4.2 Air Quality

This section presents air quality conditions in the Project vicinity and evaluates the potential for the proposed Project to result in significant impacts related to exposing people to unhealthful air quality. This section relies in part on an Air Quality Technical Report prepared by Ramboll US Corporation (Ramboll), 2020) in support of the Project (see Appendix AIR, *Air Quality Supporting Information*) which was independently peer reviewed by ESA in addition to the other technical resources that are referenced herein.

CEQA requires the analysis of potential adverse effects of a project on the surrounding environment. Potential effects of the environment on a project's future users or residents are generally not required to be considered in a CEQA evaluation, except when the project may exacerbate existing hazards or existing conditions.[1] In addition, the City of Oakland's *CEQA Thresholds of Significance Guidelines* require that the potential effects of existing air quality conditions on the Project be evaluated to provide information to decision-makers and the public (City of Oakland, 2016). As such, this section analyzes both the Project's impacts on air quality as well as the potential adverse effects of existing air pollution on the Project and the surrounding community.

The Notice of Preparation (NOP) for this EIR received comments related to air quality, involving the Project's consistency with various plans, policies, and regulations relating to air quality, regional and local air emissions impacts and sensitive receptors, mobile emissions, emissions associated with remediation, and evaluation of air pollutant reduction measures. These topics are included in the analysis in this section.

This section also analyzes the Maritime Reservation Scenario, focused on environmental conditions, regulations, impacts and mitigation measures that are different from those identified for the Project.

4.2.1 Environmental Setting

Climate and meteorological conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. The Project is located in the City of Oakland and is within the boundaries of the San Francisco Bay Area Air Basin (SFBAAB or "air basin"). The SFBAAB encompasses the nine-county region including all of Alameda, Contra Costa, Santa Clara, San Francisco, San Mateo, Marin and Napa counties, and the southern portions of Solano and Sonoma counties. The climate of the Bay Area is determined largely by a high-pressure system that is often present over the eastern Pacific Ocean off the West Coast of North America. During winter, the Pacific high-pressure system shifts southward, allowing an increased number of storms systems to pass through the region. During summer and early fall, when fewer storms pass through the region, emissions generated within the Bay Area will accumulate due to more stable conditions. The combination of abundant sunshine under the restraining influences of topography and subsidence inversions create conditions that are conducive to the formation of photochemical pollutants, such as ground-level ozone and secondary particulates, including nitrates and sulfates.

[1] See *California Building Industry Association v. Bay Area Air Quality Management District* ((2015) Cal.4th, Case No. S213478).

More precisely, the Project Area lies within the Northern Alameda and Western Contra Costa Counties climatological subregion. This subregion extends from Richmond to San Leandro with San Francisco Bay as its western boundary, and its eastern boundary defined by the Oakland-Berkeley Hills. In this subregion, marine air traveling through the Golden Gate, as well as across San Francisco and the San Bruno Gap (a gap in the Coastal Range between the ocean and the San Francisco Airport), is a dominant weather factor. Average wind speeds vary from season to season with the strongest average winds occurring during summer and the lightest average winds during winter. Summer temperatures in Oakland average at a low of 57°F and a high of 72°F, while winter temperatures average at a low of 46°F and a high of 59°F. Rainfall is highly variable and confined almost exclusively to the "Wet Season" period from early November to mid-April. Oakland averages 24 inches of precipitation annually, but because much of the area's rainfall is derived from the fringes of mid-latitude storms, a shift in the annual storm track of a few hundred miles can mean the difference between a very wet year and near drought conditions.

Existing Air Quality

The Bay Area Air Quality Management District (BAAQMD or "air district") operates a regional monitoring network that measures the ambient concentrations of the six criteria air pollutants. Existing and probable future levels of air quality in Oakland can generally be inferred from historical ambient air quality data based on measurements conducted by the BAAQMD at its nearby monitoring stations. The monitoring station closest to the Project site is the Oakland West station approximately 1.3 miles north of the Project site. The Oakland West station monitors ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and particulate matter with a diameter of less than 2.5 micrometers ($PM_{2.5}$). Particulate matter with a diameter of less than 10 micrometers (PM_{10}) is not measured at any of the monitoring stations in Oakland.

Pollutants of concern in the Bay Area include O_3 and PM; the SFBAAB is in non-attainment with respect to the federal and State standards for these pollutants. **Table 4.2-1** shows a five -year summary of monitoring data (2015 through 2019) for these pollutants from the Oakland West station, as well as NO_2, an ozone precursor, and CO, for which the Bay Area is in attainment status. Due to the proximity of the Project site to the Oakland West station, air quality measurements collected at this station are understood to be generally representative of conditions within the vicinity of the Project site. Table 4.2-1 also compares measured pollutant concentrations with the California Ambient Air Quality Standards (CAAQS or "state standards") and the National Ambient Air Quality Standards (NAAQS or "national standards") (see Section 4.2.2, *Regulatory Setting,* below).

With regard to human exposure to air pollution, the community of West Oakland is identified as a jurisdiction with disproportionate impacts from air quality under the Community Air Protection Program (Assembly Bill [AB] 617), as discussed in the *Regulatory Setting* section below. West Oakland has a high cumulative exposure burden to air pollution due to numerous existing sources of air pollution in the community. These include heavy-duty trucks, diesel locomotives, off-road equipment, stationary sources, and water borne vessels associated with the Port of Oakland, major highways (including Interstates 80, 580, 880, and 980), Schnitzer Steel, freight and passenger rail, and numerous industrial and commercial stationary sources. Although many of the stationary sources of air pollution are regulated by BAAQMD's Regulation 2: New Source Review

permitting program, they all contribute to the exposure of residents to harmful pollutants and accumulate to lead to health effects.

TABLE 4.2-1
AIR QUALITY DATA SUMMARY (2015–2019) FOR OAKLAND WEST MONITORING STATION

Pollutant	Standard[a]	Monitoring Data by Year[b]				
		2015	2016	2017	2018[c]	2019[c]
Ozone						
Highest 1-Hour Average (ppm)	0.090 ppm	0.091[d]	0.065	0.087	0.063	0.101
State Standards Exceedance Days		0	0	0	0	1
Highest 8-Hour Average (ppm)	0.070 ppm	0.064	0.052	0.068	0.050	0.072
State Standard Exceedance Days		0	0	0	0	1
National Standard Exceedance Days	0.070 ppm	0	0	0	0	1
Fine Particulate Matter ($PM_{2.5}$)						
Highest 24-Hour Average (µg/m^3)	35 µg/m^3	38.7	23.9	56.0	169.2	29.3
Measured Days over National Standard Exceedances/Samples		3	0	7	15	0
State Annual Average (µg/m^3)	12 µg/m^3	10.2	8.7	12.9	14.4	7.8
National Annual Average (µg/m^3)	12.0 µg/m^3	10.1	8.6	12.8	14.3	7.7
Nitrogen Dioxide (NO_2)						
Highest Hourly Average (ppm)	0.18 ppm	0.057	0.049	0.052	0.076	0.050
Measured Days over State Standard,Exceedances/Samples		0	0	0	0	0
Carbon Monoxide (CO)						
Highest 8-Hour Average (ppm)	9.0 ppm	2.6	2.2	2.1	3.1	1.7
Measured Days over State Standard		0	0	0	0	0

NOTES:

ppm = parts per million; µg/m^3 = micrograms per cubic meter

a Generally, State Standards and National Standards are not to be exceeded more than once per year.
b "—" indicates that data are not available. Measurements are from the Oakland West Monitoring Station in Oakland.
c According to the California Air Resources Board (CARB), data after 2017 may be preliminary.
d A violation occurs only if the standard is exceeded. Because 0.091 rounds to 0.09, it is not considered a violation. A recorded concentration of 0.095 or greater would constitute a violation of the state standard.

SOURCES: CARB, 2020a; BAAQMD, 2015; BAAQMD, 2016a; BAAQMD, 2017a; BAAQMD, 2017b; BAAQMD, 2018; BAAQMD, 2019a.

As discussed below, AB 617 requires that communities and air districts collaborate to reduce air pollution and associated health effects. The BAAQMD and a collaboration of various stakeholders developed a community emissions reduction plan for West Oakland, referred to as the *West Oakland Community Action Plan*. The BAAQMD approved the plan in October 2019. The plan includes 84 potential community-level strategies and control measures to reduce criteria pollutant and toxic air contaminant (TAC) emissions and decrease resident's exposure to these TAC emissions, with the goal of eliminating health risk disparities in West Oakland. See the *Regulatory Setting* section below for more information.

Criteria Air Pollutants

Ozone (O_3)

Short-term exposure to elevated concentrations of ground-level ozone can lead to a number of negative health effects. Ozone irritates the eyes and causes constriction of the airways. Besides causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Ozone is generally not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving ultraviolet radiation and the reactive organic gases (ROG) and nitrogen oxides (NO_X). ROG and NO_X are known as precursor compounds for ozone. Ozone creation generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. It is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NO_X under the influence of wind and sunlight. Concentrations of ozone tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds.

According to the United States Environmental Protection Agency (U.S. EPA), ozone can cause the muscles in the airways to constrict potentially leading to wheezing and shortness of breath. Exposure to ozone can make it more difficult to breathe deeply and vigorously; cause shortness of breath and pain when taking a deep breath; cause coughing and sore or scratchy throat; inflame and damage the airways; aggravate lung diseases such as asthma, emphysema and chronic bronchitis; increase the frequency of asthma attacks; make the lungs more susceptible to infection; continue to damage the lungs even when the symptoms have disappeared; and cause chronic obstructive pulmonary disease. Long-term exposure to ozone is linked to aggravation of asthma and is likely to be one of many causes of asthma development. Exposure to higher concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children (U.S. EPA, 2018a). According to the California Air Resources Board (CARB), inhalation of ozone causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms and exposure to ozone can reduce the volume of air that the lungs breathe in and cause shortness of breath (CARB, 2019a). The U.S. EPA states that people most at risk from breathing air containing ozone include those with asthma, children, older adults, and people who are active outdoors, especially outdoor workers (U.S. EPA, 2018a). Children are at the greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure (U.S. EPA, 2018a). According to CARB, studies show that children are no more or less likely to suffer harmful effects than adults; however, children and teens may be more susceptible to ozone and other pollutants because they spend nearly twice as much time outdoors and engaged in vigorous activities as compared to adults. Children breathe more rapidly than adults and inhale more pollution per pound of their body weight than adults and are less likely than adults to notice their own symptoms and avoid harmful exposures. Further research may be able to better distinguish between health effects in children and adults (CARB, 2019a).

Carbon Monoxide (CO)

Ambient CO concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Wind speed and atmospheric mixing also influence CO concentrations. Under inversion conditions, CO concentrations may be distributed more uniformly over an area that may extend some distance from vehicular sources. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues and is especially dangerous for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses.

At very high concentrations, which are possible indoors or in other enclosed environments, CO can cause dizziness, confusion, unconsciousness, and death. Very high levels of CO are not likely to occur outdoors; however, when CO levels are elevated outdoors, they can be of particular concern for people with some types of heart disease since these people already have a reduced ability for getting oxygenated blood to their hearts and are especially vulnerable to the effects of CO when exercising or under increased stress. In these situations, short-term exposure to elevated CO may result in reduced oxygen to the heart accompanied by chest pain also known as angina (U.S. EPA, 2016a). The most common effects of CO exposure are fatigue, headaches, confusion, and dizziness due to inadequate oxygen delivery to the brain. For people with cardiovascular disease, short-term CO exposure can further reduce their body's already compromised ability to respond to the increased oxygen demands of exercise, exertion, or stress. Inadequate oxygen delivery to the heart muscle leads to chest pain and decreased exercise tolerance. Unborn babies, infants, elderly people, and people with anemia or with a history of heart or respiratory disease are most likely to experience health effects with exposure to elevated levels of CO (CARB, 2019b).

CO concentrations have declined dramatically in California due to existing mobile source emissions controls and programs, and most areas of the state, including the Project vicinity, meet the CO state and federal standards. CO monitoring and emissions modeling were vital in the early 1980s when CO levels were regularly exceeded throughout California. In more recent years, CO measurements and modeling have not been a priority in California air districts due to the retirement of older polluting vehicles, fewer emissions from new vehicles, and in the use of cleaner fuels. The clear success in reducing CO levels is evident in the first paragraph of the executive summary of CARB *2004 Revision to the California State Implementation Plan for Carbon Monoxide Updated Maintenance Plan for Ten Federal Planning Areas* (CARB, 2004):

> *"The dramatic reduction in carbon monoxide (CO) levels across California is one of the biggest success stories in air pollution control. Air Resources Board (ARB or Board) requirements for cleaner vehicles, equipment and fuels have cut peak CO levels in half since 1980, despite growth. All areas of the State designated as non-attainment for the federal 8-hour CO standard in 1991 now attain the standard, including the Los Angeles urbanized area. Even the Calexico area of Imperial County on the congested Mexican border had no violations of the federal CO standard in 2003. Only the South Coast and Calexico continue to violate the more protective State 8-hour CO standard, with declining levels beginning to approach that standard."*

Nitrogen Dioxide (NO_2) and Nitrogen Oxides (NO_X)

NO_2 is a reddish brown gas that is a by-product of fossil fuel combustion for which ambient air quality standards have been promulgated (CARB, 2019c). Mobile sources and industrial operations are major sources of NO_2. NO_2 may be visible as a coloring component of a brown-hued cloud on high pollution days, especially in conjunction with high ozone levels.

The terms NO_X and NO_2 are sometimes used interchangeably. However, the term NO_X is typically used when discussing emissions, usually from combustion-related activities, and the term NO_2 is typically used when discussing ambient air quality standards. Where NO_X emissions are discussed in the context of the thresholds of significance or impact analyses, the discussions are based on the conservative assumption that all NO_X emissions would oxidize in the atmosphere to form NO_2.

NO_2 is an air quality concern because it acts as a respiratory irritant and is a precursor to ozone formation. NO_2 is a major component of the group of gaseous nitrogen compounds commonly referred to as nitrogen oxides (NO_X). Specifically, NO_X is produced by fuel combustion in motor vehicles, industrial stationary sources (such as industrial activities), ships, aircraft, and rail transit. Typically, nitrogen oxides emitted from fuel combustion are in the form of nitric oxide (NO) and NO_2. NO is often converted to NO_2 when it reacts with ozone or undergoes photochemical reactions in the atmosphere. Therefore, emissions of NO_2 from combustion sources are typically evaluated based on the volume of NO_X emitted from the source.

NO_2 can potentially irritate airways in the human respiratory system (U.S. EPA 2016b). Short-term exposures can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms such as coughing, wheezing or difficulty breathing. Longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections requiring hospital admissions and visits to emergency rooms. Controlled human exposure studies show that NO_2 exposure can intensify responses to allergens in allergic asthmatics. In addition, a number of epidemiological studies have demonstrated associations between NO_2 exposure and premature death, cardiopulmonary effects, decreased lung function growth in children, respiratory symptoms, emergency room visits for asthma, and intensified allergic responses. Infants and children are particularly at risk from exposure to NO_2 due to their more rapid breathing rate for their body weight and their typically greater outdoor exposure duration while in adults, the greatest risk is to people who have chronic respiratory diseases, such as asthma and chronic obstructive pulmonary disease. Much of the information on distribution in air, human exposure and dose, and health effects is specifically for NO_2 and there is only limited information for NO_X, as well as large uncertainty in relating health effects to NO or NO_X exposure (CARB, 2019c).

Sulfur Dioxide (SO_2)

SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal and diesel and is also a precursor to the formation of atmospheric sulfate, particulate matter, and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain. In the Bay Area, high concentrations of SO_2 are only a concern in areas close to refinery operations. According to the U.S. EPA, short-term exposures to SO_2 can harm the human respiratory system and make breathing

difficult (U.S. EPA, 2018b). According to CARB, health effects at levels near the State one-hour standard are those of asthma exacerbation, including bronchoconstriction accompanied by symptoms of respiratory irritation such as wheezing, shortness of breath and chest tightness, especially during exercise or physical activity. Exposure at elevated levels of SO_2 (above 1 ppm) results in increased incidence of pulmonary symptoms and disease, decreased pulmonary function, and increased risk of mortality (CARB, 2019d). Children, the elderly, and those with asthma, cardiovascular disease, or chronic lung disease (such as bronchitis or emphysema) are most likely to experience the adverse effects of SO_2 (CARB, 2019d; U.S. EPA, 2018b).

Particulate Matter (PM)

PM_{10} and $PM_{2.5}$ consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively (a micron is one-millionth of a meter). PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Some sources of particulate matter, such as wood burning in fireplaces, demolition, and construction activities generating dust, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility. Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than a health hazard. The remaining fraction, PM_{10} and $PM_{2.5}$, are a health concern particularly at levels above the federal and state ambient air quality standards.

As long ago as 1999, the BAAQMD CEQA Guidelines reported that studies showed that elevated particulate levels contributed to the death of approximately 200 to 500 people per year in the Bay Area. Compelling evidence suggests that $PM_{2.5}$ is the most harmful air pollutant in the Bay Area air in terms of the associated impact on public health. A large body of scientific evidence indicates that both long-term and short-term exposure to $PM_{2.5}$ can cause a wide range of health effects (e.g., aggravating asthma and bronchitis), causing visits to the hospital for respiratory and cardiovascular symptoms, and contributing to heart attacks and deaths (BAAQMD, 2017b; CARB, 2017). $PM_{2.5}$ (including diesel exhaust particles) is thought to have greater effects on health because these particles are very small and therefore can penetrate to the deepest parts of the lungs.

According to CARB, both PM_{10} and $PM_{2.5}$ can be inhaled with some deposition throughout the airways. PM_{10} is more likely to deposit on the surfaces of the larger airways of the upper region of the lung while $PM_{2.5}$ is more likely to travel into and deposit on the surface of the deeper parts of the lung, which can induce tissue damage, and lung inflammation. Short-term (up to 24 hours' duration) exposure to PM_{10} has been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease, leading to hospitalization and emergency department visits. The effects of long-term (months or years) exposure to PM_{10} are less clear, although studies suggest a link between long-term PM_{10} exposure and respiratory mortality and the International Agency for Research on Cancer published a review in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer.

Short-term exposure to $PM_{2.5}$ has been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days. Long-term exposure to $PM_{2.5}$ has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children. According to CARB, populations most likely to experience adverse health effects with exposure to PM_{10} and $PM_{2.5}$ include older adults with chronic heart or lung disease, children, and asthmatics. Children and infants are susceptible to harm from inhaling pollutants such as PM_{10} and $PM_{2.5}$ as compared to healthy adults because they inhale more air per pound of body weight than do adults, spend more time outdoors, and have developing immune systems that are more susceptible to external toxins (CARB, 2017).

Mortality studies since the 1990s have shown a statistically significant direct association between mortality (premature deaths) and daily concentrations of particulate matter in the air. Despite important gaps in scientific knowledge and continued reasons for some skepticism, a comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health and can lead to premature death (Pope and Dockery, 2006).

Lead

Ambient lead concentrations currently meet both the federal and state standards in the SFBAAB. Lead has a range of adverse neurotoxin health effects, and was formerly released into the atmosphere primarily via leaded gasoline products. The phase-out of leaded gasoline in California resulted in decreasing levels of atmospheric lead.

In the Bay Area, high concentrations of lead are only a concern in areas close to general aviation airports. Lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems and the cardiovascular system, and affects the oxygen carrying capacity of blood (U.S. EPA, 2017a). The lead effects most commonly encountered in current populations are neurological effects in children, such as behavioral problems and reduced intelligence, anemia, and liver or kidney damage. Excessive lead exposure in adults can cause reproductive problems in men and women, high blood pressure, kidney disease, digestive problems, nerve disorders, memory and concentration problems, and muscle and joint pain (CARB, 2019e).

Development under the proposed Project would not introduce any new sources of lead emissions; consequently, lead emissions are not required to be quantified and are not further evaluated in this analysis.

Toxic Air Contaminants (TACs)

TACs are air pollutants that may lead to serious illness or increased mortality, even when present in relatively low concentrations. Potential human health effects of TACs include birth defects, neurological damage, cancer, and death. There are over 200 TACs with varying degrees of toxicity identified by State of California (CARB, 2011a). Individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another. In 1998, CARB classified diesel particulate matter (DPM) as a TAC,

citing its potential to cause cancer and other health problems (CARB, 1998). The U.S. EPA concluded that long-term exposure to diesel engine exhaust is likely to pose a lung cancer risk to humans and can also contribute to other acute and chronic health effects (U.S. EPA, 2002).

The BAAQMD regulates TACs by using a risk-based approach as opposed to establishing an ambient concentrations standard. This risk-based approach utilizes a health risk assessment to determine the specific sources and TACs to control as well as the level of control necessary to reduce risk to acceptable levels. A health risk assessment analyzes exposure to toxic substances and human health risks based on the dose and potency of the toxic substances.[2]

The BAAQMD provides a publicly available inventory of TAC-related health risks for permitted stationary sources throughout the air basin as well as for freeways. This inventory presents community risk and hazards from screening tools and tables that are intentionally conservative (that is, health protective). The screening-level risk factors derived from the BAAQMD's tool are intended to indicate whether additional review related to the impact is necessary and are not intended to be used to assess precise risk levels for all projects. The BAAQMD's Google Earth-based inventory of stationary source risks and hazards, most recently updated in 2014, indicates that there are approximately 50 permitted TAC sources within a radius of 1,000 meters of the Project site. As discussed in the *Regulatory Setting* section below, the BAAQMD has more recently conducted a technical risk analysis for the West Oakland community pursuant to AB 617. This analysis evaluates TAC concentrations and resulting health risks to West Oakland residents from major emissions sources within the community. It includes many more existing sources of TAC emissions than the BAAQMD screening tools discussed above, and is more accurate and up to date than the screening tools.

Based on the BAAQMD's analysis, existing stationary sources in the vicinity of the Project include Schnitzer Steel, which has metal and volatile organic compound emissions, gas stations, and numerous diesel emergency generators. Mobile sources in the vicinity include trucks, railyards, locomotives, off-road equipment, and water-borne vessels, many of which are associated with the Port of Oakland (BAAQMD and WOEIP, 2019b). In addition, the Bay Bridge, located just northwest of the Project site, and highways 80 and 880 also contribute to health risks at the Project site. There are two existing sources of TACs within the Project site, namely the heavy-duty diesel truck activity at Howard Terminal and the energy facility referred to in this EIR as the Peaker Power Plant.

Diesel Particulate Matter

CARB identified DPM as a TAC in 1998, primarily based on evidence demonstrating cancer effects in humans. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near

[2] A health risk assessment is required for stationary source permitting approval if the BAAQMD concludes that projected emissions of a specific air toxic compound from a proposed new or modified source suggest a potential public health risk. In these instances, a health risk assessment for the source in question must be prepared. Such an assessment generally evaluates acute (short-term) effects, chronic (long-term) effects, and the increased risk of cancer as a result of exposure to one or more TACs.

heavily traveled highways. CARB estimated that as of 2000, the average Bay Area cancer risk from exposure to DPM, based on a population-weighted average ambient DPM concentration, is approximately 480 in 1 million. Recent BAAQMD health risk modeling for West Oakland shows that for 2017, the local population-weighted average cancer risk from TAC emissions in West Oakland is approximately 199 per million (303 average without population weighting), and the local population-weighted annual average $PM_{2.5}$ concentration is 1.73 µg/m^3 (1.71 µg/m^3 average without population weighting) (BAAQMD and WOEIP, 2019a).[3] The background regional population-weighted average cancer risk from TAC sources located outside of West Oakland is approximately 421 per million and the annual average $PM_{2.5}$ concentration is approximately 6.9 µg/m^3. Consequently, the total population-weighted average cancer risk from local and background sources combined is 724 per million and the total average annual average $PM_{2.5}$ concentration from local and background sources combined is 8.61 µg/m^3. Health risk from ambient concentrations of DPM are much higher than the risk associated with any other TAC routinely measured in the region. The statewide risk from DPM, as determined by CARB, declined from 750 in 1 million in 1990 to 570 in 1 million in 1995; by 2012, CARB estimated the average statewide cancer risk from DPM at 520 in 1 million (CARB, 2009; CARB, n.d.).[4] These rates have declined due to better emissions controls, statewide and local regulatory action, and more fuel-efficient technology (U.S. EPA, 2004a).

In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines (CARB, 2000). Subsequent regulations apply to new trucks and diesel fuel. With new controls and fuel requirements, 60 trucks built in 2007 would have the same particulate exhaust emissions as one truck built in 1988 (Pollution Engineering, 2006). The regulation was anticipated to result in an 80 percent decrease in statewide diesel health risk in 2020 as compared with the diesel risk in 2000 (CARB, 2005). Despite notable emission reductions, CARB recommends that proximity to sources of DPM emissions be considered in the siting of new sensitive land uses. CARB notes that these recommendations are advisory and should not be interpreted as defined "buffer zones," and that local agencies must balance other considerations, including transportation needs, the benefits of urban infill, community economic development priorities, and other quality of life issues. With careful evaluation of exposure, health risks, and affirmative steps to reduce risk where necessary, CARB's position is that infill development, mixed-use, higher-density, transit-oriented

[3] Population-weighted cancer risk is in West Oakland is calculated as the average cancer risk across each residential block in West Oakland weighted by the number of people residing in that block (BAAQMD and WOEIP, 2019c). By comparison, individual cancer risk is just the average cancer risk at a particular location, independent of population density. The West Oakland Community Action Plan (WOCAP) states:

> Based on combined AERMOD results from all sources, the excess (local) cancer risk associated with local emissions sources in the West Oakland Source Domain was 303 in-a-million people, with risk values exceeding 1,000 in-a-million in areas that are proximate large emission sources, especially those that emit high levels of DPM. Furthermore, the annual excess cancer risk decreases to 199 in-a-million when weighted by population, as the highest air toxic concentrations are generally near the Port and the Schnitzer Steel facility rather than residential areas. The total excess cancer risk in West Oakland is 724 in-a-million, based on a background value of 421 in-a-million and a local value of 303 in-a-million. Based on this modeling analysis, local sources account for ~ 42 % of the excess cancer risk in West Oakland. (BAAQMD and WOEIP, 2019a).

[4] This calculated cancer risk value from ambient air exposure in California can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which for men is more than 40 percent (based on a sampling of 17 regions nationwide), or greater than 400,000 in 1 million, according to the American Cancer Society (American Cancer Society, 2018).

development, and other concepts that benefit regional air quality can be compatible with protecting the health of individuals at the neighborhood level (CARB, 2005).

Sensitive Receptors

As discussed previously, air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. More sensitive population groups include the elderly and the young; those with higher rates of respiratory disease, such as asthma and chronic obstructive pulmonary disease; and those with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. The BAAQMD defines sensitive receptors as children, adults, and seniors occupying or residing in residential dwellings, schools, daycare centers, hospitals, and senior-care facilities. Workers are not considered sensitive receptors because they have other legal protections; specifically, employers must follow regulations set forth by the Occupation Safety and Health Administration to ensure the health and well-being of their employees (BAAQMD, 2012).

The proximity of sensitive receptors to motor vehicles is an air pollution concern, especially in heavily urbanized areas, including the Project vicinity, where roadway volumes are higher than most other parts of the Bay Area. Vehicles also contribute to particulate matter emissions by generating road dust and through suspended particulate from brake and tire wear.

Existing sensitive receptors evaluated in this DEIR include a representative sample of known residents (child and adult) in the surrounding neighborhood, and other sensitive receptors (school children, daycare facilities, etc.) located in the surrounding community and along the expected travel routes of the on-road delivery and haul trucks within the Project vicinity. The health risk impact analysis in this document also includes receptor locations out to a distance of 2,000 feet (610 meters) from the Project site, which goes beyond the requirement in the BAAQMD guidelines to analyze health risks within a 1,000 foot "zone of influence" (BAAQMD, 2017c). Based on the location of the Project in West Oakland, which has been designated by the BAAQMD as a priority community through the agency's Community Health Protection Program, this "zone of influence" was conservatively extended to 2,000 feet. Residences within 2,000 feet of the Project site are generally located immediately south and north of highway 880 and to the south in Alameda; these receptors were modeled using a fine grid with 20-meter (65.6 feet) spacing. Additionally, residential receptors in the broader West Oakland area were considered; these receptors were modeled using a coarse grid with 50-meter (164 feet) spacing. In addition to the residential receptors, schools and daycare facilities located within 2,000 feet of the Project site were identified (see Appendix AIR, *Air Quality Supporting Information*).

Based on modeling data provided by the BAAQMD, as part of the health risk analysis conducted for the West Oakland Community Action Plan (WOCAP), background cancer risk values for on-site receptor locations at the Project[5] range from 263 to 399 in 1 million, with background values ranging from 55 to 2,492 (on-site at Schnitzer Steel) in 1 million within 2,000 feet of the site. Background $PM_{2.5}$ concentrations range from 1.7 to 3.2 $\mu g/m^3$ on the Project site, with

[5] The range of on-site risk values only include modeled on-site receptor locations in the buildings at the project site where sensitive receptors might be located. As such, it is possible that there are areas on the Project site with higher and lower background risks, but these areas would not correspond to any on-site receptors.

background values varying between 1.1 to 64 µg/m^3 (on-site at Schnitzer Steel) within 2,000 feet of the site. The nearest off-site sensitive receptors are residential uses located approximately 100 feet to the north of the Project across Embarcadero Street (the Phoenix Lofts). Appendix AIR, *Air Quality Supporting Information*, has a detailed discussion of nearby sensitive receptors, including a figure presenting their locations.

Visibility Reducing Particles

Visibility-reducing particles are any particles in the atmosphere that obstruct the range of visibility by creating haze (CARB, 2016). These particles vary in shape, size and chemical composition, and come from a variety of natural and manmade sources including windblown metals, soil, dust, salt, and soot. Other haze-causing particles are formed in the air from gaseous pollutant (e.g., sulfates, nitrates, organic carbon particles) which are the major constituents of fine PM, such as $PM_{2.5}$ and PM_{10}, and are caused from the combustion of fuel. CARB's standard for visibility reducing particles is not based on health effects, but rather on welfare effects, such as reduced visibility and damage to materials, plants, forests, and ecosystems. The health impacts associated with $PM_{2.5}$ and PM_{10} are discussed above under Particulate Matter.

Air Quality Index

The U.S. EPA developed the Air Quality Index scale to make the public health impacts of air pollution concentrations easily understandable. (U.S. EPA, 2015; U.S. EPA, 2014). The Air Quality Index, much like an air quality "thermometer," translates daily air pollution concentrations into a number on a scale between 0 and 500. The numbers in the scale are divided into six color-coded ranges, with numbers 0-300 as outlined below:

- Green (0–50) indicates "good" air quality. No health impacts are expected when air quality is in the green range.
- Yellow (51–100) indicates air quality is "moderate." Unusually sensitive people should consider limited prolonged outdoor exertion.
- Orange (101–150) indicates air quality is "unhealthy for sensitive groups." Active children and adults, and people with respiratory disease, such as asthma, should limit outdoor exertion.
- Red (151–200) indicates air quality is "unhealthy." Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion.
- Purple (201–300) indicates air quality is "very unhealthy." Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit outdoor exertion.

The Air Quality Index numbers refer to specific amounts of pollution in the air. They are based on the federal air quality standards for ozone, CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$. In most cases, the federal standard for these air pollutants corresponds to the number 100 on the Air Quality Index chart. If the concentration of any of these pollutants rises above its respective standard, it can be unhealthy for the public. In determining the air quality forecast, local air districts, including the BAAQMD, use the anticipated concentration measurements for each of the major pollutants, convert them into Air Quality Index numbers, and determine the highest Air Quality Index for each zone in a district.

Readings below 100 on the Air Quality Index scale would not typically affect the health of the general public (although readings in the moderate range of 50 to 100 may affect unusually sensitive people). Historical U.S. EPA data indicate that Alameda County, the county in which the Project Site is located, experienced air quality in the Purple level (very unhealthy) on 3 days and in the Red level (unhealthy) on 16 days between the years 2015 and 2019 (less than 1 and about 3 days per year, respectively). As shown in **Table 4.2-2**, the SFBAAB had a total of 12 Orange-level (unhealthy for sensitive groups) days in 2015, 13 days in 2016, 9 days in 2017, 5 days in 2018, and 8 days in 2019. Recent elevated Air Quality Index values, with specific exacerbation to $PM_{2.5}$ and CO levels, are likely attributed to wildfires and their impact on regional air quality in California (BAAQMD, 2017e; CARB, 2019f).

TABLE 4.2-2
AIR QUALITY INDEX STATISTICS FOR ALAMEDA COUNTY

Statistics for Alameda County	Number of Days by Year				
	2015	2016	2017	2018	2019
Unhealthy for Sensitive Groups (Orange)	12	13	9	5	8
Unhealthy (Red)	0	2	4	10	0
Very Unhealthy (Purple)	0	0	1	2	0

SOURCE: U.S. EPA, 2019a.

Odorous Emissions

Though offensive odors from stationary sources rarely cause any physical harm, they still remain unpleasant and can lead to public distress generating citizen complaints to local governments. The occurrence and severity of odor impacts depend on the nature, frequency and intensity of the source; wind speed and direction; and the sensitivity of receptors. The CEQA Guidelines recommends that odor impacts be considered for any proposed new odor sources located near existing receptors, as well as any new sensitive receptors located near existing odor sources. Generally, increasing the distance between the receptor and the odor source would mitigate odor impacts.

The BAAQMD provides examples of odor sources, which include wastewater treatments plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. In accordance with the recommendations in the BAAQMD Guidelines, the City has mapped known odor sources within its jurisdiction. The Project site is not located within the buffer areas of any of the odor sources mapped by the City mapped in accordance with the BAAQMD factors (City of Oakland, 2010).

4.2.2 Regulatory Setting

Federal

The Federal Clean Air Act requires the U.S. EPA to identify National Ambient Air Quality Standards (NAAQS or "national standards") to protect public health and welfare. National standards have been established for ground-level ozone, CO, NO_2, SO_2, respirable particulate matter (PM_{10} and $PM_{2.5}$), and lead. Pursuant to the 1990 Federal Clean Air Act amendments, the U.S. EPA

classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutants, based on whether or not the NAAQS had been achieved.

Table 4.2-3 shows the current national and State ambient air quality standards for each pollutant as well as the attainment status of the Bay Area with respect to these standards.

TABLE 4.2-3
AMBIENT AIR QUALITY STANDARDS AND SAN FRANCISCO BAY AREA AIR BASIN ATTAINMENT STATUS

Pollutant	Averaging Time	State Standard	SFBAAB Attainment Status for California Standard	Federal Primary Standard	SFBAAB Attainment Status for Federal Standard
Ozone	8 Hour	0.070 ppm	Non-Attainment	0.070 ppm	Non-Attainment
	1 Hour	0.090 ppm	Non-Attainment	—	—
Carbon Monoxide	8 Hour	9.0 ppm	Attainment	9 ppm	Attainment
	1 Hour	20 ppm	Attainment	35 ppm	Attainment
Nitrogen Dioxide	Annual Average	0.030 ppm	—	0.053 ppm	Attainment
	1 Hour	0.18 ppm	Attainment	0.100 ppm	Unclassified
Sulfur Dioxide	Annual Average	—	—	0.030 ppm	Attainment
	24 Hour	0.04 ppm	Attainment	0.14 ppm	Attainment
	1 Hour	0.25 ppm	Attainment	0.075 ppm	Attainment
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 $\mu g/m^3$	Non-Attainment	—	—
	24 Hour	50 $\mu g/m^3$	Non-Attainment	150 $\mu g/m^3$	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 $\mu g/m^3$	Non-Attainment	12.0 $\mu g/m^3$	Unclassified/Attainment
	24 Hour	—	—	35 $\mu g/m^3$	Non-Attainment
Sulfates	24 Hour	25 $\mu g/m^3$	Attainment	—	—
Lead	Calendar Quarter	—	—	1.5 $\mu g/m^3$	Attainment
	30-Day Average	1.5 $\mu g/m^3$	Attainment	—	—
	3-Month Rolling Average	—	—	0.15 $\mu g/m^3$	Unclassified
Hydrogen Sulfide	1 Hour	0.03 ppm	Unclassified	No Federal Standard	—
Vinyl Chloride	24 Hour	0.010 ppm	No information available	—	—
Visibility Reducing Particles	8 Hour	Extinction of 0.23/km; visibility of 10 miles or more	Unclassified	No Federal Standard	—

NOTES:
ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter
SOURCE: BAAQMD, 2017b

The Federal Clean Air Act requires each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP) and the Federal Clean Air Act amendments added requirements for states containing areas that violate the NAAQS to revise their State Implementation Plans to

incorporate additional control measures to reduce air pollutants that are in violation of the standards. Thus, the State Implementation Plan is a living document that is periodically modified to reflect the latest emissions inventories, planning documents, rules and regulations of air basins as reported by the agencies with jurisdiction over them. The U.S. EPA has responsibility to review all State Implementation Plans to determine if they meet federal requirements and will achieve air quality goals when implemented. If the U.S. EPA determines a State Implementation Plan to be inadequate, it may prepare a Federal Implementation Plan for the nonattainment area and may impose additional control measures. Failure to submit an approvable State Implementation Plan or to implement the plan within mandated timeframes can result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

Light-Duty Vehicle Greenhouse Gas and Corporate Average Fuel Economy Standards

On May 19, 2009, President Obama announced a national policy for fuel efficiency and emissions standards in the United States auto industry. The adopted federal standard applied to passenger cars and light-duty trucks for model years 2012 through 2016. The rule surpassed the prior Corporate Average Fuel Economy (CAFE)[6] standards and required an average fuel economy standard of 35.5 miles per gallon (mpg) and 250 grams of carbon dioxide (CO_2) per mile by model year 2016, based on U.S. EPA calculation methods. These standards were formally adopted on April 1, 2010. In August 2012, standards were adopted for model year 2017 through 2025 passenger cars and light-duty trucks. By 2020, new vehicles are projected to achieve 41.7 mpg (if greenhouse gas emission [GHG] reductions are achieved exclusively through fuel economy improvements) and 213 grams of CO_2 per mile (Phase II standards). By 2025, vehicles are projected to achieve 54.5 mpg (if GHG reductions are achieved exclusively through fuel economy improvements) and 163 grams of CO_2 per mile. According to the U.S. EPA, under these standards a model year 2025 vehicle would emit one-half of the GHG emissions from a model year 2010 vehicle (U.S. EPA, 2012). In 2017, the U.S. EPA recommended no change to the GHG standards for light-duty vehicles for model years 2022–2025.

In August 2018, the U.S. EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) proposed the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule that would, if adopted, maintain the CAFE and CO_2 standards applicable in model year 2020 for model years 2021 through 2026. The estimated CAFE and CO_2 standards for model year 2020 are 43.7 mpg and 204 grams of CO_2 per mile for passenger cars and 31.3 mpg and 284 grams of CO_2 per mile for light trucks, projecting an overall industry average of 37 mpg, as compared to 46.7 mpg under the standards issued in 2012. In September 2019, the U.S. EPA published the final rule in the Federal Register.[7] The U.S. EPA also published the final rule for the One National Program on Federal Preemption of State Fuel Economy Standards that finalizes critical

[6] The Corporate Average Fuel Economy standards are regulations in the United States, first enacted by Congress in 1975, to improve the average fuel economy of cars and light trucks. The U.S Department of Transportation has delegated the National Highway Traffic Safety Administration as the regulatory agency for the Corporate Average Fuel Economy standards.

[7] Federal Register, Vol. 84, No. 188, Friday, September 27, 2019, Rules and Regulations, 51310-51363.

parts of the SAFE) Vehicles Rule and makes clear that federal law preempts state and local tailpipe GHG emissions standards as well as zero emission vehicle (ZEV) mandates.

Although these emissions standards are focused on reducing GHG emissions, they will also reduce criteria pollutant emissions; including ROG, NO_X, PM, and ozone because increased fuel efficiency will result in fewer combustion emissions associated with gasoline and diesel fuel use.

State

CARB manages air quality, regulates mobile emissions sources, and oversees the activities of county Air Pollution Control Districts and regional Air Quality Management Districts. CARB also establishes state ambient air quality standards and vehicle emissions standards.

Ambient Air Quality Standards

As shown in Table 4.2-3, California has adopted ambient standards, called the CAAQS, that are more stringent than the NAAQS for the criteria air pollutants and includes air quality standards for some pollutants for which there is no corresponding national standard. Under the California Clean Air Act, areas have been designated as attainment or nonattainment with respect to the state standards.

With respect to the State-identified criteria air pollutants (sulfates, hydrogen sulfide, visibility reducing particles, and vinyl chloride) presented in Table 4.2-3, the proposed Project would either not use base materials that generate these pollutants in the day to day operations or during construction and therefore would not have emissions of those pollutants (hydrogen sulfide, vinyl chloride, and lead), or such emissions would be accounted for as part of the pollutants estimated in this analysis (visibility reducing particles are associated with particulate matter emissions, and sulfates are associated with SO_2). Vinyl chloride is used in the process of making polyvinyl chloride (PVC) plastic and vinyl products and is primarily emitted from industrial processes (CARB, 2019g). Vinyl chloride would not be emitted directly during operations or during construction; therefore, there would be no Project emissions of vinyl chloride. In addition, CARB determined there is not sufficient scientific evidence available to support the identification of a threshold exposure level for vinyl chloride, therefore, CARB does not monitor or make status designations for this pollutant (CARB, 2011a).

Mobile Source Regulations

In response to the transportation sector accounting for a large percentage of California's CO_2 emissions, AB 1493 (HSC Section 42823 and 43018.5) (also referred to as the Pavley standards), enacted on July 22, 2002, required CARB to set GHG emission standards for passenger vehicles, light duty trucks, and other vehicles whose primary use is non-commercial personal transportation manufactured in and after 2009. The federal Clean Air Act ordinarily preempts state regulation of motor vehicle emission standards; however, California is allowed to set its own standards with a federal Clean Air Act waiver from the U.S. EPA. In June 2009, the U.S. EPA granted California the waiver.

However, as discussed previously, the U.S. EPA and United States Department of Transportation (USDOT) adopted federal standards for model year 2012 through 2016 light-duty vehicles, which

corresponds to the vehicle model years regulated under the State's Pavley Phase I standards. In August 2012, the U.S. EPA and USDOT adopted GHG emission standards for model year 2017 through 2025 vehicles; however, these standards were rescinded and replaced under the SAFE Vehicles Rule as discussed above. In response to the SAFE Vehicles Rules and the One National Program on Federal Preemption of State Fuel Economy Standards, California and 22 other states and environmental groups in September 2019 in U.S. District Court in Washington, filed lawsuits to challenge the Federal determination in September that California cannot set vehicle emission standards and zero-emission vehicle mandates.

Although these emissions standards are focused on reducing GHG emissions, they will also reduce criteria pollutant emissions; including ROG, NO_X, PM, and ozone because increased fuel efficiency will result in fewer combustion emissions associated with gasoline and diesel fuel use.

Toxic Air Contaminants

As discussed previously, the California Health and Safety Code defines TACs as air pollutants which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. The State Air Toxics Program was established in 1983 under AB 1807 (Tanner). A total of 243 substances have been designated TACs under California law including the 189 (federal) hazardous air pollutants adopted in accordance with AB 2728 in 1993. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources, requiring "High-priority" facilities to perform a health risk assessment and, if specific thresholds are violated, to communicate the results to the public.

In August of 1998, CARB identified particulate emissions from diesel-fueled engines (diesel particulate matter, or DPM) as TACs (CARB, 1998). CARB subsequently developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB, 2000). The document represents proposals to reduce DPM emissions, with the goal of reducing emissions and associated health risks by 75 percent in 2010 and by 85 percent in 2020. The program aims to require the use of state-of-the-art catalyzed DPM filters and ultra-low sulfur diesel fuel on diesel-fueled engines.

