided by the annual net emission reductions (unweighted aggregate of net emissions reduction in tons per year of VOC, NOx, and PM10) over the same time period during use of the Control Systems ("Net Annual Emission Reductions"). Annualized Cost shall include all costs associated with the Control Systems, including without limitation, all capital costs associated with design, permitting and construction of the Control Systems and all costs associated with system evaluation, operations and maintenance. Cost Effectiveness (dollars per ton) may be calculated pursuant to the formulas below. • Cost Effectiveness ($/ton) = Annualized Cost ($/year) / Net Annual Emission Reductions (tons/year) • Net Annual Emission Reductions = Annual Vessel Emission Reductions – Annual Emissions Generated by Control System and Associated Equipment Operations If Cost Effectiveness is greater than Appendix G of the Carl Moyer grant guidelines in effect as of the Effective Date, then implementation of the Control Systems shall not be considered feasible. Tenant shall provide the Director of Environmental Management Division for the Harbor Department with a written report (the "Report") documenting the findings and conclusions of the feasibility analysis within one year of the Effective Date. The Report's feasibility conclusion shall include, but not be limited to, specific findings in the following areas: (1) size constraints; (2) allowance for articulation of the recovery crane/device to service a variety of ship sizes that may reasonably call at the premises during the term of the proposed permit; (3) navigation for terminal operations as well as those of adjacent terminals; (4) compliance with Marine Oil Terminal Engineering and Maintenance Standards; (5) operational safety issues; and (6) compliance with the rules and orders of any applicable regulatory agency. The deadline for Tenant to submit the Report may be extended with the approval of the Board of Harbor Commissioners (Board), provided that such approval shall not be unreasonably withheld. City shall have one year to review and comment on the Report unless the Board reasonably determines that additional time is needed as a result of unanticipated events or any events beyond the reasonable control of the City. The Report and any associated staff comments from the City will be presented by the City to the Board at a public meeting. If the City's review of the Report is delayed beyond one year, then the City shall present this information to the Board at a public meeting along with a proposed new comment deadline for the City. If the Board and Tenant agree that implementation of a Control System(s) is/are feasible, then Tenant shall complete a pilot study ("Pilot Study") within three years of the later of (i)

	receiving all approvals and permits required by Applicable Laws for such study; (ii) receiving any and all licenses and other intellectual property rights required by Applicable Laws to conduct such study; (iii) commencing with terminal operations upon the completion of all New Improvements and Tenant Constructed Improvements; and (iv) Board providing Tenant with approval to proceed. The deadline for Tenant to complete the Pilot Study may be extended with approval by the Board, provided that such approval shall not be unreasonably withheld. The Pilot Study shall consist of (i) installation of a test control system (the "Test System") for purposes of testing the performance of a Control System; and (ii) testing of the Test System and the collection of data therefrom. At the conclusion of testing, the Tenant shall submit a report (the "Pilot Study Report") to the Board. The Pilot Study Report shall include the following information: vessels tested, operation and maintenance costs, emission reductions, operational considerations and any other information Tenant reasonably determines to be relevant. The results of the Pilot Study, and any intellectual property rights therein, shall be owned by Tenant. The City and the Board shall use the results and Pilot Study Report only for the evaluation of the Pilot Study. City shall not issue any press releases or make any written public disclosures with respect to the Report or the Pilot Study Report without first providing Tenant with a reasonable opportunity to review such releases or disclosure for accuracy and to ensure that no technical information is disclosed where such public disclosure is not necessary (Tenant understands that nothing herein shall be interpreted to supersede the California Public Records Act and the City's responsibilities thereto). If, based on the results of the Pilot Study set forth in the Pilot Study Report, the City and Tenant determine that all of the issues relating to feasibility and regulatory requirements of the Control System were adequately addressed, then Tenant shall, as soon as reasonably practicable after such determination, implement the Control System(s) into its operations throughout the remainder of the permit.
Timing	During operation.
Methodology	LAHD will include this lease measure.
Responsible Parties	Shell, LAHD.
Residual Impacts	Significant and unavoidable.

3.1.5 Significant Unavoidable Impacts

3.1.5.1 Construction Impacts

Emissions from proposed Project construction would exceed significance thresholds for NO_x. After mitigation, emissions would remain significant and unavoidable for NO_x.

Emissions from the proposed Project's overlapping construction and operations would exceed significance thresholds for NO_X, VOC, and $PM_{2.5}$. After mitigation, emissions would remain significant and unavoidable for NO_X, VOC, and $PM_{2.5}$.

Construction of the proposed Project would exceed the federal and state 1-hour NO_2 ambient air concentration thresholds. After mitigation, impacts would remain significant and unavoidable for federal and state 1-hour NO_2 concentrations.

Concurrent construction and operations of the proposed Project would exceed the federal and state 1-hour NO_2 ambient air concentration thresholds; after mitigation, impacts would remain significant and unavoidable for federal and state 1-hour NO_2 concentrations.

3.1.5.2 Operational Impacts

Emissions from proposed Project operation prior to mitigation would exceed significance thresholds for NO_X and VOC in all analysis years (2019, 2031, and 2048). After mitigation, impacts would remain significant and unavoidable for NO_X and VOC in all analysis years (2019, 2031, and 2048).