In April 2005, CARB published *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB, 2005). This handbook is intended to give guidance to local governments in the siting of sensitive land uses, such as residences, schools, daycare centers, playgrounds, or medical facilities, near sources of air pollution. There are two existing sources of TACs within the Project site: heavy-duty diesel truck activity at Howard Terminal and the energy facility referred to in this EIR as the Peaker Power Plant. In addition, there are 13 stationary sources within 1,000 feet of the Project site boundary, including the Schnitzer Steel metals recycling yard, emergency diesel generators, and gasoline dispensing facilities. The specific sources identified in the cumulative assessment are presented in Appendix AIR, *Air Quality Supporting Information*. Finally, mobile sources of TACs near the Project site include freeways and high-volume roadways.

Community Air Protection Program (AB 617)

AB 617 was promulgated into state law in 2017. The purpose of this legislation is for CARB to establish the Community Air Protection Program (CAPP). CARB's objective in implementing the CAPP is to reduce human health risk levels by reducing air toxics exposure in communities most impacted by TAC emissions. CARB requires that air districts "must initiate community partnerships and undertake a robust public process in developing and implementing the community emissions reduction programs." There have been 10 initial designated communities throughout the state targeting emissions reductions, community monitoring or both. The majority of AB 617 communities have both reduction and monitoring designations.

The state legislature has provided a funding mechanism to support early actions allowing for deployment of cleaner technologies for designated communities such as West Oakland as well as grants to promote community participation in both the monitoring and emissions reductions aspects of the program. Other aspects of the program include accelerated retrofit of pollution controls on industrial stationary sources, an increase in financial penalties, and increased transparency and availability of emissions and air quality information thereby driving air pollution control efforts statewide with a goal of improved intra-Air District communication and cooperation.

West Oakland is a designated CAPP community and a steering committee has been formed consisting of the community, BAAQMD, and CARB, to develop the West Oakland Community Action Plan (WOCAP). The WOCAP includes a list of proposed measures to reduce air pollution and resident exposure to TACs (see *Local Plans, Ordinances, and Policies* section below for a list of measures) (BAAQMD and WOEIP, 2019b). A draft Action Plan and the accompanying draft EIR were released in July 2019. The EIR was certified as final and the action plan was adopted by BAAQMD on October 2, 2019 (BAAQMD and WOEIP, 2019b). CARB adopted the action plan on December 5, 2019, per Resolution 19-29.[8] Details specific to the WOCAP are summarized in the *Local Plans, Ordinances, and Policies* section below.

AB 734

AB 734, California Environmental Quality Act: Oakland Sports and Mixed-Use Project, signed by the Governor in September 2018, specifies procedures for the administrative and judicial review of the environmental review and approvals granted for the proposed Project at Howard Terminal, provided the Project meets stringent environmental requirements. AB 734 provides an expedited judicial review process of 270 days, to the extent feasible, for any potential lawsuit against the Project to be adjudicated. To ensure that the Project meets the highest environmental requirements necessary for the expedited judicial review that has been provided to other large-scale projects, AB 734 makes a commitment to a number of conditions, including the following: (1) the baseball park receives Leadership in Energy and Environmental Design (LEED) Gold certification for new construction; (2) the project does not result in any net additional emissions of GHGs, including GHG emissions from employee transportation, and meets a requirement that not less than 50 percent of the GHG emission reduction measures necessary (excluding those from residential uses) are from local, direct GHG reduction measures, as determined by the California Air Resources Board (CARB); (3) the project has a transportation management plan or transportation

[8] CARB Resolution 19-29 is available at: https://ww3.arb.ca.gov/board/res/2019/res19-29.pdf.

demand management program, or both, that achieves a 20 percent reduction in the number of vehicle trips as compared to operations absent the transportation management plan or transportation demand management program, or both; and (4) the project is located within a priority development area identified in the sustainable communities strategy *Plan Bay Area 2040*.

In August 2020, CARB staff concluded that, with commitments to implement feasible GHG emissions reduction measures and purchase carbon credits, the proposed Project would not result in any net additional GHG emissions relative to the baseline (as calculated by CARB) and determined that the proposed Project would meet the GHG emissions requirements of AB 734 (CARB, 2020b).

Regional

The regional agency responsible for developing air quality plans for the Bay Area is the BAAQMD, the agency with permit authority over stationary emission sources of air pollutants in the Bay Area and broad responsibility for air quality conditions in the region.

BAAQMD Air Quality Plans

The 1977 Federal Clean Air Act amendments require regional planning and air pollution control agencies to prepare a regional Air Quality Plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled in order to achieve all standards specified in the Clean Air Act. The California Clean Air Act also requires development of air quality plans and strategies to meet state air quality standards in areas designated as non-attainment (with the exception of areas designated as non-attainment for the state PM standards). Maintenance plans are required for attainment areas that had previously been designated non-attainment in order to ensure continued attainment of the standards. (As indicated above, air quality plans developed to meet federal requirements are referred to as State Improvement Plans.)

For state air quality planning purposes, the SFBAAB is classified as a serious non-attainment area for the 1-hour ozone standard. The "serious" classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that the BAAQMD update the Clean Air Plan every three years to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data (Sections 40924 and 40925 of the California Health and Safety Code). The Bay Area's record of progress in implementing previous measures must also be reviewed. The plans for the SFBAAB are prepared with the cooperation of the Metropolitan Transportation Commission (MTC), and the Association of Bay Area Governments (ABAG).

In April 2017, the air district adopted the *2017 Clean Air Plan* whose primary goals are to protect public health and to protect the climate (BAAQMD, 2017d). The plan includes a wide range of proposed control measures to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and decrease emissions of potent GHGs. The *2017 Clean Air Plan* updates the *Bay Area 2010 Clean Air Plan* and complies with state air quality planning requirements as codified in the California Health and Safety Code (although the 2017 plan was delayed beyond the 3-year update requirement of the code). The SFBAAB is designated non-attainment for both the one- and eight-hour state ozone standards. In addition, emissions of ozone precursors in the air basin

contribute to air quality problems in neighboring air basins. Under these circumstances, state law requires the Clean Air Plan to include all feasible measures to reduce emissions of ozone precursors and to reduce the transport of ozone precursors to neighboring air basins.

The 2017 Clean Air Plan contains 85 measures to address reduction of several pollutants: ozone precursors, particulate matter, air toxics, and GHGs. Other measures focus on a single type of pollutant, potent GHGs such as methane and black carbon that consists of harmful fine particles that affect public health. These control strategies are grouped into the following categories:

- Stationary Source Measures;
- Transportation Control Measures;
- Energy Control Measures;
- Building Control Measures;
- Agricultural Control Measures;
- Natural and Working Lands Control Measures;
- Waste Management Control Measures;
- Water Control Measures; and
- Super GHG Control Measures.

Under the California Clean Air Act, the BAAQMD is required to develop an air quality attainment plan for criteria pollutants that are designated as non-attainment within the air district. Several project components may be subject to BAAQMD rules and regulations governing criteria pollutants, toxic air contaminants, and odorous compounds, even though permits may not be required. Stationary sources, such as generators, are required to have permits from the BAAQMD before constructing, changing, or operating the source. If the project is subject to BAAQMD permit requirements, the sources would need to comply with BAAQMD Regulation 2 and proceed through the two-stage Authority to Construct and Permit to Operate process.

BAAQMD CEQA Guidelines and Thresholds of Significance

In December 1999, the BAAQMD adopted its *CEQA Guidelines – Assessing the Air Quality Impacts of Projects and Plans*, as a guidance document to provide lead government agencies, consultants, and project proponents with uniform procedures for assessing air quality impacts and preparing the air quality sections of environmental documents for projects subject to CEQA. The *BAAQMD CEQA Guidelines* is an advisory document and local jurisdictions are not required to utilize the methodology outlined therein. The document describes the criteria that the BAAQMD uses when reviewing and commenting on the adequacy of environmental documents. It recommends thresholds for use in determining whether projects would have significant adverse environmental impacts, identifies methodologies for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts.

The BAAQMD updated the 1999 CEQA Air Quality Guidelines in 2010. In May of 2011, the BAAQMD adopted an updated version of its Thresholds of Significance for use in determining the significance of projects' environmental effects under CEQA (Thresholds), and published their

CEQA Guidelines for consideration by lead agencies. The 2011 CEQA Guidelines Thresholds lowered the previous (1999) thresholds of significance for annual emissions of ROG, NO_X, and PM_{10}, and set a standard for $PM_{2.5}$ and fugitive dust. The 2011 CEQA Guidelines also include methodologies for evaluating risks and hazards for the siting of stationary sources and of sensitive receptors. The BAAQMD resolution adopting the significance thresholds in 2010 and 2011 was set aside by the Alameda County Superior Court on March 5, 2012. On August 13, 2013, the California Court of Appeals issued a full reversal of the Superior Court's judgment, and on December 17, 2015, the California Supreme Court reversed in part the appellate court's judgment and remanded the case for further consideration consistent with the Supreme Court opinion. The California Supreme Court ruled unanimously that CEQA review is focused on a project's impact on the environment "and not the environment's impact on the project." (*California Building Industry Association v. Bay Area Air Quality Management District* (December 17, 2015, Case No. S213478)). The Supreme Court confirmed that "agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future residents or users." The Court also held that when a project has "potentially significant exacerbating effects on existing environmental hazards" those impacts are properly within the scope of CEQA because they can be viewed as impacts of the project on "existing conditions" rather than impacts of the environment on the project.

The BAAQMD most recently updated its CEQA Air Quality Guidelines in May 2017, and these guidelines continue to provide direction on recommended analysis methodologies but no longer recommend quantitative significance thresholds. In the revised Guidelines, the air district recommends that lead agencies develop their own thresholds of significance. The BAAQMD offers, as possibilities, its previous 1999 Guidelines thresholds and also presents a table of thresholds promulgated by other California air districts, as well as a reference to California Air Pollution Control Officers Association and State Air Resources Board guidance. Lead agencies may also reference the BAAQMD CEQA Thresholds Options and Justification Report developed by district staff in 2009. This latter option provides lead agencies with a justification for continuing to rely on the BAAQMD 2011 thresholds. The adopted City Thresholds for air quality are generally based upon the BAAQMD 2011 CEQA Guidelines and Thresholds, but also account for the BAAQMD's 2017 guidance. Accordingly, this document references both the 2011 and 2017 BAAQMD CEQA Air Quality Guidelines.

Local Plans, Ordinances, and Policies

City of Oakland General Plan

Land Use and Transportation Element (LUTE)

The LUTE (which includes the Pedestrian Master Plan and Bicycle Master Plan) of the Oakland General Plan contains the following objectives and policies that address issues related to reducing transportation-related sources of emissions:

> **Objective T2:** Provide mixed use, transit-oriented development that encourages public transit use and increases pedestrian and bicycle trips at major transportation nodes.
>
> > ***Policy T2.1: Encouraging Transit-Oriented Development:*** Transit-oriented development should be encouraged at existing or proposed transit nodes, defined by the convergence

of two or more modes of public transit such as BART, bus, shuttle service, light rail or electric trolley, ferry, and inter-city or commuter rail.

Policy T2.2: Guiding Transit-Oriented Development. Transit-oriented developments should be pedestrian oriented, encourage night and day time use, provide the neighborhood with needed goods and services, contain a mix of land uses, and be designed to be compatible with the character of surrounding neighborhoods.

Policy T2.5: Linking Transportation Activities. Link transportation facilities and infrastructure improvements to recreational uses, job centers, commercial nodes, and social services (i.e., hospitals, parks, or community centers).

Objective T3: Provide a hierarchical network of roads that reflects desired land use patterns and strives for acceptable levels of service at intersections.

Policy T3.2: Promoting Strategies to Address Congestion. The city should promote and participate in both local and regional strategies to manage traffic supply and demand where unacceptable levels of service exist or are forecast to exist.

Policy T3.5: Including Bikeways and Pedestrian Walks. The City should include bikeways and pedestrian ways in the planning of new, reconstructed, or realigned streets, wherever possible.

Policy T3.6: Incorporating Design Feature for Alternative Travel. The City will require new development, rebuilding, or retrofit to incorporate design features in their projects that encourage use of alternative modes of transportation such as transit, bicycling, and walking.

Policy T3.7: Resolving Transportation Conflicts. The city, in constructing and maintaining its transportation infrastructure, shall resolve any conflicts between public transit and single occupant vehicles in favor of the transportation mode that has the potential to provide the greatest mobility and access for people, rather than vehicles, giving due consideration to the environment, public safety, economic development, health, and social equity impacts.

Objective T4: Increase use of alternative modes of transportation.

Policy T4.1: Incorporating Design Features for Alternative Travel. The City will require new development, rebuilding, or retrofit to incorporate design features in their projects that encourage use of alternative modes of transportation such as transit, bicycling, and walking.

Policy T4.2: Creating Transportation Incentives. Through cooperation with other agencies, the City should create incentives to encourage travelers to use alternative transportation options.

Policy T4.3: Reducing Waiting Times. The City should encourage transit operators to reduce waiting times for users by coordinating schedules and maintaining intervals of fifteen (15) minutes or less between buses during daytime periods.

Policy T4.4: Developing Light Rail or Electric Trolley. The City supports the development of light rail or trolley bus along Regional Transit streets in high travel demand on corridors.

Policy T4.5: Preparing a Bicycle and Pedestrian Master Plan. The City should prepare, adopt, and implement a Bicycle and Pedestrian Master Plan as a part of the Transportation Element of [the] General Plan.

Policy T4.6: Making Transportation Accessible for Everyone. Alternative modes of transportation should be accessible for all of Oakland's population. Including the elderly, disable, and disadvantaged.

Policy T4.7: Reusing Abandoned Rail Lines. Where rail lines (including sidings and spurs) are to be abandoned, first consideration should be given to acquiring the line for transportation and recreational uses, such as bikeways, footpaths, or public transit.

Objective T6: Make streets safe, pedestrian accessible, and attractive.

Policy T6.1: Posting Maximum Speeds. Collector streets shall be posted at a maximum speed (usually a maximum speed of 25 miles per hour), except where a lower speed is dictated by safety and allowable by law.

Policy T6.2: Improving Streetscapes. The City should make major efforts to improve the visual quality of streetscapes. Design of the streetscape, particularly in neighborhoods and commercial centers, should be pedestrian-oriented and include lighting, directional signs, trees, benches and other support facilities.

Policy T6.3: Making the Waterfront Accessible. The waterfront should be made accessible to the pedestrians and bicyclists in Oakland's neighborhoods.

Objective D3: Create a pedestrian-friendly downtown.

Policy D3.2: Incorporating Parking Facilities. New parking facilities for cars and bicycles should be incorporated into the design of any project in a manner that encourages and promotes safe pedestrian activity.

Policy D10.6: Creating Infill Housing. Infill housing that respects surrounding development and the streetscape should be encouraged in the downtown to strengthen or create distinct districts.

Policy D11.1: Promoting Mixed-Use Development. Mixed use developments should be encouraged in the downtown for such purposes as to promote its diverse character, provide for needed goods and services, support local art and culture, and give incentive to reuse existing vacant or underutilized structures.

Policy N3.2: Encouraging Infill Development. In order to facilitate the construction of needed housing units, infill development that is consistent with the General Plan should take place throughout the City.

The LUTE also accounts for the air quality considerations of land use compatibility decisions with an objective to minimize land use compatibility conflicts (Objective I/C4) including the following policies:

Policy I/C4.1: Protecting Existing Activities. Existing industrial, residential, and commercial activities and areas which are consistent with long term land use plans for the City should be protected from the intrusion of potentially incompatible land uses.

Policy I/C4.2: Minimizing Nuisances. The potential for new or existing industrial or commercial uses, including seaport and airport activities, to create nuisance impacts on surrounding residential land uses should be minimized through appropriate siting and efficient implementation and enforcement of environmental and development controls. Where residential development would be located above commercial uses, parking garages, or any other uses with a potential to generate odors, the odor-generating use should be properly vented (e.g., located on rooftops) and designed (e.g., equipped with afterburners) so as to minimize the potential for nuisance odor problems.

Open Space, Conservation and Recreation Element (OSCAR)

The OSCAR Element of the Oakland General Plan contains the following Air Quality objective and policies that would apply to the proposed Project (City of Oakland, 1996).

Objective CO-12: Air Resources. To improve air quality in Oakland and the surrounding Bay Region.

Policy CO-12.1: Land Use Patterns Which Promote Air Quality. Promote land use patterns and densities which help improve regional air quality conditions by: (a) minimizing dependence on single passenger autos; (b) promoting projects which minimize quick auto starts and stops, such as live-work development, mixed use development, and office development with ground floor retail space; (c) separating land uses which are sensitive to pollution from the sources of air pollution; and (d) supporting telecommuting, flexible work hours, and behavioral changes which reduce the percentage of people in Oakland who must drive to work on a daily basis.

Policy CO-12.2: Coordinated Transportation Systems. Maintain a coordinated bus, rail, and ferry transit system which provides efficient service to major destinations and promotes alternatives to the single passenger auto.

Policy CO.12.3: Transportation Systems Management. Expand existing transportation systems management and transportation demand management strategies which reduce congestion, vehicle idling, and travel in single passenger autos.

Policy CO-12.4: Design of Development to Minimize Air Quality Impacts. Require that development projects be designed in a manner which reduces potential adverse air quality impacts. This may include: (a) the use of vegetation and landscaping to absorb carbon monoxide and to buffer sensitive receptors; (b) the use of low-polluting energy sources and energy conservation measures; and (c) designs which encourage transit use and facilitate bicycle and pedestrian travel.

Policy CO-12.5: Use of Best Available Control Technology. Require new industry to use best available control technology to remove pollutants, including filtering, washing, or electrostatic treatment of emissions.

Policy CO-12.6: Control of Dust Emissions. Require construction, demolition and grading practices which minimize dust emissions. These practices are currently required by the City and include the following:

- Avoiding earth moving and other major dust generating activities on windy days.
- Sprinkling unpaved construction areas with water during excavation, using reclaimed water where feasible (watering can reduce construction-related dust by 50 percent).
- Covering stockpiled sand, soil, and other particulates with a tarp to avoid blowing dust.

- Covering trucks hauling dirt and debris to reduce spills. If spills do occur, they should be swept up promptly before materials become airborne.
- Preparing a comprehensive dust control program for major construction in populated areas or adjacent to sensitive uses like hospitals and schools.
- Operating construction and earth-moving equipment, including trucks, to minimize exhaust emissions.

Policy CO-12.7: Regional Air Quality Planning. Coordinate local air quality planning efforts with other agencies, including adjoining cities and counties and the public agencies responsible for monitoring and improving air quality. Cooperate with regional agencies such as the BAAQMD, the MTC, the ABAG, and the Alameda County Congestion Management Agency in developing and implementing regional air quality strategies. Continue to work with BAAQMD and the California Air Resources Board in enforcing the provisions of the California and Federal Clean Air Acts, including the monitoring of air pollutants on a regular and ongoing basis.

Objective CO-13: Energy Resources. To manage Oakland's energy resources as effectively as possible, reduce consumption of non-renewable resources, and develop energy resources with reduce dependency on fossil fuels.

Policy CO13.2: Energy Efficiency. Support public information campaigns, energy audits, the use of energy-saving appliances and vehicles, and other efforts which help Oakland residents, businesses, and City operations become more energy efficient.

Policy CO13.3: Construction Methods and Materials. Encourage the use of energy-efficient construction and building materials. Encourage site plans for new development which maximize energy efficiency.

Policy CO13.4: Alternative Energy Sources. Accommodate the development and use of alternative energy resources, including solar energy and technologies which convert waste or industrial byproducts to energy, provided that such activities are compatible with surrounding land uses and regional air and water quality requirements.

Oakland Municipal Code

To protect sensitive receptors from public health effects from a release of hazardous substances, the Oakland Municipal Code Title 8, section 42.105, allows the City, at its discretion, to require facilities that handle hazardous substances within 1,000 feet of a residence make written disclosure of whether it will handle, store, or produce any substance presenting a threat to public health listed pursuant to section 44321 of the California Health and Safety Code and prepare a hazardous materials assessment report and remediation plan.

Per the City of Oakland Municipal Code, Title 15 Buildings and Construction, Chapter 15.36 Demolition Permits, 15.36.100 Dust Control Measures:

"Best Management Practices" shall be used throughout all phases of work, including suspension of work, to alleviate or prevent fugitive dust nuisance and the discharge of smoke or any other air contaminants into the atmosphere in such quantity as will violate any city or regional air pollution control rules, regulations, ordinances, or statutes. Water or dust palliatives or combinations of both shall be applied continuously and in sufficient quantity during the performance of work and at other times as required. Dust nuisance shall also be

> abated by cleaning and sweeping or other means as necessary. A dust control plan may be required as condition of permit issuance or at other times as may be deemed necessary to assure compliance with this section. Failure to control effectively or abate fugitive dust nuisance or the discharge of smoke or any other air contaminants into the atmosphere may result in suspension or revocation of the permit, in addition to any other applicable enforcement actions or remedies. (Ord. 12152 Section 1, 1999).

The City of Oakland has implemented Green Building principles in City buildings through the following programs: Civic Green Building Ordinance (Ordinance No. 12658 C.M.S., 2005), requiring, for certain large civic projects, techniques that minimize the environmental and health impacts of the built environment through energy, water and material efficiencies and improved indoor air quality, while also reducing the waste associated with construction, maintenance and remodeling over the life of the building; Green Building Guidelines (Resolution No. 79871, 2006) which provides guidelines to Alameda County residents and developers regarding construction and remodeling; and Green Building Education Incentives for private developers. These actions reduce natural gas use in buildings, which reduces criteria pollutant emissions from natural gas combustion.

As of March 2017, Chapter 15.04, Part 11 of the City's Municipal Code requires all new multifamily and non-residential buildings to include full circuit infrastructure for plug-in electric vehicle (PEV) charging stations for at least 10 percent of the total parking spaces. In addition, inaccessible conduits for future expansion of PEV spaces must be installed for 90 percent of the total parking at multi-family buildings and 10 percent of the total parking at non-residential buildings. The new requirements are designed to accelerate the installation of vehicle chargers to address demand. The replacement of gasoline and diesel vehicles with electric vehicles will reduce criteria air pollutants associated with traditional vehicle fuel combustion.

CARB's determinationunder AB 734 was issued August 25, 2020, and requires that projects construct at least 50 percent of residential buildings to be all-electric (see the *Project Features Analyzed* section below). As of December 1, 2020, the Oakland City Council voted to amend the City's Municipal Code to prohibit the use of fossil fuel gas in all newly constructed buildings. This includes the use of natural gas in both residential and commercial buildings. The ordinance allows for developers who can demonstrate that it is not feasible for a new building to go 100% electric to apply for a waiver.

City of Oakland Energy and Climate Action Plan (ECAP)

In 2009, the Oakland City Council passed Resolution 82129 establishing GHG) reduction targets for the City, setting goals of 36 percent reduction by 2020 and 83 percent reduction by 2050, relative to 2005. Resolution No. 84126 C.M.S., approved December 4, 2012, adopted the Energy and Climate Action Plan, which provided the City's strategy through 2020 and included Oakland's first GHG Emissions Inventory as an Appendix.

In October 2018, the Oakland City Council passed Resolution 87183 adopting an interim citywide GHG emissions reduction target of 56 percent below 2005 levels by the year 2030 to keep the City on track to meeting its 2050 target. The staff report recommending adoption of the new, interim GHG reduction target for 2030 was based on the 2018 report *Pathways to Deep*

GHG Reduction in Oakland Final Report (City of Oakland, 2018b), which uses the CURB[9] planning tool to identify the most cost-effective GHG reduction strategies for achieving long-term GHG targets consistent with state and international goals. The City's 2018 CURB report represents a robust analysis of the land use and transportation sectors, identifying the following measures related to building and transportation systems that the City could take through 2030 to change its existing emissions trajectory and achieve its long-term GHG reduction goals:

- Update codes for new buildings to eliminate gas heating systems by 2030
- Accelerate the electrification of space heating systems and dramatically improve building envelopes in existing buildings
- Increase mass transit options and coverage
- Continue to build out pedestrian and bicycle infrastructure
- Accelerate the electrification of private vehicles and low-capacity taxi and transportation network company (TNC) vehicles

In July 2020, via Resolution 88267, Oakland City Council adopted the 2030 Equitable Climate Action Plan (ECAP), a comprehensive plan to achieve the 2030 GHG reduction target and increase Oakland's resilience to the impacts of the climate crisis, both through a deep equity lens (City of Oakland, 2020a). Alongside the 2030 ECAP, Council also adopted a goal to achieve community-wide carbon neutrality no later than 2045 (City of Oakland, 2020b). Achieving carbon neutrality will require complete decarbonization (ensuring that all mechanical systems run on clean electricity) of Oakland's building sector.

The 2030 ECAP includes a set of 40 Actions projected to result in a 60 percent reduction in GHG emissions by 2030, relative to Oakland's 2005 emission levels. Actions are split into seven sectors: Transportation and Land Use, Buildings, Material Consumption and Waste, Adaptation, Carbon Removal, City Leadership, and Port of Oakland.

The following 2030 ECAP Actions would affect private development in Oakland. Many of these actions would also reduce air quality emissions in addition to reducing GHG emissions such as:

> ***TLU-1: Align all Planning Policies and Regulations with ECAP Goals and Priorities.*** In the course of scheduled revisions, the City will amend or update the General Plan, Specific Plans, Zoning Ordinance, Subdivision Regulations, Parks Master Plan, and appropriate planning policies or regulations to be consistent with the GHG reduction, adaptation, resilience, and equity goals in this ECAP. Appropriate planning policies should study the following strategies and incorporate such policies that are found not to have adverse environmental or equity impacts:
>
> - Remove parking minimums and establish parking maximums where feasible, ensuring public safety and accessibility
> - Require transit passes bundled with all new major developments

[9] Climate Action for Urban Sustainability (CURB) is a scenario planning tool that was developed by the World Bank, C40, Global Covenant of Mayors, and Bloomberg Philanthropies to assist cities in the creation of climate action plans. More information available at: http://www.worldbank.org/en/topic/urbandevelopment/brief/the-curb-tool-climate-action-for-urban-sustainability.

- Revise zoning such that the majority of residents are within 1/2-mile of the most essential destinations of everyday life
- Provide density bonuses and other incentives for developments near transit that provide less than half of the maximum allowable parking
- Update the Transit Oriented Development (TOD) Guidelines to further prioritize development of housing near transit, including housing for low, very low, and extremely low-income levels
- Require structured parking be designed for future adaptation to other uses
- Institute graduated density zoning
- Remove barriers to and incentivize development of affordable housing near transit
- Incorporate policies addressing sea level rise, heat mitigation, and other climate risks into zoning standards and all long-range planning documents. Revise these policies every five years based on current science and risk projections
- Identify and remove barriers to strategies that support carbon reduction, adaptation, resilience, and equity goals, including community solar and energy storage

TLU-2: Align Permit and Project Approvals with ECAP Priorities. The City will amend Standard Conditions of Approval (SCAs), as well as mitigation measures and other permit conditions, to align with the ECAP's GHG reduction priorities. The City will explore adoption of a threshold of significance for GHG impacts to align with the ECAP. In applying conditions on permits and project approvals, the City will ensure that all cost-effective strategies to reduce GHG emissions from buildings and transportation are required or otherwise included in project designs, including infrastructure improvements like bicycle corridor enhancements, wider sidewalks, crossing improvements, public transit improvements, street trees and urban greening, and green stormwater infrastructure. Where onsite project GHG reductions are not cost-effective, prioritize local projects benefiting frontline communities.

TLU-4: Abundant, Affordable, and Accessible Public Transit. The City will work with public transit agencies to replace autos with public transit as a primary transportation mode for trips beyond walking distance, ensuring convenient, safe, and affordable public transit access within Oakland and to neighboring cities for all Oaklanders. By 2023, the City will work with public transit agencies to develop short- and long-term strategies to increase public transit ridership by at least 3% per year each year through 2050. Strategies include modifying existing routes and creating new routes for increased reliability, frequency, speed, and efficiency, among others. To facilitate route efficiency, the City will work with AC Transit to evaluate the need for new or changed routes in Oakland on an ongoing basis. The City will also work with public transit agencies, community organizations, and community institutions to ensure that all Oakland residents, regardless of location and disability status, can access the public transit network. This will include supplementing the central transit network with zero-emission, short-distance, neighborhood-level transportation services such as shuttles, prioritizing areas with high percentages of zero-car or low-car households, persons with disabilities, low-income households, and senior citizens.

TLU-5: Create a Zero Emission Vehicle (ZEV) Action Plan. Completion of the ZEV Action Plan by 2021 will increase adoption of electric vehicles and e-mobility while addressing equity concerns and prioritizing investment in frontline communities. The plan will set ambitious targets for ZEV infrastructure and be coordinated with other land use and mobility options so that ZEVs increase as a percentage of all vehicles while overall vehicle miles

traveled decreases. The plan will address the following sectors: medium and heavy-duty vehicle electrification, including trucks and delivery vehicles; personal vehicle charging infrastructure in multifamily buildings, including affordable buildings; curbside charging; electric micromobility; workforce development; curbside charging in the public right-of-way; and City-owned parking facilities.

TLU-7: Rethink Curb Space. The City will prioritize use of curb space throughout the city by function. In order of priority, the City will allocate curb space for mobility needs for public transit and active transportation, such as walking and biking; access for people and commerce (loading zones and short-term parking); activation; and storage for long-term parking. The City's adopted Bike and Pedestrian Plans will be used to determine mobility needs. Where on-street parking is provided, the City will revise pricing, availability, and location of parking to encourage (in order of priority) active transportation, public transit, and clean vehicles, without increasing cost-burden to low-income residents and other sensitive populations such as seniors. The City will also require parking costs to be unbundled from residential and commercial leases.

TLU-8: Expand and Strengthen Transportation Demand Management Requirements. The City will increase TDM performance requirements for new developments where feasible to support the mode shifts necessary to achieve a low carbon transportation system. The City will expand the TDM program to include requirements for existing employers, and fund ongoing monitoring and enforcement of TDM requirements.

TLU-9: Ensure Equitable and Clean New Mobility. The City will ensure that new mobility platforms and technologies equitably support City carbon reduction goals, including integrated planning for vehicles, public transit, and active transportation networks and amenities. The City would undertake a number of actions to achieve this goal, including:

- Apply Greenlining Institute's Mobility Equity Framework and the Racial Equity Impact tool developed by Oakland's Department of Race and Equity to policies and programs related to new mobility.
- Increase use of Intelligent Transportation Systems to give priority to transit and clean vehicles.
- Provide incentives for walking, biking, carpooling, and ride sharing, and disincentives for fossil fuel-based on demand delivery.
- Require carbon emission reduction plans for charging and rebalancing of micromobility fleets.
- Facilitate the establishment of Transportation Management Associations to enable distribution of public transit passes and invest in increased public transit and other mobility strategies, such as walking, biking and micromobility that can reduce vehicle miles travelled.
- Explore potential for a "mobility wallet" to pay residents to take carbon- and space-efficient travel modes.

B-1: Eliminate Natural Gas in New Buildings. By 2023, the City will prohibit new buildings and major renovations from connecting to natural gas infrastructure.

In addition, ECAP measures that may apply directly to private development include:

> ***MCW-6: Establish a Deconstruction Requirement.*** The City will establish a deconstruction requirement to reduce demolition waste from construction and renovation and facilitate material reuse. The City will regulate hauling and processing of construction and demolition debris to ensure that salvageable materials are identified and removed for reuse instead of being recycled or disposed to landfill.
>
> ***A-6: Expand and Protect Green Infrastructure and Biodiversity.*** The City will fund and implement a green infrastructure program for the installation and maintenance of projects and existing civic resources such as the parks system and public spaces, to improve stormwater management, support biodiversity, reduce air pollution exposure, and increase access to natural spaces, including trees. The City will prioritize investment in frontline communities, and particularly in residential neighborhoods dominated by concrete and asphalt with limited green space and elevated air pollution, in Priority Conservation Areas, and in areas where green infrastructure, including trees and other types of vegetated buffers, can effectively address stormwater management issues and reduce air pollution exposure among sensitive populations.

West Oakland Community Action Plan

As discussed in the State regulatory section above, AB 617 known as the CAPP, requires that communities and air districts collaborate to reduce air pollution and associated health effects in certain impacted communities like West Oakland. Pursuant to AB 617, the BAAQMD and the West Oakland Environmental Indicators Project (WOEIP) together developed a community emissions reduction plan for West Oakland, referred to as the WOCAP. The plan identifies 89 potential community-level strategies and control measures intended to reduce criteria pollutant and TAC emissions and decrease West Oakland residents' exposure to these TAC emissions, with the goal of improving community health by eliminating disparities in exposure to local air pollution. Specifically, the plan sets forth equity-based targets for cancer risk, DPM and $PM_{2.5}$ concentrations in seven "impact zones" with the highest pollution levels in the City. These targets are: 1) by 2025 all neighborhoods in West Oakland have the same air quality as the average neighborhood in West Oakland has today, and 2) by 2030 all neighborhoods in West Oakland have the same air quality as the "cleanest" neighborhood in West Oakland has today (BAAQMD and WOEIP, 2019b).

As discussed in the *Environmental Setting* section above, the BAAQMD conducted a technical analysis to support the WOCAP pursuant to AB 617. This analysis spatially maps the contribution of emissions from major pollutant sources to pollutant concentrations within the community. The analysis evaluated $PM_{2.5}$ concentrations and potential health impacts (cancer risk) from directly emitted $PM_{2.5}$ and TAC emissions (including DPM), which are the primary air pollutants that pose the greatest risk to the health of residents in West Oakland. This analysis includes many more existing sources of TAC emissions than the traditional CEQA screening tools discussed above.

The WOCAP CEQA document was certified on October 2, 2019 (BAAQMD and WOEIP, 2019b). BAAQMD adopted the WOCAP on October 2, 2019 and CARB approved Resolution

19-29 adopting the WOCAP on December 5, 2019.[10] Specific strategies and emissions reduction measures are organized under the following categories: Health Programs, Land Use, Mobile Sources, and Stationary Sources. Selected measures and strategies that are relevant to the proposed Project include, but are not limited to the following (BAAQMD and WOEIP, 2019b):

Land Use Strategies:

Action 9: The City of Oakland develops a plan to limit the hours that trucks can operate in the community.

Action 13: The City of Oakland conducts a study regarding development fees for environmental mitigations.

Action 14: The Air District provides subsidized loans for local businesses to install energy storage systems (e.g., batteries, fuel cells) to replace stationary sources of pollution (e.g., back-up generators).

Action 17: The City of Oakland adopts policies to lessen air quality impacts of residential and office buildings through the reduction or elimination of natural gas systems.

Action 18: The Air District advocates for more electrical infrastructure and power storage, development of (1) fast-charging facility, (1) truck charging stations and better land use support for electric trucks by 2025.

Action 20: The City of Oakland revises development requirements to require the implementation of as many transportation demand management (TDM) strategies as feasible by developers of new buildings.

Action 22: The City of Oakland adopts more stringent air quality construction and operations thresholds and mitigation requirements for West Oakland.

Action 26: The City and Port of Oakland will work to establish permanent locations for parking and staging of Port related trucks and cargo equipment, i.e. tractors, chassis, and containers. Such facilities will provide long-term leases to parking operators and truck owner-operators at competitive rates. Such facilities will be at the City or Port logistics center or otherwise not adjacent to West Oakland residents.

Mobile Sources Strategies:

Action 29: The California Air Resources Board develops the following regulations to increase the number of zero-emission trucks and buses operating in West Oakland:

- The Advanced Clean Trucks regulation to transition to zero-emission technology those truck fleets that operate in urban centers, have stop-and-go driving cycles, and are centrally maintained and fueled.
- Amendment to the drayage truck regulation to transition the drayage truck fleet to zero emissions.

[10] California Air Resources Board Resolution 19-29 (December 5, 2019).

Action 40: The City of Oakland, consistent with the West Oakland Truck Management Plan, implements, in consultation with West Oakland residents, traffic calming measures to keep truck traffic off residential streets.

Action 41: The Air District works with CARB to streamline the process for providing financial incentives for fueling infrastructure, and for low and zero-emission equipment. The Air District increases outreach and assistance to individual owner-operators and small companies by providing 2 workshops in West Oakland by 2022.

Action 42: The City and Port of Oakland award long-term leases to vendors that will deliver trucker services (including mini-market and convenience stores, fast food, and fast casual restaurants), and parking to keep trucks off West Oakland streets.

Action 49: The Air District offers financial incentives to replace box and yard diesel trucks with zero emission trucks owned by West Oakland businesses every year.

Action 54: The Air District will award up to $1 million in funding incentives to pay for the cost of purchasing cleaner equipment in West Oakland potentially including: electric lawn and garden equipment, battery electric Transportation Refrigeration Units, cargo-handling equipment by 2021.

Action 57: Through the Pilot Trip Reduction Program, the BAAQMD offers incentives for the purchase of electric bicycles for bike share programs.

Stationary Sources Strategies:

Action 74: The Air District advocates for a plan that East Bay Clean Energy and PG&E are participating in the effort to replace the Dynergy Power Plant[11] with a cleaner and more reliable source of energy by 2022. The proposed location for this initiative is the Oakland C, Oakland L, Maritime Port of Oakland, and Schnitzer Steel substation pocket, which is located within PG&E's Oakland distribution planning area. Eligible resource types include: (1) in-front-of-the-meter renewable generation; (2) in-front-of-the-meter energy storage, and (3) behind-the-meter energy storage. EBCE is seeking to procure the energy, resource adequacy (RA), and renewable energy credits (RECs) associated with these local resources, while PG&E will focus on meeting Oakland's transmission reliability needs.

Action 75: The Air District intends to develop and fund a program to reduce exposure to air pollution at schools, day care facilities, hospitals, apartments and homes in West Oakland by 2021. This strategy includes policies or grants for building energy efficiency upgrades to reduce infiltration of pollutants and the installation of high-efficiency air filtration systems (rated MERV 13 or higher).

Action 78: Consistent with the State's Building Energy Efficiency Standards for air filtration in effect as of January 1, 2020, the City of Oakland requires newly constructed buildings of 4 or more units to include air filtration systems equal to or greater than MERV 13 (ASHRAE Standard 52.2), or a particle size efficiency rating equal to or greater than 50 percent in the 0.30–1.0 μm range and equal to or greater than 85 percent in the 1.0–3.0 μm range (AHRI Standard 680).

[11] Referred to as the Peaker Plant in this EIR.

Health Programs Strategies:

Action 82: The California Office of Environmental Health Hazard Assessment, in partnership with the Steering Committee, the City of Oakland, CARB, and the Air District, studies setting a limit on West Oakland's cumulative exposure to TACs.

Action 86: The Alameda County Public Health Department works with agency and local partners to investigate the use of green building approaches in housing construction and renovation that will reduce emissions and exposure to air pollution emissions. This work examines weatherization/energy efficiency and renewable energy services. This work draws from the Contra Costa County Health Department's pilot effort in cooperation with the Regional Asthma Management Program.

Action 87: CARB conducts a technology assessment of commercial cooking rules and control strategies and proposes incentives and/or a Suggested Control Measure for commercial cooking. The Air District offers incentives and/or proposes a regulation to reduce emissions from commercial cooking.

Action 88: The City of Oakland revises standard conditions of approval for conditional use permits for large projects to require "opt-up" to East Bay Community Energy's Brilliant 100 carbon-free electricity supply.

Port of Oakland Seaport Air Quality 2020 and Beyond Plan

In June 2019, the Port of Oakland approved its *Seaport Air Quality 2020 and Beyond Plan* (2020 and Beyond Plan) to address emissions arising from equipment and operations at the Seaport, with a pathway towards zero emissions. The 2020 and Beyond Plan seeks to minimize emissions of criteria air pollutants and toxic air contaminants, including DPM, as well as GHG emissions. The 2020 and Beyond Plan has five goals:

1. Keep the Port competitive and financially sustainable, and ensure that the Port remains a catalyst for jobs and economic development.
2. Minimize emissions of criteria air pollutants and TACs, with a focus on reducing DPM emissions, thereby reducing community exposure to pollutants that are harmful to public health.
3. Reduce GHG emissions.
4. Build and strengthen partnerships among the Port, Port tenants, equipment manufacturers, equipment owners and operators, community organizations, regulatory agencies, and the public.
5. Provide opportunities for meaningful stakeholder engagement.

The 2020 and Beyond Plan goals and strategies are designed to complement concurrent and future plans and studies by federal, State, regional, and regulatory agencies and organizations to address air quality, community health risk, and climate change. It builds upon the Port's existing Maritime Air Quality Improvement Plan that was approved by the Board of Port Commissioners in 2009 (Port of Oakland, 2019). The Port has added Port-related WOCAP strategies to the pool of screened actions for inclusion in the 2020 and Beyond Plan. Following review against the feasibility criteria, two of the WOCAP strategies were selected and approved by the Board of Port Commissioners for the 2020 and Beyond Near-Term Action Plan.

4.2.3 Significance Criteria

The City of Oakland has established thresholds of significance for CEQA impacts which are consistent with those in Appendix G of the CEQA Guidelines (City of Oakland, 2016). These adopted thresholds are presented below and have been used in the analysis.

The Project would have a significant impact on the environment if it would:

1. During project construction result in average daily emissions of 54 pounds per day of ROG, NO_X, or $PM_{2.5}$ or 82 pounds per day of PM_{10};
2. During project operation result in average daily emissions of 54 pounds per day of ROG, NO_X, or $PM_{2.5}$ or 82 pounds per day of PM_{10}; or result in maximum annual emissions of 10 tons per year of ROG, NO_X, or $PM_{2.5}$ or 15 tons per year of PM_{10};
3. Contribute to carbon monoxide (CO) concentrations exceeding the California Ambient Air Quality Standards (CAAQS) of nine parts per million (ppm) averaged over eight hours and 20 ppm for one hour;
4. For new sources of TACs, during either project construction or project operation expose sensitive receptors to substantial levels of TACs under project conditions resulting in (a) an increase in cancer risk level greater than 10 in 1 million, (b) an increase in non-cancer risk (chronic or acute) hazard index greater than 1.0, or (c) an increase of annual average $PM_{2.5}$ concentration of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$); or, under cumulative conditions, during either project construction or project operation expose existing sensitive receptors to substantial levels of TACs resulting in (a) a cancer risk level greater than 100 in a million, (b) a non-cancer risk (chronic or acute) hazard index greater than 10.0, or (c) annual average $PM_{2.5}$ concentration of greater than 0.8 $\mu g/m^3$ [NOTE: Pursuant to the BAAQMD CEQA Guidelines, when siting new TAC sources consider receptors located within 1,000 feet. For this threshold, sensitive receptors include residential uses, schools, parks, daycare centers, nursing homes, and medical centers. The cumulative analysis should consider the combined risk from all TAC sources.];
5. Expose new sensitive receptors to substantial ambient levels of TACs associated with project construction or project operation resulting in (a) a cancer risk level greater than 10 in a million, (b) a non-cancer risk (chronic or acute) hazard index greater than 1.0, or (c) annual average $PM_{2.5}$ concentration of greater than 0.3 $\mu g/m^3$; or, under cumulative conditions, expose new sensitive receptors to substantial ambient levels of TACs during either project construction or project operation resulting in (a) a cancer risk level greater than 100 in a million, (b) a non-cancer risk (chronic or acute) hazard index greater than 10.0, or (c) annual average $PM_{2.5}$ concentration of greater than 0.8 $\mu g/m^3$ [NOTE: Pursuant to the BAAQMD CEQA Guidelines, when siting new sensitive receptors consider TAC sources located within 1,000 feet including, but not limited to, stationary sources, freeways, major roadways (greater than 10,000 vehicles per day), truck distribution centers, airports, seaports, ferry terminals, and rail lines. For this threshold, sensitive receptors include residential uses, schools, parks, daycare centers, nursing homes, and medical centers.]; or
6. Frequently and for a substantial duration, create or expose sensitive receptors to substantial objectionable odors affecting a substantial number of people.

Except for impacts related to TACs and odors, air quality impacts are by their nature cumulative impacts because one project by itself generally cannot generate air pollution in mass and volume that would violate regional air quality standards. The Project's emissions are compared to specific,

quantitative thresholds for criteria pollutants. Potential resulting health risks associated with criteria pollutants are discussed in accordance with the recent California Supreme Court decision in *Sierra Club v. County of Fresno*.[12]The changes to Appendix G of the State CEQA Guidelines effective in December 2018 were intended to reflect recent changes to the CEQA statutes and court decisions. Many of these recent changes and decisions are already reflected in the City's adopted significance thresholds, which are used to determine the significance of potential impacts. To the extent that the topics or questions in Appendix G are not reflected in the City's thresholds, these topics and questions have been taken into consideration in the impact analysis below. Specifically, original criterion (b) "Violate any air quality standard or contribute substantially to an existing or projected air quality violation?" is addressed through current criteria (a) and (b). The change to original criterion (e) for odors (now criterion d), does not affect the impact analysis for Project-related odors. In addition, the analysis below also addresses CEQA Guidelines Appendix G air quality criterion (a) "Conflict with or obstruct implementation of the applicable air quality plan."

The City's thresholds of significance pertaining to air quality are generally based on the thresholds adopted by the Bay Area Air Quality Management District (BAAQMD) in June 2010. In March 2012 the Alameda County Superior Court issued a judgment finding that BAAQMD had failed to comply with CEQA when the thresholds were adopted. In August 2013 the California Court of Appeal reversed the Superior Court's decision. Pursuant to CEQA, lead agencies must apply appropriate thresholds based on substantial evidence in the record. The City's thresholds rely upon the technical and scientific basis for BAAQMD's 2010 thresholds. Use of the City's thresholds is consistent with and authorized by CEQA Guidelines section 15064. The City's thresholds have not been challenged and remain in effect. Best practice dictates that the methods for assessing air quality impacts (e.g., calculating air pollution emissions and potential health impacts) should be based on the latest version of BAAQMD's CEQA Guidelines and guidelines published by other regional, state, and federal regulatory agencies (BAAQMD, 2017c). Note that not all of the BAAQMD's 2010 thresholds have been adopted by the City for CEQA significance determination.

Approach to Analysis

The air quality analysis conducted for this impact assessment employs emission factors, models and tools distributed by industry experts and agencies with jurisdiction and management authority for air quality in the Project site including CARB, the California Air Pollution Officers Association (CAPCOA), the California Office of Environmental Health Hazard Assessment (OEHHA) and U.S. EPA. Additionally, the analysis includes methods identified in the BAAQMD *CEQA Air Quality Guidelines* (BAAQMD, 2017c).

Project Features Analyzed

The following design features have been included in the modeling for the Project.

[12] *Sierra Club v. County of Fresno* (Friant Ranch), S219783, Fifth Appellate District, F066798, Fresno County Superior Court. (2018) 6 Cal.5th 502.

Construction Activities

Construction of the Project has the potential to create air quality impacts through the use of heavy-duty construction equipment, construction workers' vehicle trips, truck hauling trips, and vendor truck trips. In addition, fugitive dust emissions would result from site disturbance, including grading and asphalt recycling, and fugitive ROG emissions would result from application of architectural coatings and paving.

For the purposes of this analysis, the Project is conservatively assumed to be developed in two phases, though actual phasing may be in two or more phases or sub-phases. As presented in the Air Quality Technical Appendix (Appendix AIR), Phase 1 construction was assumed to begin in 2020, rather than in 2022 as currently anticipated, and to be completed in 2025, when construction of Phase 2 would begin. Build-out was also expected to be completed earlier than now anticipated, and the analysis assumed that the buildings constructed in each phase of the construction program (i.e., Phase 1 or Phase 2) would be occupied and fully operational as soon as construction of each phase is completed. These assumptions are conservative because they do not account for new emissions-reducing technologies or regulations that may become applicable over time, and because occupancy and operation of each phase would likely ramp up over time, rather than immediately upon completion of construction.[13]

Mobile equipment such as excavators, graders, backhoes, loaders, pile-driving rigs, crushing equipment, pavers, water trucks, and forklifts would be used for demolition, geotechnical work, excavation, and grading, but also for building construction and hardscape and landscape materials installation.[14] Track/tire-mounted cranes and tower cranes would be used for building construction, including but not limited to steel and precast erection and building façades. Miscellaneous stationary equipment would include generators and air compressors, and possibly crushing and processing equipment and cement/mortar mixers. A variety of other smaller mechanical equipment would also be used at the Project site during the construction period, such as saw cutters, cutting/chopping saws, tile saws, stud impact guns, welding machines, and concrete boom pumps. Additionally, construction of the proposed Project would require some pile driving.

In addition, as described in Section 4.8, *Hazards and Hazardous Materials*, the Project site contains hazardous materials and is currently capped, preventing contact with the underlying contaminants in fill, soil, and groundwater. Project construction would remove all of the existing cap on the Project site as construction proceeds, with the exception of a portion of the Peaker Power Plant site, where the existing cap would be retained in place, pending future plans for the Peaker Power Plant. Depending on the specific proposed land use and location of the use within the Project site, some areas would have a new hardscape cap installed, some areas may have an engineered equivalent installed, and some areas may not require a cap. Subsurface Project

[13] To avoid unnecessary confusion, the analysis presented in this section uses numerically sequenced years (e.g. Year 1, Year 2, Year 3, etc.) to refer to the start and end of construction and other aspects of the project schedule assumed in the technical analysis presented in Appendix AIR. The Appendix continues to utilize the years used in the analysis (e.g. construction commencing in year 2020).

[14] Fire Station 2 is proposed to remain in place as part of the Project and would be incorporated into the Project design; however, the impacts of demolition of Fire Station 2 are analyzed and disclosed in this EIR in case the demolition is desired or necessary in the future.

construction activities would also include installation of piers, construction of building foundations, and installation of subsurface utilities. All grading and construction activity associated with site cleanup was included in the analysis of Project construction emissions.

Project construction would also generate emissions from off-site truck trips for deliveries of concrete and other building materials, transportation of construction equipment to and from the site, hauling soils and debris from the site, and street sweepers.

Project Operations, Stationary Sources, and Transportation Sources

The Project would generate operational emissions from a variety of sources, including stationary sources (diesel emergency generators); energy sources (natural gas combustion for heating and cooking); area sources (consumer products, architectural coatings, and landscape equipment); and from mobile sources (daily automobile and truck trips). Key operational elements of the proposed Project that could directly or indirectly result in air quality impacts include the following:

- Traffic increases associated with the new ballpark and other proposed land uses (see Section 4.15, *Transportation and Circulation*).
- Operation of emergency standby diesel generators would introduce new stationary emissions sources.
- Combustion of natural gas for heating and cooking including central power sources such as boilers.
- Other area sources including consumer products, architectural coatings, and landscape equipment.
- Travel and idling emissions associated with daily delivery and service vehicle trips.

Emissions were calculated separately for Phase 1 operations and full buildout operations, and separately for the ballpark stadium and other land uses proposed for the site. As described in Chapter 3, *Project Description*, Phase 1 would include the ballpark, up to 540 residential units, up to 250,000 square feet of office, up to 30,000 square feet of retail, approximately 400 hotel rooms located in one or more hotels, up to 1,240 parking spaces, and associated infrastructure. Phase 2 would include the remaining development, which comprises up to 2,460 residential units, up to 1.25 million square feet of office, up to 240,000 square feet of retail, up to 50,000 square feet of performance venue, up to 2,000 parking spaces for the ballpark and 5,660 parking spaces for other uses, and associated infrastructure for the Project.

The proposed ballpark at Howard Terminal would have a capacity of 35,000 attendees. For the proposed ballpark, it was assumed that the Athletics' game schedule would not shift substantially from the standard MLB Coliseum activity, which includes approximately 41 weekday evening, 14 weekday day, and 27 weekend games. For all 82 ballgames, it was assumed that each event would have a maximum attendance of 35,000; this presents a highly conservative analysis of operational emissions because it presumes that every game would sell out for an entire year. For comparison, the existing 30-year average annual attendance at the Oakland – Alameda County Coliseum is 22,671. For other events, it was assumed that the ballpark would host an average of nine concerts per year with a maximum of 35,000 attendees per event, approximately 100 corporate or community events with a maximum of 2,000 attendees, 16 plaza events with a maximum of 4,000 attendees, and 35 other events with a maximum of 7,500 attendees per year

(for a total of approximately 841,500 attendees annually). As estimates, these numbers are at the high end of what may occur, and therefore provide a conservative basis for the analysis.

LEED Certification

To qualify for CEQA streamlining under AB 734, the ballpark must receive LEED Gold certification for new construction within one year after completion of the first baseball season, and each new nonresidential building must receive LEED Gold certification for new construction within one year after its construction is completed. Residential buildings must achieve sustainability standards of at least a LEED Gold level or the comparable GreenPoint rating, including meeting sustainability standards for access to quality transit. Therefore, LEED Gold certification is part of the Project design.

Building Electrification

The Project sponsor has committed to construct at least 50 percent of residential buildings to be all-electric (i.e., no use of natural gas) consistent with CARB's determination under AB 734. The Project would also be required to comply with applicable requirements in the City's building code that reduce or eliminate the use of natural gas, unless the City grants a waiver for restaurants and/or other land uses.

Electric Vehicle Chargers

City of Oakland Municipal Code Section 15.04 requires the installation of plug-in electric vehicle (PEV) charging infrastructure, including PEV-ready, PEV-capable, and ADA-accessible parking spaces. The City's Municipal code requires EV-ready electrical prewiring but not actual charger installation. In addition, Project parking will be equipped with electric vehicle chargers at 10 percent of the total number of parking spaces (which goes beyond City of Oakland code requirements) (City of Oakland, 2017). The Project sponsor has indicated that the electric vehicle charging stations will achieve a similar or better functionality as a Level 2 charging station. This will encourage the use of EVs at the Project site and discourage the use of gasoline and diesel passenger vehicles, thus reducing mobile source emissions associated with vehicle travel to and from the Project site. Refer to Appendix AIR, *Air Quality Supporting Information*, for additional information on quantification methods, along with studies supporting the link between EV charging infrastructure and consumer EV purchases and EV travel.

Transportation Management Plan & Transportation Demand Management

As discussed in Section 4.15, *Transportation and Circulation*, California AB 734 provides that the construction of a new ballpark for the Oakland A's and an accompanying mixed-use development would qualify for expedited judicial review if (among other requirements), it includes a Transportation Management Plan (TMP) and/or Transportation Demand Management (TDM) program sufficient to achieve a 20 percent vehicle trip reduction (VTR) compared to operations absent the TMP and the TDM program. This requirement applies to both the ballpark, for which a TMP is proposed, and the other development, for which a TDM program is proposed. The 20 percent VTR needs to be achieved within one year after completing the first baseball season for the ballpark component of the Project and within one year after completing the other development. (Note that while the TMP and TDM program are required as part of AB 734 and

proposed as part of the Project, they will also be included in the Project's mitigation monitoring and reporting program (MMRP) to ensure their effectiveness and monitoring.)

Tenant Relocation

As of September 18, 2020, existing uses on Howard Terminal and their approximate acreages include truck parking/container depot (23 acres), loaded and empty container storage and staging (4 acres), longshoreperson training facilities (5 acres), berthing vessels for maintenance and storage (7 acres), and miscellaneous uses including roadways, unused areas, truck repair, and office uses (11 acres). Truck parking/container depot uses are implemented under license through a truck parking management operating agreement that expires in April 2021 and that is anticipated to be extended; the agreement covers all parking areas at the Seaport, including Howard Terminal and the Roundhouse. All other leases at Howard Terminal (approximately six, including drayage truck yards) are month-to-month, may be terminated on 30 days' written notice, and do not include tenant relocation rights or benefits.

With development of the proposed Project, the existing tenants and users of Howard Terminal are assumed to move to other locations within the Seaport (including the Roundhouse parking adjacent to Howard Terminal), the City, or the region in which their uses are permitted under applicable zoning and other regulations. The Port is currently evaluating other locations within the Seaport for the longshoreman training facility.

On behalf of Bay Conservation and Development Commission (BCDC), The Tioga Group recently completed the *2019-2050 Bay Area Seaport Forecast* (Tioga Group, 2020). Under a strong growth scenario, the forecast projects that 13.4 acres of overnight parking for drayage tractors (no container or chassis) and 17.1 acres of overnight parking with container and chassis, for a total of 30.5 acres of overnight parking, would be required by 2050. Slow and moderate growth scenarios would require a total of 28.4 acres and 29.7 acres of parking, respectively. As part of the Oakland Army Base (OAB) redevelopment, the City and Port are each required to provide 15 acres of truck parking and ancillary maritime services, and have designated areas for those purposes. Specifically, the City has identified the approximately 15-acre site within the former OAB to fulfill this obligation, and the Port has located 15 acres of parking in the Roundhouse, directly west of Schnitzer Steel, to fulfill its obligation for 15 acres of overnight parking. Because information from the Tioga forecast indicates the need for up to 30.5 acres of overnight parking under the strong growth forecast scenario, this additional 30 acres of combined Port and City parking will be sufficient to meet the overnight parking needs of the Port through 2050.

Therefore, truck drivers or businesses currently parking at Howard Terminal should find sufficient overnight parking in the Seaport or the former OAB. On the other hand, for those who prefer to use container depot facilities, where containers are stored for several days or more instead of overnight, they would likely need to find a location outside the Seaport in areas of the City or the region where such uses are permitted by zoning. Each driver or business would make an independent assessment, based on individual operational needs, business plans, locations where container depot uses are permitted and available, and other factors, as to where or whether to move.

It would be speculative for this EIR to make assumptions as to the specific locations where each of the current short-term tenants and users would elect to relocate. However, as indicated by the Port, one possibility is that the truck parking currently occurring at Howard Terminated could relocate to the Roundhouse. Therefore, the analysis presented in the section conservatively includes an assessment of the additional health risks from this relocation. This analysis is conservative because the Roundhouse is closer to the Project site than other potential locations that might be used for truck parking, and health risks when combined with those of the Project would be greater than they would be if the truck parking were to occur at other, more distant locations.

Outside of the Seaport and the OAB, in the vicinity of West Oakland, the City's zoning significantly restricts trucking-related uses and off-street truck parking. Trucking related uses are only allowed in the "T-overlay" zone, which is the area directly north of Howard Terminal and south of 5th Street, bounded by Brush Street to the east and the southbound Union Street off-ramp from I-880 to the west. Most of the area within the T-overlay zone is developed. Most, if not all, of the properties that could be used for truck parking, container staging, or similar uses are currently occupied, for example by warehouses, a bus fleet yard, and light industrial businesses with associated auto parking lots. Existing truck parking outside of the T-overlay zone is either illegal or a legal non-conforming use that cannot be expanded. In particular, the areas under the I-880 freeway, with the exception of those with limited turning area to accommodate truck movement, are already mostly occupied by existing truck parking. Therefore, the impacts of truck parking on sensitive uses are part of the existing conditions in this area.

Similarly, with regard to on-street truck parking, including drayage truck parking, in nearby West Oakland, the West Oakland Truck Management Plan, approved in May 2019, includes four strategies intended to address truck and trailer parking across West Oakland by both changing regulation and improving enforcement. Strategy 8 (change parking regulations) is identified as a "Year 1" strategy and is expected to be implemented in 2021 (City of Oakland and Port of Oakland, 2019). Preparation of the West Oakland Truck Management Plan was undertaken expressly to comply with and to implement Mitigation Measure 4.3-7 of the OAB EIR, which states: "The City and the Port shall continue and shall work together to create a truck management plan designed to reduce the effects of transport trucks on local streets." As used in this Mitigation Measure, "transport trucks" means the trucks serving the Port of Oakland and the OAB. Mitigation Measure 4.3-7 is focused on reducing negative impacts from transport trucks, including drayage trucks, on local streets, which is also expected to improve the quality of life, including localized improvements in air quality, for the community (City of Oakland, 2002).

Drayage trucks currently bring goods to and from the Port of Oakland from a variety of off-site locations via the regional freeway system. This would continue with the proposed Project, and only the trip ends associated with use of parking at Howard Terminal would occur elsewhere, although where is unknown. Nonetheless, the trucks would continue to enter the Seaport at the three access points on Adeline, 7th, and Maritime Streets, and only their parking/staging locations would be located elsewhere in the Seaport, the City, or the region.

VMT associated with truck travel is likely to change, but the magnitude of the change and whether VMT would increase or decrease is currently not known by either the Project sponsor, the City, or the Port. Therefore, estimating the change in VMT and resulting emission increases or decreases would be speculative and is therefore not conducted.

In this EIR's analysis, criteria pollutant emissions associated with existing Howard Terminal tenants (i.e. current truck parking and related activities at the Project site) were not subtracted from the total new emissions associated with the Project because these emissions are analyzed at a regional scale within the air basin, and it is assumed that the tenants would relocate elsewhere in the Seaport, the City, or the region, and the emissions associated with these tenants' activities would continue to occur in different locations within the region. For exposure to TAC emissions, which is analyzed locally in the Project-level health risk assessment, this EIR subtracts the health risks associated with exposure to existing TAC emissions derived from trucks locally accessing and parking at Howard Terminal (as an existing condition) from the Project's contribution to health risks since the CEQA project-level standard of significance is an increase in health risk, and adds the increase in health risks to account for an equivalent amount of parking relocated to the Roundhouse. This EIR also includes the quantity of existing TAC emissions associated with trucks locally driving between the Seaport and freeway, which trucks use to access the origin/destination of the goods they carry as part of the analysis, and includes the exposure of sensitive populations to these existing TAC emissions.

Methods for Analysis of Impacts

Construction and operation of the proposed Project would result in criteria air pollutant emissions, which are generally regional in nature, and exposure to TACs including DPM and $PM_{2.5}$. Construction and operational TAC emissions can result in a localized health impact expressed in terms of exposure to $PM_{2.5}$ annual average concentrations and the increased probability of contracting cancer per 1 million persons exposed to TAC concentrations. The assessment of criteria air pollutant impacts provided below addresses significance criteria 2 and 3 identified above (i.e., operational ROG, NO_X, $PM_{2.5}$, PM_{10} and CO). The assessment of localized health risk and exposure to $PM_{2.5}$ concentrations addresses City significance criteria 4 and 5 identified above (i.e., TAC impacts on sensitive receptors).

With respect to odors (criterion 6), the BAAQMD's 2017 CEQA Guidelines provide guidance in the form of screening distances, to help evaluate potential odor impacts. They identify potential odor sources of particular concern, such as wastewater treatment plants, oil refineries, asphalt plants, chemical manufacturing, painting/coating operations, coffee roasters, food processing facilities, recycling operations and metal smelters, and recommend buffer zones around them to avoid potential odor conflicts.

The air quality analysis conducted for this impact assessment uses the emission factors, models, and tools distributed by a variety of industry experts and agencies including CARB, CAPCOA, OEHHA, and the U.S. EPA. Additionally, the analysis uses methods identified in BAAQMD's *CEQA Air Quality Guidelines* (BAAQMD, 2017c). While the air district is currently developing an update to its *CEQA Air Quality Guidelines*, which will likely include changes to its thresholds of significance, no draft has yet been made public and therefore this analysis applies the most

recent guidance available. The air district anticipates publishing new draft guidance by the end of 2019 or early 2020.

As noted earlier, in the *California Building Industry Association v. Bay Area Air Quality Management District* case decided in 2015,[15] the California Supreme Court held that CEQA does not generally require lead agencies to consider how existing environmental conditions might impact a project's users or residents, except where the project would exacerbate an existing environmental condition. Accordingly, the significance criterion 5 above related to exposure of new sensitive receptors to substantial pollutant concentrations are applicable only to the extent that the Project exacerbates existing air quality conditions. If the project would exacerbate existing or future air quality conditions, then the significance of that impact needs to be analyzed.

Criteria Air Pollutants

As described above under Regulatory Framework, the SFBAAB experiences low concentrations of some pollutants when compared to federal or state standards and is designated as either in attainment or unclassified for criteria pollutants, with the exception of ozone (ROG and NO_X are ozone precursors), $PM_{2.5}$, and PM_{10}. These pollutants are designated as non-attainment for either the State or federal standards.

By definition, regional air pollution is largely a cumulative impact in that no single project is sufficient in size to, by itself, result in nonattainment of air quality standards. Instead, a project's individual emissions are considered to contribute to the existing, cumulative air quality conditions. If a project's contribution to cumulative air quality conditions is considerable, then the project's impact on air quality would be considered significant (BAAQMD, 2017c).

Construction Emissions

Fugitive dust emissions are typically generated during construction phases. Studies have shown that the application of best management practices (BMPs) at construction sites effectively controls fugitive dust, and individual measures have been shown to reduce fugitive dust by anywhere from 30 to 90 percent (Western Regional Air Partnership 2006; BAAQMD 2009). The BAAQMD recommends that analyses focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to a quantitative significance threshold (BAAQMD, 2017c). Therefore, implementation of these BMPs (BAAQMD mitigation measures) are the basis for determining the significance of air quality impacts from fugitive dust emissions.

Mass average daily and annual combustion emissions were evaluated consistent with the methodology used by the California Emissions Estimator Model (CalEEMod) (version 2016.3.2), an emissions estimation/evaluation model that was developed in collaboration with the air quality management districts of California. CalEEMod separates the construction process into multiple phases to account for various construction scenarios. Off-road construction equipment emissions were estimated using the emission factors from CARB's OFFROAD 2011 model, and on-road construction emissions were estimated using the emission factors from EMission FACtors 2017

[15] *California Building Industry Association v. Bay Area Air Quality Management District,* 62 Cal.4th 369. Opinion Filed December 17, 2015.

(EMFAC2017) model.[16] The use of these models is also consistent with the BAAQMD's health risk modeling for the WOCAP (BAAQMD and WOEIP, 2019c). Off-gassing emissions associated with the application of architectural coatings and asphalt paving were estimated using default CalEEMod methods and emission factors.

Total construction emissions by phase and sub-phase were calculated using the estimated duration of each construction phase for comparison against the significance thresholds. Because there would be overlapping construction and operational activities after Phase 1 is complete, both average daily and total annual construction emissions are estimated for comparison to the BAAQMD significance thresholds. Refer to Appendix AIR, *Air Quality Supporting Information*, for a detailed list of project-specific equipment considered and duration assumptions.

It was conservatively assumed that construction activities would occur over seven years total, which is the fastest potential period over which the Project could be constructed; if construction occurs over a longer timeframe, actual average daily or maximum annual emissions could be less than those estimated in this analysis.[17] For the purposes of this analysis, the Project is conservatively assumed to be developed in two phases, though actual phasing may be in two or more phases or sub-phases. The emissions estimates presented in this section are based on a technical analysis assuming Phase 1 of construction would begin in 2020 (referred to throughout this section as Year 1) with a target completion date of mid-2023 (Year 4), Phase 2 demolition would occur in conjunction with Phase 1 during Years 1 and 2 and the construction of Phase 2 would begin in 2023 (Year 4) to be completed by 2027 (Year 8). This represents a conservative estimate because construction is now anticipated to start two years later than assumed in this analysis (2022 instead of 2020) and emission estimates presented in this analysis do not account for the benefits of technological advances, fuel-efficiency improvements, and building code updates likely to occur in the future during later years of construction, which would reduce the construction emissions from those contained in this analysis (ESA, 2021). For example, refer to Table 9 in Appendix AIR, *Air Quality Supporting Information*, which presents declining emission factors for onroad construction equipment over time.

This analysis also assumes that the buildings constructed in each phase of the construction program (i.e., Phase 1 or Phase 2) would be occupied and fully operational as soon as construction of each phase is completed. This is conservative because occupancy and operation of each phase would likely ramp up over time, rather than immediately upon completion of construction. Also because operation of Phase 1 is anticipated to occur during construction of Phase 2, the operational analysis (see Impact AIR-2) accounts for Phase 1 operational emissions that would occur simultaneously with construction of Phase 2. This allows for an analysis of the

[16] Updated EMFAC2017 emission factors published by CARB in December 2017 were approved by U.S. EPA on August 15, 2019.

[17] The phasing of project implementation would be subject to changes due to market conditions and other unanticipated factors. If construction is delayed or occurs over a longer period, emissions could be reduced because of (1) newer and cleaner-burning construction equipment fleet mix and (2) a less intensive and overlapping buildout schedule (i.e., fewer daily emissions occurring over a longer period). Conversely, if construction is accelerated and occurs over a shorter period, average daily and total annual emissions could increase. However, it is assumed that the construction schedule represents an accelerated phasing schedule for the Project for the purposes of conservatively assessing impacts, and that construction would not occur at a more rapid pace than is analyzed.

total emissions that would occur from construction activities and simultaneous operations during the seven-year construction period.

All construction emissions were analyzed primarily using methods from CalEEMod with the exception of on-road vehicles. For on-road vehicles, including haul trucks and vendor trips, travel and idling emissions were estimated using emission factors from the EMFAC2017 model. A detailed discussion of data sources and analysis used to calculate construction emissions is provided in Appendix AIR, *Air Quality Supporting Information*.

Operational Emissions

Mass average daily and annual mobile and area source operational emissions were estimated using methods consistent with the CalEEMod (version 2016.3.2) and EMFAC2017 emissions models. For purposes of estimating emissions from ballpark-related activities, it was assumed that each event would have a maximum attendance of 35,000; this presents a highly conservative analysis of operational emissions because it presumes that every game would sell out for an entire year.

The Project would generate operational emissions from stationary sources (diesel emergency generators); energy sources (natural gas combustion in stoves and heating); area sources (consumer products, architectural coatings, and landscape equipment); and mobile sources (exhaust from on-road automobile and truck trips). The analysis conservatively assumes that the Project would include an emergency generator at the ballpark stadium as well as a new emergency generator on each of the mixed-use buildings for a total of 17 new generators.

Area source and energy emissions were calculated using methods consistent with CalEEMod based on the type and size of land uses associated with the Project, including the estimated average annual number of attendees at the ballpark and the number of the residents anticipated on site. Natural gas combustion for the ballpark was estimated based on historical natural gas use from the Coliseum, which is conservative because the new ballpark would likely be more efficient for natural gas use than the existing Coliseum. Natural gas use was adjusted to reflect the 2019 Title 24 Energy Efficiency Standards, which apply to all new construction after January 1, 2019. Other area sources are consumer products, architectural coatings, and landscaping equipment. Total area source emissions depend on square footage and the number of dwelling units.

Mobile-source emissions for the proposed Project would include event-day trips related to MLB games and other events at the ballpark; commute trips by ballpark and sports team management employees; resident, employee, and visitor trips associated with the other development/land uses on the site; delivery trips associated with events at the ballpark and the performance venue; and bus trips to the performance venue. These emissions were calculated using emission factors from EMFAC2017 for Alameda County based on the number of vehicle trips identified in the transportation analysis conducted for the Project and the anticipated fleet mix for each travel category (Fehr & Peers, 2019). Emissions for vehicles were estimated for running exhaust, idling exhaust, starting exhaust, and evaporative losses. Fugitive PM_{10} and $PM_{2.5}$ emissions were estimated for road dust, tire wear, and brake wear using EMFAC2017 emission factors and silt loading factors specific to Alameda County (CARB, 2018a; CARB, 2018b). Emissions were also

calculated for heavy-duty delivery truck idling and TRU operation for refrigerated trucks associated with deliveries of materials to the ballpark and performance venue events.[18]

Emissions were also calculated for Port truck idling associated with additional traffic delays on weekdays due to ballgames and ancillary land uses, based on information in the traffic study. Idling emissions were calculated using idle-hour per day delays for specific time periods at various intersections within the vicinity of the Project and the Port from the transportation study and the same methods and emission factors discussed above for truck idling.

Additionally, the emissions benefit of on-site electric vehicle (EV) charging stations for 10 percent of the total number of parking spaces was quantified (note that City of Oakland Municipal Code Section 15.04 requires 10 percent of parking spaces to install EV-ready electrical prewiring). Availability of EV chargers is expected to replace criteria pollutant emissions-generating conventional fossil-fueled vehicles by encouraging EV use. To estimate the additional emission reductions from the Project charging stations beyond the business-as-usual EV fleet penetration assumed by CARB, the EV fleet penetration in the "Reference Scenario" of CARB's VISION model was subtracted from the EV fleet penetration in CARB's VISION Model Cleaner Technologies and Fuels (CTF) scenario in the Bay Area region for each relevant calendar year. This approach thus only takes emission reductions for charger use that occurs due to the Project and excludes reductions from charger use that would be expected to occur with default EV fleet penetration in absence of the Project. Refer to Appendix AIR, *Air Quality Supporting Information*, for additional information on quantification methods, along with studies supporting the link between EV charging infrastructure, consumer EV purchases, and EV travel.

The Project sponsor's commitment to CARB to construct at least 50 percent of residential buildings to be all-electric (i.e., use of electricity rather than natural gas for cooking and heating) is not reflected in the quantitative analysis of project operations.

The Project is not expected to require additional ferry or excursion vessel service for ballgames, although some weekend and post-game service could be provided if ferries are available. According to the San Francisco Bay Area Water Emergency Transportation Authority (WETA), during peak periods, the existing terminal will be fully utilized by the planned service expansion contemplated in the Downtown San Francisco Ferry Terminal Expansion Project Draft EIR, and no ballgame-specific service is possible during peak commute hours (URS Corporation, 2013). WETA ferries currently have capacity on regular commuter boats coming from SF on weeknights pre-game, and WETA may be able to run a dedicated return boat after week-day games and consider some weekend service. Any potential service to the ballpark is expected to fall within the regional service levels analyzed in WETA's EIR.

[18] Only truck operations data for the ballpark and performance venue events were available; heavy-duty delivery truck activity associated with other development is not known. TRU emissions from non-ballpark land uses of the Project were not included since it is not yet known what tenants will be included in these land uses. Therefore, for the ballpark and performance venue, emissions associated with heavy-duty delivery truck idling and TRU operation were based on specific ballpark-related truck activity. For the non-ballpark uses, heavy-duty delivery truck emissions are based on EMFAC2017 default values, and no TRU-related emissions were included due to lack of data.

Operational emissions associated with specific pollutant-generating activities by future tenants were not estimated because the future tenants and their activities are currently not known. It would therefore be speculative to predict these activities and their emissions. Such activities may include truck-related businesses (like shipping and delivery services), dry cleaning, and other light industrial uses that may generate criteria pollutant and TAC emissions. Because it would be speculative to attempt to quantify emission associated with future activities like these, they were not quantified in this EIR.

A detailed quantification of operations-related criteria air pollutant emissions was conducted for Year 4, the completion year for Phase 1 construction and upon Project buildout operations in Year 8. The criteria air pollutant significance thresholds reflect when a project would contribute considerably to significant air quality impacts. Operational emissions are added to construction emissions when they would occur concurrently (Year 4–Year 8).

A detailed discussion of data sources and analysis used to calculate operational emissions is provided in Appendix AIR, *Air Quality Supporting Information*.

Existing Conditions

Operational emissions from existing conditions include criteria air pollutant and precursor emissions, including ROG, NO_X, PM_{10}, and $PM_{2.5}$ from a variety of emissions sources, including architectural coating, consumer products, energy use (indirect emissions from electricity and direct emissions from natural gas), exhaust from on-road vehicles (mobile emissions), stationary sources within the Coliseum site (generators), water and wastewater, solid waste disposal, and area sources such as landscaping equipment. Existing conditions represent operations at the existing 47,170-attendee capacity ballpark at the Oakland – Alameda County Coliseum as the home field of the Oakland A's for the year 2018.

For purposes of estimating emissions from existing ballpark-related activities at the Oakland – Alameda County Coliseum, the 30-year average annual attendance of 22,671 was used. This is lower than the maximum attendance value assumed for Project-related emissions of 35,000 attendees per game. The facility also currently hosts other special events (e.g., Motocross and Monster Jam exhibitions). As of 2018, which is the existing conditions year used in this EIR, the Coliseum hosted other non-A's events, including National Football League (NFL) football games (which have been relocated to Las Vegas). For purposes of this analysis, since only emissions associated with A's operations and ballgames would be guaranteed to be relocated to the new ballpark, these were the emissions eliminated from the estimate of "net new" emissions associated with the Project for determining impacts. In other words, all A's related emissions at the new ballpark would not technically be "new" regional emissions. These emissions are presented below under Impact AIR-2. Emissions for full Coliseum operations in 2018, including emissions associated with events that would not relocate to the Project site (such as NFL games), are presented in Appendix AIR, *Air Quality Supporting Information*, for informational purposes only.

Mass average daily and annual mobile and area source emissions for existing conditions were estimated using methods consistent with the CalEEMod (version 2016.3.2) emissions model for an operational year of 2018. Emission calculation methods for existing conditions are consistent with

those used for Project operations as discussed above. Regarding mobile sources for A's home games, trips that previously would have begun or ended at the Oakland – Alameda County Coliseum would instead be replaced with trips to or from the Project site, to the extent that the proposed ballpark's smaller seating capacity (35,000 seats) would be able to accommodate them. As noted above, the 30-year average annual attendance of 22,671 was used to estimate A's related mobile source emissions at the Coliseum. Mobile source emissions were calculated using vehicle trips identified in the transportation analysis conducted for the Coliseum (Fehr & Peers, 2019) and EMFAC2017 emission factors. Emissions for all other sources were based on activity data supplied by the Project sponsor and CalEEMod default values where needed.

As discussed above (under *Tenant Relocation*), with development of the proposed Project, the existing tenants and users of Howard Terminal are assumed to move to other locations within the Seaport, the City, or the region in which their uses are permitted under applicable zoning and other regulations. As such, criteria pollutant emissions associated with the relocation of existing Howard Terminal tenants were not subtracted from total new emissions associated with the Project because it is assumed that the tenants would relocate elsewhere in the City or the region and the emissions associated with these tenants' activities would continue to occur in different locations within the region.

Also, the fire station located on the Project site was not in operation when the NOP was issued and emissions associated with the fire station's use were not included in a calculation of "net new" emissions because operation of the fire station is a City service, unrelated to the Project, and would occur on the Project site or elsewhere in the City whether or not the Project is constructed.[19]

A detailed discussion of data sources and analysis used to calculate emissions for the Oakland – Alameda County Coliseum is provided in Appendix AIR, *Air Quality Supporting Information*.

Local Health Risks

The Health Risk Assessment (HRA) prepared for the Project focuses on $PM_{2.5}$ and TACs because these pose significant health impacts at the local level (BAAQMD, 2017c). The methods for the TAC analysis were based on the most-recent BAAQMD Recommended Methods for Screening and Modeling Local Risks and Hazards, which recommends the use of the U.S. EPA's American Meteorological Society/U.S. EPA Regulatory Air Dispersion (AERMOD) model (BAAQMD, 2012). The HRA also follows the most recent Air Toxics Hot Spots Program Risk Assessment Guidelines from OEHHA (CalEPA and OEHHA, 2015).

This analysis calculated the Project-level excess lifetime cancer risk, chronic health impacts, and annual average $PM_{2.5}$ concentrations to estimate Project-specific and cumulative health risks for both construction and operational emissions. These calculations were based on the emission calculation methods identified above, annual average pollutant concentrations determined from

[19] Fire Station 2 is proposed to remain in place as part of the Project and would be incorporated into the Project design; however, the impacts of demolition of Fire Station 2 are analyzed and disclosed in this EIR in case the demolition is desired or necessary in the future.

AERMOD, and accepted dose and risk calculations from OEHHA and BAAQMD, as discussed below.

The HRA examined all existing sensitive receptors within 2,000 feet of the Project boundary and parts of West Oakland in the vicinity of nearby freeways. The Project would locate new sensitive receptors, primarily residential land uses and daycare facilities, on-site and these were also considered. For each exposure scenario (as described below) and health risk type (excess lifetime cancer risk, chronic health impacts, and annual average $PM_{2.5}$ concentrations), the HRA identified the Maximally Exposed Individual Receptor (MEIR) for determining the impacts of the Project. The MEIR represents the receptor location with the greatest health risk. Refer to Appendix AIR, *Air Quality Supporting Information*, for specific locations of existing and proposed on-site residential uses.

TAC Concentrations

The HRA evaluated health risks and $PM_{2.5}$ concentrations resulting from the Project upon the surrounding community. For the Project, this would include construction emissions over the course of buildout, operational traffic, operational heavy-duty delivery truck travel and idling, TRU operation for refrigerated trucks at the ballpark, and stationary sources (emergency generators).[20] The methods used to evaluate emissions for the Project and cumulative health risk assessment are based on the most recent air district CEQA Guidelines and the most recent Air Toxics Hot Spots Program Risk Assessment Guidelines (BAAQMD, 2016b; CalEPA and OEHHA, 2015). In addition, the HRA is generally consistent with the BAAQMD's health risk modeling for the WOCAP (BAAQMD and WOEIP, 2019c). Any differences in modeling methods are noted below.

The cancer risk analysis in the HRA is based on construction DPM concentrations from off-road diesel construction equipment and on-road diesel haul trucks and operational DPM concentrations from the emergency generators, operational traffic, delivery truck travel and idling, and TRU operations for the ballpark. In addition, volatile organic TAC emissions, speciated from evaporative and exhaust total organic compounds (TOGs) from on-road emissions from non-diesel vehicles during operations were also included in the cancer risk analysis. TAC concentrations were estimated using the U.S. EPA's preferred atmospheric dispersion modeling system (AERMOD) (U.S. EPA, 2018c).

Annual average $PM_{2.5}$ concentrations for construction were estimated based on exhaust emissions from off-road diesel construction equipment and on-road diesel haul trucks. Annual average $PM_{2.5}$ concentrations for operations were estimated based on exhaust emissions from all fuel combustion sources; including operational traffic, emergency generators and delivery vehicles,

[20] TRU emissions from non-ballpark land uses were not included since it is not yet known what tenants will be included in the non-ballpark land uses and whether TRUs would be part of their operations. Similarly, while the analysis includes idling emissions from trucks traveling to and from the Port of Oakland delayed in traffic due to the Project the HRA does not include exposure of sensitive receptors to these emissions. These idling emissions represent only 1.3 percent of all DPM emissions from mitigated Project operations, and would be spread out around the many intersections analyzed rather than concentrated in the vicinity of the MEIR, resulting in a minimal effect on on-site or off-site receptors included in the HRA analysis.

and TRU operations; as well as fugitive emissions from tire wear, brake wear, and road dust from mobile sources.

For a conservative estimate, health impacts from operational traffic were evaluated for all roadways including highways with Project-generated traffic above 1,000 vehicles per day in the vicinity of the Project. Health impacts from operational traffic were also evaluated for all highway segments with less than 1,000 Project-generated trips per day that were neighbored by two other segments with more than 1,000 Project-generated trips per day.

As noted above, operational emissions associated with specific pollutant-generating activities by future tenants, such as truck-related businesses or dry cleaning, were not estimated because the future tenants and their activities are currently not known. It would therefore be speculative to predict these activities and their emissions. The only exception was truck parking on the Roundhouse site at the Port of Oakland, which was assumed in the analysis in order to account for potential relocation of truck parking from Howard Terminal. Specifically, health risks associated with truck parking that may relocate from Howard Terminal to the Roundhouse site were estimated.

For detail with regard to terrain and land use considerations, emission rates, source parameters, and risk characterization methods applied in the assessment, please refer to Appendix AIR, *Air Quality Supporting Information*.

Sensitive Receptors

As discussed above in the Environmental Setting section, in order to evaluate health impacts to on-site and off-site receptors, nearby sensitive receptor populations were identified. Sensitive receptor locations were identified using a search performed by Environmental Data Resources (EDR), as shown in Appendix AIR. The EDR report identified schools, daycare centers, nursing homes, and hospitals near the Project. These locations were modeled as discrete locations.

Workers are not considered sensitive receptors because they have other legal protections, including regulations set forth by the Occupation Safety and Health Administration. These protections guarantee the health and safety of workers and potential worker health risks are therefore not evaluated in this HRA, per BAAQMD CEQA guidelines (BAAQMD, 2012). Homeless individuals were also not considered sensitive receptors for the purposes of this analysis. Because their locations are not known, it would be speculative to assume the long-term presence of individual homeless receptors at any given location in the modeling domain. In addition, cancer risk is evaluated over a lifetime exposure of 30 years, and it is unlikely that any homeless individual would remain present near the Project site for a full 30 years. The HRA does include numerous sensitive receptor locations near the Project site, including the Phoenix Lofts building approximately 100 feet to the north of the Project across Embarcadero Street, and live-aboard boats in the marina approximately 600-800 feet from the site's eastern boundary.

Existing sensitive receptors also include discrete locations within 2,000 feet of the Project site boundary. The entirety of the Project site was assessed as a potential sensitive receptor area using a 66-foot (20-meter) receptor grid, consistent with the BAAQMD's health risk modeling for the

West Oakland Community Action Plan (BAAQMD and WOEIP, 2019c). Additionally, residential receptors in the broader West Oakland area were modeled using a fine grid with 20-meter spacing within 2,000 feet of the Project site and coarse grid with 50-meter (164 feet) spacing beyond 2,000 feet of the Project site.

Exposure Assessment

Exposure assessment guidance assumes that people in residences would be exposed to air pollution 24 hours per day, 350 days per year, for 30 years as the basis for calculating cancer risk in all health risk assessments (CalEPA and OEHHA, 2015). The exposure rate for the residential scenario is more conservative than those for other sensitive receptor types (i.e., school child, daycare child, and patients) as residents have the highest exposure frequency, exposure time, and exposure duration.[21] Therefore, the air pollutant exposure to residents typically results in the greatest adverse health outcome for all population groups. As such, a conservative approach of considering all on-site and off-site sensitive receptors as residential receptors was used in this analysis.

TAC exposure and resulting health risks were quantified for the Project using the following three exposure scenarios to determine the MEIR:

Scenario 1: Off-Site Receptors – Construction Plus Operations. The analysis of Scenario 1 assumes off-site receptors (residents, daycare, and school) are present near the Project site. The analysis of off-site receptors starts by assuming a fetus in its third trimester is present when demolition begins for Phase 1 and is exposed to all construction activity emissions for Phase 1 and Phase 2 from Year 1 to Year 8 (seven years), operational emissions for Phase 1 from Year 4 to Year 8 (four years), and operational emissions for full Project buildout from Year 8 to Year 31 (23 years), for a total exposure of 30 years.

Scenario 2: On-Site Receptors – Construction Plus Operations. The analysis of Scenario 2 assumes on-site receptors (residents and daycare[22]) occupy and are present at the Project site (Phase 1 areas).) when Phase 1 construction concludes. The analysis of on-site receptors starts by assuming a fetus in its third trimester is present when construction activities for Phase 1 conclude in Year 4 and is exposed to all Phase 2 construction activity emissions from Year 4-Year 8 (four years), operational emissions for Phase 1 from Year 4-Year 8 (four years), and operational emissions for full Project buildout from Year 8-Year 34(26 years), for a total exposure of 30 years. Scenario 2 does not include on-site receptors in Phase 2 areas, because it assumes that Phase 2 areas would be occupied at Project buildout, when construction emissions would cease (see discussion below about the implications of alternative buildout scenarios).

Scenario 3: Off-Site and On-Site Receptors Operations. The analysis of Scenario 3 assumes off-site receptors (residents, daycare, and school) and on-site receptors (residents and daycare) are present at the Project site (Phase 1 and Phase 2 areas). The analysis of receptors starts by assuming a fetus in its third trimester is present when construction activities for Phase 2 conclude in Year 8 and is exposed to operational emissions for full Project buildout from Year 8-Year 38, for a total exposure of 30 years. Scenario 3 represents

[21] For example, residents are assumed to be exposed for 30 years, as compared to the daycare child who is assumed to be exposed for 6 years; resident children are assumed to be exposed 24 hours/day, 7 days/week as compared to the daycare child that is assumed to be exposed 8 hours/day and 5 days/week.

[22] It was assumed that daycare receptors could be present anywhere at the site when Phase 1 construction is complete and exposed to all Phase 2 construction emissions.

a full 30-year operational exposure to document lifetime exposure of residents to full Project buildout emissions once construction is complete.

As discussed above for criteria air pollutants, the TAC emissions (and exposure) provided in this analysis are based on generally conservative assumptions, including the expectation that construction would begin sooner than is likely and that a relatively large amount of construction takes place during a relatively intensive schedule. Because of these conservative assumptions, actual TAC emission rates and sensitive receptor exposure during construction could be less than those estimated in this analysis. If construction is delayed or occurs over a longer period, TAC emissions could be reduced because of the newer and cleaner-burning construction equipment fleet mix that would likely be present in later years. TAC exposure could also be reduced due to a less intensive buildout schedule (i.e., fewer daily TAC emissions occurring over a longer period, spreading exposure into less susceptible, older sensitive receptor age groups).

However, it is possible that under an extended construction schedule, on-site receptors would be exposed to construction for longer periods of time. This is unlikely to result in greater health risks compared to what was modeled because as discussed above, a longer construction schedule would spread out TAC emission over less susceptible sensitive receptor age groups and also because newer, cleaner construction equipment would be phased into the fleet over time. In addition, it is likely that some new on-site receptors in Phase 2 areas would be exposed to subsequent development prior to buildout. These receptors would be exposed to fewer construction TAC emissions than the Scenario 1 receptors (who are exposed to 100 percent of Phase 2 construction TAC emissions), and therefore the associated health risks for these potential receptors are expected to be lower than Scenario 1 health risks. See Impact AIR-5 below for results of the analysis, including a discussion of how a different construction schedule could influence Project-related exposure and resulting health risks.

Health Risk Calculations

The health risk calculations used in the HRA for the Project are summarized below. See Appendix AIR, *Air Quality Supporting Information*, for additional supporting technical information regarding the HRA.

Cancer Risk

The health risk assessment evaluated excess lifetime cancer risk as a result of exposure to both construction and operational emissions. Excess lifetime cancer risks were estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor. The excess lifetime cancer risk is based on DPM emissions from construction (off-road diesel construction equipment and on-road diesel hauling trucks) and operational (operational traffic and diesel emergency generators) sources. Under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole. This analysis was based on the surrogate approach, as recommended by Cal/EPA (CalEPA and OEHHA, 2015). Excess lifetime cancer risk for DPM occurs exclusively through the inhalation

pathway, so only the inhalation pathway was considered in the HRA. Estimated excess cancer risks were calculated using the sensitivity factors and breathing rates recommended by the Office of Environmental Health Hazard Assessment (CalEPA and OEHHA, 2015).

Children living off-site were assumed to be present at one location during the entire construction period. All off-site and on-site residents were assumed to be present at one location for 30 years, consistent with OEHHA guidance.

Chronic Health Impacts

Non-cancer effects of chronic (i.e., long- term) DPM and other TAC exposures were evaluated using the Hazard Index (HI) approach consistent with OEHHA guidance. The chronic HI is calculated by dividing the maximum modeled annual average concentration at the maximum impacted receptor by the Reference Exposure Level (REL). The REL is the concentration at or below which no adverse health effects are anticipated. RELs for DPM and TACs were obtained from OEHHA and BAAQMD. For example, OEHHA has recommended an ambient concentration of 5 $\mu g/m^3$ as the chronic inhalation REL for DPM exhaust. Chronic inhalation REL for TACs associated with tailpipe and evaporative TOG were based on the BAAQMD's weighted toxicity calculation methods and the latest data in the HARP2 database.

$PM_{2.5}$ Concentrations

The health risk assessment also analyzes annual average $PM_{2.5}$ concentrations as a result of exposure to both construction and operational emissions. $PM_{2.5}$ concentrations were based on $PM_{2.5}$ exhaust emissions from construction and $PM_{2.5}$ exhaust and fugitive emissions from operations. These concentrations represent the annual average concentration from all sources each year of Project construction and operation at each sensitive receptor location.

Acute Health Impacts

Acute health impacts associated with short-term exposure to TACs (such as 1-hour and 8-hour exposures) are expected to be minor compared to cancer risks and chronic health impacts. For DPM sources, according to the BAAQMD, *"Diesel exhaust particulate matter should be used as a surrogate for all TAC emissions from diesel-fueled compression-ignition internal combustion engines*," and DPM does not have an acute reference exposure level (BAAQMD, 2016c; CARB, 2018c). BAAQMD confirmed via correspondence with ESA that DPM from internal combustion engines is used as a surrogate to evaluate the combined impacts of all individual TACs found in diesel engine exhaust, and because DPM does not have an acute health effects value, you cannot calculate acute health risks from DPM (Allen pers. comm.). Therefore, the HRA does not include acute impacts associated with DPM.

For organic TACs speciated from TOG emissions associated with light-duty gasoline vehicle travel during Project operations, acute health impacts are not considered a risk-driver (BAAQMD, 2012). In addition, the BAAQMD's health risk modeling for the WOCAP did not evaluate acute health risks; it only included $PM_{2.5}$ concentrations and cancer risk from directly emitted $PM_{2.5}$ and TAC emissions (including DPM), which are the primary air pollutants that pose the greatest risk to the health of residents in West Oakland (BAAQMD and WOEIP, 2019c). Therefore, the information

from the BAAQMD used to conduct the cumulative HRA do not contain acute health risk values, and thus acute health risks were not included in the cumulative HRA.

Existing Conditions

Local health impacts associated with TAC emissions from existing conditions include existing heavy-duty truck activity at Howard Terminal. These trucks emit DPM during travel and idling at the site. As discussed above (under *Tenant Relocation*), with development of the proposed Project, the existing tenants and users of Howard Terminal are assumed to move to other locations within the region in which their uses are permitted under applicable zoning and other regulations. All trucks currently making trips in/out of Howard Terminal will continue to make the same number of trips to and from the Seaport, to the same destinations within the Seaport, from their new locations.

As discussed in *Exposure Assessment* above, the HRA considers existing off-site sensitive receptors evaluated starting as a fetus in its third trimester when construction begins for Year 1 of Phase 1 (Scenario 1). This exposure scenario represents a *future* resident child exposed to Project TAC emissions from construction and operation. Although this future resident child doesn't currently exist, and is therefore not exposed to existing TAC emissions from heavy-duty truck activity at Howard Terminal, without the Project this future resident child *would* exist and be exposed to these existing TAC emissions. It is worth noting that the Project does not create this future sensitive receptor; the receptor would be present in the future with or without the Project; the Project would only affect the exposure of this future sensitive receptor to TAC emissions by removing existing TAC sources (truck activity) and adding new TAC sources (Project construction and operational activity).Therefore, because the Project would remove these existing TAC emission sources, and the future sensitive receptor would not be exposed to these emissions, the existing health risks associated with existing TAC emissions were subtracted from the Project's total health risks to determine impacts of the Project (see Impact AIR-4 below).

Because the Coliseum is located outside of the HRA modeling domain, TAC emissions from Coliseum operations would not affect either existing off-site sensitive receptors or new on-site sensitive receptors associated with the Project. Therefore, these health risks were not included in the HRA or impacts analysis.

Health Impact Assessment (HIA)

In a recent court ruling in *Sierra Club v. County of Fresno* (Friant Ranch),[23] the California Supreme Court determined that the EIR in question was inadequate as it failed to correlate the significant increase in criteria pollutant emissions that the Project would generate to the adverse impacts on human health that could result from those emissions, nor did the EIR explain why it is not scientifically possible to do so. In particular, the court noted that the Project impacts were significant for the emissions of NO_X and PM, but did not explain the health effects of the emissions of these two pollutants as a result of the Project.

It is recognized that health effects from ozone are correlated with increases in the ambient level of ozone in the air a person breathes (U.S. EPA, 2016c). This EIR attempts to correlate Project-

[23] *Sierra Club v. County of Fresno* (Friant Ranch) (2018) 6 Cal.5th 502.

related mass emissions totals for certain criteria pollutants to estimated health-based consequences by preparing a quantitative health impact assessment (HIA). More specifically, in order to estimate the health effects of the increases of criteria pollutants from the Project under unmitigated conditions (with the exception of the inclusion of Mitigation Measure AIR-1c [Diesel Particulate Matter Controls], AIR-1d [Super-Compliant VOC Architectural Coatings during Construction], and the TDM/TMP programs), a photochemical grid model (PGM), Comprehensive Air Quality Model with extensions (CAMx) was used to estimate the small increases in concentrations of ozone and $PM_{2.5}$ in the region as a result of the unmitigated emissions of criteria and precursor pollutants from the Project (Ramboll US Corporation, 2018). Project emissions modeled in the HIA include VOCs, NO_X, and $PM_{2.5}$. U.S. EPA's default health effect functions in the U.S. EPA Benefits Mapping and Analysis Program Community Edition (BenMAP-CE, herein referred to as "BenMAP") for PM use fine particulate ($PM_{2.5}$) as the causal PM agent, so the health effects of PM_{10} are represented using $PM_{2.5}$ as a surrogate. Next, BenMAP was used to estimate the resulting health effects from these small Project-related increases in concentrations of ozone and $PM_{2.5}$ (U.S. EPA, 2019b).[24]

The current version of the U.S. EPA BenMAP model has health effect functions associated only with ozone and $PM_{2.5}$; therefore, the HIA analyzed those two pollutants quantitatively. It is infeasible to perform a quantitative analysis of other criteria air pollutant emissions based on existing modeling tools. The HIA does not quantify the potential health effects from other criteria air pollutants, because the U.S. EPA has recently stopped quantifying the health effects and economic costs for additional air pollutants (other than ozone and $PM_{2.5}$). As an example, for NO_2, the U.S. EPA has noted that uncertainty remains regarding the effects of NO_2 independent of the effects from other air pollutants, including ozone and $PM_{2.5}$ (U.S. EPA, 2016d). Additionally, in 2017, the U.S. EPA concluded that a quantitative risk assessment was not supported for NO_2, stating that there were significant limitations in the available epidemiological studies including "the potential for co-pollutant confounding of the NO_2 from association, potential bias due to exposure measurement error, and the shape of the concentration-response function" (U.S. EPA, 2017b).

Although exposure to high levels of CO and NO_2 are recognized to result in negative health effects, the applicable NAAQS are widely recognized to be designed to be protective of human health, even for sensitive populations. Moreover, as explained by the CARB, "An air quality standard defines the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without any harmful effects on people or the environment" (CARB, 2019h). Thus, if a region is in compliance with the ambient air quality standards, its regional air quality can be considered protective of public health. The NAAQS are statutorily required to be set by the U.S. EPA at levels that are "requisite to protect the public health," 42 U.S.C. § 7409(b)(1). The NAAQS and CAAQS have been set at levels considered safe to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly with a margin of safety; and to protect public welfare, including protection against decreased

[24] U.S. EPA's default health effect functions in BenMAP for PM use fine particulate ($PM_{2.5}$) as the causal PM agent, so the health effects of PM_{10} are represented using $PM_{2.5}$ as a surrogate. NO_X and VOCs are not criteria air pollutants but, in the presence of sunlight, they form ozone and contribute to the formation of secondary $PM_{2.5}$ and thus are analyzed here.

visibility and damage to animals, crops, vegetation, and buildings. As such, the closer a region is to attaining a particular NAAQS or CAAQS, the lower the human health impact is from that pollutant. Generally, as nonreactive pollutants travel away from the source, they disperse and their concentrations diminish rather quickly. As presented above in section 4.2.2, *Regulatory Setting*, and as presented in Table 4.2-3, the SFAAB is designated non-attainment for both the one- and eight-hour state ozone standards and non-attainment for the federal 8-hour ozone standard. In terms of PM, the SFAAB is non-attainment for both the annual and 24-hour state PM_{10} standards, and non-attainment for the annual state $PM_{2.5}$ standard and the 24-hour federal $PM_{2.5}$ standard. SO_2 and CO are not evaluated due to their small contribution to the formation of secondary $PM_{2.5}$ and ozone. The health effects from ozone and $PM_{2.5}$ are examined for this Project because the U.S. EPA has determined that these criteria pollutants would have the greatest effect on human health. The emissions of other criteria pollutants and precursors, including VOC and NO_X, are analyzed because they contribute to the formation of ozone and secondary $PM_{2.5}$.

Typically, the health impact of a particular criteria pollutant is analyzed by air districts on a regional scale based on the area's attainment status in terms of the NAAQS or CAAQS. Because air districts' attainment plans and supporting air model tools are regional in nature, they are not typically used to evaluate the impacts to ambient concentrations of criteria air pollutants, or to correlate those impacts to the potential resultant impacts to public health effects, from an individual project. For example, based on its recent experiences applying regional scale models to relatively small increase in emissions, SJVAPCD stated in its Amicus Brief in the *Sierra Club v. County of Fresno* case: "currently available modeling tools are not well suited for this task" and "even once a model is developed to accurately ascertain local increases in concentrations of photochemical pollutants like ozone and some particulates, it remains impossible, using today's models, to correlate that increase in concentration to a specific health impact. The reasons for this technical unsuitability are the same: such models are designed to determine regional, population-wide health effects, and simply are not accurate when applied at the local level" (SJVAPCD, 2014). However, the U.S. EPA has prepared a memorandum documenting the suitability for using CAMx and CMAQ for ozone and secondary $PM_{2.5}$ modeling of single-sources or group of sources (U.S. EPA, 2017c).

In order to determine the potential health effects of the proposed Project, mass emission rates of ROG[25], NO_X, and $PM_{2.5}$ from operation of the Project were distributed spatially and temporally. The dispersion and chemical formation of these pollutants was predicted using a photochemical grid model and meteorological data for a representative year to evaluate "worst case" concentrations of resulting ozone and $PM_{2.5}$ associated with the Project. The "base case" emissions reflect BAAQMD emissions inventory data projected to 2035 using county, pollutant and source category-specific growth factors derived from CARB's California Emissions Projection Analysis Model (CEPAM) 2016 state implementation plan (SIP) inventory (CARB, 2018d). The resulting base case concentrations represent modeled conditions without contribution from the Project. Future emissions projections for the year 2035 were used because this is the

[25] Reactive organic gas (ROG) emissions are quantified and modeled as VOCs in this assessment. ROG means total organic gases minus ARB's "exempt" compounds (e.g., methane, ethane, CFCs, etc.). ROG is similar, but not identical, to U.S. EPA's term "VOC", which is based on U.S. EPA's exempt list, which is slightly different from CARB's list.

nearest future year to the Project build-out with base emissions available as of the date of this analysis. The BAAQMD PGM database is tailored for California using California-specific input tools and use a high-resolution 4-km horizontal grid to better simulate meteorology and air quality in the complex terrain and coastal environment of California. The BAAQMD selected the computational domain to maintain consistency with the 2000 Central California Ozone Study (CCOS) (BAAQMD, 2009). The CCOS was established to understand and investigate the ozone formation in Central California; therefore, the computational domain included all Central California and portions of Northern California. The unmitigated criteria pollutant emissions from the Project were then combined spatially and temporally with the BAAQMD emission inventory data. The future modelling scenario was simulated using the CAMx source apportionment technology. Both cumulative concentrations from all the sources and the concentrations from Project-specific emissions are derived from a single simulation. Using the source apportionment tools in a single PGM simulation avoids the model noise produced when taking the differences between outputs from two PGM simulations.

The HIA is generally cumulative by nature because it evaluates a future 2035 planning scenario based on the BAAQMD's future emissions inventory for the air basin (as required by the SIP), which includes all reasonably foreseeable development and future changes in emission rates and regulations. As such, the HIA is inherently a cumulative analysis as it considers all emissions sources within the air basin as forecasted by the BAAQMD. However, the HIA only evaluates the health effects of the Project's incremental contribution of criteria pollutant emissions.

For all pollutants, for any year, the maximum operational emissions at full buildout were greater than construction emissions and combined construction and operational emissions for any year when construction and operations overlap. Thus, in order to estimate the worst-case outcome, the operational full build out emissions were used in the HIA (Year 8) and construction emissions were not included in the HIA. Year 8, the Project full buildout operation year is anticipated to observe the highest levels of operational emissions because emissions are thereafter expected to reduce over time as vehicle emission rates decline beyond the full buildout year as fuel efficiency increases and new vehicle emission standards come into effect (see section 4.2.2 *Regulatory Setting* for a discussion of the CAFE, Pavley, and SAFE vehicle standards). Upon the A's departure from the existing stadium (the Coliseum), a permanent reduction in A's-related emissions potential at the Coliseum is anticipated. However, existing A's-related emissions were conservatively not subtracted from the Project emissions in this evaluation. For this reason, the analysis overstates the emissions associated with the Project.

CAMx was used to obtain the incremental ozone and $PM_{2.5}$ concentration impacts associated with the Project's unmitigated emissions. Next, the BenMAP program was used to estimate the potential health effects of the Project's contribution to ozone and $PM_{2.5}$ concentrations (U.S. EPA, 2018d, U.S. EPA, 2018e). BenMAP uses the concentration estimates produced by CAMx, along with population and health effect concentration-response (C-R) functions, to estimate various health effects of the pollutant concentration increases. The U.S. EPA default health effects resulting from $PM_{2.5}$ exposure include mortality (all causes), hospital admissions (respiratory, asthma, cardiovascular), emergency room visits (asthma), and acute myocardial

infarction (non-fatal). The U.S. EPA default health effects that are evaluated for ozone are mortality, emergency room visits (respiratory) and hospital admissions (respiratory).

The HIA was conducted in August 2019 based on initial estimates of the Project's criteria pollutant emissions. As a result, there are slight differences between the criteria pollutant emissions used for the HIA and the criteria pollutant emissions analyzed in this document under each impact. While a full re-run of the photochemical grid model and BenMAP assessment could be performed with the current (updated) emissions inventory, because the emissions changes are small and there are minimal changes to the emissions sources and their spatial allocations, it is appropriate to use a linear model based on the refined modeling already completed to estimate the corresponding changes in health effects. A full model re-run would not provide additional, meaningful information. In addition, as the current analysis is based on initial estimates from 2019 that are higher and hence more conservative, impacts based on a full model re-run would be less than what is presented in this section. For more information on this linear analysis, along with a summary of the updates and revisions made to the emissions that differ from the HIA and the general effect of these updates on the HIA results, please see Appendix AIR *Quality Supporting Information*.

There are a number of conservative assumptions built into the HIA, which include, but are not limited to, the following:

- Unmitigated Project emissions are used in the modeling, with the exception of Tier 4 generators and low-VOC architectural coatings;
- Maximum daily emissions are used in the modeling and are assumed to occur for an entire year, with the exception of mortality health effects from $PM_{2.5}$ (which rely on average annual emissions);
- Existing condition emissions for activities occurring at the Coliseum that would be removed with the Project were not removed from the model;
- Health effects can occur at any concentration, including small incremental concentrations;[26] and
- All $PM_{2.5}$, including fugitive dust and exhaust from fuel combustion, is of equal toxicity.[27]

As a result of the conservative assumptions presented above, the results of the modeling are intended to represent an upper bound of potential impacts. In addition, the complex nature of criteria air pollutant dispersion and the complexity of atmospheric chemistry should be

[26] This presumes that impacts seen at large concentration differences can be linearly scaled down to small increases in concentration, with no consideration of potential thresholds below which health impacts may not occur. This methodology of linearly scaling impacts is broadly accepted for use in regulatory evaluations and is considered as being health protective (U.S. EPA, 2010).

[27] The U.S. EPA has stated that results from various studies have shown the importance of considering particle size, composition, and particle source in determining the health impacts of PM (U.S. EPA, 2009). U.S. EPA also found that studies have reported that particles from industrial sources and from coal combustion appear to be the most significant contributors to PM-related mortality. This is particularly important to note here, as the majority of PM emissions generated from the Project are from brake wear, tire wear, and entrained roadway dust, and not from combustion. Therefore, by not considering the relative toxicity of PM components, the results presented here are conservative. See Appendix AIR for further discussion.

considered when interpreting results. The results also generally present an unmitigated condition and would be reduced by implementation of required mitigation presented in the impacts analysis for air quality and greenhouse gas emissions. Even with the conservative assumptions noted above, the health effects are small and may be zero.

Although this EIR uses thresholds of significance for mass emissions of criteria pollutants, because there are currently no guidance or thresholds for significance determination regarding health effects from criteria pollutant emissions, the analysis compared the BenMAP results to background health incident rates.[28] Thus, the analyses do not conclude whether the predicted health effects are significant for CEQA purposes; rather, the predicted health effects are provided for informational purposes so as to enhance the understanding of the effects of impacts determined to be significant (e.g., Impacts AIR-1 and AIR-2) based on other measurable criteria. The quantitative HIA results, along with detailed modeling methods, are presented in Appendix AIR, *Air Quality Supporting Information*.

Odors

This analysis evaluates whether the proposed Project would create objectionable odors that would affect a substantial number of people (e.g., by introducing new land uses that are typically associated with odor complaints). It also evaluates whether the Project would expose new sensitive receptors to substantial objectionable odors affecting a substantial number of people.

Other Emissions

In addition, as described in Section 4.8, *Hazards and Hazardous Materials*, the proposed ballpark, and residential, office, retail, and other uses would use and store chemicals associated with their particular use. These chemicals that would include fuels, oils and lubricants, solvents and cleaners, and paints and thinners, which are all commonly used in the proposed land uses. The routine use or an accidental spill of hazardous materials could result in inadvertent releases, which could adversely affect workers, the public, and the environment. The required compliance with the numerous laws and regulations that govern hazardous materials would limit the potential for creation of hazardous conditions due to the use or accidental release of hazardous materials, and would render air quality impacts from the release of hazardous materials less than significant. See Section 4.8, *Hazards and Hazardous Materials*.

Methods for Analysis of Cumulative Impacts

The cumulative analysis was conducted for two impact areas: (1) regional criteria pollutant emissions, and (2) regional health risks. The first represents cumulative regional air quality impacts associated with criteria pollutants, and is evaluated in context with the applicable regional air quality plan. The second represents cumulative health risk impacts on sensitive receptors, and is evaluated per City significance criteria (4) and (5). See below for discussion of each impact area.

[28] The "background health incidence" is an estimate of the average number of people that suffer from some adverse health effect in a given population over a given period of time, in the absence of additional emissions from the Project. Health incidence rates and other health data are typically collected by the government as well as the World Health Organization.

Regional Criteria Pollutant Impacts

By definition, regional air pollution is largely a cumulative impact in that no single project is sufficient in size, by itself, to cause nonattainment of air quality standards. Instead, a project's individual emissions contribute to existing cumulative air quality conditions (BAAQMD, 2017c). However, the approach to analysis of cumulative impacts varies for criterial pollutants (regional pollutants) and for TAC emissions, which are considered in the context of site-specific health risks.

As described earlier, project-level thresholds for criteria air pollutants are based on levels by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants. Therefore, if a project's criteria pollutant emissions are below the project-level thresholds, the project would not result in a considerable contribution to cumulative regional air quality impacts and a project's contribution to cumulative regional air quality impacts would only be considered significant if the project's impact individually would be significant (i.e., exceeds the City's quantitative thresholds) (BAAQMD, 2017c).[29] For a project that would not result in a significant impact individually, the project's contribution to any cumulative impact would be considered less than significant if the project is consistent with the applicable regional air quality plan. In this case, the applicable regional air quality plan is the 2017 Clean Air Plan. Consistency with the Clean Air Plan can be determined if the Project supports the goals of the plan, includes applicable control measures from the plan and would not disrupt or hinder implementation of any plan control measures.

Regional Health Risk Impacts

Because TAC emissions potentially result in site-specific health risks, a cumulative HRA was conducted following two separate methods. First, cumulative health risks were calculated using the BAAQMD CEQA guidelines and existing tools. Second, cumulative health impacts were calculated using the background results from the Draft EIR for the WOCAP.

The first approach follows the standard BAAQMD CEQA Guideline approach by tabulating the impact of Project-related construction risks plus existing off-site sources (stationary and mobile) at the maximum off-site and on-site sensitive receptor location for construction. The BAAQMD recommends that the cumulative health risk analysis include other air emissions sources within a "zone of influence" of 1,000 feet surrounding the project. As such, this evaluation identifies all stationary and mobile sources within 1,000 feet of the Project boundary. In addition to the evaluation of each single source, the combined health risk from all TAC and $PM_{2.5}$ sources are evaluated. Sources evaluated include any BAAQMD permitted stationary source, roadways with over 10,000 vehicles per day, and any other major source of emissions within the zone of influence such as railways. The BAAQMD provides tools with conservative estimates of impacts from these sources, including a stationary source tool, railway screening tool, highway screening tool, major roadway screening tool, and roadway screening tables. These tools were used to estimate the health impacts from all cumulative existing sources at the MEIR locations. The

[29] The BAAQMD CEQA Guidelines state, "In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary. The analysis to assess project-level air quality impacts should be as comprehensive and rigorous as possible."

combined cancer risk, non-cancer chronic hazard index, and $PM_{2.5}$ concentration from all the sources at the Project MEIR are then calculated.

The second approach takes into account the cumulative contribution of localized health risks to sensitive receptors from sources included in the BAAQMD's health risk modeling for the WOCAP plus the Project's sources. Because the BAAQMD has calculated specific health risks for all major TAC sources in West Oakland as part of the WOCAP, this second approach includes more detailed information than using the standard screening tools. Specifically, the HRA conducted by the BAAQMD for the WOCAP includes the following sources of TAC emissions that are not included in the standard BAAQMD risks and hazards screening analysis tools: vehicle travel on local roads (not just major highways), truck-related businesses, ocean-going vessels, commercial harbor craft, cargo handling equipment, port trucks at terminals, locomotives, railyards, commuter ferries, and excursion vessels (BAAQMD and WOEIP, 2019c). Background excess lifetime cancer risk and annual average $PM_{2.5}$ concentrations from these sources were included in the cumulative analysis for the Project. Because the BAAQMD did not include acute or chronic health impacts in their health risk modeling for the WOCAP, the cumulative analysis for the Project under this second approach does not include acute or chronic health impacts (BAAQMD and WOEIP, 2019c). In addition, the WOCAP modeling files provided by the BAAQMD represent a "business-as-usual" (BAU) scenario without implementation of any TAC emission reduction actions in the WOCAP, and therefore presents a highly conservative estimate of background cancer risk and $PM_{2.5}$ concentrations. It should be noted that the MEIRs evaluated in the cumulative analysis do not reflect the highest impact from the Project and cumulative sources combined, but rather the MEIRs selected from Project impacts only.

Based on the location of the Project in proximity to West Oakland, which has been designated by the BAAQMD as a priority community through the agency's Community Health Protection Program, BAAQMD's 1,000 foot "zone of influence" was conservatively extended to 2,000 feet. In response to a request from BAAQMD, the zone was further increased to include other parts of West Oakland in the vicinity of nearby freeways.

The emissions quantification tools and methods used in the BAAQMD's health risk modeling for the WOCAP and project-level HRA differ slightly, however, it is not anticipated that these differences would result in any major differences in results. For off-road construction emissions, the BAAQMD used OFFROAD2011 while the Project-level HRA used methods contained in CalEEMod version 2016.3.2., which use OFFROAD2011 methodology. For on-road vehicle emissions, the BAAQMD used EMFAC2014, whereas the Project-level HRA used the newer EMFAC2017. For dispersion modeling meteorological data, the BAAQMD used the Oakland Sewage Treatment Plant for 2014, whereas the Project-level HRA used the Oakland International Airport for 2014 through 2018. For dispersion modeling terrain data, BAAQMD utilized the Shuttle Radar Topography Mission digital terrain data and the Project-level HRA utilized the National Elevation Dataset. Construction sources were not modeled in the WOCAP, but they were included for the Project. Certain release parameters for on-road mobile sources were modeled differently by the BAAQMD. All other modeling parameters are consistent between the two analyses.

4.2.4 Impacts of the Project

Project Construction Impacts

Impact AIR-1: Demolition and construction associated with the Project would result in average daily emissions that would exceed the City's construction significance thresholds of 54 pounds per day of ROG, NO_X, or $PM_{2.5}$ or 82 pounds per day of PM_{10}. (Criterion 1) (*Significant and Unavoidable with Mitigation*)

Project-related construction would generate air pollutant emissions through the use of heavy-duty construction equipment, from truck trips hauling materials, and from construction workers traveling to and from the Project site. Mobile source emissions, primarily NO_X, would be generated from the use of equipment such as excavators, bulldozers, wheeled loaders, scrapers, and cranes during the demolition, grading, and site prep construction phases. During the building construction phases, emissions would be generated from the use of equipment including pile driving rigs, forklifts, excavators, cranes, saws, air compressors, and water trucks. During the finishing phases, paving operations and the application of asphalt, architectural coatings (i.e., paints) and other building materials would release ROG. Project-related demolition, excavation, grading, and other construction activities may also cause wind-blown dust that could contribute particulate matter into the local atmosphere. The assessment of construction air quality impacts considers each of these sources and recognizes that construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions.

Fugitive Dust

Project-related demolition, excavation, grading, and other construction activities may cause wind-blown dust that could contribute particulate matter into the local atmosphere. As discussed in the *Environmental Setting* section above, construction dust can be an irritant causing watering eyes or irritation to the lungs, nose, and throat. Demolition, excavation, grading, and other construction activities can cause wind-blown dust that adds particulate matter to the local atmosphere. Depending on exposure, adverse health effects can occur due to this particulate matter in general as well as due to specific contaminants such as lead or asbestos that may be constituents of dust.

Despite the established federal standards for air pollutants and ongoing implementation of state and regional air quality control plans, air pollutants continue to have impacts on human health throughout the country. California has found that particulate matter exposure can cause health effects at lower levels than national standards. The current health burden of particulate matter demands that, where possible, public agencies take feasible available actions to reduce sources of particulate matter exposure.

In response to these concerns, Mitigation Measure AIR-1a: Dust Controls requires the Project sponsor to implement all applicable dust control measures during construction of the Project as stipulated by the BAAQMD (BAAQMD, 2017c). As discussed above in the "Approach to Analysis" section, the BAAQMD considers implementation of the BAAQMD-recommended mitigation measures, i.e., BMPs, for fugitive dust sufficient to ensure that construction-related

fugitive dust is reduced to a less-than-significant level, and thus does not have quantitative significance thresholds for fugitive dust from construction activities. Therefore, implementation of dust control measures in compliance with Mitigation Measure AIR-1a would ensure that potential dust-related construction air quality impacts of the proposed Project would be less than significant.

As discussed above under *Project Features Analyzed*, the Project site contains hazardous materials and is currently capped, preventing contact with the underlying contaminants in fill, soil, and groundwater. Project construction would remove all of the existing cap on the Project site and conduct remediation and/or mitigation and site grading in phases as construction proceeds. All site construction activities associated with exposure to onsite soil (including fugitive dust) or groundwater will be conducted in compliance with site-specific Health and Safety Plans (HASPs) to protect workers and the environment from site contaminants. This is required per Mitigation Measure HAZ-1c (Health and Safety Plan).[30] Please refer to Section 4.8, *Hazards and Hazardous Materials*, for more information.

Criteria Air Pollutants

As discussed above in the *Approach to Analysis* section, the Project is assumed to be developed in two phases over a combined period of approximately seven years from Year 1 to Year 8 with full buildout and operation in Year 8. Initial construction activities affecting the full site area include demolition of the existing Howard Terminal buildings and parking lots, followed by development-related environmental remediation and/or mitigation (see Section 4.8, *Hazards and Hazardous Materials*, for more detail). Site grading is assumed to occur by phase, and is not conducted all at once. Phase 1 construction is set to last from Year 1 with a target completion date in mid-Year 4. This phase would include the ballpark, up to 540 residential units, up to 250,000 square feet of office, up to 30,000 square feet of retail, approximately 400 hotel rooms located in one or more hotels, 1,240 parking spaces, and associated infrastructure. Construction activities related to Phase 1 land uses (the ballpark and initial mixed use development) include cut off wall construction, grading, site preparation, and site utility upgrades and relocations, followed by building construction, paving, and architectural coating. Phase 2 is planned to begin in Year 4 and be completed as early as Year 8 and would include the remaining development including up to 2,460 dwelling units, 1,250,000 square feet of office, 240,000 square feet of retail, up to 50,000 square feet of performance venue, up to 2,000 parking spaces for the ballpark and 5,660 parking spaces for other uses, and associated infrastructure. Construction activities related to Phase 2 land uses would include the same activities for the remaining mixed-use development. It is estimated that approximately 250,000 total (approximately 139 average daily) roundtrip vendor trips would occur during the seven-year construction period. For material cut/fill and soil hauling during the grading phases, it is assumed that approximately 22,000 round trips would be needed for Phase 1 (approximately 118 average daily) and 17,000 round trips would be needed for Phase 2 (approximately 91 average daily).

[30] The HASPs shall be prepared according to Title 8. California Code of Regulations, Section 5192 and Title 29 Code of Federal Regulations 1910.120. The HASPs will be submitted to The Department of Toxic Substances Control (DTSC) for review and approval.

Average daily unmitigated construction-related criteria pollutant emissions by year are presented in **Table 4.2-4**, which compares the average daily emissions of each year of construction with City of Oakland significance thresholds. For detailed construction-related criteria pollutant emissions resulting from Project construction by construction area, construction activity, and year, please refer to Appendix AIR, *Air Quality Supporting Information*.

TABLE 4.2-4
AVERAGE DAILY UNMITIGATED CONSTRUCTION EMISSIONS BY YEAR[a]

Year[a]	Average Daily Emissions (lbs/day)[b]			
	ROG	NO_X	PM_{10} (exhaust)[c]	$PM_{2.5}$ (exhaust)[c]
Significance Threshold	**54**	**54**	**82**	**54**
Year 1	5.1	48	2.3	2.1
Year 2	16	**166**	5.9	5.4
Year 3	**56**	**113**	4.5	4.2
Year 4	51	**72**	2.9	2.7
Year 5	8.7	**99**	3.1	2.9
Year 6	**60**	**75**	2.5	2.4
Year 7	**108**	**99**	3.6	3.4
Year 8	**107**	**93**	3.4	3.2

NOTES:

lbs/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter that is 10 microns or less in diameter; $PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the emissions estimates presented in this table are conservative because emissions are expected to decrease over time due to improvements in technology and regulatory requirements.

b **Bold values** = threshold exceedance

c Only exhaust emissions of PM_{10} and $PM_{2.5}$ emissions are shown, because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a. (Dust Controls).

SOURCES: Appendix AIR, *Air Quality Supporting Information*; Ramboll US Corporation, 2020.

As shown in Table 4.2-4, the combined average daily unmitigated Project emissions would exceed the City's significance thresholds for NO_X in Years 2 through 8; maximum emissions of NO_X (166 lbs/day) would occur during Year 2, the year when construction activity peaks and activity associated with geotechnical work, demolition, grading and site prep, and Phase 1 building construction overlaps. Also shown in Table 4.2-4, the combined average daily unmitigated Project emissions would exceed the City's significance thresholds for ROG in Year 3 and Year 6 through Year 8; maximum emissions of ROG (108 lbs/day) would occur during Year 7, the year when architectural coating and paving occurs, and therefore maximum off-gassing ROG emissions occur. No other criteria pollutant would exceed the thresholds in any year. The NO_X and ROG exceedances would result in a significant impact, and mitigation measures are required.

Mitigation Measures AIR-1a, AIR-1b, AIR-1c, and AIR-1d are identified to address the impacts of construction.

Mitigation Measure AIR-1a: Dust Controls.

The Project sponsor shall implement all of the following applicable dust control measures during construction of the Project:

Basic Controls

1. Water all exposed surfaces of active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour (mph). Reclaimed water should be used whenever feasible.
2. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. Limit vehicle speeds on unpaved roads to 15 mph.
5. All demolition activities (if any) shall be suspended when average wind speeds exceed 20 mph.
6. All trucks and equipment, including tires, shall be washed off prior to leaving the site.
7. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6- to 12-inch compacted layer of wood chips, mulch, or gravel.

Enhanced Controls

1. Apply and maintain vegetative ground cover (e.g., hydroseed) or non-toxic soil stabilizers to disturbed areas of soil that will be inactive for more than one month. Enclose, cover, water twice daily, or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).
2. Designate a person or persons or include dust monitoring stations to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off site. Their duties shall include holidays and weekend periods when work may not be in progress.
3. When working at a site, install appropriate wind breaks (e.g., trees, fences) on the windward side(s) of the site, to minimize wind-blown dust. Windbreaks must have a maximum 50 percent air porosity.
4. Post a publicly visible large on-site sign that includes the contact name and phone number for the Project complaint manager responsible for responding to dust complaints and the telephone numbers of the City's Code Enforcement unit and the BAAQMD. When contacted, the Project complaint manager shall respond and take corrective action within 48 hours.
5. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.

Mitigation Measure AIR-1b: Criteria Air Pollutant Controls.

The Project sponsor shall implement all of the following applicable criteria air pollutant control measures during construction of the Project:

1. Idling times on all diesel-fueled commercial vehicles over 10,000 lbs. shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to two minutes. Clear signage to this effect shall be provided for construction workers at all access points.
2. Idling times on all diesel-fueled off-road vehicles over 25 horsepower shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to two minutes and fleet operators must develop a written policy as required by Title 23, Section 2449, of the California Code of Regulations ("California Air Resources Board Off Road Diesel Regulations").
3. All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. Equipment check documentation shall be kept at the construction site and be available for review by the City, Port and the Air District as needed.
4. Portable equipment shall be powered by grid electricity if available. If grid electricity is not available, propane or natural gas generators shall be used if feasible. Diesel engines shall only be used if grid electricity is not available and propane or natural gas generators cannot meet the electrical demand.
5. Low VOC (i.e., ROG) coatings shall be used that comply with BAAQMD Regulation 8, Rule 3: Architectural Coatings.
6. All equipment to be used on the construction site shall comply with the requirements of Title 13, Section 2449, of the California Code of Regulations ("California Air Resources Board Off-Road Diesel Regulations") and upon request by the City (and the Air District if requested), the Project sponsor shall provide written documentation that fleet requirements have been met (please see Enhanced Controls below for equipment inventory requirements).

Enhanced Controls

1. Construction Emissions Minimization Plan: The Project sponsor shall prepare a Construction Emissions Minimization Plan (Emissions Plan) for all identified criteria air pollutant reduction measures. The Emissions Plan shall be submitted to the City for review and approval prior to the issuance of construction-related permits for site preparation (including but not limited to grading activities, hazardous materials remediation, and/or horizontal infrastructure) for each individual project site (or phase with multiple project sites to be constructed concurrently by one entity). If requested, a copy of the Emissions Plan shall be provided to the Port and Air District. The Emissions Plan shall include the following:
    a. An equipment inventory including the list off-road equipment anticipated to be required for each phase of construction, including a protocol requiring that a current list of equipment shall be maintained on each construction site for review by City inspectors at all times for conformity with the Emissions Plan. The list of equipment maintained on site shall include, but is not limited to, the equipment manufacturer, equipment identification number, engine model year, engine

certification (tier rating), horsepower, and engine serial number. For all Verified Diesel Emissions Control Strategies (VDECS), the equipment inventory shall also include the technology type, serial number, make, model, manufacturer, CARB verification number level, and installation date.

b. A Certification Statement signed by each construction contractor agreeing to comply fully with the Emissions Plan and acknowledging that a significant violation of the Emissions Plan shall constitute a material breach of contract.

Mitigation Measure AIR-1c: Diesel Particulate Matter Controls.

Prior to the issuance of a construction permit the Project sponsor shall implement the following:

1. The Project sponsor shall implement appropriate measures during construction to reduce potential health risks to sensitive receptors due to exposure to diesel particulate matter (DPM) from construction emissions, including the following:

   a. All off-road diesel equipment shall have engines that meet Tier 4 Final off-road emission standards, as certified by CARB. The equipment shall be properly maintained and tuned in accordance with manufacturer specifications. This shall be verified through submittal of an equipment inventory and Certification Statement to the City building official. The Certification Statement must state that the Contractor agrees to compliance and acknowledges that a significant violation of this requirement shall constitute a material breach of contract. If engines that comply with Tier 4 Final off-road emission standards are not commercially available for specific off-road equipment necessary during construction, then the Project sponsor shall provide the next cleanest piece of off-road equipment as provided by the step-down schedules in Table M-AIR-1c. The Contractor shall provide to the City for review and approval documentation showing that engines that comply with Tier 4 Final off-road emission standards are not commercially available for specific off-road equipment necessary during construction.

TABLE M-AIR-1C
OFF ROAD EQUIPMENT COMPLIANCE STEP DOWN SCHEDULE

Compliance Alternative	Engine Emissions Standard	Emissions Control
1	Tier 4 Interim	N/A
2	Tier 3	ARB Level 3 VDECS
3	Tier 2	ARB Level 3 VDECS

For purposes of this mitigation measure, "commercially available" shall mean the availability of Tier 4 Final engines similar to the availability for other large-scale construction projects in the City occurring at the same time and taking into consideration factors such as (i) potential significant delays to critical-path timing of construction; for the ballpark and (ii) geographic proximity to the Project site of Tier 4 Final equipment.

The Project sponsor shall maintain records concerning its efforts to comply with this requirement.

How to use the table: if engines that comply with Tier 4 Final off-road emission standards are not commercially available, then the Project sponsor shall meet

Compliance Alternative 1. If off-road equipment meeting Compliance Alternative 1 are not commercially available, then the Project sponsor shall meet Compliance Alternative 2. If off-road equipment meeting Compliance Alternative 2 are not commercially available, then the Project sponsor shall meet Compliance Alternative 3.

In addition, if the Project sponsor uses any of the compliance alternatives in Table M-AIR-1c, the Project sponsor must demonstrate to the satisfaction of the City that the health risks from Project construction and operation do not exceed a total of 10 in a million excess cancer risk for any on-site or off-site receptor and also that the annual average $PM_{2.5}$ concentrations from Project construction and operation do not exceed a total of 0.3 $\mu g/m^3$ for any on-site or off-site receptor.

2. Construction Emissions Minimization Plan

   The Project sponsor shall prepare a Construction Emissions Minimization Plan (Emissions Plan) for all identified DPM reduction measures (if any). The Emissions Plan shall be submitted to the City (and the Port and Air District if requested) for review and approval prior to the issuance of construction-related permits for site preparation (including but not limited to grading activities, hazardous materials remediation, and/or horizontal infrastructure) for each individual project site (or each phase with multiple project sites to be constructed concurrently by one entity). The Emissions Plan shall include the following:

   a. An equipment inventory including the list of off-road equipment anticipated to be required for each phase of construction, including a protocol requiring that a current list of equipment shall be maintained on each construction site for review by City inspectors at all times for conformity with the Emissions Plan. The list of equipment maintained on site shall include, but is not limited to, the equipment manufacturer, equipment identification number, engine model year, engine certification (tier rating), horsepower, and engine serial number. For all VDECS, the equipment inventory shall also include the technology type, serial number, make, model, manufacturer, CARB verification number level, and installation date.

   b. A Certification Statement signed by each construction contractor agreeing to comply fully with the Emissions Plan and acknowledging that a significant violation of the Emissions Plan shall constitute a material breach of contract.

Mitigation Measure AIR-1d: Super-Compliant VOC Architectural Coatings during Construction.

The Project sponsor shall use super-compliant VOC architectural coatings during construction for all interior spaces and shall include this requirement on plans submitted for review by the City's building official. "Super-Compliant" refers to paints that meet the more stringent regulatory limits in South Coast Air Quality Management District rule 1113 which requires a limit of 10 grams VOC per liter (http://www.aqmd.gov/home/regulations/compliance/architectural-coatings/super-compliant-coatings).

Mitigation Measure Effectiveness

Implementation of Mitigation Measure AIR-1b (Criteria Air Pollutant Controls) would require all construction equipment, diesel trucks, and generators be equipped with Best Available Control Technology for emission reductions of NO_X and PM. Implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) would require that the Project reduce potential health

risks to sensitive receptors by equipping all off-road equipment with Tier 4 Final engines. In addition, Mitigation Measure AIR-1b requires all architectural coatings used during construction to comply with BAAQMD Regulation 8, Rule 3: Architectural Coatings and implementation of Mitigation Measure AIR-1d (Super-Compliant VOC Architectural Coatings during Construction) requires that all indoor painting (architectural coatings) during construction utilize super-compliant coatings at a limit of 10 grams VOC per liter, as defined in the South Coast Air Quality Management District's Rule 1113 (Architectural Coatings) (SCAQMD, 2019). Indoor coating ROG emissions from construction were therefore estimated assuming the 10 grams VOC per liter limit.

The use of renewable diesel to fuel all diesel engines was considered as a potential mitigation measure to further reduce NO_X emissions. Renewable diesel could potentially reduce ROG, NO_X, and PM emissions associated with off-road construction equipment and may help reduce projected average daily NO_X emissions in Year 2 below the significance threshold. According to CARB, renewable diesel has been shown to reduce ROG emissions by 5 percent, NO_X emissions by 10 percent, and PM emissions by 30 percent (CARB, 2015). However, the CARB study only assessed the use of renewable diesel in a 2006 Cummins on-road engine equipped with a diesel particle filter; it did not assess renewable diesel in off-road engines nor did it assess renewable diesel in Tier 4 engines.[31] Therefore, these percent reductions are not applicable to Tier 4 off-road equipment used for Project construction. According to a recent study prepared for the BAAQMD and the SCAQMD, renewable diesel "does not significantly reduce NO_X emissions from diesel engines equipped with selective catalytic reduction (SCR), nor PM emissions from diesel engines equipped with DPF [diesel particulate filter] technology" and "In engines utilizing a DPF for PM control (and SCR for NO_X control), the impacts of RD on PM emissions were inconclusive" (GNA, 2017). The study recommends that further research be conducted for renewable diesel in high-horsepower off-road engines and in diesel engines with advanced emissions controls. Given the findings of this study and because Tier 4 off-road engines (as required by Mitigation Measure AIR-1c) are typically equipped with DPF technology, it is possible that renewable diesel may not reduce criteria pollutant and TAC emissions from off-road equipment overall. Given this uncertainty in the actual effects of renewable diesel on emissions from off-road construction equipment meeting Tier 4 engine standards, renewable diesel was not identified as a mitigation measure to reduce NO_X emissions from construction.

Additional measures to further reduce NO_X emissions were also considered and rejected as infeasible. The additional measures considered and rejected included (1) adjusting the construction schedule to reduce the intensity of construction activity and shift the equipment producing the most NO_X emissions into years with less construction activity, (2) extending the overall schedule to reduce the emissions intensity in any given year, (3) replacing the largest pieces of construction equipment with smaller pieces of construction equipment, and (4) using alternative fuels in equipment such as natural gas or electricity. These actions were determined to be infeasible because they would not meet the buildout schedule of the Project and other financial and operational considerations, and because the equipment fleet proposed and modelled in this analysis represents the most likely to be available at this time, including the proportion of electric and diesel equipment (see Appendix AIR

[31] The CARB study did assess the use of biodiesel in a John Deere non-road engine, but not renewable diesel; in addition, the non-road engine was a 2009 model year, Tier 3 engine.

for more detail). As such, no additional feasible mitigation measures have been identified for achieving further substantial reductions in NO_X emissions from construction activities.

There are a number of transportation improvements and mitigation measures that call for construction of off-site facilities that may also generate construction emissions. These include but are not limited to creation of a Transportation Hub, bus lanes, bike lanes, and a pedestrian and bicycle overcrossing of the railroad tracks. Mitigated construction emissions presented below incorporate construction activity associated with the pedestrian and bicycle overpass, which would require a substantial amount of construction, and also construction activity associated with the other off-site improvements, although these improvements would require minimal construction activity when compared with other construction activities for the Project (and are in keeping with transportation improvements routinely undertaken by the City). These improvements, which often involve installing signs, striping lanes, constructing barriers, and similar activities, would not add a significant amount to the unmitigated construction emissions. The construction of these improvements would also be subject to the mitigation measures identified in this chapter or other equally effective conditions of approval.

Total annual mitigated average daily construction-related criteria pollutant emissions, with implementation of Mitigation Measure AIR-1c and AIR-1d are presented in **Table 4.2-5**, which compares emissions with City of Oakland significance thresholds. For detailed construction-related criteria pollutant emissions resulting from Project construction by construction area, construction activity, and year, with implementation of Mitigation Measure AIR-1c and AIR-1d, please refer to Appendix AIR, *Air Quality Supporting Information*.

As shown in Table 4.2-5, the combined average daily Project emissions with implementation of Mitigation Measure AIR-1c and AIR-1d would exceed the City's significance threshold in Year 2 for NO_X with maximum average daily emissions of 81 lbs/day. No other criteria pollutant would exceed the thresholds in any year. Maximum emissions of PM_{10} exhaust (1.5 lbs/day), and $PM_{2.5}$ exhaust (1.4 lbs/day) would occur during Year 2, the year when construction activity peaks and activity associated with geotechnical work, demolition, grading and site prep, and Phase 1 building construction overlaps. Maximum emissions of ROG (45.2 lbs/day) would occur during Year 7 when architectural coating and paving occurs, and therefore maximum off-gassing ROG emissions occur. These maximum PM_{10}, $PM_{2.5}$and ROG emissions are all below the City's significance thresholds for these pollutants.

With Implementation of Mitigation Measure AIR-1a, AIR-1b, AIR-1c, and AIR-1d, as shown in Table 4.2-5 below, emissions of NO_X would not be reduced to below the thresholds of significance, and the impact would be significant and unavoidable with mitigation for NO_X emissions in Year 2. Emissions of ROG, PM_{10}, and $PM_{2.5}$ would be reduced to below the thresholds of significance, and the impact would be less than significant with mitigation for ROG, PM_{10}, and $PM_{2.5}$ emissions.

Significance after Mitigation: Significant and Unavoidable with mitigation.

TABLE 4.2-5
AVERAGE DAILY MITIGATED CONSTRUCTION EMISSIONS BY YEAR

Year[a]	Average Daily Emissions (lbs/day)[b]			
	ROG	NO_X	PM_{10} (exhaust)[c]	$PM_{2.5}$ (exhaust)[c]
Significance Threshold	**54**	**54**	**82**	**54**
Year 1	1.70	14	0.51	0.48
Year 2	8.6	**81**	1.5	1.4
Year 3	27	37	0.68	0.64
Year 4	24	20	0.38	0.35
Year 5	3.5	42	0.58	0.54
Year 6	26	32	0.46	0.42
Year 7	45	36	0.56	0.53
Year 8	45	39	0.54	0.52

NOTES:

lbs/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter that is 10 microns or less in diameter; $PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter;

Mitigation Measures modeled in this table include Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), modeled as Tier 4 engines on all off-road equipment, (as available), and Mitigation Measure AIR-1d (Super-compliant VOC Architectural Coatings during Construction), modeled as super-compliant VOC coatings with 10 grams VOC per liter for all interior coatings. This table also includes construction activities associated with construction of the pedestrian and bicycle overcrossing and other off-site construction associated with transportation improvements, required as mitigation in the Transportation section.

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the emissions estimates presented in this table are conservative because emissions are expected to decrease over time due to improvements in technology and regulatory requirements.
b **Bold values** = threshold exceedance
c Only exhaust emissions of PM_{10} and $PM_{2.5}$ emissions are shown, because fugitive dust emissions are addressed through best management practices as required Mitigation Measure AIR-1a (Dust Controls).

SOURCES: Appendix AIR, *Air Quality Supporting Information*; Ramboll US Corporation, 2020.

Operational Impacts

Impact AIR-2: Operation of the Project (and combined overlapping construction and operation) would result in operational average daily emissions of more than 54 pounds per day of ROG, NO_X, or $PM_{2.5}$ or 82 pounds per day of PM_{10}; or result in maximum annual emissions of 10 tons per year of ROG, NO_X, or $PM_{2.5}$ or 15 tons per year of PM_{10}. (Criterion 2) (*Significant and Unavoidable with Mitigation*)

Operation of the Project would result in an increase in criteria air pollutant and precursor emissions, including ROG, NO_X, PM_{10}, and $PM_{2.5}$ from a variety of emissions sources, including on-site stationary sources (emergency generators), on-site energy sources (e.g., natural gas combustion for space and water heating), on-site area sources (landscape maintenance, architectural coatings, use of consumer products such as hairsprays, deodorants, cleaning products, etc.) and mobile on-road sources. As discussed above in the *Approach to Analysis* section above, these operational emissions associated with the Project were calculated using methods consistent with the CalEEMod land use emissions model program. Impacts from the Project are determined by subtracting existing A's-related emissions from Project emissions to determine the net new emissions associated with the Project.

The transportation analysis for the Project estimates that upon buildout, the Project would result in approximately 28,000 net additional vehicle trips per day (approximately 32,500 for the Project minus 4,500 for existing conditions) and 119 million net additional total annual VMT (approximately 139 million VMT for the Project minus 21 million VMT for existing A's-related conditions) after accounting for use of alternative modes of transportation, internal trip capture, and the TDM/TMP programs. For the ballpark stadium, there would be 25,900 average weekday evening trips, 26,400 average weekday day trips, 27,100 average daily weekend trips, 26,800 trips for concert events, and 10,644 trips for other events and sports team management; this results in 7,873 total average daily trips and over 31 million total annual average VMT. This compares to the 30-year annual average existing A's-related Coliseum trips of 18,720 average weekday evening trips, 18,979 average weekday day trips, 19,821 average daily weekend trips, and 258 trips for other events and sports team management; this results in 4,480 total average daily trips and nearly 21 million total annual average VMT. For other (non-ballpark) land uses associated with the Project, there would be approximately 24,600 average daily trips and nearly 108 million annual average VMT.

The analysis of unmitigated operational emissions assumes the Project will meet the 20 percent trip reduction requirement of AB 734 via implementation of a TMP/TDM Plan.[32]

Table 4.2-6 presents total annual and average daily criteria pollutant emissions by source for existing A's-related emissions (2018), Project Phase 1 operations (Year 4), and Project full buildout operations (Year 8). **Table 4.2-7** summarizes total annual and average daily emissions by year from Year 4 through Year 9, the first full year of operation post-buildout, including emission reductions from existing A's-related emissions, and compares net new Project emissions with the City of Oakland significance thresholds. As shown in Table 4.2-7, operational emissions are scaled for partial years of operation in Year 4 for Phase 1 and Year 8 for full buildout based on the number of days of full operations for those years compared to 365 total days per year. Phase 1 ballpark development is anticipated to be complete by April of Year 4 and would be operational for 255 days in Year 4; Phase 1 non-ballpark development is anticipated to be complete on by December of Year 4 and would be operational for 30 days in Year 4; full buildout development is expected to be complete by September of Year 8. and would be operational for 120 days in Year 8. Therefore, operational emissions in Year 4 and Year 8 would be less than the total annual Phase 1 operational emissions and total annual full buildout operational emissions, respectively. As indicated in Table 4.2-7, Phase 1 operational emissions in Year 4 would not exceed any significance thresholds. However, Phase 1 operational emissions of NO_X would exceed the significance threshold in Year 5–Year 7. Also indicated in Table 4.2-7, net new full buildout operational emissions of ROG, NO_X, and PM_{10} would exceed the significance thresholds in Year 8 and Year 9. Net new $PM_{2.5}$ emissions would not exceed any significance thresholds for any year for full buildout operations.

[32] Mitigation Measure TRANS-1a (Transportation Demand Management) and TRANS-1b (Transportation Management Plan) outline the process for achieving and monitoring the required 20 percent trip reduction (see Section 4.15, Transportation and Circulation). For an analysis of operational emissions without the required 20 percent trip reduction, please refer to Appendix AIR.

TABLE 4.2-6
TOTAL UNMITIGATED AVERAGE DAILY AND ANNUAL OPERATIONAL EMISSIONS BY SOURCE FOR EXISTING A'S-RELATED EMISSIONS AND PROJECT PHASE 1 AND BUILDOUT

	Average Daily Emissions (lbs/day)				Total Annual Emissions (tons/year)			
Emissions Source[a]	**ROG**	**NO_X**	**PM_{10}**	**$PM_{2.5}$**	**ROG**	**NO_X**	**PM_{10}**	**$PM_{2.5}$**
Existing A's-Related Emissions (2018)[b]								
Area Sources	16	0.0054	0.0021	0.0021	2.9	9.8E-04	3.8E-04	3.8E-04
Natural Gas Use	0.09	0.9	0.065	0.065	0.017	0.16	0.012	0.012
Mobile Sources[c]	17	18	21	4.7	3.0	3.3	3.8	0.8
TRU Operation	0.0099	0.11	0.0030	0.0027	0.0018	0.019	5.4E-04	5.0E-04
Total A's Related Existing Emissions	*33*	*19*	*21*	*4.7*	*6.0*	*3.5*	*3.8*	*0.9*
Phase 1 Buildout Conditions (Year 4)[e]								
Area Sources	45	0.25	0.12	0.12	8.1	0.046	0.022	0.022
Natural Gas Use	0.73	6.5	0.50	0.50	0.13	1.2	0.091	0.091
Mobile Sources[c]	34	61	60	14	6.2	11	11	2.5
Emergency Generators	0.41	7.3	0.27	0.26	0.075	1.3	0.048	0.047
EV Charging Reduction	-0.0020	-0.0047	-1.3E-04	-1.2E-04	-3.7E-04	-8.7E-04	-2.3E-05	-2.1E-05
TRU Operation	0.012	0.10	0.0011	0.0010	0.0023	0.019	2.0E-04	1.9E-04
Truck Idling	0.43	2.87	0.011	0.011	0.079	0.52	2.1E-03	2.0E-03
Total Project Emissions	*80*	*78*	*61*	*15*	*15*	*14*	*11*	*2.7*
Total Net New Emissions	*47*	*59*	*40*	*9.9*	*8.6*	*10.8*	*7.3*	*1.8*
Full Project Buildout Conditions (Year 8)[e]								
Area Sources	134	1.4	0.68	0.68	24	0.26	0.12	0.12
Natural Gas Use	2.1	19	1.5	1.5	0.39	3.5	0.27	0.27
Mobile Sources[c]	63	174	143	33	11	32	26	6.1
Emergency Generators	1.1	20	0.69	0.67	0.20	3.6	0.13	0.12
EV Charging Reduction	-0.11	-0.22	-0.0072	-0.0066	-0.020	-0.040	-0.0013	-0.0012
TRU Operation	0.015	0.11	7.8E-04	7.2E-04	0.0027	0.020	1.4E-04	1.3E-04
Truck Idling	0.53	3.4	0.014	0.013	0.096	0.62	0.0026	0.0025
Total Project Emissions	*201*	*217*	*146*	*36*	*37*	*40*	*27*	*6.6*
Total Net New Emissions	*168*	*198*	*126*	*32*	*31*	*36*	*23*	*5.8*

NOTES:

lbs/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter that is 10 microns or less in diameter; $PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; EV = electric vehicle; TRU = transportation refrigeration unit; E = In scientific notation, the letter E is used to mean "10 to the power of."

The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the emissions estimates presented in this table are conservative because emissions are expected to decrease over time due to improvements in technology and regulatory requirements.

a Categories defined as follows (Refer to Appendix AIR, *Air Quality Supporting Information*, for the land use type and sizes assumed in the modeling; Emissions were modeled using methods consistent CalEEMod v2016.3.2).

- **Area Sources** = these include architectural coatings (fugitive emissions of ROG associated with the reapplication of paint and coatings on interior and exterior surfaces during building maintenance), consumer products (fugitive emissions of ROG associated with non-industrial solvents, including cleaning supplies, kitchen aerosols, cosmetics and toiletries), and landscaping (emissions from the combustion of gasoline in landscaping equipment, like lawnmowers and leaf blowers).
- **Natural Gas Use** = Emissions from natural gas combustion for space heating and cooking.
- **Mobile Sources** = On-road fugitive dust (fugitive emissions of PM_{10} and $PM_{2.5}$ from vehicles driving on roadways, including road dust, tire wear, and brake wear) and on-road exhaust (emissions from the combustion of vehicle fuel (gasoline, diesel, and natural gas) in on-road vehicles; includes exhaust and evaporative emissions); emissions are estimated using EMFAC2017.
- **Emergency Generators** = Emissions from the testing and maintenance of diesel-powered emergency generators.
- **EV Charging Reduction** = Electric vehicle chargers encourage the use of electric vehicles, reducing criteria pollutant emissions from conventional fossil-fueled vehicles.
- **TRU Operation** = Emissions from operation of diesel-powered TRUs on delivery trucks serving the ballpark.
- **Truck Idling** = truck idling emissions associated with trucks traveling to and from the Port due to additional traffic delays on ballpark event days.

TABLE 4.2-6 (CONTINUED)
TOTAL UNMITIGATED AVERAGE DAILY AND ANNUAL OPERATIONAL EMISSIONS BY SOURCE FOR EXISTING A'S-RELATED EMISSIONS AND PROJECT PHASE 1 AND BUILDOUT

b Existing A's-Related Emissions for 2018 presented here only represent emissions associated with A's operations and ballgames that would be relocated to the new ballpark. Emissions for full Coliseum operations in 2018, including emissions associated with events that will not relocate to the Project site (such as NFL games), are presented in Appendix AIR for informational purposes. Neither existing emissions nor future emissions include those associated with operation of the fire station on Howard Terminal.
c Mobile source emissions include the 20% trip reduction required by AB 734 and implementation of on- and off-site transportation improvements and mitigation measures included in the Transportation section. For emissions without the 20% trip reduction, refer to Appendix AIR, *Air Quality Supporting Information*.
e Phase 1 buildout and full Project buildout emissions represent a full year of operational emissions, assuming 365 days of operation. However, Phase 1 will only be fully operational for a portion of Year 4 after construction concludes in April of Year 4 for the ballpark (December of Year 4 for non-ballpark development) and full buildout will only be fully operational for a portion of Year 8 after construction concludes in September of Year 8.

SOURCE: Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020

TABLE 4.2-7
TOTAL UNMITIGATED ANNUAL AND AVERAGE DAILY OPERATIONAL EMISSIONS BY YEAR

Year[a]	Scenario	Average Daily Emissions (lbs/day)[b]				Total Annual Emissions (tons/year)[b]			
		ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$
	Significance Threshold	**54**	**54**	**82**	**54**	**10**	**10**	**15**	**10**
	A's Related Existing Conditions (2018)[c]	32.9	19.0	20.6	4.7	6.0	3.5	3.8	0.9
Year 4	Phase 1 Operational Emissions[d,e]	43.7	26.9	33.8	7.8	8.0	4.9	6.2	1.4
	Net New Emissions[f]	*10.9*	*7.9*	*13.1*	*3.1*	*2.0*	*1.4*	*2.4*	*0.6*
Year 5–Year 7[f]	Phase 1 Operational Emissions[e]	80.2	78.2	60.5	14.6	14.6	14.3	11.0	2.7
	Net New Emissions[f]	*47.4*	***59.2***	*39.9*	*9.9*	*8.6*	***10.8***	*7.3*	*1.8*
Year 8	Full Buildout Operational Emissions[d,e]	120.1	124.2	88.8	21.8	21.9	22.7	16.2	4.0
	Net New Emissions[f]	***87.2***	***105.3***	*68.2*	*17.1*	***15.9***	***19.2***	*12.4*	*3.1*
Year 9	Full Buildout Operational Emissions[e,h]	200.9	217.4	146.1	36.2	36.7	39.7	26.7	6.6
	Net New Emissions[f]	***168.0***	***198.5***	***125.5***	*31.5*	***30.7***	***36.2***	***22.9***	*5.8*
	Maximum Annual Emissions	***168.0***	***198.5***	***125.5***	*31.5*	***30.7***	***36.2***	***22.9.***	*5.8*

NOTES:

lbs/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter that is 10 microns or less in diameter; $PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter.

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the emissions estimates presented in this table are conservative because emissions are expected to decrease over time due to improvements in technology and regulatory requirements.
b **Bold values** = threshold exceedance
c Emissions for A's related existing conditions are presented in Table 4.2-6. These emissions only represent emissions associated with A's operations and ballgames that would be relocated to the new ballpark. Only emissions for A's related existing conditions were subtracted from Project emissions to determine net new emissions associated with the Project.
d Operational emissions are scaled for partial years of operation in Year 4 and Year 8 based on the number of days of full operations for those years compared to 365 total days per year (30 days in Year 4 and 120 days in Year 8). See Table 4.2-6 for detailed operational emissions by source for Phase 1 operations and full buildout operations in Year 4 and Year 8. For Year 4, ballpark emissions are not scaled as the ballpark is operational at the start of Phase 1. Only Phase 1 ancillary land use emissions are scaled by the ratio of 30 days to 365 days.
e Mobile source emissions include the 20% trip reduction required by AB 734 and implementation of on- and off-site transportation improvements and mitigation measures included in the Transportation section. For emissions without the 20% trip reduction, refer to Appendix AIR, *Air Quality Supporting Information*.
f Net new emissions represent construction *plus* Project operational emissions *minus* existing A's-related emissions. Neither existing emissions nor future emissions include those associated with operation of the fire station on Howard Terminal.
g Operational emissions are anticipated to be the same during 2024–2026 when Phase 1 is operational and before full Project buildout occurs.
h Year 9 is the first full year (365 days) of full Project buildout operations and associated emissions.

SOURCE: Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020

The Project would develop and implement TMP and TDM program to reduce use of single-occupant vehicles and to increase the use of rideshare, transit, bicycle and walk modes for trips to and from, as well as within the Project site (see Section 4.15, *Transportation and Circulation*). The TMP, which would address ballpark trips, and the TDM program which would address non-ballpark trips, are required to reduce trips by 20 percent as required by AB 734.

Shuttle bus service connecting the ballpark's Transportation Hub to one or more of the three nearby BART stations (West Oakland, 12th Street, and Lake Merritt) on game days or for large concerts is identified as a City priority measure in the TMP. Because shuttle service is a priority TMP measure that may result in additional emissions compared to existing conditions, criteria air pollutant emissions from this service have been estimated. These emissions are anticipated to be 0.022 tons/year and 0.48 lbs/day of ROG, 0.55 tons/year and 12.0 lbs/day of NO_X, 0.036 tons/year and 0.78 lbs/day of PM_{10} and 0.010 tons/year and 0.23 lbs/day of $PM_{2.5}$ (see Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020). These emissions would be in addition to those set forth in Tables 4.2-6 and 4.2-7 above. With the addition of shuttle bus emissions, the conclusions regarding the significance of impacts from the Project's emissions would not change and the mitigation measures and their application would remain the same.

City of Oakland Municipal Code Section 15.04 requires the installation of plug-in electric vehicle (PEV) charging infrastructure, including PEV-ready, PEV-capable, and ADA-accessible parking spaces. In addition, parking on the Project site will be equipped with electric vehicle charging infrastructure that provides charging opportunities to 10 percent of the total number of parking spaces (in line with City of Oakland code requirements) (City of Oakland 2017). The Project sponsor anticipates that the electric vehicle charging stations would achieve a similar or better functionality as a Level 2 charging station. This would encourage the use of EVs at the Project site and discourage the use of gasoline and diesel passenger vehicles, thus reducing mobile source emissions associated with vehicle travel to and from the Project site. Refer to Appendix AIR, *Air Quality Supporting Information*, for additional information on quantification methods, along with studies supporting the link between EV charging infrastructure and consumer EV purchases and EV travel.

Mitigation Measure GHG-1 (Preparation and Implementation of a GHG Reduction Plan) requires that the Project sponsor prepare a GHG Reduction Plan prior to the start of Project construction activities to document Project GHG emissions, including emissions after Project-specific GHG reduction measures are implemented, and to determine the net incremental emission reductions required to meet the "no net new" GHG emissions threshold over the 30-year life of the Project. The GHG Reduction Plan developed for the Project would specify how the Project proposes to meet the "no net additional" GHG emissions threshold through the implementation of both on-site and off-site reduction measures, including the purchase of sufficient offset credits if needed. Mitigation Measure GHG-1 would include many mitigation measures that may also reduce criteria pollutant and TAC emissions as a co-benefit, and would thus reduce the Project's impact on air quality.

In addition, the Project must comply with the requirements of the California Green Building Standards (CALGreen) mandatory measures and the applicable requirements of the City of Oakland Green Building Ordinance (chapter 18.02 of the Oakland Municipal Code). In addition,

Project sources would be subject to the requirements of the City of Oakland Green Building Ordinance – Bay Friendly Landscapes (see Section 4.7, *Greenhouse Gas Emissions*). This would reduce energy use associated with Project operations, including natural gas consumption and associated criteria pollutant emissions.

Tables 4.2-6 and 4.2-7 above reflect emission reductions achieved from the implementation of the 20 percent trip reduction requirement of AB 734, achieved and monitored through the TMP and TDM programs via implementation Mitigation Measure TRANS-1a (Transportation Demand Management) and TRANS-1b (Transportation Management Plan), along with the installation of EV charging stations, which goes beyond the City of Oakland Municipal Code (which requires EV-ready electrical prewiring). These tables show that these reductions are not sufficient to reduce Phase 1 (Year 5-Year 8) operational emissions of NO_X below the significance thresholds for that pollutant. For the first full year of operation after Full Buildout (Year 9, these reductions are also not sufficient to reduce Full Buildout operational emissions for ROG, NO_x and PM_{10} below the significance thresholds for those pollutants. Therefore, mitigation would be required for both Phase 1 operations and Full Buildout operations.

The ROG, NO_X, and PM_{10} exceedances would result in a significant impact, and mitigation measures are required. Although these mitigation measures are required to reduce impacts from combined operations and construction starting in Year 5 with full annual Phase 1 operations, they apply to all Phase 1 operations beginning in Year 4 because they must be incorporated into Phase 1 design in order to be effective in later years.

Mitigation Measures AIR-1b, AIR-1c, AIR-1d, AIR-2a, AIR-2b, AIR-2c, AIR-2d, and AIR-2e, as well as Mitigation Measures TRANS-1a, TRANS-1b, TRANS-1c, TRANS-1d, TRANS-1e, TRANS-2a, TRANS-2b, TRANS-2c, TRANS-3a, and TRANS-3b, are identified to address the impacts of combined construction and operation.

> **Mitigation Measure AIR-1b: Criteria Air Pollutant Controls.** (See Impact AIR-1)
>
> **Mitigation Measure AIR-1c: Diesel Particulate Matter Controls.** (See Impact AIR-1)
>
> **Mitigation Measure AIR-1d: Super-Compliant VOC Architectural Coatings during Construction.** (See Impact AIR-1)
>
> **Mitigation Measure AIR-2a: Use Low and Super-compliant VOC Architectural Coatings in Maintaining Buildings through Covenants, Conditions, and Restrictions.**
>
> The Project Sponsor shall require all nonresidential developed parcels to include within their Covenants, Conditions, and Restrictions (CC&Rs) and/or ground leases requirements for all future interior spaces to be repainted only with "Super-Compliant" Architectural Coatings (http://www.aqmd.gov/home/regulations/compliance/architectural-coatings/super-compliant-coatings). "Super-Compliant" refers to paints that meet the more stringent regulatory limits in South Coast AQMD Rule 1113 which requires a limit of 10 grams VOC per liter.

Mitigation Measure AIR-2b: Promote use of Green Consumer Products.

To reduce ROG emissions associated with the Project, the Project Sponsor and/or future developer(s) shall provide education for residential and commercial tenants concerning green consumer products. Prior to receipt of any certificate of final occupancy and every five years thereafter, the Project sponsor and/or future developer(s) shall develop electronic correspondence to be distributed by email annually and upon any new lease signing to residential and/or commercial tenants of each building on the Project site that encourages the purchase of consumer products that generate lower than typical VOC emissions. The correspondence shall encourage environmentally preferable purchasing.

Mitigation Measure AIR-2c: Diesel Backup Generator Specifications.

To reduce NO_X associated with operation of the proposed Project, the Project sponsor shall implement the following measures. These features shall be submitted to the City for review and approval and be included on the Project drawings submitted for the construction-related permit or on other documentation submitted to the City:

1. If feasible, non-diesel fueled generators shall be installed to replace diesel-fueled generators. Alternative fuels used in generators, such as biodiesel, renewable diesel, natural gas, or other biofuels or other non-diesel emergency power systems, must be demonstrated to reduce NO_X emissions compared to diesel fuel.
2. All new diesel backup generators shall have engines that meet or exceed California Air Resources Board Tier 4 off-road Compression Ignition Engine Standards (title 13, CCR, section 2423) which have the lowest NO_X emissions of commercially available generators. If the California Air Resources Board adopts future emissions standards that exceed the Tier 4 requirement, the emissions standards resulting in the lowest NO_X emissions shall apply.
3. All new diesel backup generators shall have an annual maintenance testing limit of 20 hours, subject to any further restrictions as may be imposed by the Air District in its permitting process.
4. All diesel backup generator exhaust shall be vented on the rooftops of each building where the generators are located. This could be achieved by either placing the diesel backup generators themselves on the rooftops, or by constructing exhaust stacks from the diesel backup generator locations to the rooftops. Alternatively, the generators or exhaust stacks could be located in areas where the Project sponsor can quantitatively demonstrate that these locations would not result in health risks that exceed those associated with rooftop placement for both existing offsite and future onsite sensitive receptors. This analysis must consider health risks from the Project as a whole at full buildout, including all 17 generators installed at the Project site, and including emissions from off-site sources of TACs under cumulative conditions, and the impact of all existing offsite or new onsite sensitive receptors.
5. For each new diesel backup generator permit submitted to the Air District for the Project, the Project sponsor shall submit the anticipated location and engine specifications to the City for review and approval prior to issuance of a permit for the generator from the City of Oakland Department of Building Inspection. Once operational, all diesel backup generators shall be maintained in good working order for the life of the equipment and any future replacement of the diesel backup generators shall be required to be consistent with these emissions specifications. The operator of the facility at which the generator is located shall be required to maintain

records of the testing schedule for each diesel backup generator for the life of that diesel backup generator and to provide this information for review to the planning department within three months of requesting such information.

Mitigation Measure AIR-2d: Diesel Truck Emission Reduction.

The Project sponsor shall incorporate the following health risk reduction measures into the Project design and construction contracts (as applicable) in order to reduce the potential health risk due to exposure to toxic air contaminants. These features shall be submitted to the City for review and approval and be included on the Project drawings submitted for the construction-related permit or on other documentation submitted to the City. Emissions from Project-related diesel trucks shall be reduced through implementing the following measures, if feasible:

1. Installing electrical hook-ups for diesel trucks at loading docks.
2. Requiring trucks to use Transportation Refrigeration Units (TRU) that meet Tier 4 emission standards.
3. Requiring truck-intensive tenants to use advanced exhaust technology (e.g., hybrid) or alternative fuels.
4. Prohibiting trucks from idling for more than two minutes.
5. Establishing truck routes to avoid sensitive receptors in the Project. A truck route program, along with truck calming, parking, and delivery restrictions, shall be implemented.

Mitigation Measure AIR-2e: Criteria Pollutant Mitigation Plan.

The Project sponsor shall prepare a Criteria Pollutant Mitigation Plan (CPM Plan) prior to the issuance of building construction related permits for site preparation (including but not limited to grading activities, hazardous materials remediation, and/or horizontal infrastructure) for each individual project site (or phase with multiple project sites to be constructed concurrently by one entity). The purpose of the CPM Plan is to document expected construction and operational criteria pollutant emissions, including ROG, NO_X, PM_{10} and $PM_{2.5}$ emissions; and to identify all available feasible measures (as defined under CEQA; see below) to reduce total criteria pollutant emissions below the City's thresholds of significance. The criteria pollutant emissions estimate for the Project shall include consideration of all criteria pollutant emission reduction measures and emission reduction actions that will be implemented by the Project and shall describe the approximate criteria pollutant emissions reductions that will be associated with each action and reduction measure.

The CPM Plan shall be submitted to the City of Oakland Planning Department for review and approval or conditional approval based on a determination of whether the CPM Plan meets the conditions described below. The CPM Plan shall include some or all of the recommended measures listed below, as needed to reduce the Project's criteria pollutant emissions below the City's thresholds of significance. Should the Project sponsor deem any of the recommended measures infeasible, the CPM Plan shall clearly explain why such measure is considered to be infeasible, and how the goal of reducing all criteria pollutant emissions below the City's thresholds will be accomplished without the measure, and the Project sponsor shall only be permitted to remove measures if the City of Oakland Planning Department, in its discretion, determines that the measure is

infeasible. The criteria pollutant emissions estimate for the Project shall include consideration of all mitigation measures and emission reduction actions that will be implemented by the Project and shall describe the approximate criteria pollutant emissions reductions that will be associated with each action and mitigation measure.

The CPM Plan shall include a detailed description of the criteria pollutant emissions for all construction activities and all operational components of each Project site as shown in final development plan or equivalent based on the best available construction and operational activity and energy use data at the time of Project approval and the latest and most up-to-date emissions modeling and estimation protocols and methods. The plan shall, at minimum, include the following elements:

1. **Project Criteria Pollutant Emissions** – The Project's criteria pollutant emission estimates presented in the CPM Plan shall include both construction and operational emissions and will be based on the emission factors for mobile sources, area sources, energy sources, and stationary sources commonly used at the time the CPM Plan is completed, along with the incorporation of existing vehicle emission standards and building energy standards. If shuttle service to and from the Transportation Hub is provided as part of the TMP, then the estimates shall include emissions from this service. Emission factors are likely to decrease over time for some emission sources, such as mobile sources as the vehicle fleet shifts to more low- and zero-emissions fuel sources, and as new future technology that cannot currently be anticipated is adopted. The initial Project criteria pollutant emission estimates will be based upon final design, Project-specific traffic generation estimates, energy use estimates, equipment to be used on-site, and other emission factors appropriate for the Project prior to construction. Methods should generally follow the approach used in this DEIR and in Appendix AIR.
2. **Criteria Pollutant Emission Reduction Measures** – the CPM Plan shall include all feasible criteria pollutant emission reduction measures that reduce or offset the Project's incremental criteria pollutant emissions below the City's thresholds of significance. All emission reduction measures shall be verifiable and feasible to implement over the Project life. The CPM Plan shall be consistent with all regulatory requirements at the time the CPM Plan is developed, and shall include the recommended reduction measures identified below unless the Project sponsor provides evidence reasonably satisfactory to the City of Oakland Planning Department that (a) one or more measures are infeasible, or (b) that one or more measures are not required to reduce the Project's criteria pollutant emissions below City's thresholds. Measures shall be implemented as needed to achieve the City's significance thresholds. In addition, all measures shall be considered in the order of City preference as follows: (1) on-site measures, (2) off-site measures within the City of Oakland, and (3) off-site measures within the San Francisco Bay Area Air Basin. All feasible on-site and off-site measures must be implemented before emissions offsets are considered in the CPM Plan.

   For the purposes of this mitigation measure, "feasible" shall mean as defined under CEQA "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."

a. ***Recommended On-Site Emission Reduction Measures:***

i. *Minimize the Project's energy demand through physical design features, with the ultimate goal of zero net energy buildings.* Minimize electricity and natural gas demand through implementation of design measures. New development, including residential, commercial, and retail buildings, shall be designed as zero net energy buildings as defined by the U.S. Department of Energy as follows: "An energy-efficient building where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy" (DOE, 2015).

ii. *Electrify all residential development.* Residential buildings shall be 100 percent electric and not include any natural gas appliances, including water heaters, clothes washers, HVAC systems, and stoves. Notwithstanding the fact that this is a recommended measure, the Project shall comply with applicable building electrification requirements adopted by the City as part of its building code unless a waiver is granted by the City for a Project use and compliance with regulatory requirements shall not be considered mitigation.

iii. *Electrify nonresidential development.* Nonresidential buildings shall be 100 percent electric and not include any natural gas appliances, including water heaters, clothes washers, HVAC systems, and stoves. Notwithstanding this measure, the Project shall comply with any applicable building electrification requirement adopted by the City as part of its building code unless a waiver is granted by the City for a Project use and compliance with regulatory requirements shall not be considered mitigation.

iv. *Additional electric vehicle (EV) charging stations beyond regulatory requirements.* Install EV charging stations that provide charging opportunities at the Project site beyond regulatory requirements. The Project Sponsor shall promote the use of clean fuel-efficient vehicles through preferential (designated and proximate to entry) parking and installation of charging stations beyond the level required by regulatory requirements. Promote the use of zero-emission vehicles by requesting that any car share program operator with vehicles provided on the Project site include electric vehicles within its car share program to reduce the need to have a vehicle or second vehicle and to reduce vehicle emissions.

v. *Preferred parking for alternative-fueled vehicles and car sharing.* Reduce the need to have a vehicle (or second vehicle) by providing preferential (designated and proximate to entry) parking for ride sharing vehicles on site beyond regulatory requirements. Promote the use of zero-emission vehicles by requesting that any car share program operator with vehicles provided on Project site include electric vehicles within its car share program.

vi. *Additional TDM or TMP measures.* Implement TDM or TMP measures that go beyond the 20 percent vehicle trip reduction in the TDM or TMP Plan by encouraging mode shift from vehicles to other modes of transportation including transit, biking, walking, and ride-sharing.

vii. *Additional actions from Mitigation Measure GHG-1.* Implement any additional on-site actions from Mitigation Measure GHG-1 (Preparation and Implementation of a GHG Reduction Plan) that would reduce criteria pollutant emissions in addition to GHG emissions.

viii. *Additional measures and technology.* Implement additional measures and technology to reduce criteria pollutant emissions from Project construction and operations that are not currently known or available. This may include new energy systems (such as battery storage) to replace natural gas use, new transportation systems (such as autonomous vehicle networks) to reduce fossil-fueled vehicles, or other technology (such as alternatively-fueled emergency generators or renewable backup energy supply) that is not currently available at the project-level, provided that the CPM Plan demonstrates to the City's satisfaction that such measure are as or more effective as the existing measures described above.

b. ***Recommended Off-Site Emission Reduction Measures:***

i. *Community energy-efficiency retrofits.* Fund, contribute to, or implement community energy efficiency retrofits in West Oakland, the greater Oakland community, or other communities selected for the CARB's Community Air Protection Program under AB 617, to reduce off-site building energy use.

ii. *Off-site EV chargers.* Fund or implement a program that expands the installation of EV chargers in West Oakland, the greater Oakland community, or other communities selected for the CARB's Community Air Protection Program under AB 617, to reduce mobile source emissions from gasoline and diesel vehicles.

iii. *Additional actions from Mitigation Measure GHG-1.* Implement any additional off-site actions from Mitigation Measure GHG-1 (Preparation and Implementation of a GHG Reduction Plan) that would reduce criteria pollutant emissions in addition to GHG emissions.

c. ***Emissions Offsets:*** Prior to issuance of the final certificate of occupancy for the final building associated with Phase 1, the Project sponsor, with the oversight of the City of Oakland Planning Department, shall either:

i. *Directly fund or implement a specific offset project within the City of Oakland* to achieve the equivalent of annual tons-per-year reduction equal to the total estimated operational ROG, NO_X, and PM_{10} emissions offsets required to reduce the Project's criteria pollutants below City's significance thresholds. The emissions offset measures will be based on the criteria pollutant reductions necessary after implementation of all other emission reduction measures implemented through the verified CPM Plan described above. To qualify under this mitigation measure, the specific emissions offset project must result in emission reductions within the San Francisco Bay Area Air Basin that would not otherwise be achieved through compliance with existing regulatory requirements. A preferred offset project would be one implemented locally within West Oakland or the surrounding community. Such projects could include community-level strategies and control measures identified in BAAQMD's AB 617 West Oakland Community Action Plan (or any future AB 617 plan for nearby communities), such as zero-emission trucks, upgrading locomotives with cleaner engines, replacing existing diesel stationary and standby engines with Tier 4 diesel or cleaner engines, or expanding or installing energy storage systems (e.g., batteries, fuel cells) to replace stationary sources of pollution. Prior to implementing the offset project, it must be approved by the City of Oakland Bureau of Planning, as consistent with the requirements of this mitigation measure. The Project

Sponsor shall notify the City of Oakland Bureau of Planning within six months of completion of the offset project for verification; or

ii. *Pay mitigation offset fees* to the Air District Bay Area Clean Air Foundation or other governmental entity. The mitigation offset fee shall fund one or more emissions reduction projects within the San Francisco Bay Area Air Basin. The fee will be determined by the City, the Project Sponsor, and the Air District or other governmental entity, and be based on the type of projects available at the time of the payment. This fee is intended to fund emissions reduction projects to achieve annual reductions of ROG, NO_X, and PM_{10} equal to the amount required to reduce emissions below significance levels after implementation of other identified mitigation measures as currently calculated and implemented through the CPM Plan.

The offset fee for ROG and NO_X shall be made prior to issuance of the first building permit for the Project when the combination of construction and operational emissions is predicted to first exceed 54 pounds per day. This offset payment shall total the annual tons per year of ROG and NO_X above the 54 pounds-per-day and 10 tons-per-year threshold after implementation of Mitigation Measures AIR-2a though AIR-2d and the verified CPM Plan. The offset fee for PM_{10} shall be made prior to issuance of the final certificate of occupancy for the final building associated with Full Buildout of the Project when operational emissions of PM_{10} is predicted to first exceed 82 pounds per day. This offset payment shall total the annual tons per year of PM_{10} above the 82 pounds-per-day and 15 tons-per-year threshold and PM_{10} after implementation of Mitigation Measures AIR-2a though AIR-2d and the verified CPM Plan.

The total emission offset amount shall be calculated by summing the maximum daily construction and operational emissions of ROG, NO_X, and PM_{10} (pounds/day), above the City's threshold multiplying by 260 work days per year for construction and 365 days per year for operation, and converting to tons. The amount represents the total estimated operational and construction-related ROG, NO_X, and PM_{10} emissions offsets required to reduce the Project's criteria pollutant emissions below the City's thresholds after implementation of all other mitigation measures implemented through the CPM Plan.

Documentation of mitigation offset payments, as applicable, shall be provided to the City.

When paying a mitigation offset fee under paragraph (c)(ii), the Project sponsor shall enter into a memorandum of understanding (MOU) with the Air District Clean Air Foundation or other governmental entity. The MOU shall include details regarding the funds to be paid, the administrative. The MOU shall include details regarding the funds to be paid, the administrative fee, and the timing of the emissions reductions project. Acceptance of this fee by the air district shall serve as acknowledgment and a commitment to (1) implement an emissions reduction project(s) within a time frame to be determined, based on the type of project(s) selected, after receipt of the mitigation fee to achieve the emissions reduction objectives specified above and (2) provide documentation to the Planning Department and the Project sponsor describing the project(s) funded by the mitigation fee, including the amount of emissions of ROG, NO_X, and PM_{10}

reduced (tons per year) within the San Francisco Bay Area Air Basin from the emissions reduction project(s). To qualify under this mitigation measure, the specific emissions reduction project must result in emission reductions within the air basin that are real, surplus, quantifiable, and enforceable and would not otherwise be achieved through compliance with existing regulatory requirements or any other legal requirement. The requirement to pay such mitigation offset fee shall terminate if the Project sponsor is able to demonstrate that the Project's emissions upon the: (a) full buildout or (b) termination of the Development Agreement if it is later than full buildout are less than the 10-ton-per-year thresholds for ROG and NO_X and the 15-ton-per-year threshold for PM_{10}.

The Project sponsor shall prepare an Annual CPM Verification Report in the first quarter of each year following completion of each project site as shown in final development plan or equivalent. The purpose of the Report is to quantify total Project construction and operational criteria pollutant emissions for the previous year based on appropriate emissions factors for that year and the effectiveness of emission reduction measures that were implemented, and determine the on-site and off-site emission reduction measures and additional ROG, NO_X, and PM_{10} offsets needed to bring the Project below the City's thresholds of significance for the coming year. The Report shall be prepared by the Project proponent and submitted to the City Planning Department for review and verification. Criteria pollutant offsets for the previous year, if required, shall be in place by the end of each reporting year. If the City Planning Department determines the report is reasonably accurate, it may approve the report; otherwise, the City shall identify deficiencies and direct the Project sponsor to correct and re-submit the report for approval.

Mitigation Measure TRANS-1a: Transportation Demand Management (TDM) Plan. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1b: Transportation Management Plan. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1c: Implement a Transportation Hub on 2nd Street. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1d: Implement Bus-Only Lanes on Broadway. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1e: Implement Pedestrian Improvements. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-2a: Implement Buffered Bike Lanes Consistent with the Bike Plan on 7th Street from Mandela Parkway to Martin Luther King Jr. Way. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-2b: Implement Bike Lanes Consistent with the Bike Plan on Martin Luther King Jr. Way from Embarcadero West to 8th Street. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-2c: Implement Bike Lanes Consistent with the Bike Plan on Washington Street from Embarcadero West to 10th Street. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-3a: Implement At-Grade Railroad Crossing Improvements. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-3b: Pedestrian and Bicycle Overcrossing. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure Effectiveness

As discussed under Impact AIR-1, Implementation of Mitigation Measure AIR-1b (Criteria Air Pollutant Controls) and Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) would reduce criteria pollutant emissions from off-road equipment by equipping all off-road equipment with the most effective VDECS available, or through the use of Tier 4 Final engines. In addition, Mitigation Measure AIR-1d (Super-Compliant VOC Architectural Coatings during Construction) requires all interior architectural coatings used during construction to be super-compliant coatings at a limit of 10 grams VOC per liter, as defined in the South Coast Air Quality Management District's Rule 1113. These measures would reduce construction emissions during years when construction would overlap with operations.

With regard to Mitigation Measure AIR-2a (Use Low and Super-compliant VOC Architectural Coatings in Maintaining Buildings through Covenants, Conditions, and Restrictions), BAAQMD Regulation 8, Rule 3, places limits on the VOC content of paint and other architectural coatings, and use of lower VOC coatings available to consumers can further reduce operational ROG emissions. Low- and Super-Compliant VOC paints are manufactured and sold by numerous companies. ROG emissions associated with maintenance application of paint and other architectural coatings represent a relatively small percentage (approximately 11 percent) of total Project ROG emissions. Mitigation Measure AIR-2a would require the use of super-compliant VOC coatings with a maximum VOC content equal to 10 grams of VOC per liter for all interior spaces; the default VOC content of coatings is 100 grams per liter for interior coatings (150 grams per liter for exterior coatings). In modeling this measure, it was assumed that all nonresidential land uses would use super-compliant VOC coatings for interior paints. For nonresidential exterior paints and residential interior and exterior paints, it was assumed that the low-VOC coatings would not be used, given that the Project sponsor may not be able to enforce the types of coatings used in nonresidential exterior coatings and in residential tenant spaces. Based on these assumptions, Mitigation Measure AIR-2a would reduce total ROG emissions associated with maintenance application of paint and other architectural coatings by approximately 19 percent. Operational emissions would still exceed thresholds as the overall contribution of architectural coating emissions to total Project emissions is comparatively small. If the use of no-VOC interior paints could feasibly be enforced and implemented, total ROG emissions from maintenance application of paint and other architectural coatings could be reduced by up to 21 percent. If low-VOC coatings were used for nonresidential exterior surfaces, total ROG emissions from architectural coatings could be reduced by approximately 30 percent; if low-VOC coatings were used for residential interior and exterior surfaces, total ROG emissions from architectural coatings could be reduced by approximately 80 percent.

Mitigation Measure AIR-2b (Promote use of Green Consumer Products) would require the Project sponsor to educate residential tenants and encourage commercial tenants to purchase products that are safer and better for the environment. However, given the Project sponsor does not have

authority to require use of certain consumer products by building occupants or tenants, no reduction in ROG emissions can be attributed to this measure. ROG emissions would remain above the significance threshold of 54 pounds per day and 10 tons per year.

Mitigation Measure AIR-2c (Diesel Backup Generator Specifications) would reduce ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions from emergency generators by requiring all generators to meet U.S. EPA Tier 4 engine emission standards and by requiring that generators have an annual maintenance testing limit of 20 hours, instead of 50 hours as permitted by the BAAQMD. This measure is expected to reduce generator emissions of ROG by roughly 70 percent and NO_X, PM_{10}, and $PM_{2.5}$ emissions by roughly 96 percent compared to generators meeting the minimum requirements of the CARB Airborne Toxics Control Measure (ATCM) for Stationary Compression Ignition Engines and the testing limit of 50 hours per year (17 CCR 93115) (CARB, 2011b).

Mitigation Measure AIR-2d (Diesel Truck Emission Reduction) would reduce ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions from on-road heavy-duty truck travel and idling by requiring advanced exhaust technology, Tier 4 emission standards for TRUs, the use of electrical hookups to replace TRU operations, and idling limitations. At Full Buildout, DPM emissions from TRUs account for less than 1 percent of all DPM emissions from Project construction and Project operations. Additionally, TRU emissions represent 0.001 to 0.05 percent of total criteria pollutant emissions associated with Project operations and 3 to 5 percent of total criteria pollutant emissions associated with on-site truck activity (including idling and travel). Therefore, the contribution of Mitigation Measure AIR-2d toward reducing operational emissions would be minor. Therefore, although this measure would result in emission reductions, it was not modeled.

Mitigation Measure AIR-2e (Criteria Pollutant Mitigation Plan) would reduce ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions from implementation of the CPM Plan, to be implemented prior to the start of Project construction activities for any uses not included in Phase 1 (currently anticipated to occur in Year 5) and approved by the City of Oakland Bureau of Planning. However, the exact amount of daily and annual emission reductions from implementation of the required CPM Plan is not currently known. The CPM Plan also includes the provision for emissions offsets to reduce ozone precursor emissions equal to the total estimated operational and construction-related ROG and NO_X emissions offsets required to reduce related ROG and NO_X emissions below the City's adopted thresholds of significance (54 pounds per day and 10 tons per year) after implementation of all other emission reduction measures implemented through the verified CPM Plan. In addition, implementation of the emissions reduction project(s) would be conducted by BAAQMD or another government entity and is outside the jurisdiction and control of the City and not fully within the control of the Project sponsor. Mitigation Measure AIR-2e also allows the Project sponsor to directly fund or implement an offset project.

Additional mitigation measures included in Section 4.15, Transportation and Circulation, would also serve to reduce the Project's operational criteria pollutant emissions. These include TRANS-1a (Transportation Demand Management [TDM] Plan), TRANS-1b (Transportation Management Plan), TRANS-1c (Implement a Transportation Hub on 2nd Street), TRANS-1d (Implement Bus-Only Lanes on Broadway), TRANS-1e (Implement Pedestrian Improvements), TRANS-2a (Implement Buffered Bike Lanes on 7th Street from Mandela Parkway to Martin Luther King Jr.

Way), TRANS-2b (Implement Bike Lanes Consistent with the Bike Plan on Martin Luther King Jr. Way from Embarcadero West to 8th Street), TRANS-2c (Implement Bike Lanes Consistent with the Bike Plan on Washington Street from Embarcadero West to 10th Street), TRANS-3a (Implement At-Grade Railroad Crossing Improvements), and TRANS-3b (Pedestrian and Bicycle Overcrossing). However, the precise effect on vehicle travel and the associated reduction in criteria pollutant emissions from implementation of these measures cannot be specifically calculated based on information currently known. Therefore, reductions from these mitigation measures are not included in the mitigated emissions tables below.

As discussed above under Impact AIR-1, there are a number of transportation improvements and mitigation measures that call for construction of off-site facilities that may also generate construction emissions. These include but are not limited to creation of a Transportation Hub, bus lanes, protected bike lanes, and a pedestrian and bicycle overcrossing of the railroad tracks. All off-site improvements would be within public rights of way and would not result in increased roadway capacity or traffic volumes. Consequently, these transportation improvements would not increase operational mobile source emissions or result in operational impacts beyond what was analyzed here.

Table 4.2-8 below presents a summary of potential emission reductions from potential mitigation measures to be included in the CPM plan under Mitigation Measure AIR-2d. Note that the emission reductions presented for the AIR-2e measures are preliminary and subject to revision per the details of the CPM Plan, and were therefore not included in the mitigated total emissions for the Project.

TABLE 4.2-8
SUMMARY OF POTENTIAL ADDITIONAL EMISSION REDUCTIONS BY MITIGATION MEASURE

Mitigation Measure	Potential Emission Reductions – Average Daily Emissions (lbs/day)				Potential Emission Reductions – Total Annual Emissions (tons/year)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$
Potential Measures under MM AIR-2e[a]								
Residential Electrification[b]	0.8	6.6	0.5	0.5	0.1	1.2	0.1	0.1
Nonresidential Electrification[c]	0.4	3.5	0.3	0.3	0.1	0.6	0.05	0.05
Additional EV Charging[d]	0.1	0.2	0.01	0.0050	0.015	0.031	0.0010	0.0009

NOTES:

lbs/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter that is 10 microns or less in diameter; $PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; EV = electric vehicle.

[a] These reductions represent potential emission reductions for measures included in AIR-2e, but the details of these measures have not yet been determined per the CPM Plan. Because it has not yet been determined which (if any) of the measures shown above will be implemented, these potential additional mitigation measures are not added together or to the Proposed Project results but are presented for informational purposes only.

[b] Emission reductions based on the assumption that all natural gas use from residential land uses is replaced by electricity.

[c] Emission reductions based on the assumption that 50% of natural gas use from nonresidential land uses is replaced by electricity. This is provided for illustrative purposes; the actual amount of nonresidential space that will be electrified may be greater based on building code requirements.

[d] Emission reductions from additional EV charging stations are based on the assumption that the Project Sponsor would install additional Level 2 EV charging stations beyond the currently planned 10% of parking spaces. This measure will further encourage the use of EVs at the Project site and discourage the use of gasoline and diesel passenger vehicles, thus reducing mobile source emissions. For more information about this potential reduction measure, refer to Appendix AIR.

SOURCE: Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020

Table 4.2-9 below presents average daily and total annual combined mitigated construction and mitigated operational emissions during the years when construction and operations overlap. This table presents overlapping construction emissions with Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), modeled as Tier 4 Final engines on all off-road equipment (as available), and with Mitigation Measure AIR-1d (Super-Compliant VOC Architectural Coatings during Construction), modeled as 10 grams VOC per liter for interior architectural coatings. This table also shows operational emissions with implementation of Mitigation Measures AIR-2a (Low VOC Architectural Coatings) and AIR-2c (Diesel Backup Generator Specifications). Because Mitigation Measure AIR-2b (Green Consumer Products) cannot be quantified at this time, it was not included in the table. The amount of criteria pollutant emission reductions achieved through specific measures required to be implemented under Mitigation Measure AIR-2e (Criteria Pollutant Mitigation Plan) cannot be quantified with certainty at this time. Therefore, these reductions are not presented in Table 4.2-9.

In addition, although the CPM Plan would include emissions offsets required to reduce any ROG, NO_X, and PM_{10} emissions that would exceed the respective thresholds of significance for these pollutants after implementation of all other feasible on-site and off-site emission reduction measures, implementation of the emissions reduction project(s) could be conducted by BAAQMD or another government entity and is outside the jurisdiction and control of the City and not fully within the control of the Project sponsor. Mitigation Measure AIR-2e also allows the Project sponsor to directly fund or implement an offset project; however, no such project has been identified.

As shown in Table 4.2-9, mitigation would reduce ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions from operations. However, even with mitigation that can be quantified (i.e., not including Mitigation Measure AIR-2b and AIR-2e), net new Project emissions would still remain above the significance thresholds. Net new emissions of NO_X would exceed the significance thresholds in all years from Year 5 through Year 9. Net new emissions of ROG would exceed the significance thresholds in all years from Year 6 through Year 9. Net new emissions of PM_{10} would exceed the significance thresholds in Year 9. Net new emissions of $PM_{2.5}$ would not exceed the significance thresholds in any year. Maximum net new emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ occur in Year 9 at full Project buildout.

Health Impacts Assessment for Ozone Precursors – Regional Effects

The types of adverse health effects known to occur as a result of exposure to criteria air pollutants and the potential secondarily formed ozone have been discussed in "Criteria Air Pollutants" under Section 4.2.1, above. The analysis below uses available models to attempt to correlate the Project's unmitigated criteria air pollutant emissions to elevated concentrations of such pollutants in the region, and then to identify health effects that may occur as a result of predicted increased concentrations. The following analysis reflects a good faith attempt, based on the existing tools, to relate the expected adverse air quality impacts to likely health consequences as directed by the Supreme Court in the Friant Ranch case.[33] Limitations and qualifications of the analysis are highlighted after the presentation of the analysis results, below.

[33] *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 517-522.

TABLE 4.2-9
TOTAL ANNUAL AND AVERAGE DAILY COMBINED MITIGATED CONSTRUCTION AND MITIGATED OPERATIONAL EMISSIONS BY YEAR

Year[a]	Scenario	Average Daily Emissions (lbs/day)[b]				Total Annual Emissions (tons/year)[b]			
		ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$
	Significance Threshold	**54**	**54**	**82**	**54**	**10**	**10**	**15**	**10**
	A's Related Existing Conditions[c]	32.9	19.0	20.6	4.7	6.0	3.5	3.8	0.9
Year 4	Construction[d]	23.6	20.2	0.4	0.4	3.1	2.7	0.05	0.05
	Phase 1 Operations[e,f]	42.8	23.9	33.7	7.7	7.8	4.4	6.1	1.4
	Net New Emissions[g]	*33.5*	*25.1*	*13.4*	*3.3*	*4.9*	*3.6*	*2.4*	*0.6*
Year 5	Construction[d]	3.5	42.1	0.6	0.5	0.5	5.5	0.07	0.07
	Phase 1 Operations[e]	78.2	71.2	60.3	14.4	14.3	13.0	11.0	2.6
	Net New Emissions[g]	*48.9*	***94.3***	*40.2*	*10.2*	*8.7*	***15.0***	*7.3*	*1.8*
Year 6	Construction[d]	25.8	31.7	0.5	0.4	3.4	4.1	0.06	0.05
	Phase 1 Operations[e]	78.2	71.2	60.3	14.4	14.3	13.0	11.0	2.6
	Net New Emissions[g]	***71.1***	***83.9***	*40.1*	*10.1*	***11.6***	***13.6***	*7.3*	*1.8*
Year 7	Construction[d]	45.2	36.3	0.6	0.5	5.9	4.7	0.07	0.07
	Phase 1 Operations[e]	78.2	71.2	60.3	14.4	14.3	13.0	11.0	2.6
	Net New Emissions[g]	***90.6***	***88.5***	*40.2*	*10.2*	***14.2***	***14.2***	*7.3*	*1.8*
Year 8	Construction[d]	45.0	38.5	0.5	0.5	3.9	3.4	0.05	0.05
	Full Buildout Operations[e,f]	117.1	113.4	88.5	21.4	21.4	20.7	16.1	3.9
	Net New Emissions[g]	***129.2***	***132.9***	*68.4*	*17.2*	***19.3***	***20.6***	*12.4*	*3.1*
Year 9	Construction[d]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Full Buildout Operations[e,h]	195.8	198.8	145.5	35.6	35.7	36.3	26.6	6.5
	Net New Emissions[g]	***162.9***	***179.8***	***124.9***	*30.9*	***29.7***	***32.8***	***22.8***	*5.6*
	Maximum Annual Net New Emissions	***162.9***	***179.8***	***124.9***	*30.9*	***29.7***	***32.8***	***22.8***	*5.6*

NOTES:

lbs/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter that is 10 microns or less in diameter; $PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter.

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the emissions estimates presented in this table are conservative because emissions are expected to decrease over time due to improvements in technology and regulatory requirements.

b **Bold values** = threshold exceedance

c Existing A's-related emissions are presented in Table 4.2-6.

d Average daily construction emissions represent total annual emissions divided by 260 work days per year (with the exception of the ballpark emissions, which were divided by 312 days per year to account for weekend work). See Tables 4.2-4 and 4.2-5 for more detail. Emissions include implementation of Mitigation Measure AIR-1b (Criteria Air Pollutant Controls), Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), and Mitigation Measure AIR-1d (Super-Compliant VOC Architectural Coatings during Construction). This table also includes construction activities associated with construction of a pedestrian and bicycle overpass as well as other off-site construction associated with transportation improvements as called for in the Transportation section. This table does not include event shuttles operating at the Transit Mobility Hub, as discussed in the TMP; emissions from these shuttles would be relatively small and would not affect the significance conclusions. See Appendix AIR for more detail.

e Average daily operational emissions represent total annual emissions divided by 365 days per year. See Table 4.2-6 for more detail. Emissions include the 20% trip reduction required by AB 734, Mitigation Measure AIR-2a (Use Low and Super-compliant VOC Architectural Coatings in Maintaining Buildings through Covenants, Conditions, and Restrictions), and Mitigation Measure AIR-2c (Diesel Backup Generator Specifications).

f Operational emissions are scaled for partial years of operation in Year 4 and Year 8 based on the number of days of full operations for those years compared to 365 total days per year (30 in Year 4 and 120 in Year 8). For Year 4, ballpark emissions are not scaled as the ballpark is operational at the start of Phase 1. Only Phase 1 non-ballpark land use emissions are scaled by the ratio of 30 days to 365 days.

g Net new emissions represent Project construction *plus* Project operational emissions *minus* existing A's-related emissions. Neither existing emissions nor future emissions include those associated with operation of the fire station on Howard Terminal.

h Year 9 is the first full year (365 days) of full Project buildout operations and associated emissions.

SOURCES: Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020

The CEQA significance thresholds for ROG and NO_X are emission levels above which stationary air pollutant sources permitted by the BAAQMD (typically, industrial facilities, refineries, and other industrial point sources) must offset their emissions through purchase of "offsets" from other facilities that have reduced emissions, either through installation of emissions controls or removal of an emissions source. Such offset levels allow for regional development while keeping the cumulative effects of new sources at a level that will not impede attainment of the NAAQS. As described in Section 4.2.2, *Regulatory Setting*, compliance with the ambient air quality standards indicates that regional air quality can be considered protective of public health. However, as also explained in Section 4.2.2, the ambient air quality standards are expressed in terms of the concentrations of individual pollutants within the air.

As explained by the BAAQMD in its 2010 report justifying its CEQA significance thresholds, the thresholds for the ozone precursors ROG and NO_X were tied to the BAAQMD's offset requirements for ozone precursors. The offset requirements are based on the Bay Area's non-attainment with the federal ozone standard and therefore, such an approach is appropriate "to prevent further deterioration of ambient air quality and thus has nexus and proportionality to prevention of a regionally cumulative significant impact (e.g. worsened status of non-attainment)" (BAAQMD, 2010). As explained above, attainment can be considered protective of public health, thus providing a strong link between a mass emission threshold and avoidance of health effects. For PM_{10} and $PM_{2.5}$, the BAAQMD established CEQA significance thresholds based on the federal New Source Review program for new stationary sources of pollution, which contains stricter thresholds than does BAAQMD's offset program for these pollutants. "These thresholds represent the emission levels above which a project's individual emissions would result in a considerable adverse contribution to the [San Francisco Bay Area Air Basin]'s existing air quality conditions" (BAAQMD, 2009). As with ROG and NO_X discussed above, these thresholds likewise provide a connection between a mass emission threshold and avoidance of health effects.

Because there is no significance threshold related to health effects of criteria pollutant emissions, the following analysis is provided for information purposes and presents the extent to which unmitigated (with the exception of Mitigation Measure AIR-2a [Use Low and Super-compliant VOC Architectural Coatings in Maintaining Buildings through Covenants, Conditions, and Restrictions] and AIR-2c [Diesel Backup Generator Specifications]) criteria air pollutant emissions from the Project would result in (1) changes in the concentration of criteria air pollutants in the atmosphere, and (2) correlative health effects that may occur as a result of those changes in air pollutant concentrations.

Results of Analysis

Photochemical grid modeling performed using CAMx predicts slight increases in ozone and $PM_{2.5}$ concentrations with the unmitigated Project emissions as compared to the base case emissions. The CAMx results for the base case as compared to the base case plus Project show the following increases at the most affected model grid cells:[34]

[34] The most affected model grid cell for $PM_{2.5}$ concentrations overlays the Project site and contains much of West Oakland. The most affected model grid cell for ozone concentrations is to the east of the Project site, over the East Bay Hills.

- 0.0128 parts per billion (ppb), or 0.03 percent, for annual average of maximum daily 8-hour ozone;
- 0.118 ppb, or 0.22 percent, for overall maximum daily 8-hour average ozone;
- 0.269 $\mu g/m^3$, or 0.92 percent, for annual average $PM_{2.5}$; and
- 0.2685 $\mu g/m^3$, or 1.04 percent, for maximum 24-hour average $PM_{2.5}$.

Note that these estimated increases are for the most affected grid cell; thus, the estimated changes in all other modeled grid cells will be less. These results generally validate the prediction that the addition of locally generated emissions could result in incremental increases in nearby ground level concentrations of ozone and $PM_{2.5}$. However, these differences are very small.

Although there is a strong correlation between elevated concentrations and elevated health incidence rates, the regression of the health incidence data and dose response functions to very low concentrations is a recognized uncertainty. In addition, as discussed below, there are several additional modeling uncertainties and assumptions embodied in the analysis. Health effects presented are conservatively estimated, and may be zero.

Overall, the estimated change in health effects from ozone and $PM_{2.5}$ associated with unmitigated Project emissions are minimal in light of background incidences. Specifically, for all the health endpoints quantified, the number of estimated incidences is between 0.000046 percent and 0.0020 percent of the background health incidence.[35] The "background health incidence" is an estimate of the average number of people that suffer from some adverse health effect in a given population over a given period of time in the absence of additional emissions from the Project. Health incidence rates and other health data are typically collected by the government as well as the World Health Organization. When taken into context, the small increase in incidences and the very small percent of the number of background incidences indicate that these health effects are minimal in a developed, urban environment.

$PM_{2.5}$-related health outcomes attributed to Project-related increases in ambient air concentrations include asthma-related emergency room visits (approximately 1 additional per year), asthma-related hospital admissions (less than 0.1 additional per year), all cardiovascular-related hospital admissions (not including myocardial infarctions) (less than 0.2 additional per year), all respiratory-related hospital admissions (approximately 0.4 additional per year), mortality (approximately 1.5 additional per year),[36] and nonfatal acute myocardial infarction (less than 0.1 additional per year for all age groups). These numbers compare to the background incidences for the modeled regional area of asthma-related emergency room visits (115,302 per year for ages 0–99), asthma-related hospital admissions (13,394 per year for ages 0–64), all cardiovascular-related hospital admissions (not including myocardial infarctions) (148,633 per year for ages 65–99), all respiratory-related hospital admissions (127,218 per year for ages 65–99), all-cause mortality (256,043 per year for

35 These percentages are based on Project-level incremental health effects divided by background health incidences provided by BenMAP as discussed in the *Methods for Analysis of Impacts* section above and Appendix AIR.

36 Mortality associated with $PM_{2.5}$ is a result of an individual's exposure to average annual $PM_{2.5}$ concentrations. As such, this analysis uses average annual $PM_{2.5}$ concentrations to estimate incidences of mortality.

ages 30–99), and nonfatal acute myocardial infarction (40,571 per year for ages 18–99). These numbers represent 2035 background health effect incidences for the entire modeled regional area of 22.5 million people (see Appendix AIR for additional discussion).[37]

Ozone-related health outcomes attributed to Project-related increases in ambient air concentrations included respiratory-related hospital admissions (less than 0.2 additional per year), mortality (less than 0.1 additional per year), and asthma-related emergency room visits (less than 0.8 additional per year for ages 0–17 and less than 1.2 additional per year for ages 18–99). These numbers compare to the background incidences for the entire modeled regional area of respiratory-related hospital admissions (127,218 per year for ages 65–99), non-accidental mortality (170,592 per year for ages 0–99), and asthma-related emergency room visits (39,464 for ages 0–17 and 75,838 for ages 18–99). These numbers represent 2035 background health effect incidences for the entire modeled regional area of 22.5 million people (see Appendix AIR for additional discussion).[38,39]

As discussed above in the *Methods for Analysis of Impacts* Section above, the results presented above were based on initial estimates of the Project's criteria pollutant emissions. Consequently, there are slight differences between the criteria pollutant emissions used to estimate the health outcomes presented above and the criteria pollutant emissions presented in this document. However, because changes to the emission levels, sources, and locations are small, a linear assessment was conducted to illustrate the potential changes in the numbers reported above associated with the changes in criteria pollutant emissions. See Appendix AIR, *Air Quality Supporting Information*. As discussed in Appendix AIR, the conclusions associated with these change in health incidences would not change as a result of this linear assessment.

It is important to note that the change in health incidences reported above from the incremental increase in Project emissions represent total cumulative health incidences for the entire modeled regional area of 22.5 million people. However, although the health outcomes attributed to Project-related increases in ambient air concentrations are small compared to the outcomes correlated to regional background health effects, the maximum $PM_{2.5}$ concentrations associated with incremental Project's emissions occur within the model grid cell which overlays the Project site and contains much of West Oakland. Maximum ozone concentrations are seen to the east of the Project site, into the East Bay Hills. The remaining impacts occur in nearby grid cells within the Cities of Oakland, Berkeley, Hayward, Walnut Creek, Richmond, and other East Bay cities. Minimal impacts occur outside of the East Bay and larger Bay Area. This is because the Project's

37 For background incidence rates, BenMAP projects likely mortality rates for future years, but for other health effects, incidence rates are based on population changes only and may not reflect rates for future years. Year 2035 is consistent with the year of base case emissions modeled in CAMx. The base case represents future emissions projections for the year 2035 because this is the nearest future year with base emissions available as of the date of this analysis.

38 Ibid.

39 Background health incidence numbers are specific to the health outcome and age range evaluated selected by the USEPA in BenMAP. Differences in background incidence disclosed for $PM_{2.5}$-related and ozone-related health outcomes are due to differences in the evaluated health outcomes (e.g., $PM_{2.5}$ is evaluated for all-cause mortality ages 30-99 while ozone is evaluated for non-accidental mortality ages 0-99).

emissions disperse and dissipate with distance, and the formation of ozone and secondary $PM_{2.5}$ resulting from the Project's direct emissions also decline with distance.

The Project-related changes in health effects from ozone and $PM_{2.5}$ are minimal in light of total regional background incidences. The HIA does not quantify the potential health effects from other criteria air pollutants, because the U.S. EPA has recently stopped quantifying the health effects and economic costs for additional air pollutants (other than ozone and $PM_{2.5}$). For this reason, it is not possible to estimate the potential health effects from criteria air pollutants other than ozone and $PM_{2.5}$. See the *Methods for Analysis of Impacts* section above for more information.

The background health effects represent the health effects occurrences estimated in the regional population (about 22.5 million people) of the modeling domain without the emissions produced by the Project.[40,41] The modeling performed is highly conservative, since the emissions for the Project upon which the photochemical grid modeling is conducted are added emissions to the air basin-wide inventory, as if all Project-related emissions are net new, whereas it has been documented in this section, and in Sections 4.15, *Transportation and Circulation*, and 4.7, *Greenhouse Gas Emissions*, that a percentage of the Project-related travel demand and related emissions currently occur. As such, these emissions would have been included in BAAQMD's 2035 inventory, although attributed to the current location(s) of emission. Nonetheless, the very small increase in health effects incidence, relative to the substantially larger number of background health effects incidences, demonstrates that the Project would have a very small impact on specific health effects.

Modeling Assumptions

As noted in the *Methods for Analysis* section above, health outcomes presented here conservatively utilize maximum daily emissions (with the exception of mortality health effects from $PM_{2.5}$ which rely on average annual emissions) assumed to occur for an entire year. Should average daily emissions be used, health risk impact results would be lower. In addition, health effects associated with the Project are estimated using a number of highly conservative assumptions, including:

- Unmitigated operational Project emissions are used in the modeling, with the exception of Mitigation Measure AIR-2a (Use Low and Super-compliant VOC Architectural Coatings in Maintaining Buildings through Covenants, Conditions, and Restrictions) and AIR-2c (Diesel Backup Generator Specifications);
- Co-benefits of greenhouse gas emission reduction mitigation have not been considered, and could result in meaningful reductions in ozone precursors;

[40] Based on the 2010 census data, the EPA's PopGrid software generates the Ben-MAP ready population dataset for the modeling domains, which is 17,928,057 for the 4km modeling grid (the modeling domain is a 387.74-by-253.52-mile [158,196.14-square-mile] area). Based on the 2010 population dataset generated by PopGrid, BenMAP predicts the 2035 population for the modeled domain increases to 22,502,033 and used that in the health impact calculations.

[41] As discussed in Methods for Analysis of Impacts, the regional modeling domain was selected to maintain consistency with the 2000 CCOS, which was established to understand and investigate the ozone formation in Central California. Therefore, the domain includes all Central California and portions of Northern California.

- Maximum daily emissions are used in the modeling and are assumed to occur for an entire year, with the exception of mortality health effects from $PM_{2.5}$, which are based on average annual emissions;
- Existing condition emissions for existing A's-related activities occurring at the Coliseum that would be removed with the Project were not removed from the model, and the associated health benefits of these anticipated emission reductions are not considered;
- Health effects can occur at any concentration, including small incremental concentrations;[42] and
- All $PM_{2.5}$ emissions are of equal toxicity, regardless of the source of PM or the constituents of each PM emissions source.[43]

These assumptions all result in highly conservative health risk estimates and are intended to represent the worst-case, upper bound potential impacts.

Uncertainty of Results

As many regional-scale health impact assessments and this Project-level analysis demonstrate, performing a quantitative HIA is complex and difficult, but some level of analyses can be performed to some extent. Nevertheless, the limits of such analyses should be noted. The model outputs provide seemingly precise values. It would be inappropriate, however, to assume that these values, though seemingly precise, give an exact understanding of the Project's actual impacts. The uncertainty in such analyses is inherent and unavoidable.

Analyses that evaluate the changes in concentrations resulting from individual sources and the health effects associated with changes in pollutants as a result of regulation on a localized basis can be done for direct TAC emissions which have very specific localized health effects that can be estimated with reasonable accuracy (see analysis below under Impact AIR-4). The HIA for the Project does not link the changes in ozone and $PM_{2.5}$ concentration associated with Project operations to any specific *individual* health impact; instead, it uses studies that report *correlations* between health effects and exposure to ozone and $PM_{2.5}$ to estimate potential effects on the population in the region surrounding the Project.

The modeling performed to estimate a single project's contribution to ambient concentrations of pollutants requires assumptions for many variables, both related to the Project, and to the meteorological and other characteristics of the air basin, into which the pollutants are emitted. Models often rely on assumptions that may not capture fully or accurately the complexity or dynamism of the physical world. All simulations of physical processes, whether ambient air

[42] This presumes that impacts seen at large concentration differences can be linearly scaled down to small increases in concentration, with no consideration of potential thresholds below which health impacts may not occur. This methodology of linearly scaling impacts is broadly accepted for use in regulatory evaluations and is considered as being health protective (U.S. EPA, 2010).

[43] The U.S. EPA has stated that results from various studies have shown the importance of considering particle size, composition, and particle source in determining the health impacts of PM (U.S. EPA, 2009). U.S. EPA also found that studies have reported that particles from industrial sources and from coal combustion appear to be the most significant contributors to PM-related mortality. This is particularly important to note here, as the majority of PM emissions generated from the Project are from brake wear, tire wear, and entrained roadway dust, and not from combustion. Therefore, by not considering the relative toxicity of PM components, the results presented here are conservative. See Appendix AIR for further discussion.

concentrations or health effects from air pollution, have an associated level of uncertainty due to many simplifying assumptions. Each step in the modeling process, and each assumption incorporated into the model, adds a degree of uncertainty into the reported results. The overall uncertainty of the modeled results is a combination of many uncertainties associated with each individual component of the modeling study. These inputs include air pollutant emission estimates, ambient air concentration modeling, and health impact calculations using various health impact functions. The combination and compounding of the uncertainties from each step of the modeling analysis, in the context of the very small increments of change that are predicted, could result in large uncertainties. The modeling results should be viewed in light of these uncertainties.

Generally, models that correlate criteria air pollutant concentrations with specific health effects focus on regulatory decision-making that will apply throughout an entire air basin or region. These models focus on the region-wide health effects of pollutants so that regulators can assess the costs and benefits of adopting a proposed regulation that applies to an entire category of air pollutant sources, rather than the health effects related to emissions from a specific proposed project or source. Because of the scale of these analyses, any single project is likely to have only very small incremental effects which may be difficult to differentiate from the effects of air pollutant concentrations in an entire air basin. For regional pollutants, it is difficult to trace a particular project's criteria air pollutant emissions to a specific health effect. Even if the model reports a given health effect, the actual effect may differ from the modeled results; that is, the modeled results suggest precision, when in fact the available models have numerous uncertainties that limit their precision for predicting health effects associated with emission sources that are small in comparison to regional, air basin-wide emissions.

Meteorology, the presence of sunlight, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone or PM. The effects on ground-level ambient concentrations of pollutants that may be breathed by people are also influenced by the spatial and temporal patterns of the emission sources. In other words, the effect on ozone and PM concentrations from a given mass of pollutants emitted in one location may vary from the effect if that same mass of pollutants was emitted in a different location in the Air Basin. Emissions from the construction and operation of the Proposed Project would vary by time of day, month, and season, and the majority of Project-related emissions, being generated by mobile sources (cars and trucks) driving to and from the site, would be emitted throughout a wide area defined by the origins and destinations of people travelling to and from the Project.

In addition to the conservative assumptions built into the emissions noted above, there are a number of assumptions built into the application of C-R functions in BenMAP that may lead to an overestimation of health effects. For example, for all-cause mortality impacts from $PM_{2.5}$, these estimates are based on a single epidemiological study that found an association between $PM_{2.5}$ concentrations and mortality. While similar studies suggest that such an association exists, there remains uncertainty regarding a clear causal link. This uncertainty stems from the limitations of epidemiological studies, such as inadequate exposure estimates and the inability to control for many factors that could explain the association between $PM_{2.5}$ and mortality such as lifestyle factors like smoking or exposures to other air pollutants.

For both the $PM_{2.5}$ and ozone health effects calculated, each of the pollutants may be a confounder of the other. Thus, while the C-R functions are from studies that evaluated the effects for each pollutant individually, both air pollutants could contribute to the health effect outcomes evaluated, and thus the overall impacts may be overstated.

These assumptions and uncertainties do not necessarily mean the modeled results are invalid or uninformative. Rather, it means that one should not have undue confidence in the seeming precision of the reported outcome. Stated another way, the modeled results may be valid, but they should not be misinterpreted as an exact calculation of something as complex as photochemical grid modeling, or as correlating a given level of emissions with specific health effects. In this case, the modeled health effects may differ from the actual future health effects associated with the Project.

Additionally, the estimate of health effects presumes that impacts seen at large concentration differences can be linearly scaled down to small concentration differences, with no consideration of potential thresholds below which health effects may not occur. This methodology of linearly scaling impacts is broadly accepted for use in regulatory evaluations and is considered as being health protective (U.S. EPA, 2010). In summary, health effects presented in this report are conservatively estimated, and the actual impacts may be lower or possibly even zero.

Context of Results

The Project-related additional health incidences from $PM_{2.5}$ are minimal when compared with the background regional health incidences. For example, the less than 1.1 additional annual asthma-related emergency room visits associated with the Project compares to background incidences of asthma-related emergency room visits of 115,302 per year; the Project represents only a 0.001 percent increase (or a rate of 1 per 20.3 million). As another example, the approximate 1.5 annual incidences of mortality associated with the Project compares to background mortality rate of 256,043 per year; the Project represents a 0.0006 percent increase (or a rate of 1 per 14.6 million). However, as discussed above, although the Project-related additional health incidences are small compared to the regional background health incidences, the majority of the Project's impacts occur within West Oakland and the surrounding urban area.

It is also worth noting that the City of Oakland itself has some of the highest health incidence rates in the both the County and the State (Alameda County Public Health Department, 2014). For example, the City of Oakland's age-adjusted asthma-related emergency room visit rate is 777.6 per 100,000, which is the highest rate of any city in Alameda County (the County average is 542.5). From 2011-2013 there were 9,478 asthma-related emergency room visits in the City. The data show that the City of Oakland already has very high health incidence rates when compared to county or state average rates, so the contribution from the Project to regional health incidences should be evaluated within this context.

As demonstrated by BAAQMD's health risk modeling for the WOCAP, and the cumulative health risk analysis presented below in Impact AIR-2.CU, West Oakland has a disproportionally high health burden. The City also has ozone precursor emissions and associated health effects that are higher than regional averages. Given this context, the background health incidences in the modeled region are higher than the average California city.

Conclusion

The very small increase in health effects incidence, relative to the substantially larger number of background health effects incidences, demonstrates that the Project would have a very small impact on specific health effects. The estimated increases in those health effect incidences are quite minor compared to the background health incidence values with the largest $PM_{2.5}$ health effect (all-cause mortality) representing only 0.0006 percent of the total of all deaths, and the largest effect for ozone (asthma related emergency room visits by adults) representing 0.0016 percent of all emergency room visits.

While the quantitative HIA uses the best available tools and guidance currently available, there are many compounding uncertainties which may affect the reported results such that the modeled health effects may differ from the actual future health effects associated with the Project. The calculated health effects for the Project are conservatively estimated, and may in fact be zero.

In summary, the estimated health effects from the Project are low relative to existing health risks and represent only a very small fraction of the total background health incidence. Nonetheless, as disclosed in Table 4.2-9 above, the average daily and total annual operational criteria air pollutants emissions associated with the Project represent a significant and unavoidable impact to regional air quality, because they exceed the BAAQMD's mass emission thresholds.

Additional discussion of modeling limitations and uncertainty is provided in Appendix AIR, *Air Quality Supporting Information*.

Summary: Criteria Pollutant Emissions

Mitigation Measure AIR-2a (Use Low and Super-compliant VOC Architectural Coatings in Maintaining Buildings through Covenants, Conditions, and Restrictions) would reduce ROG emissions associated with architectural coatings through the use of Super-Compliant VOC paints. Mitigation Measure AIR-2b (Promote use of Green Consumer Products) would encourage the use of Low-VOC consumer products, and may reduce ROG emissions. Mitigation Measure AIR-2c (Diesel Backup Generator Specifications) would reduce criteria pollutant emissions associated with diesel backup generators through the use of Tier 4 Final engines and reduced testing hours. Mitigation Measure AIR-2d (Diesel Truck Emission Reduction) would reduce criteria pollutant emissions from on-road heavy-duty truck travel and idling by requiring exhaust controls and other emission reduction actions.

Mitigation Measure AIR-2e requires the development and implementation of the CPM Plan which would incorporate a wide variety of mitigation measures into the Project design prior to the start of construction. While expected to be effective at reducing emissions below the City's thresholds, the specific measures to be implemented through the CPM Plan are currently not known and therefore the amount of criteria pollutant emission reductions achieved through these measures is not quantifiable. Implementation of some of the emissions reduction project(s) could be conducted by BAAQMD or other governmental entity and is outside the jurisdiction and control of the City and not fully within the control of the Project sponsor.

For these reasons, the residual impact of Project emissions during construction and overlapping operations is conservatively considered significant and unavoidable with mitigation, acknowledging the assumption that the Project sponsor would implement Mitigation Measures AIR-2a though AIR-2d, in addition to Mitigation Measure AIR-2e. Although some of the specific mitigation measures and offset projects are not identified with particularity at this time, given the general description of the measures, it is anticipated that implementation of this mitigation measure would not result in any adverse environmental effects.

In summary, implementation of Mitigation Measures AIR-2a, AIR-2b, AIR-2c, AIR-2d, and AIR-2e would reduce ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions from the Project, but, for the reasons stated above, it is conservatively assumed that criteria pollutant emissions would remain significant and unavoidable with mitigation.

Significance after Mitigation: Significant and Unavoidable with mitigation.

Carbon Monoxide

Impact AIR-3: Traffic associated with the development of the proposed Project would not contribute to carbon monoxide (CO) concentrations exceeding the California Ambient Air Quality Standards (CAAQS) of nine parts per million (ppm) averaged over eight hours and 20 ppm for one hour. (Criterion 3) (*Less than Significant*)

Regional ambient air quality monitoring data, including those presented in Table 4.2-1, demonstrate that CO concentrations within West Oakland and the air basin at large are well below federal and state standards, despite long-term upward trends in regional VMT. In recent years, the potential for localized increases in carbon monoxide concentrations from increased traffic has been greatly reduced due to improvements in vehicle exhaust controls since the early 1990s and the use of oxygenated fuels.

The BAAQMD's recommended approach for determining if a Project would contribute to CO concentrations exceeding the CAAQS of 9 ppm averaged over eight hours and 20 ppm for one hour is to use screening criteria. If the Project meets all of the BAAQMD's screening criteria, the Project would result in a less-than-significant impact to air quality with respect to local CO concentrations. Pursuant to the BAAQMD CEQA Guidelines' screening criteria for CO, localized CO concentrations should be estimated for projects in which (a) project-generated traffic would conflict with an applicable congestion management program established by the county congestion management agency or (b) project-generated traffic would increase traffic volumes at affected intersections to more than 44,000 vehicles per hour (or 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited, such as tunnels, parking garages, bridge underpasses, natural or urban street canyons, and below-grade roadways). In Oakland, only the MacArthur Maze portion of Interstate 580 exceeds the 44,000 vehicles per hour screening criteria, which is approximately 2 miles northwest of the Project site and would therefore not result in elevated CO concentrations at the Project site. Further, ambient CO standards have not been exceeded in the Bay Area for over a decade, largely due to reformulated fuels in California and vehicle emissions controls, as discussed above. Therefore, development under the Project

would not be required to estimate localized CO concentrations as it would not contribute to CO concentrations exceeding CAAQS. The impact would be less than significant and no mitigation measures are required.

Mitigation: None required.

Toxic Air Contaminants

Impact AIR-4: Construction and operation of the Project could generate substantial levels of toxic air contaminants (TACs) and impact off-site receptors. (Criterion 4) (*Less than Significant with Mitigation*)

The HRA for the Project was conducted to assess increased cancer risk, non-cancer chronic health effects, and localized annual average $PM_{2.5}$ concentrations from both construction and operational sources. Localized $PM_{2.5}$ concentrations and non-cancer chronic health risks are assessed based on annual average concentrations and exposure, and hence, separate evaluations are performed for construction and operations except where they overlap Conversely, cancer risk is assessed based on the probability of contracting cancer over a person's lifetime, evaluated as 30 years. Therefore, the probability of an increased cancer risk is determined by evaluating a sensitive receptor's exposure to both construction and operational emissions combined. To determine whether significant impacts would occur, the cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentration results are compared to the project-related significance thresholds of an increase in cancer risk level greater than 10 in 1 million, a non-cancer chronic hazard index (HI) greater than 1.0, and an annual average $PM_{2.5}$ concentration of greater than $0.3 \mu g/m^3$ of $PM_{2.5}$, respectively.

As discussed in the *Approach to Analysis* section above, the HRA considered three separate exposure scenarios to assess worst-case risk at both new on-site and existing off-site sensitive receptor locations. Scenario 1 assesses exposure of existing off-site sensitive receptors to all construction (Phase 1 and the remaining development), Phase 1 operations while Phase 2 is being constructed, and full buildout operations for a total 30-year exposure. Scenario 3 assesses exposure of existing off-site and new on-site sensitive receptors to full buildout operations for a total 30-year exposure. Scenario 1 and Scenario 3 for existing off-site sensitive receptors are analyzed below. Scenario 2 assesses exposure of all existing off-site and all new on-site sensitive receptors occupying Phase 1 buildings once Phase 1 construction is complete to Phase 2 construction emissions and full buildout operations for a total 30-year exposure. Scenario 2 and Scenario 3 for new on-site sensitive receptors are addressed in Impact AIR-5 below.

Construction sources considered in the HRA include emissions from off-road construction equipment and on-road heavy-duty diesel trucks. Operational sources considered in the HRA include operational traffic generated by the proposed development and travel associated with the ballpark, TRU emissions from ballpark deliveries, and emergency generators.[44] Under California

[44] Emissions associated with possible relocation of truck parking to the Roundhouse site is also included as a conservative assumption. The analysis does not quantify risks associated with possible relocation of truck parking to other locations because those locations have not been identified and it would be speculative to do so.

regulatory guidelines, DPM is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole (BAAQMD, 2016c). Therefore, DPM was the only TAC included in the cancer risk analysis for construction and operational emissions exposure. Annual average $PM_{2.5}$ concentrations include exhaust from all fuel combustion sources from both construction and operational activities along with road dust, tire wear, and brake wear from operational mobile sources.

Both the BAAQMD and the City of Oakland guidelines recommend that health risk analyses consider receptors located within 1,000 feet of new sources. Based on the location of the Project in West Oakland, which has been designated by the BAAQMD as a priority community through the agency's Community Health Protection Program, the HRA conservatively assessed health risks from Project construction and operation on existing and new sensitive receptors within 2,000 feet of the proposed Project boundary and other parts of West Oakland in the vicinity of nearby freeways.

Existing Conditions

Health risks for existing conditions include exposure to TAC emissions from existing local heavy-duty truck activity at Howard Terminal (i.e. current truck parking and related activities at the Project site). These trucks emit DPM and $PM_{2.5}$ during travel and idling at the site. Nearby existing off-site sensitive receptors (such as those located at Phoenix Lofts approximately 100 feet to the north of the Project site) are currently exposed to this local DPM and $PM_{2.5}$ emitted at Howard Terminal without implementation of the Project, resulting in increased cancer risk, chronic non-cancer risks, and exposure to $PM_{2.5}$ concentrations. With implementation of the Project, it is assumed that trucks currently accessing and parking at Howard Terminal would continue to enter the Seaport at the three access points on Adeline, 7th, and Maritime Streets, and only their parking/staging locations would be located elsewhere. As explained in Section 4.2.3 under *Tenant Relocation*, though it is currently unknown where the truck parking from Howard Terminal would be relocated to, one possibility could be the Roundhouse as indicated by Port staff. To provide for a conservative health risk analysis for off-site and on-site sensitive receptors, it is assumed that all existing truck parking at Howard Terminal would relocate to the Roundhouse. This is a conservative assumption because it is likely that some of the trucks at Howard Terminal would relocate to other locations within the Seaport, the City, or the region in which their uses are permitted under applicable zoning and other regulations.[45] There are currently no other sites within the Seaport that are located closer to the MEIR locations than the Roundhouse. The location of parking sites within the region are not known, but they would be farther from the MEIR locations. Therefore, with the Project, the off-site MEIR would not experience health risks associated with existing parking and staging activities at the Howard Terminal portion of the Project site but could experience health risks associated with the same activities at the Roundhouse instead. As discussed in the *Methods for Analysis of Impacts* section above, because the Project would remove these existing TAC emission sources at Howard Terminal, the impact of the Project on health risks to existing off-site sensitive receptors is considered to be the difference between

[45] As discussed in Section 4.2.3 above, the City's zoning significantly restricts trucking-related uses and off-street truck parking. Trucking related uses are only allowed in the T-overlay zone located directly north of Howard Terminal and south of 5th Street, between Brush Street and the southbound Union Street off-ramp from I-880. However, most of the area within the T-overlay zone is developed or already occupied and is not available for truck parking.

exposure to the existing TAC emissions at Howard Terminal (i.e. existing conditions) and exposure to the Project's TAC emissions. This is consistent with the City significance threshold which identifies ***an increase*** in cancer risk level greater than 10 in one million as a significant impact. Therefore, the existing health risks were subtracted from the Project's total health risks to determine impacts of the Project for the off-site MEIR. The analysis also includes the potential relocation of truck parking from Howard Terminal to the Roundhouse under the assumption described above. Health risks from existing conditions (heavy-duty truck activity at Howard Terminal) at the Project-level MEIR location are presented in **Table 4.2-10** below, along with health risks from potential relocation of this truck activity to the Roundhouse.

Impacts on Existing Sensitive Receptors

Existing sensitive receptors in the HRA include all existing off-site sensitive receptors within 2,000 feet of the proposed Project boundary and other parts of West Oakland in the vicinity of nearby freeways. See Appendix AIR, *Air Quality Supporting Information*, for a figure presenting the location of sensitive receptors include in the HRA. As discussed in the *Approach to Analysis* section above, the air pollutant exposure to residents typically results in the greatest adverse health outcome for all population groups. As such, a conservative approach of considering all off-site sensitive receptors as residential receptors was used in this analysis. The exposure rate for the residential scenario is more conservative than those for other sensitive receptor types (i.e., school child, daycare child, and patients) as residents have the highest exposure frequency, exposure time, and exposure duration.

As previously discussed under *Sensitive Receptors* in the *Environmental Setting*, off-site sensitive receptors close to the Project site primarily include residential uses to the north across Embarcadero Street (the Phoenix Lofts). Existing residences are located as close as 100 feet from the Project site boundary. The Downtown Oakland Specific Plan (DOSP) Preliminary Draft Plan indicates that there could be new downtown residential sensitive receptors across Embarcadero West approximately 100 feet north of the Project site, which is the same distance from the Project site as the current existing off-site sensitive receptors located at Phoenix Lofts (City of Oakland, 2019). The DOSP would not place sensitive receptors any closer to the project site than those located at Phoenix Lofts, which was considered in the analysis. Therefore, the health risks at any future potential DOSP receptor location would likely not exceed those included in this EIR. However, because the exact location of new future residential sensitive receptors is currently not known (and when those future receptors would be present and exposed to the Project's TAC emissions), this Draft EIR does not include these potential future locations as existing off-site sensitive receptors for analyzing the direct impacts of the Project. Other residential areas throughout West Oakland were also considered.

Construction TAC Emissions

Regarding construction emissions, off-road equipment a large contributor to DPM emissions in California, although since 2007, the CARB has found the emissions to be substantially lower than previously expected (CARB, 2010). Additionally, a number of federal and state regulations are requiring cleaner off-road equipment. Specifically, both the U.S. EPA and California have set emissions standards for new off-road equipment engines, ranging from Tier 1 to Tier 4. Tier 1 emission standards were phased in from 1996 to 2000, and Tier 4 interim and final emission

TABLE 4.2-10
UNMITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE EXISTING OFF-SITE MEIR

Scenario/Emissions Source/Location/Year	Excess Lifetime Cancer Risk (per million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b,c,d]
Significance Threshold	**10.0**	**1.0**	**0.3**
Scenario 1: Construction Plus Operations			
Existing Howard Terminal[d]	-2.2	-5.9E-04	-6.4E-04
Project Construction	**62**	0.034	7.9E-03
Project Operational Generators	4.1	—	2.7E-03
Project Operational Traffic	0.88	—	0.18
Project Operational TRUs[e]	0.018	—	1.1E-05
Potential Truck Parking at the Roundhouse[f]	0.38	—	4.1E-04
Total Unmitigated Project	**67**	0.034	0.19
Total Unmitigated Net New Project w/Roundhouse[g]	**65**	0.034	0.19
MEIR Location (UTM – X)	563080	563080	563180
MEIR Location (UTM – Y)	4183660	4183660	4183920
Year of Maximum Exposure[h]	n/a	Year 2	Year 8
Scenario 3: Full Buildout Operations			
Existing Howard Terminal[d]	-2.2	-8.1E-05	-6.4E-04
Project Construction	—	—	—
Project Operational Generators	9.4	5.4E-04	2.7E-03
Project Operational Traffic	2.0	0.0037	0.18
Project Operational TRUs[e]	0.035	2.3E-06	1.1E-05
Potential Truck Parking at the Roundhouse[f]	0.38	5.2E-05	4.1E-04
Total Unmitigated Project	**11.4**	0.0042	0.19
Total Unmitigated Net New Project w/Roundhouse[g]	9.6	0.0042	0.19
MEIR Location (UTM – X)	563080	563180	563180
MEIR Location (UTM – Y)	4183660	4183920	4183920
Year of Maximum Exposure[h]	n/a	Year 9	Year 9

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; TRU = transportation refrigeration unit; UTM = universal transverse Mercator; — = no value reported; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance

b Health risks assume the 20% trip reduction requirement of AB 734 is met and include implementation of the pedestrian and bicycle overcrossing which is required as mitigation in the Transportation section.

c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a (Dust Controls). For operations, $PM_{2.5}$ concentrations include exhaust, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at off-site receptors in Scenario 1 include contributions from multiple phases of Project construction and subsequent Project operations since Year 8 includes construction and operation. In Scenario 3, $PM_{2.5}$ concentrations at off-site receptors in Scenario 3 include only contributions from Project operations.

d Existing Howard Terminal operations include truck activity at the Project site that would be relocated, including on-site truck idling and truck movement. Because this activity would be removed from the site with implementation of the Project, the TAC emissions associated with this activity would also be removed, and the corresponding health risks for exposure of existing off-site receptors to these TAC emissions would also be removed.

e Delivery truck idling and TRU operations were only included for the ballpark and performance venue, given data limitations for non-ballpark delivery trucks. Performance venue TRUs were modeled at the ballpark loading docks since the location of the performance venue loading docks is not yet known. This table does not include event shuttles operating at the Transit Mobility Hub, as discussed in the TMP; health risks from these shuttles would be negligible. See Appendix AIR for more detail.

f Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City, or the region. Note that Roundhouse health risk is less than existing Howard Terminal health risk because the existing off-site MEIR is located further away from the Roundhouse than from Howard Terminal.

g Total unmitigated net new Project w/Roundhouse represents total unmitigated Project health risks *minus* health risks from existing Howard Terminal truck activity *plus* potential health risks from relocated truck parking to the Roundhouse.

h For cancer risk, the exposure is excess lifetime 30-year exposure; for non-cancer chronic HI and $PM_{2.5}$ concentrations, this represents the year when the maximum value occurs at the MEIR. Note that the technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

SOURCES: Appendix AIR, *Air Quality Supporting Information*.

standards for all new engines were phased in between 2008 and 2015 (U.S. EPA 2004a). To meet the Tier 4 emission standards, engine manufacturers are required to produce new engines with advanced emission-control technologies. Although the full benefits of these regulations will not be realized for several years as Tier 4 equipment replaces older equipment, the U.S. EPA estimates that by implementing the federal Tier 4 standards, NO_X and PM emissions will be reduced by more than 90 percent (U.S. EPA, 2004b). Furthermore, California regulations limit maximum idling times to five minutes, which further reduces public exposure to NO_X and PM emissions (California Code of Regulations, Title 13, Division 3, § 2485).

Construction activities associated with the Project would constitute a new source of DPM and $PM_{2.5}$ emissions. As discussed above, studies have demonstrated that DPM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to DPM poses a chronic health risk (CARB, 1998; U.S. EPA, 2002). Project construction activities would produce DPM and $PM_{2.5}$ emissions from construction equipment exhaust as well as haul truck trips. These emissions could result in elevated concentrations of DPM and $PM_{2.5}$ at nearby sensitive receptors which could lead to an increase in the risk of cancer or other health impacts.

The HRA conducted for the Project (presented below and detailed in Appendix AIR to this Draft EIR) analyzes the incremental cancer risks to existing sensitive receptors in the vicinity of the proposed Project, using emission rates (in pounds per hour) from CalEEMod and EMFAC2017 emissions models. Unitized emission rates (1 g/s) for each source were input into the U.S. EPA's AERMOD atmospheric dispersion model to calculate dispersion factors; these dispersion factors were then multiplied by the actual estimated DPM (reported as exhaust PM_{10}), TOG, and $PM_{2.5}$ emission rates to estimate ambient air concentrations at receptors in the Project vicinity. Established cancer potency factors and acceptable reference concentrations for non-cancer health effects were applied to the highest estimated concentrations of TACs at the receptors analyzed to estimate cancer and non-cancer risks. The cancer risk also takes into account the OEHHA-recommended age sensitivity factors and breathing rates, as well as the fraction of time spent at home over an exposure duration of 30 years. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing air pollutants. Detailed methodology and assumptions used in the HRA are provided in Appendix AIR to this Draft EIR.

Operational TAC Emissions

The sources of TAC emissions that would occur during the operational phase of the Project include emissions from mobile sources (passenger vehicles and delivery vehicles) and stationary sources (17 emergency backup diesel generators, delivery vehicle idling at the ballpark loading docks, and delivery vehicle TRU operations at the ballpark loading docks). Mobile source air toxics are compounds emitted from highway vehicles, which are known or suspected to cause cancer or other serious health and environmental effects. Delivery vehicle idling and TRU operations at non-ballpark uses were not included in the HRA since data was not available on the number, type, and location of these TRU operations given the uncertainty in future business operations and loading dock locations at the Project. Delays to Port trucks and Port truck idling emissions from traffic delays were also not included in the HRA because these DPM emissions were shown to be a relatively small percentage of overall DPM emissions and are therefore not

expected to contribute significantly to health risk.[46] Mobile source air toxics emissions are primarily associated with combustion of fossil fuels and include benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, polycyclic organic matter (POM), naphthalene, and DPM.

The Project would include an emergency generator at the ballpark stadium as well as a new emergency generator on each of the mixed-use buildings for a total of 17 proposed diesel back-up generators. Diesel generators, if larger than 50 horsepower, must obtain a permit from the BAAQMD and comply with the CARB ATCM for Stationary Compression Ignition Engines (17 CCR 93115; CARB, 2011c). For the purpose of protecting human health, the BAAQMD will not issue a permit for a new generator that results in an operational cancer risk greater than 10 in 1 million.

Cancer Risk Impacts

Table 4.2-10 shows the HRA results for existing off-site receptors for Scenario 1 exposure from unmitigated Project construction and operational activities along with Scenario 3 exposure for full buildout operations. For Scenario 1 exposure, as shown in the table, the maximum cancer risk from unmitigated Project construction emissions at the off-site MEIR would be 62 per million and the maximum cancer risk from unmitigated Project operational emissions would be 5 per million. The total cancer risk from unmitigated construction and operational sources combined would be 67 per million at the off-site MEIR. When accounting for the removal of existing health risks associated with existing on-site port truck idling and truck movement, which are estimated to be 2.2 per million, and the addition of health risks associated with the possible relocation of these emissions to the Roundhouse, the net total Project cancer risk (unmitigated) would be 65 per million at the off-site MEIR, which is the Phoenix Lofts (737 2nd St).

Therefore, at 65 per million, the incremental increase in the off-site MEIR lifetime cancer risk due to combined construction and operational activities would exceed the City's threshold of 10 per million. Consequently, the impact of the proposed Project would be *potentially significant*, and mitigation would be required. Scenario 3 exposure would be less than Scenario 1 exposure, as presented in the Table, and would not exceed the cancer risk threshold of significance.

As discussed above, existing tenants and trucks at Howard Terminal are assumed to relocate elsewhere in the Seaport, the City or the region and could expose other off-site sensitive receptors to TAC emissions associated with truck activities. While the precise locations to which trucks that are currently parking in Howard Terminal would be relocated is unknown, a conservative analysis assuming all truck parking is relocated to the Roundhouse would expose the off-site MEIR to an excess cancer risk of 0.38 per million. Note that this value is lower than the excess cancer risk at the MEIR location associated with existing truck activity at Howard Terminal of 2.2 per million.

[46] Idling emissions from trucks traveling to and from the Port of Oakland delayed in traffic due to the Project represent 1.3 percent of all DPM emissions from Project operations. These emissions would also be spread out around the many intersections analyzed and would not be concentrated in the vicinity of the MEIR. Therefore, it is expected that these truck idling emissions from traffic delays would have a minimal effect on on-site or off-site receptor exposures.

As noted above in the *Approach to Analysis* section, it was assumed that a relatively large amount of construction activity would take place during a relatively intensive and overlapping schedule. This would produce the highest likely estimate of cancer risk for off-site receptors, because a longer construction schedule would spread out TAC emissions over less susceptible sensitive receptor age groups and also because newer, cleaner construction equipment would be phased into the fleet over time. Therefore, these risk values represent a conservative estimate of construction-related health risks for all likely construction phasing scenarios.

Shuttle bus service connecting the ballpark's Transportation Hub to one or more of the three nearby BART stations (West Oakland, 12th Street, and Lake Merritt) on game days or for large concerts is identified as a City priority measure in the TMP. Because shuttle service is a priority TMP measure that may result in additional emissions compared to existing conditions, health risks associated with this service have been estimated. Implementing this service would increase the excess lifetime cancer risk at the off-site MEIR by 0.039, for a total unmitigated contribution (construction + operations + shuttles) of 65.23 (as compared to 65.19 for the Project without shuttles) (See Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020). The same mitigation measures would apply, and conclusions regarding the significance of off-site cancer risk impacts associated with the Project's emissions would not change.

Non-Cancer Health Impacts

Non-cancer chronic (long-term) adverse health impacts unrelated to cancer are measured against a hazard index (HI), which is defined as the ratio of the predicted incremental DPM exposure concentration from the proposed Project to a reference exposure level (REL) that could cause adverse health effects. A HI of greater than 1.0 is considered significant.

For Scenario 1 exposure, as shown in Table 4.2-10, the non-cancer chronic HI for the Project at the off-site MEIR was estimated to be 0.034 for construction and combined construction and operation in the Year 2 (there is no chronic HI for operations in Year 3 because operational emissions don't begin until Phase 1 construction is complete in Year 4). The off-site MEIR is located at the Phoenix Lofts (737 2nd St). Therefore, the non-cancer chronic HI would less than 1 for all off-site receptors. As the non-cancer chronic HI would be below the project-level threshold of 1.0, the impact of the proposed Project would therefore be *less than significant*. For Scenario 3 exposure, the non-cancer chronic HI for the Project would be less than Scenario 1 exposure because combined construction and operational non-cancer HI is greater than operational only.

Potential shuttle service associated with the TMP (as discussed above) would not increase the non-cancer chronic HI as presented in Table 4.2-10 above because the year of maximum impact is 2021 before the shuttles are operational (See Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020). The conclusions regarding the significance of off-site non-cancer chronic risk associated with the Project's emissions would not change.

$PM_{2.5}$ Concentrations

Table 4.2-10 also shows the results of the risk assessment for exposure to $PM_{2.5}$ during construction and operations at the maximally impacted off-site receptor.

For Scenario 1 exposure, as shown in Table 4.2-10, the annual average $PM_{2.5}$ concentrations for the unmitigated Project at the off-site MEIR was estimated to be 7.9E-03 µg/m^3 for construction, 0.19 µg/m^3 for operations, and 0.19 µg/m^3 for combined construction and operation in Year 8. When accounting for the removal of existing health risks associated with existing on-site Port truck idling and truck movement at Howard Terminal, and the addition of health risks associated with the potential relocation of truck parking to the Roundhouse, the net total Project annual average $PM_{2.5}$ concentrations would be 0.19 µg/m^3 at the off-site MEIR. The off-site MEIR is located on Brush Street halfway between 4th Street and 5th Street. This MEIR is a different location from the cancer risk MEIR because $PM_{2.5}$ concentrations are driven by road dust associated with operational on-road vehicle traffic, instead of off-road construction DPM emissions which drive the cancer risk; as such the $PM_{2.5}$ MEIR is located near a high-traffic roadway segment instead of near construction activity. Based on these results, the annual average $PM_{2.5}$ concentrations would not exceed the City's threshold of 0.3 µg/m^3. Consequently, the impact of the proposed Project would be *less than significant*. For Scenario 3 exposure, the annual average $PM_{2.5}$ concentrations for the Project would be less than Scenario 1 exposure because combined construction and operational $PM_{2.5}$ concentrations is greater than operational only.

Potential shuttle service associated with the TMP (as discussed above) would result in an increase in average annual $PM_{2.5}$ concentrations of 0.0010 µg/m^3 for a total unmitigated contribution (construction + operations + shuttles) of 0.195 µg/m^3 (as compared to 0.194 µg/m^3 for the Project without shuttles) (See Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020). The same mitigation measures would apply, and conclusions regarding the significance of off-site $PM_{2.5}$ concentrations associated with the Project's emissions would not change.

Mitigation Measures AIR-1c, AIR-2c, AIR-2d, AIR-2e, and AIR-3 would address impacts of Project-related TAC emissions on existing off-site sensitive receptors.

> **Mitigation Measure AIR-1c: Diesel Particulate Matter Controls.** (See Impact AIR-1)
>
> **Mitigation Measure AIR-2c: Diesel Backup Generator Specifications.** (See Impact AIR-2)
>
> **Mitigation Measure AIR-2d: Diesel Truck Emission Reduction.** (See Impact AIR-2)
>
> **Mitigation Measure AIR-2e: Criteria Pollutant Mitigation Plan.** (See Impact AIR-2)
>
> **Mitigation Measure AIR-3: Truck-Related Risk Reduction Measures – Toxic Air Contaminants.**
>
> The Project sponsor shall incorporate the following health risk reduction measures into the Project design of the ballpark and non-residential uses in order to reduce the potential health risk due to truck-related sources of toxic air contaminants. These measures shall be specified on the Project plans for confirmation by the City's building official at the time of plan check and would be subject to periodic inspection.
>
> 1. *Truck Loading Docks Requirement:* The Project sponsor shall locate proposed truck loading docks as far from nearby sensitive receptors as feasible.

2. *Truck Fleet Emission Standards:* The Project sponsor shall comply with all applicable California Air Resources Board (CARB) requirements to control emissions from diesel engines and demonstrate compliance to the satisfaction of the City. Methods to comply include, but are not limited to, new clean diesel trucks, higher-tier diesel engine trucks with added particulate matter (PM) filters, hybrid trucks, alternative energy trucks, or other methods that achieve the applicable CARB emission standard. Compliance with this requirement shall be verified through CARB's Verification Procedures for In-Use Strategies to Control Emissions from Diesel Engines.

Mitigation Measure Effectiveness

As discussed under Impact AIR-1, Mitigation Measure AIR-1b (Criteria Air Pollutant Controls) and AIR-1c (Diesel Particulate Matter Controls) would be implemented as part of the Project to reduce construction equipment exhaust emissions. In order to comply with Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), the construction equipment fleet for the Project would be required to meet Tier 4 Final engine standards (except where demonstrated to be infeasible to the satisfaction of the City). This would reduce DPM and $PM_{2.5}$ emissions associated with off-road diesel construction equipment, thereby reducing excess lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations.

Mitigation Measure AIR-2c (Diesel Backup Generator Specifications) would reduce DPM and $PM_{2.5}$ emissions associated with operational emergency generators, thereby reducing excess lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations. It would also require that emergency generator exhaust be vented at the building rooftops or alternative locations which would result in an equivalent reduction in TAC exposure, which would further reduce health risks at the MEIR locations. This measure would reduce excess lifetime cancer risk at the off-site MEIR below the threshold of significance of 10 per million.

Mitigation Measure AIR-2d (Diesel Truck Emission Reduction) would reduce DPM and $PM_{2.5}$ emissions associated with on-road heavy-duty truck travel and idling, thereby reducing excess lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations.

Mitigation Measure AIR-3 (Truck-Related Risk Reduction Measures – Toxic Air Contaminants) would reduce DPM and $PM_{2.5}$ associated with on-road heavy-duty truck travel and idling, thereby reducing excess lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations. In addition, this measure would reduce exposure of existing off-site sensitive receptors to truck-related TAC emissions by locating truck loading docks as far from nearby existing off-site sensitive receptors as feasible, although this mitigation measure was not quantified in the HRA because the exact locations of loading docks are currently not known.

Mitigation Measure AIR-2e (Criteria Pollutant Reduction Plan) may also reduce DPM, $PM_{2.5}$, and TOG emissions associated with a variety of Project-related operational sources through the implementation of all feasible mitigation measures to reduce criteria pollutant emissions. For example, the construction of additional EV charging stations would encourage the use of EVs, thereby reducing gasoline and diesel vehicle travel, and reducing DPM, $PM_{2.5}$ exhaust, and TOG emissions from mobile sources. Additional TDM measures beyond the TDM plan would also

reduce vehicle travel and VMT, thereby reducing DPM, $PM_{2.5}$, and TOG emissions from mobile sources. Therefore, AIR-2e would likely reduce excess lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations. However, the exact reduction in TAC emissions, the exact locations where such reductions in TAC emissions will occur, and the exact reduction in associated health risks from AIR-2e is not currently known. Therefore, reductions from AIR-2e are not included in calculating the mitigated scenario.

It should also be noted that in addition to reducing the Project's health risks to existing receptors, Mitigation Measure AIR-2e may also reduce health risks from *existing* TAC sources in the West Oakland community. Mitigation Measure AIR-2e may include off-site emission reduction measures and emissions offsets in the community to mitigate Project-level ROG, NO_X, and PM_{10} emissions during operations. A preferred offset project would be one implemented locally within West Oakland, and may include community-level strategies and control measures identified in the West Oakland Community Action Plan, such as zero-emission drayage truck operations at the Port of Oakland, upgrading locomotives with cleaner engines, replacing existing diesel stationary and standby engines with Tier 4 diesel or cleaner engines, or installing energy storage systems (e.g., batteries, fuel cells) to replace stationary sources of pollution. Although the exact programs and emission reductions have not yet been identified, it is possible that some of these local off-site community measures would have the co-benefit of reducing existing health risks in the community. Reductions from these potential off-site measures are not included in calculating the mitigated scenario.

Table 4.2-11 shows the mitigated HRA results for existing off-site receptors for Scenario 1 exposure from Project construction and operational activities along with Scenario 3 exposure for full buildout operations taking into account the implementation of Mitigation Measure AIR-1c assuming all Tier 4 Final equipment for construction emissions (where feasible) and Mitigation Measure AIR-2c assuming all Tier 4 Final emergency generators, 20 hours of annual generator testing and maintenance, and all generator exhaust is vented at the building rooftops. Because the effectiveness of Mitigation Measure AIR-2d and AIR-3 on health risks is not known, Table 4.2-11 does not quantify AIR-2d and AIR-3. In addition, because the specific amount or location of emissions reductions under the CPM Plan under Mitigation Measure AIR-2e cannot be determined at this time, Table 4.2-11 does not quantify AIR-2e.

Cancer Risk Impacts

With implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) and Mitigation Measure AIR-2c (Diesel Backup Generator Specifications), the excess lifetime cancer risk at the off-site MEIR is reduced to 7.2 per million for construction, 1.0 per million for operations, and 8.3 per million for combined construction and operations. When accounting for the removal of existing health risks associated with existing on-site port truck idling and truck movement at Howard Terminal, and the addition of health risks from the potential relocation of truck parking to the Roundhouse, the net total Project cancer risk would be 6.5 per million at the off-site MEIR, which is less than the threshold of significance of 10 per million. Therefore, with Implementation of Mitigation Measure AIR-1c and AIR-2c, as shown in Table 4.2-11 above, excess lifetime cancer risk would be reduced to below the thresholds of significance, and the impact would be less than significant with mitigation.

TABLE 4.2-11
MITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE EXISTING OFF-SITE MEIR

Emissions Source/Receptor Type	Excess Lifetime Cancer Risk (per million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b,c]
Significance Threshold	**10.0**	**1.0**	**0.3**
Scenario 1: Construction Plus Operations			
Existing Howard Terminal[d]	-2.2	-8.1E-05	-6.4E-04
Project Construction	7.2	2.2E-04	2.5E-03
Project Operational Generators	0.15	1.3E-05	6.6E-05
Project Operational Traffic	0.88	3.7E-03	0.18
Project Operational TRUs[e]	0.018	2.3E-06	1.1E-05
Potential Truck Parking Relocation to Roundhouse[f]	0.38	5.2E-05	4.1E-04
Total Mitigated Project	8.3	0.0039	0.19
Total Mitigated Net New Project w/Roundhouse [g]	6.5	0.0039	0.19
MEIR Location (UTM – X)	563080	563180	563180
MEIR Location (UTM – Y)	4183660	4183920	4183920
Year of Maximum Exposure[h]	n/a	Year 8	Year 8
Scenario 3: Full Buildout Operations			
Existing Howard Terminal[d]	-0.3	-8.1E-05	-6.4E-04
Project Construction	—	—	—
Project Operational Generators	0.049	1.3E-05	6.6E-05
Project Operational Traffic	3.5	3.7E-03	0.18
Project Operational TRUs[e]	0.0086	2.3E-06	1.1E-05
Potential Truck Parking Relocation to Roundhouse[f]	0.19	5.2E-05	4.1E-04
Total Mitigated Project	3.6	0.0037	0.18
Total Mitigated Net New Project w/Roundhouse[g]	3.5	0.0037	0.18
MEIR Location (UTM – X)	563180	563180	563180
MEIR Location (UTM – Y)	4183920	4183920	4183920
Year of Maximum Exposure[h]	n/a	Year 9	Year 9

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; TRU = transportation refrigeration unit; UTM = universal transverse Mercator; — = no value reported; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance

b Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) and Mitigation Measure AIR-2c (Diesel Backup Generator Specifications). This table also assumes the 20% trip reduction requirement of AB 734 is met and includes construction activities associated with implementation of the pedestrian and bicycle overcrossing as well as off-site construction associated with transportation improvements required as mitigation in the Transportation section.

c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a. For operations, $PM_{2.5}$ concentrations include exhaust, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at off-site receptors in Scenario 1 include contributions from multiple phases of Project construction and subsequent Project operations since Year 8 includes construction and operation. In Scenario 3, $PM_{2.5}$ concentrations at off-site receptors in Scenario 3 include only contributions from Project operations.

d Existing Howard Terminal operations include truck activity at the Project site that would be relocated, including on-site truck idling and truck movement. Because this activity would be removed from the site with implementation of the Project, the TAC emissions associated with this activity would also be removed, and the corresponding health risks for exposure of existing off-site receptors to these TAC emissions would also be removed.

e Delivery truck idling and TRU operations were only included for the ballpark and performance venue, given data limitations for non-ballpark delivery trucks. Performance venue TRUs were modeled at the ballpark loading docks since the location of the performance venue loading docks is not yet known. This table does not include event shuttles operating at the Transit Mobility Hub, as discussed in the TMP; health risks from these shuttles would be negligible. See Appendix AIR for more detail.

f Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region. Note that Roundhouse health risk is less than existing Howard Terminal health risk because the existing off-site MEIR is located further away from the Roundhouse than from Howard Terminal.

g Total mitigated net new Project w/Roundhouse represents total Project health risks *minus* health risks from Howard Terminal truck activity *plus* potential health risks from relocated truck parking to the Roundhouse.

TABLE 4.2-11 (CONTINUED)
MITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE EXISTING OFF-SITE MEIR

h For cancer risk, the exposure is excess lifetime 30-year exposure; for non-cancer chronic HI and $PM_{2.5}$ concentrations, this represents the year when the maximum value occurs at the MEIR. Note that the technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

SOURCES: Appendix AIR, *Air Quality Supporting Information*.

Non Cancer Health Impacts

With the implementation of Mitigation Measure AIR-1c and AIR-2c, when accounting for the removal of existing health risks associated with existing on-site port truck idling and truck movement at Howard Terminal, and the addition of health risks from the potential relocation of truck parking to the Roundhouse, the net total Project non-cancer chronic HI at the off-site MEIR would be 0.0002 for construction, 0.0037 for operations, and 0.0039 for combined construction and operation in the year 2027. The off-site MEIR with Mitigation Measure AIR-1c and AIR-2c is located at the Phoenix Lofts (737 2nd St). Therefore, with implementation of Mitigation Measure AIR-1c and AIR-2c, as shown in Table 4.2-11 above, the non-cancer chronic HI would less than 1 for all off-site receptors. As the non-cancer chronic HI would be below the project-level threshold of 1.0, the impact of the proposed Project would therefore be less than significant with mitigation.

$PM_{2.5}$ Concentrations

With the implementation of Mitigation Measure AIR-1c and AIR-2c, when accounting for the removal of existing health risks associated with existing on-site port truck idling and truck movement at Howard Terminal, and the addition of health risks from the potential relocation of truck parking to the Roundhouse, the net total Project annual average $PM_{2.5}$ concentrations would be 0.003 $\mu g/m^3$ for construction, 0.18 $\mu g/m^3$ for operations, and 0.19 $\mu g/m^3$ for combined construction and operation. The off-site MEIR with Mitigation Measure AIR-1c and AIR-2c is located on Brush Street halfway between 4th Street and 5th Street. As noted above, this MEIR is a different location from the cancer risk MEIR because $PM_{2.5}$ concentrations are driven by road dust associated with operational on-road vehicle traffic, instead of off-road construction DPM emissions which drive the cancer risk; as such the $PM_{2.5}$ MEIR is located near a high-traffic roadway segment instead of near construction activity. Based on these results, with implementation of Mitigation Measure AIR-1c and AIR-2c, as shown in Table 4.2-11 above, the annual average $PM_{2.5}$ concentrations would less than 0.3 $\mu g/m^3$ for all off-site receptors. As the annual average $PM_{2.5}$ concentrations would be below the project-level threshold of 0.3 $\mu g/m^3$, the impact of the proposed Project would therefore be less than significant with mitigation.

Significance after Mitigation: Less than Significant with mitigation.

Impact AIR-5: Construction and operation of the Project could expose proposed future on-site sensitive receptors to substantial levels of toxic air contaminants (TACs). (Criterion 5) (*Less than Significant with Mitigation*)

As discussed in Impact AIR-4, an HRA for the Project was conducted to assess increased cancer risk, non-cancer chronic health effects, and localized annual average $PM_{2.5}$ concentrations from both

construction and operational sources. The methods for the HRA are described in the *Approach to Analysis* section above with additional technical supporting documentation in Appendix AIR.

As discussed in the *Approach to Analysis* section above, the HRA considered three separate exposure scenarios to assess worst-case risk at both future on-site and existing off-site sensitive receptor locations. Scenario 1 assesses risk at existing off-site sensitive receptors only (since it begins prior to the on-site receptors living at the Project site). Scenario 2 assesses exposure of all new on-site sensitive receptors occupying Phase 1 buildings once Phase 1 construction is complete to remaining construction emissions and full buildout operations for a total 30-year exposure. Scenario 2 is analyzed here. Scenario 3 assesses exposure of existing off-site and new on-site sensitive receptors to full buildout operations for a total 30-year exposure.

Existing Conditions

Health risks associated with TAC emissions from existing conditions include existing heavy-duty truck activity at Howard Terminal. These trucks emit DPM and $PM_{2.5}$ exhaust during travel and idling at the site. Unlike for Impact AIR-4 above, these existing health risks were not subtracted from the Project's health risks, but health risks from the potential relocation of truck parking from Howard Terminal to the Roundhouse was added to determine total net new health risks for the Project for new on-site sensitive receptors. This difference is due to the fact that without the Project there would be no new on-site sensitive receptors that would be exposed to existing health risks. Therefore, on-site sensitive receptors would be exposed to the entirety of the Project's TAC emissions and potential relocated truck-related emissions occurring at the Roundhouse without taking a subtraction for existing TAC sources at Howard Terminal that would be removed before the on-site receptors are present on the site.

Impacts on New Sensitive Receptors

New on-site sensitive receptors in the HRA include all new on-site sensitive receptors located at the Project site. Sensitive receptors were assumed to be present at each non-ballpark building. For Scenario 2, which includes construction exposure, only receptors in the Phase 1 areas were assessed; for Scenario 3, which only includes full-buildout operational exposure, receptors in all non-ballpark buildings were assessed. As discussed in the Approach to Analysis section above, the air pollutant exposure to residents typically results in the greatest adverse health outcome for all population groups. As such, a conservative approach of considering all on-site sensitive receptors as residential receptors was used in this analysis. The exposure rate for the residential scenario is more conservative than those for other sensitive receptor types (i.e., school child, daycare child, and patients) as residents have the highest exposure frequency, exposure time, and exposure duration. New on-site receptors were modeled at heights consistent with the number of floors of the building (starting at a height of 1.8 meters, with additional receptors at 3-meter intervals to represent each floor of the building (4.8 m, 7.8 m, etc.) through 103.8 meters. It was assumed that residential or daycare receptors could be present anywhere at the site in any building; therefore, all on-site receptors were assumed to be residential.

Construction TAC Emissions

As discussed in Impact AIR-4 above, construction activities associated with the Project would constitute a new source of DPM and $PM_{2.5}$ emissions. Project construction activities would

produce DPM and $PM_{2.5}$ emissions from off-road equipment exhaust as well as haul truck trips. These emissions could result in elevated concentrations of DPM and $PM_{2.5}$ at future on-site sensitive receptors, which could lead to an increase in the risk of cancer or other health impacts. The HRA conducted for the Project (presented below and detailed in Appendix AIR) analyzes the incremental cancer risks to new on-site sensitive receptors in the vicinity of the proposed Project, using emission rates calculated using the CalEEMod emission model methods and other emissions modeling protocols, as discussed in the *Approach to Analysis* section above.

Operational TAC Emissions

As discussed in Impact AIR-4 above, the sources of TAC emissions that would occur during the operational phase of the Project include emissions from mobile sources (passenger vehicles, delivery vehicles, and potential relocated truck movement at the Roundhouse) and stationary sources (17 emergency backup diesel generators, delivery vehicle idling at the ballpark loading docks, delivery vehicle TRU operations at the ballpark loading docks, and potential relocated truck idling at the Roundhouse). Operational sources considered in the HRA include operational traffic generated by the proposed development, delivery vehicle idling and travel associated with the ballpark, (including TRU operations), and emergency generators. As discussed in "Approach to Analysis" in Section 4.2.3, TRU emissions associated with non-ballpark land uses were not included in the HRA for operational sources because it is not yet known what tenants will be included in the non-ballpark land uses and whether TRUs would be part of their operations. Delays to port trucks and port truck idling emissions from traffic delays were also not included in the HRA because these DPM emissions account for only 1.3 percent of total DPM emissions from Project operations and the emissions would be spread out around the many intersections analyzed and would not be concentrated in the vicinity of the on-site MEIR; therefore, port truck delay emissions are expected to have a minimal effect on health risks at on-site or off-site receptors.

Cancer Risk Impacts

Table 4.2-12 shows the HRA results for new on-site receptors for Scenario 2 exposure from Project construction and operational activities along with Scenario 3 exposure for full buildout operations. Both scenarios are unmitigated. For Scenario 2 exposure, as shown in the table, the maximum cancer risk from Project construction emissions at the on-site MEIR would be 10 per million and the maximum cancer risk from Project operational emissions would be 191 per million. The total cancer risk from construction and operational sources combined would be 201.1 per million at the on-site MEIR. When accounting for the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse, the net total Project cancer risk would be 201.3 per million at the on-site MEIR. The on-site MEIR is located at Block 6. Therefore, cancer risk due to combined construction and operational activities would exceed the City's threshold of 10 per million. Consequently, the impact of the proposed Project would be potentially significant and mitigation would be required. Scenario 3 exposure would be less than Scenario 2 exposure, as presented in the table.

As noted above, the on-site MEIR would be located at Block 6. The location is due to a wide number of factors, including proximity of the on-site MEIR to construction and operational TAC sources, meteorology at the Project site, and receptor exposure assumptions.

TABLE 4.2-12
UNMITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE NEW ON-SITE MEIR

Scenario/Emissions Source/Location/Year	Excess Lifetime Cancer Risk (per million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b,c]
Significance Threshold	**10.0**	**1.0**	**0.3**
Scenario 2: Construction Plus Operations			
Project Construction	10	0.019	0.091
Project Operational Generators	**191**	0.16	**0.78**
Project Operational Traffic	0.48	4.8E-04	0.025
Project Operational TRUs[d]	0.030	6.3E-06	2.9E-05
Potential Truck Parking Relocation to Roundhouse[e]	0.22	1.8E-04	0.0014
Total Unmitigated Project	**201.1**	0.18	**0.89**
Total Unmitigated Project w/Roundhouse[f]	**201.3**	0.18	**0.89**
MEIR Location (UTM – X)	563420	562820	562820
MEIR Location (UTM – Y)	4183440	4183580	4183580
Year of Maximum Exposure[g]	n/a	Year 8	Year 8
Scenario 3: Full Buildout Operations			
Project Construction	—	—	—
Project Operational Generators	**592**	0.16	**0.78**
Project Operational Traffic	0.51	4.8E-04	0.025
Project Operational TRUs[d]	0.023	6.3E-06	2.9E-05
Potential Truck Parking Relocation to Roundhouse[e]	0.65	1.8E-04	0.0014
Total Unmitigated Project	**592.1**	0.16	**0.80**
Total Unmitigated Project w/Roundhouse[f]	**592.8**	0.16	**0.80**
MEIR Location (UTM – X)	562820	562820	562820
MEIR Location (UTM – Y)	4183580	4183580	4183580
Year of Maximum Exposure[g]	n/a	Year 9	Year 9

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; TRU = transportation refrigeration unit; UTM = universal transverse Mercator; — = no value reported; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance

b Health risks assume the 20% trip reduction required by AB 734 and includes construction of the pedestrian and bicycle overcrossing as well as off-site construction associated with transportation improvements required as mitigation in the Transportation section.

c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a (Dust Controls). For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at on-site receptors in Scenario 2 include contributions from multiple phases of Project construction and subsequent Project operations since Year 8 includes construction and operation. In Scenario 3, $PM_{2.5}$ concentrations at on-site receptors in Scenario 3 include only contributions from Project operations.

d Delivery truck idling and TRU operations were only included for the ballpark and performance venue, given data limitations for non-ballpark delivery trucks. Performance venue TRUs were modeled at the ballpark loading docks since the location of the performance venue loading docks is not yet known. This table does not include event shuttles operating at the Transit Mobility Hub, as discussed in the TMP; health risks from these shuttles would be negligible. See Appendix AIR for more detail.

e Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region. Note that Roundhouse health risk is less than existing Howard Terminal health risk because the existing off-site MEIR is located further away from the Roundhouse than from Howard Terminal.

f Total unmitigated Project w/Roundhouse represents total Project health risks *plus* potential health risks from relocated truck parking to the Roundhouse.

g For cancer risk, the exposure is excess lifetime 30-year exposure; for non-cancer chronic HI and $PM_{2.5}$ concentrations, this represents the year when the maximum value occurs at the MEIR. Please note that technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

SOURCES: Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020.

As noted above in the *Approach to Analysis* section, it was assumed that a relatively large amount of construction would take place during a relatively intensive schedule. This would produce the highest likely estimate of cancer risk for on-site receptors in Phase 1 buildings, because a longer construction schedule would spread out TAC emission over less susceptible sensitive receptor age groups and also because newer, cleaner construction equipment would be phased into the fleet over time. Therefore, these risk values represent a conservative estimate of construction-related health risks for all likely construction phasing scenarios.

As discussed above, all new on-site sensitive receptors occupying Phase 1 buildings once Phase 1 construction is complete are exposed to all subsequent construction emissions (Scenario 2 exposure). It is possible that the buildout of subsequent development beyond Phase 1 would occur in a staggered fashion, such that there would be new on-site receptors occupying new buildings and exposed to construction activities and TAC emissions during subsequent construction. Scenario 2, which represents Phase 1 on-site receptors exposed to the entirety of TAC emissions from construction of all subsequent development beyond Phase 1, is likely to produce higher cancer risks than any future potential on-site receptor (present in subsequent development areas outside of Phase 1) that would be exposed to TAC emissions from partial construction of the remaining development. This is because the Scenario 2 on-site receptor is exposed to greater construction TAC emissions (for all of subsequent development beyond Phase 1) than this potential future on-site receptor in non-Phase 1 areas (construction for partial subsequent development).

Shuttle bus service connecting the ballpark's Transportation Hub to one or more of the three nearby BART stations (West Oakland, 12th Street, and Lake Merritt) on game days or for large concerts is identified as a City priority measure in the TMP. Because shuttle service is a priority TMP measure that may result in additional emissions compared to existing conditions, health risks associated with this service have been estimated. Implementing this service would result in an excess lifetime cancer risk at the on-site MEIR of 0.115, for a total unmitigated contribution (construction + operations + shuttles) of 201.4 (as compared to 201.3 for the Project without shuttles) (See Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020). The same mitigation measures would apply, and conclusions regarding the significance of on-site cancer risk impacts associated with the Project's emissions would not change.

Non Cancer Health Impacts

For Scenario 2 exposure, as shown in Table 4.2-12, the non-cancer chronic HI for the unmitigated Project at the on-site MEIR was estimated to be 0.019 for construction, 0.16 for operations, and 0.18 for combined construction and operation in the year 2027 taking into account the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse. The on-site MEIR is located at Block 6. Therefore, the non-cancer chronic HI would less than 1 for all on-site receptors. As the non-cancer chronic HI would be below the project-level threshold of 1.0, the impact of the proposed Project would therefore be *less than significant*. For Scenario 3 exposure, the non-cancer chronic HI for the Project would be less than Scenario 1 exposure because combined construction and operational non-cancer HI is greater than operational only.

Potential shuttle service associated with the TMP (as discussed above) would result in an increase in non-cancer chronic HI of 7.5E-06 for a total unmitigated contribution (construction + operations +

shuttles) of 0.17886 (as compared to 0.17885 for the Project without shuttles) (See Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020). The conclusions regarding the significance of on-site non-cancer chronic risk associated with the Project's emissions would not change.

$PM_{2.5}$ Concentrations

Table 4.2-12 shows the results of the risk assessment for exposure to $PM_{2.5}$ during construction at the maximally impacted on-site receptor with an unmitigated Project.

For Scenario 2 exposure, as shown in Table 4.2-12, the annual average $PM_{2.5}$ concentrations for the unmitigated Project at the on-site MEIR was estimated to be 0.091 $\mu g/m^3$ for construction, 0.80 $\mu g/m^3$ for operations, and 0.89 $\mu g/m^3$ for combined construction and operation taking into account the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse. The on-site MEIR is located at Block 6. Therefore, the annual average $PM_{2.5}$ concentrations due to combined construction and operational activities would exceed the City's threshold of 0.3 $\mu g/m^3$. Consequently, the impact of the proposed Project would be *potentially significant* and mitigation would be required. For Scenario 3 exposure, the annual average $PM_{2.5}$ concentrations for the Project would be less than Scenario 2 exposure because combined construction and operational $PM_{2.5}$ concentrations is greater than operational only.

Potential shuttle service associated with the TMP (as discussed above) would result in an increase in average annual $PM_{2.5}$ concentrations of 0.00031 $\mu g/m^3$ for a total unmitigated contribution (construction + operations + shuttles) of 0.8930 $\mu g/m^3$ (as compared to 0.8927 $\mu g/m^3$ for the Project without shuttles) (see Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020). The same mitigation measures would apply, and conclusions regarding the significance of on-site $PM_{2.5}$ concentrations associated with the Project's emissions would not change.

Mitigation Measures AIR-1c, AIR-2c, AIR-2d, AIR-2e, AIR-3, AIR-4a, and AIR-4b are identified to address impacts of Project-related TAC emissions on new on-site sensitive receptors.

> **Mitigation Measure AIR-1c: Diesel Particulate Matter Controls.** (See Impact AIR-1)
>
> **Mitigation Measure AIR-2c: Diesel Backup Generator Specifications.** (See Impact AIR-2)
>
> **Mitigation Measure AIR-2d: Diesel Truck Emission Reduction.** (See Impact AIR-2)
>
> **Mitigation Measure AIR-2e: Criteria Pollutant Mitigation Plan.** (See Impact AIR-2)
>
> **Mitigation Measure AIR-3: Truck-Related Risk Reduction Measures – Toxic Air Contaminants.** (See Impact AIR-2)
>
> **Mitigation Measure AIR-4a: Install MERV16 Filtration Systems.**
>
> The Project Sponsor shall install a mechanical ventilation system at all residential buildings at the Project site capable of achieving the protection from particulate matter ($PM_{2.5}$) equivalent to that associated with a Minimum Efficiency Reporting Value (MERV) 16 filtration (as defined by American Society of Heating, Refrigerating and Air-Conditioning Engineers [ASHRAE] standard 52.2). The system must meet the requirements of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls). As part

of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required.

Alternatively, the Project sponsor shall retain a qualified air quality consultant to prepare an updated HRA for the Project in accordance with the CARB and the Office of Environmental Health and Hazard Assessment requirements to determine the health risk of exposure of Project residents/occupants/users to TAC emissions. The updated HRA shall be conducted during final design for the proposed building or phase, when the exact level of TAC exposure is known, based on proximity to actual, then-current emission sources from both the entire Project and background cumulative sources consistent with the methods used in the EIR for cumulative analysis. The updated HRA shall be submitted to the City for review and approval. If the approved updated HRA concludes that health risks are at or below both the City's project-level and cumulative thresholds of significance for new on-site sensitive receptors with a filtration system alternative to MERV16, then the alternative MERV filtration system identified in the approved updated HRA shall be allowed rather than MERV16.

Mitigation Measure AIR-4b: Exposure to Air Pollution – Toxic Air Contaminants.

The Project sponsor shall incorporate the following health risk reduction measures into the Project design in order to reduce the potential health risk due to exposure to toxic air contaminants as feasible for the Project's sources of TACs. These features shall be submitted to the City for review and approval and be included on the Project drawings submitted for the construction-related permit or on other documentation submitted to the City:

1. Installation of air filtration to reduce cancer risks and Particulate Matter (PM) exposure for future on-site residents and other sensitive populations in the Project that are in close proximity to sources of air pollution. Air filter devices shall be rated MERV-16 or higher (with exceptions as provided in 4a above). As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required.
2. Where appropriate, install passive electrostatic filtering systems, especially those with low air velocities (i.e., 1 mph).
3. Phasing of residential developments when proposed within 500 feet of freeways such that homes nearest the freeway are built last, if feasible.
4. The Project shall be designed to locate sensitive receptors as far away as feasible from the Project's source(s) of air pollution. Operable windows, balconies, and building air intakes shall be located as far away from these sources as feasible. If near a distribution center, residents shall be located as far away as feasible from a loading dock or where trucks concentrate to deliver goods.
5. Sensitive receptors shall be located on the upper floors of buildings, if feasible.
6. Planting trees and/or vegetation between sensitive receptors and pollution sources, if feasible. Trees that are best suited to trapping PM shall be planted, including one or more of the following: Pine (*Pinus nigra* var. *maritima*), Cypress (*X Cupressocyparis leylandii*), Hybrid poplar (*Populus deltoids X trichocarpa*), and Redwood (*Sequoia sempervirens*).
7. Sensitive receptors shall be located as far away from truck activity areas, such as loading docks and delivery areas, as feasible.

Maintenance of Health Risk Reduction Measures. The Project sponsor or its designee shall maintain, repair, and/or replace installed health risk reduction measures, including but not limited to the HVAC system (if applicable), on an ongoing and as-needed basis. Prior to occupancy, the Project sponsor shall prepare and then distribute to the building manager/operator operation and maintenance manual for the HVAC system and filter including the maintenance and replacement schedule for the filter.

Mitigation Measure Effectiveness

As discussed under Impact AIR-1, Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) would be implemented as part of the Project to reduce construction equipment exhaust emissions. In order to comply with Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) the construction equipment fleet for the Project would be required to meet Tier 4 Final engine standards, to the extent feasible. This would reduce DPM and $PM_{2.5}$ emissions associated with off-road diesel construction equipment, thereby reducing excess lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations.

Mitigation Measure AIR-2c (Diesel Backup Generator Specifications) would reduce DPM and $PM_{2.5}$ emissions associated with operational emergency generators, thereby reducing excess lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations. It would also require that emergency generator exhaust be vented at the building rooftops or alternative locations which results in an equivalent reduction in TAC exposure, which would further reduce health risks at the on-site MEIR locations.

Mitigation Measure AIR-2d (Diesel Truck Emission Reduction) would reduce DPM and $PM_{2.5}$ emissions associated with on-road heavy-duty truck travel and idling, thereby reducing excess lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations.

Mitigation Measure AIR-3 (Truck-Related Risk Reduction Measures – Toxic Air Contaminants) would reduce DPM, $PM_{2.5}$ associated with on-road heavy-duty truck travel and idling, thereby reducing excess lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations. In addition, this measure would reduce exposure of existing off-site sensitive receptors to truck-related TAC emissions by locating truck loading docks as far from new on-site sensitive receptors as feasible, although this mitigation measure was not quantified in the HRA because the exact locations of loading docks are currently not known.

Mitigation Measure AIR-4a (Install MERV16 Filtration Systems) would reduce the exposure of new on-site sensitive receptors to DPM and $PM_{2.5}$ emissions associated with Project construction and operations. This mitigation measure requires that the Project sponsor install a mechanical ventilation system at all new residential buildings capable of achieving the protection from particulate matter equivalent to that associated with a MERV16 filtration. MERV16 air filters are considered high-efficiency filters able to remove 95 percent or greater of fine particulate matter from indoor air (ASHRAE, 2008). Therefore, with implementation of this measure, the impact on new on-site sensitive receptors would be further reduced. Because the precise reduction in DPM and $PM_{2.5}$ exposure and health risks depends on how often the receptors are indoors with their windows closed and the HVAC systems operating, and to provide a conservative estimate of the effectiveness of MERV16 filters, a building simulation analysis was conducted. The simulation

estimated the proportion of air entering a dwelling unit that would pass through the MERV16 filter, accounting for ventilation rates and operable windows. When accounting for factors such as open windows, infiltration, and ventilation, the health risk reduction from particulate pollution resulting from use of MERV16 filters is reduced by approximately 76 percent.

Mitigation Measure AIR-4b (Exposure to Air Pollution – Toxic Air Contaminants) would also reduce the exposure of new on-site sensitive receptors to TAC emissions associated with Project construction and operations. This mitigation measure requires that the Project sponsor to install air filtration systems, locate new sensitive receptors as far from TAC emission sources as feasible, and plant vegetative buffers to trap particulate matter. Although the only part of this measure that was directly modeled was MERV16 air filtration (per Mitigation Measure AIR-4a), the measure as a whole would further reduce TAC emissions and lessen exposure, thereby reducing excess lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations.

Mitigation Measure AIR-2e (Criteria Pollutant Reduction Plan) may also reduce DPM, $PM_{2.5}$, and TOG emissions associated with a variety of Project-related operational sources through the implementation of all feasible mitigation measures to reduce criteria pollutant emissions (DPM is a subset of PM_{10} exhaust, $PM_{2.5}$ is a criteria pollutant, and TOG emissions are directly related to ROG emissions). However, the exact reduction in TAC emissions and associated health risks from AIR-2e is not currently known, as the CPM Plan has not yet been developed and specific feasible mitigation measures have not yet been identified.

Table 4.2-13 shows the mitigated HRA results for new on-site receptors for Scenario 2 exposure from Project construction and operational activities along with Scenario 3 exposure for full buildout operations taking into account the implementation of Mitigation Measures AIR-1c, AIR-2c, and AIR-4a. Mitigation Measure AIR-4a was assumed to reduce particulate pollution, including DPM and $PM_{2.5}$, by approximately 76 percent as discussed above; this substantially reduces cancer risk, chronic HI, and $PM_{2.5}$ concentrations at on-site MEIR locations. Because the effectiveness of Mitigation Measure AIR-2d and AIR-3 on health risks is not known, Table 4.2-13 does not quantify AIR-2d and AIR-3. In addition, because the CPM Plan under Mitigation Measure AIR-2e has not yet been developed, Table 4.2-13 does not quantify AIR-2e.

Cancer Risk Impacts

With implementation of Mitigation Measure AIR-1c, Mitigation Measure AIR-2c, and Mitigation Measure AIR-4a, the excess lifetime cancer risk at the on-site MEIR is reduced to 2.0 in 1 million for construction, 0.19 in 1 million for operations, and 2.3 in 1 million for combined construction and operations. When accounting for the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse, the net total Project cancer risk would be 2.1 per million at the on-site MEIR. With mitigation, the maximum cancer risk occurs at Block 2.

TABLE 4.2-13
MITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE NEW ON-SITE MEIR

Scenario/Emissions Source/Location/Year	Excess Lifetime Cancer Risk (per million)[a]	Chronic Hazard Index[a]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b,c]
Significance Threshold	**10.0**	**1.0**	**0.3**
Scenario 2: Construction Plus Operations			
Project Construction	2.0	6.8E-04	3.8E-03
Project Operational Generators	0.040	3.1E-05	1.6E-04
Project Operational Traffic	0.11	1.4E-03	0.020
Project Operational TRUs[d]	0.036	2.5E-06	1.1E-05
Potential Truck Parking Relocation to Roundhouse[e]	0.14	2.8E-05	2.2E-04
Total Mitigated Project	2.1	0.0021	0.024
Total Mitigated Project w/Roundhouse[f]	2.3	0.0021	0.024
MEIR Location (UTM – X)	562940	563020	563020
MEIR Location (UTM – Y)	4183440	4183640	4183640
Year of Maximum Exposure[g]	n/a	Year 8	Year 8
Scenario 3: Full Buildout Operations			
Project Construction	—	—	—
Project Operational Generators	1.5	3.1E-05	1.6E-04
Project Operational Traffic	0.058	1.4E-03	0.020
Project Operational TRUs[d]	0.0011	2.5E-06	1.1E-05
Potential Truck Parking Relocation to Roundhouse[e]	0.014	2.8E-05	2.2E-04
Total Mitigated Project	1.60	0.0014	0.020
Total Mitigated Project w/Roundhouse[f]	1.62	0.0014	0.020
MEIR Location (UTM – X)	563420	563020	563020
MEIR Location (UTM – Y)	4183440	4183640	4183640
Year of Maximum Exposure[g]	n/a	Year 9	Year 9

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; TRU = transportation refrigeration unit; UTM – universal transverse Mercator; — = no value reported; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance

b Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), Mitigation Measure AIR-2c (Diesel Backup Generator Specifications), and Mitigation Measure AIR-4a (Install MERV16 Filtration Systems). This table also includes the 20% trip reduction requirement of AB 734 and construction of the pedestrian and bicycle overcrossing and off-site transportation improvements required as mitigation in the Transportation section.

c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a (Dust Controls). For operations, $PM_{2.5}$ concentrations include exhaust, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at on-site receptors in Scenario 2 include contributions from multiple phases of Project construction and subsequent Project operations since Year 8 includes construction and operation. In Scenario 3, $PM_{2.5}$ concentrations at on-site receptors in Scenario 3 include only contributions from Project operations.

d Delivery truck idling and TRU operations were only included for the ballpark and performance venue, given data limitations for non-ballpark delivery trucks. Performance venue TRUs were modeled at the ballpark loading docks since the location of the performance venue loading docks is not yet known. This table does not include event shuttles operating at the Transit Mobility Hub, as discussed in the TMP; health risks from these shuttles would be negligible. See Appendix AIR for more detail.

e Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking were to be relocated elsewhere in the Seaport, the City or the region. Note that Roundhouse health risk is less than existing Howard Terminal health risk because the existing off-site MEIR is located further away from the Roundhouse than from Howard Terminal.

f Total mitigated Project w/Roundhouse represents total Project health risks *plus* potential health risks from relocating truck parking to the Roundhouse.

g For cancer risk, the exposure is excess lifetime 30-year exposure; for non-cancer chronic HI and $PM_{2.5}$ concentrations, this represents the year when the maximum value occurs at the MEIR. Please note that the technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

SOURCES: Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020.

The on-site MEIR with implementation of Mitigation Measure AIR-1c, AIR-2c, and AIR-4a is a different receptor than the on-site MEIR without implementation of these mitigation measures. This is because the relative contribution of Project construction and Project operations to the total cancer risk at the on-site MEIR with mitigation is different than the relative contribution without mitigation, and therefore the maximum exposure occurs at a different location (in other words, cancer risks for the on-site MEIR without mitigation are driven more by operational generator emissions than cancer risks for the on-site MEIR with mitigation, because Mitigation Measure AIR-2c reduces generator TAC emissions more than Mitigation Measure AIR-1c reduces construction TAC emissions). This is less than the threshold of significance of 10 per million. Therefore, with Implementation of Mitigation Measures AIR-1a, AIR-2c, AIR-4a, as shown in Table 4.2-13 below, excess lifetime cancer risk would be reduced to below the thresholds of significance, and the impact would be less than significant with mitigation.

This analysis assumes there would be no new on-site receptors present during Phase 1 construction or present in subsequent development areas outside of Phase 1 before buildout is complete. Although there could be new on-site receptors occupying new buildings and exposed to construction activities and TAC emissions during subsequent construction beyond Phase 1, implementation of Mitigation Measure AIR-4a would reduce the cancer risk of any potential on-site sensitive receptors present in these areas. For this reason and the reasons mentioned above, the analyzed exposure scenario for on-site sensitive receptors presented in Table 4.2-13 above represents a conservative assessment of mitigated cancer risk.

Non-cancer Health Impacts

For Scenario 2 exposure, as shown in Table 4.2-13, with the implementation of Mitigation Measure AIR-1c, AIR-2c, and AIR-4a, when accounting for the removal of existing health risks associated with existing on-site port truck idling and truck movement at Howard Terminal, and the addition of health risks from the potential relocation of truck parking to the Roundhouse, the net total Project non-cancer chronic HI at the on-site MEIR would be 6.8E-04 for construction, 1.4E-03 for operations, and 0.0021 for combined construction and operation in the year 2027 taking into account the health risk associated with the potential relocation of truck parking relocation Howard Terminal to the Roundhouse. Therefore, with implementation of Mitigation Measure AIR-1c, AIR-2c, and AIR-4a, as shown in Table 4.2-13 above, the non-cancer chronic HI would less than 1 for all on-site receptors. As the non-cancer chronic HI would be below the project-level threshold of 1.0, the impact of the proposed Project would therefore be less than significant with mitigation.

$PM_{2.5}$ Concentrations

For Scenario 2 exposure, as shown in Table 4.2-13, with the implementation of Mitigation Measure AIR-1c and Mitigation Measure AIR-2c, when accounting for the removal of existing health risks associated with existing on-site port truck idling and truck movement at Howard Terminal, and the addition of health risks from the potential relocation of truck parking to the Roundhouse, the net total Project annual average $PM_{2.5}$ concentrations would be 3.8E-03 $\mu g/m^3$ for construction, 0.020 $\mu g/m^3$ for operations, and 0.024 $\mu g/m^3$ for combined construction and operation taking into account the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse. Therefore, with implementation of Mitigation

Measure AIR-1c, AIR-2c, and AIR-4a, as shown in Table 4.2-13 above, the annual average $PM_{2.5}$ concentrations would less than 0.3 $\mu g/m^3$ for all on-site receptors. As the annual average $PM_{2.5}$ concentrations would be below the project-level threshold of 0.3 $\mu g/m^3$, the impact of the proposed Project would therefore be less than significant with mitigation.

Significance after Mitigation: Less than Significant with mitigation.

Odors

Impact AIR-6: The Project would not create or expose sensitive receptors to substantial objectionable odors that would affect a substantial number of people. (Criterion 6) (*Less than Significant*)

This impact analyses the potential for the Project to create new odor sources and expose sensitive receptors to substantial objectionable odors created by the Project. Potential effects of the environment on a project are legally not required to be analyzed or mitigated under CEQA. Nevertheless, this EIR analyzes the Project's potential to site new receptors near existing and potential new odor sources, which is an effect of the environment on the Project, in order to provide information to the public and decision-makers. This is a non-CEQA impact analysis for informational purposes only. Where a potential significant effect of the environment on the Project is identified below, this document identifies City Standard Conditions of Approval and/or project-specific recommendations to address these issues.

New Sources

The BAAQMD Guidelines identify wastewater treatment plants, oil refineries, asphalt plants, chemical manufacturing, painting/coating operations, coffee roasters, food processing facilities, recycling operations and metal smelters as odor sources of particular concern, and recommends buffer zones of 1 to 2 miles around them to avoid potential odor conflicts. All of these odor sources are present within the City of Oakland. However, odor is a subjective impact and perception of odor can vary depending on receptor sensitivity, climate, wind patterns, topography.

The Project could result in new food service uses (e.g., restaurants), coffee roasters, or dry cleaning facilities in close proximity or in the same building as residential or other odor-sensitive uses. Food service uses, such as restaurants, can generate odors resulting from cooking processes and waste disposal. Char broilers, deep fryers, and ovens typically produce food odors that could be considered offensive to some people. In addition, food waste can putrefy if not properly managed, resulting in potential odors. Without proper controls or setbacks, there is a potential for land use conflicts that could result in odor complaints.

However, it is anticipated that the Project would not introduce any new significant sources of odor. Any proposed restaurant uses would be subject to BAAQMD's Regulation 7, which limits emission of odorous substances. This would ensure that odor impacts from such new Project-related uses would be less than significant.

Existing Sources

In accordance with the recommendations in the BAAQMD Guidelines, the City of Oakland has created a map of known odor sources including: food processing facilities; coffee roasters; chemical manufacturers; asphalt batch plants; and the East Bay Municipal Utilities District (EBMUD) wastewater treatment facility (City of Oakland, 2010). This map presents a reasonable estimation of all the odor sources of concern within the City of Oakland, based upon City's business tax records of the industry categories identified by the BAAQMD. In addition, buffer zones were drawn around the identified sites, based on the aforementioned BAAQMD criteria.

There is virtually no location within the City that is outside of an odor buffer area. The Project would site new residential uses within the odor buffer area. Odor sources that are located nearby the residential uses at Project site include, but are not limited to:

- Schnitzer Steel metal recycling facility (0.05 miles west)
- Allied Pringle Food Sales Co. food processing facility (0.2 miles northeast)
- SKASOL Incorporated chemical manufacturing facility (1.3 miles northwest)
- East Bay Conservation Corporation recycling facility (0.25 miles north)
- Blue Bottle Coffee roasting facility (0.5 miles east and 0.5 miles northeast)
- Recology recycling facility (0.25 miles northeast)
- Green Planet 21 recycling / green waste facility (0.2 miles northwest)
- Western Pacific Pulp & Paper recycling / green waste facility (0.25 miles northwest)
- EBMUD wastewater treatment plant (1.75 miles northwest)

However, the BAAQMD considers the odor buffers as maximum screening distanced for odor impacts from a particular source. Although all odor impacts from each odor source would be expected to occur within these buffers, the actual area of impact within the buffer is dependent on certain factors including (BAAQMD, 2017c):

- Nature of the odor source (e.g., wastewater treatment plant, food processing plant);
- Frequency of the odor generation (e.g., daily, seasonal, activity-specific);
- Intensity of the odor (e.g., concentration);
- Distance of the odor source to sensitive receptors (e.g., miles);
- Wind direction (e.g., upwind or downwind); and
- Sensitivity of the receptor.

According to the BAAQMD CEQA Guidelines, when new sensitive receptors and odor sources cannot be physically separated to a degree where impacts would be minimized to a less-than-significant level, the Project Sponsor should disclose odor sources to prospective tenants (BAAQMD, 2017c). The entire Project site is located within the BAAQMD-recommended odor buffer distances. Consequently, the Project could potentially expose residential occupants to substantial/frequent odor. However, because this is an effect of the environment on the Project that

the Project would not exacerbate, which is legally not required to be analyzed or mitigated under CEQA as discussed above, this information is presented for informational purposes only and no impact is determined.

Significance: Less than Significant.

Maritime Reservation Scenario

The Maritime Reservation Scenario involves an alternative site plan for the Project that was analyzed alongside the Project. The Maritime Reservation Scenario includes the same development program as the proposed Project, but would distribute that development program within a different Project site boundary that removes a portion of the southwest corner of the site.

At any point within the next 10 years, the Port of Oakland may choose to exercise its option and take back a portion of the site from the A's in order to accommodate possible expansion of the existing turning basin used to turn large vessels within Oakland's Inner Harbor. As a result, the Project site plan would be modified, and the proposed development would be denser, fitting the same development program (i.e., the ballpark and mix of other uses proposed) onto the smaller site. Changes to the Project site plan that would occur with the Maritime Reservation Scenario would occur within the area of the Project site that would be developed after Phase 1. The Maritime Reservation Scenario would distribute the Project's development program differently within the altered site configuration. Development of permanent structures within the area identified under the Maritime Reservation Scenario for a potential future turning basin would not begin until the periods of time specified in the Exclusive Negotiation Term Sheet (ENA) expired or were earlier terminated by the Port without the Port exercising its recapture option. However, the Port could terminate or exercise its option to take back all or a portion of the Maritime Reservation Area from the Project Sponsor at any time within the 10-year option term provided in the ENA. As such, this Draft EIR conservatively assumes that construction activities under the Maritime Reservation Scenario would be the same as the Project and occur over seven years total, which could occur if the Port exercises or terminates its recapture option prior to the expiration of the 10-year term.

The Port of Oakland has not designed or permitted an expanded turning basin and the impacts of the expansion, if it were proposed, are not considered in this EIR. If the Port were to exercise its option and take back a portion of the Project site from the Project sponsor, the Port would analyze the potential impacts of expanding the turning basin.

This EIR presents the air quality impacts of the Maritime Reservation Scenario that are different from those identified for the Project.

Construction Impacts

Since all of the square footage of the Project is being preserved (in a smaller footprint) in the Maritime Reservation Scenario, the construction schedule and equipment list (types, horsepower, etc. but not emissions) for the Maritime Reservation Scenario were assumed to be the same as the Project. Construction emissions for the Maritime Reservation Scenario were calculated by scaling

Project emissions by the change in acreage for on-road vehicles and off-road equipment for horizontal development. Architectural coating and vertical building construction phases are not anticipated to change with this scenario since overall building square footage would be preserved; therefore, these emissions are not scaled. Paving off-gassing emissions from the parking lot are also conservatively not scaled, but paving emissions for the roadways are scaled.

Total average daily unmitigated construction-related criteria pollutant emissions under the Maritime Reservation Scenario are presented in **Table 4.2-14**, which compares emissions with City of Oakland significance thresholds. Similar to the Project, ROG, NO_X, and PM_{10} emissions would exceed thresholds in multiple years. As such, the same mitigation measures as for the Project would be required for the Maritime Reservation Scenario. These include Mitigation Measures AIR-1a (Dust Controls), AIR-1b (Criteria Air Pollutant Controls), AIR-1c (Diesel Particulate Matter Controls), and AIR-1d (Super-Compliant VOC Architectural Coatings during Construction).

TABLE 4.2-14
AVERAGE DAILY UNMITIGATED CONSTRUCTION EMISSIONS BY AREA, ACTIVITY, AND YEAR FOR THE MARITIME RESERVATION SCENARIO

Year[a]	Average Daily Emissions (lbs/day)[b]			
	ROG	NO_X	PM_{10} (exhaust)[c]	$PM_{2.5}$ (exhaust)[c]
Significance Threshold	**54**	**54**	**82**	**54**
Year 1	4.7	45	2.1	2.0
Year 2	16	**166**	5.8	5.4
Year 3	**56**	**119**	4.7	4.4
Year 4	51	**66**	2.7	2.5
Year 5	6.9	**76**	2.4	2.3
Year 6	**60**	**73**	2.5	2.3
Year 7	**108**	**99**	3.6	3.4
Year 8	**107**	**93**	3.4	3.2

NOTES:

lbs/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter that is 10 microns or less in diameter; $PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter.

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

b **Bold values** = threshold exceedance

c Only exhaust emissions of PM_{10} and $PM_{2.5}$ emissions are shown, because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a (Dust Controls).

SOURCES: Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020.

Table 4.2-15 presents average daily mitigated construction-related criteria pollutant emissions under the Maritime Reservation Scenario with implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) and AIR-1d (Super-Compliant VOC Architectural Coatings during Construction). As shown in Table 4.2-15, the combined average daily Project emissions with implementation of Mitigation Measure AIR-1c and AIR-1d would exceed the City's significance threshold in 2021 for NO_X with maximum average daily emissions of 81 lbs/day. This exceedance is slightly less than the Project. As such, this impact would be less than the Project, but would remain significant and unavoidable with mitigation.

TABLE 4.2-15
AVERAGE DAILY MITIGATED CONSTRUCTION EMISSIONS BY AREA, ACTIVITY, AND YEAR FOR THE MARITIME RESERVATION SCENARIO

Year[a]	Average Daily Emissions (lbs/day)[b]			
	ROG	NO_X	PM_{10} (exhaust)[c]	$PM_{2.5}$ (exhaust)[c]
Significance Threshold	**54**	**54**	**82**	**54**
Year 1	1.6	14	0.50	0.47
Year 2	8.6	**81**	1.5	1.4
Year 3	27	37	0.68	0.64
Year 4	23	19	0.36	0.33
Year 5	3.0	32	0.44	0.42
Year 6	26	31	0.44	0.41
Year 7	45	36	0.56	0.53
Year 8	45	39	0.54	0.52

NOTES:

lbs/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter that is 10 microns or less in diameter; $PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter.

Mitigation Measures modeled in this table include Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), modeled as Tier 4 Final engines on all off-road equipment (as available), and Mitigation Measure AIR-1d (Super-Compliant VOC Architectural Coatings during Construction), modeled as super-compliant VOC coatings with 10 grams VOC per liter for all interior coatings. This table also includes construction activities associated with construction of the pedestrian and bicycle overpass and other off-site transportation improvements required as mitigation in the Transportation section.

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

b **Bold values** = threshold exceedance

c Only exhaust emissions of PM_{10} and $PM_{2.5}$ emissions are shown, because fugitive dust emissions are addressed through best management practices as required Mitigation Measure AIR-1a (Dust Controls).

SOURCES: Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020.

Operational Impacts, and Combined Construction and Operational Impacts

Since all of the square footage of the Project is being preserved in the Maritime Reservation Scenario, the land uses, activities, attendance and population data are the same as the Project. Additionally, mobile trips associated with hauling, vendor deliveries, and workers would also remain the same. Therefore, operational emissions are expected to be very similar to the Project operational emissions, since the overall population and activities would be identical. The only changes to operational emissions are assumed to be changes to the number and size of the on-site emergency generators, since there would be fewer non-ballpark buildings than the Project, with more square footage in each; therefore, fewer generators are required. This analysis assumes that the Maritime Reservation Scenario would include a total of 15 emergency generators with power ratings from 250 kW to 1,500 kW.

Table 4.2-16 summarizes total annual and average daily emissions by year from Year 4 through Year 9 under the Maritime Reservation Scenario, including emission reductions from existing A's-related emissions, and compares net new Project emissions with the City of Oakland significance thresholds. Similar to the Project, Phase 1 operational emissions in Year 4 would not exceed any significance thresholds. However, Phase 1 operational emissions of ROG and NO_X would not exceed the significance thresholds in Year 5-Year 7, unlike the Project. Also similar to the Project, net new full buildout operational emissions of ROG and NO_X would exceed the

significance thresholds in Year 8 and net new full buildout operational emissions of ROG, NO_X, and PM_{10} would exceed the significance thresholds in Year 9. As such, the same mitigation measures as for the Project would be required for the Maritime Reservation Scenario. These include Mitigation Measures AIR-2a (Use Low and Super-compliant VOC Architectural Coatings in Maintaining Buildings through Covenants, Conditions, and Restrictions), AIR-2b (Promote use of Green Consumer Products), AIR-2c (Diesel Backup Generator Specifications), AIR-2d (Diesel Truck Emission Reduction), and AIR-2e (Criteria Pollutant Mitigation Plan).

TABLE 4.2-16
TOTAL UNMITIGATED ANNUAL AND AVERAGE DAILY OPERATIONAL EMISSIONS BY YEAR FOR THE MARITIME RESERVATION SCENARIO

Year[a]	Scenario	Average Daily Emissions (lbs/day)[b]				Total Annual Emissions (tons/year)[b]			
		ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$
	Significance Threshold	**54**	**54**	**82**	**54**	**10**	**10**	**15**	**10**
	Existing Conditions (2018)[c]	32.9	19.0	20.6	4.7	6.0	3.5	3.8	0.9
Year 4	Phase 1 Operational Emissions[d,e]	43.7	26.9	33.8	7.8	8.0	4.9	6.2	1.4
	Net New Emissions[f]	*10.9*	*7.9*	*13.1*	*3.1*	*2.0*	*1.4*	*2.4*	*0.6*
Years 5–7	Phase 1 Operational Emissions[e]	80.2	78.2	60.5	14.6	14.6	14.3	11.0	2.7
	Net New Emissions[f]	*47.4*	***59.2***	*39.9*	*9.9*	*8.6*	***10.8***	*7.3*	*1.8*
Year 8	Full Buildout Operational Emissions[d,e]	120.1	124.0	88.8	21.8	21.9	22.6	16.2	4.0
	Net New Emissions[f]	***87.2***	***105.0***	*68.2*	*17.0*	***15.9***	***19.2***	*12.4*	*3.1*
Year 9	Full Buildout Operational Emissions[e,h]	200.9	216.7	146.1	36.2	36.7	39.5	26.7	6.6
	Net New Emissions[f]	***168.0***	***197.7***	***125.5***	*31.5*	***30.7***	***36.1***	***22.9***	*5.7*
	Maximum Emissions	***168.0***	***197.7***	***125.5***	*31.5*	***30.7***	***36.1***	***22.9***	*5.7*

NOTES:

lbs/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter that is 10 microns or less in diameter; $PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; MRS = Maritime Reservation Scenario.

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

b **Bold values** = threshold exceedance

c Emissions for A's related existing conditions are presented in Table 4.2-6. These emissions only represent emissions associated with A's operations and ballgames that would be relocated to the new ballpark. Only emissions for A's related existing conditions were subtracted from MRS emissions to determine net new emissions associated with the MRS.

d Operational emissions are scaled for partial years of operation in Year 4 and Year 8 based on the number of days of full operations for those years compared to 365 total days per year (30 days in Year 4 and 120 days in Year 8). See Table 4.2-6 for detailed operational emissions by source for Phase 1 operations and full buildout operations in Year 4 and Year. For Year 4, ballpark emissions are not scaled as the ballpark is operational at the start of Phase 1. Only Phase 1 ancillary land use emissions are scaled by the ratio of 30 days to 365 days.

e Mobile source emissions include the 20% trip reduction required by AB 734 and implementation of on- and off-site transportation improvements and mitigation measures included in the Transportation section. For emissions without the 20% trip reduction, refer to Appendix AIR, *Air Quality Supporting Information*.

f Net new emissions represent MRS construction *plus* MRS operational emissions *minus* existing A's-related emissions.

g Operational emissions are anticipated to be the same during Year 5-Year 7 when Phase 1 is operational and before full Project buildout occurs.

h Year 9 is the first full year (365 days) of full MRS buildout operations and associated emissions.

SOURCE: Appendix AIR, *Air Quality Supporting Information*; Ramboll, 2020

Table 4.2-17 below presents average daily and total annual combined mitigated construction and mitigated operational emissions under the Maritime Reservation Scenario during the years when construction and operations overlap. This table presents overlapping construction emissions with Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) and with Mitigation Measure AIR-1d (Super-Compliant VOC Architectural Coatings during Construction). As shown in Table 4.2-17, net new Project emissions would still remain above the significance thresholds despite implementation of mitigation measures AIR-2a, AIR-2b, AIR-2d, and AIR-2e. Similar to the Project, net new emissions of NO_X would exceed the significance thresholds in all years from Year 5 through Year 9, net new emissions of ROG would exceed the significance thresholds in all years from Year 6 through Year 9, net new emissions of PM_{10} would exceed the significance thresholds in Year 9, and net new emissions of $PM_{2.5}$ would not exceed the significance thresholds in any year. These exceedances are slightly less than the Project. As such, this impact would be less than the Project, but it would remain significant and unavoidable with mitigation.

Carbon Monoxide

The Maritime Reservation Scenario would not change mobile source emissions compared to the Project, because the land uses, activities, attendance and population data are the same as the Project. Therefore, the impacts and analysis for the Maritime Reservation Scenario associated with carbon monoxide would be the same as those discussed above for the Project. As such, development under the Maritime Reservation Scenario would not be required to estimate localized CO concentrations as it would not contribute to CO concentrations exceeding CAAQS. The impact would be less than significant and no mitigation measures are required.

Toxic Air Contaminants

Methods used in the health risk analysis for the Maritime Reservation Scenario are the same as those used for the Project, with the few exceptions noted below. Where exceptions are not noted, it can be assumed that methods follow the Project HRA methods.

Although construction of the Maritime Reservation Scenario could take up to 10 years to construct, this EIR assumes that the construction schedule would mimic the Project schedule, which is based on seven years of construction. Assuming a shorter time period for construction is conservative for the reasons discussed above (e.g., a longer construction schedule would result in lower emissions because of newer and cleaner-burning construction equipment fleet mix).

All construction and operational sources of emissions included in the Project HRA were also included in the Maritime Reservation Scenario HRA, with the exception of operational generators, which there are less of in the Maritime Reservation Scenario (see above).

TABLE 4.2-17
TOTAL ANNUAL AND AVERAGE DAILY COMBINED MITIGATED CONSTRUCTION AND MITIGATED OPERATIONAL EMISSIONS BY YEAR FOR THE MARITIME RESERVATION SCENARIO

Year[a]	Scenario	Average Daily Emissions (lbs/day)[b]				Total Annual Emissions (tons/year)[b]			
		ROG	NO_X	PM_{10}	$PM_{2.5}$	ROG	NO_X	PM_{10}	$PM_{2.5}$
	Significance Threshold	**54**	**54**	**82**	**54**	**10**	**10**	**15**	**10**
	Existing Conditions[c]	32.9	19.0	20.6	4.7	6.0	3.5	3.8	0.9
Year 4	Construction[d]	23.5	19.3	0.4	0.3	3.0	2.5	0.05	0.04
	Phase 1 Operations[e,f]	42.8	23.9	33.7	7.7	7.8	4.4	6.1	1.4
	Net New Emissions[g]	*33.4*	*24.3*	*13.4*	*3.3*	*4.9*	*3.4*	*2.4*	*0.6*
Year 5	Construction[d]	3.0	32.4	0.4	0.4	0.4	4.2	0.06	0.05
	Phase 1 Operations[e]	78.2	71.2	60.3	14.4	14.3	13.0	11.0	2.6
	Net New Emissions[g]	*48.3*	***84.6***	*40.1*	*10.1*	*8.7*	***13.8***	*7.3*	*1.8*
Year 6	Construction[d]	25.7	31.2	0.4	0.4	3.4	4.1	0.06	0.05
	Phase 1 Operations[e]	78.2	71.2	60.3	14.4	14.3	13.0	11.0	2.6
	Net New Emissions[g]	***71.0***	***83.4***	*40.1*	*10.1*	***11.6***	***13.6***	*7.3*	*1.8*
Year 7	Construction[c]	45.2	36.3	0.6	0.5	5.9	4.7	0.07	0.07
	Phase 1 Operations[e]	78.2	71.2	60.3	14.4	14.3	13.0	11.0	2.6
	Net New Emissions[g]	***90.6***	***88.5***	*40.2*	*10.2*	***14.2***	***14.3***	*7.3*	*1.8*
Year 8	Construction[d]	45.0	38.5	0.5	0.5	3.9	3.4	0.05	0.05
	Full Buildout Operations[e,f]	117.1	113.3	88.5	21.4	21.4	20.7	16.1	3.9
	Net New Emissions[g]	***129.2***	***132.9***	*68.4*	*17.2*	***19.3***	***20.6***	*12.4*	*3.1*
Year 9	Construction[d]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Full Buildout Operations[e,h]	195.8	198.7	145.5	35.6	35.7	36.3	26.6	6.5
	Net New Emissions[g]	***162.9***	***179.8***	***124.9***	*30.9*	***29.7***	***32.8***	***22.8***	*5.6*
	Maximum Net New Emissions	***162.9***	***179.8***	***124.9***	*30.9*	***29.7***	***32.8***	***22.8***	*5.6*

NOTES:

lbs/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = particulate matter that is 10 microns or less in diameter; $PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; MRS = Maritime Reservation Scenario.

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

b **Bold values** = threshold exceedance

c Existing A's-related emissions are presented in Table 4.2-6.

d Average daily construction emissions represent total annual emissions divided by 260 work days per year (with the exception of the ballpark construction, which is divided by 312 work days per year to account for weekend work). See Tables 4.2-4 and 4.2-5 for more detail. Emissions include implementation of Mitigation Measure AIR-1b (Criteria Air Pollutant Controls), Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), and Mitigation Measure AIR-1d (Super-Compliant VOC Architectural Coatings during Construction). This table also includes construction of the pedestrian and bicycle overpass and other off-site transportation improvements required as mitigation in the Transportation section.

e Average daily operational emissions represent total annual emissions divided by 365 days per year. See Table 4.2-6 for more detail. Emissions include the 20% trip reduction required by AB 734, AIR-2a (Use Low and Super-compliant VOC Architectural Coatings in Maintaining Buildings through Covenants, Conditions, and Restrictions), and Mitigation Measure AIR-2c (Diesel Backup Generator Specifications).

f Operational emissions are scaled for partial years of operation in Year 4 and Year 8 based on the number of days of full operations for those years compared to 365 total days per year (30 in Year 4 and 120 in Year 8). For Year 4, ballpark emissions are not scaled as the ballpark is operational at the start of Phase 1. Only Phase 1 non-ballpark land use emissions are scaled by the ratio of 30 days to 365 days.

g Net new emissions represent MRS construction *plus* MRS operational emissions *minus* existing A's-related emissions.

h Year 9 is the first full year (365 days) of full MRS buildout operations and associated emissions.

SOURCES: Appendix AIR, *Air Quality Supporting Information*; Ramboll US Corporation, 2020

Air dispersion modeling and risk characterization methods used for the Maritime Reservation Scenario are identical to those used for the Project, except for the following slight differences in emission rates and source parameters:

- **Emission Rates:** As discussed above, the Maritime Reservation Scenario operations include 15 emergency diesel generators, while the Project operations include 17.
- **Source Parameters:** Modeled construction area sources are smaller for the Maritime Reservation Scenario than for the Project, due to the smaller footprint of the Maritime Reservation Scenario relative to the Project. Because the maximum heights of the buildings remain the same as the Project, the maximum size of the generators also remains the same as the Project.

Impacts on Existing Sensitive Receptors

Table 4.2-18 shows the HRA results for existing off-site receptors for Scenario 1 exposure from construction and operational activities along with Scenario 3 exposure for full buildout operations under the Maritime Reservation Scenario. Similar to the Project, cancer risk and annual average $PM_{2.5}$ concentrations would exceed the significance thresholds (non-cancer chronic risk would not exceed the thresholds). As such, the same mitigation measures as for the Project would be required for the Maritime Reservation Scenario. These include Mitigation Measure AIR-1b (Criteria Air Pollutant Controls), AIR-1c (Diesel Particulate Matter Controls), AIR-2c (Diesel Backup Generator Specifications), AIR-2d (Diesel Truck Emission Reduction), AIR-2e (Criteria Pollutant Mitigation Plan), and AIR-3 (Truck-Related Risk Reduction Measures – Toxic Air Contaminants).

Table 4.2-19 shows the mitigated HRA results for existing off-site receptors for Scenario 1 exposure from construction and operational activities along with Scenario 3 exposure for full buildout operations under the Maritime Reservation Scenario taking into account the implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) and AIR-2c (Diesel Backup Generator Specifications). Because the effectiveness of Mitigation Measure AIR-2d and AIR-3 on health risks is not known, Table 4.2-19 does not quantify AIR-2d and AIR-3. In addition, because the CPM Plan under Mitigation Measure AIR-2e has not yet been developed, Table 4.2-19 does not quantify AIR-2e. Similar to the Project, when accounting for mitigation measures, both cancer risk and annual average $PM_{2.5}$ concentrations would be reduced below the significance thresholds. These exceedances are slightly greater than the Project. As such, this impact would be greater than the Project and less than significant with mitigation.

Impacts on New Sensitive Receptors

Table 4.2-20 shows the HRA results for new on-site receptors for Scenario 2 exposure from construction and operational activities along with Scenario 3 exposure for full buildout operations under the Maritime Reservation Scenario. Similar to the Project, cancer risk and annual average $PM_{2.5}$ concentrations would exceed the significance thresholds (non-cancer chronic risk would not exceed the thresholds). As such, the same mitigation measures as for the Project would be required for the Maritime Reservation Scenario. These include Mitigation Measure AIR-1b (Criteria Air Pollutant Controls), AIR-1c (Diesel Particulate Matter Controls), AIR-2c (Diesel Backup Generator Specifications), AIR-2d (Diesel Truck Emission Reduction), AIR-2e (Criteria Pollutant Mitigation Plan), AIR-3 (Truck-Related Risk Reduction Measures – Toxic Air Contaminants), and AIR-4a (Install MERV16 Filtration Systems).

TABLE 4.2-18
UNMITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE EXISTING OFF-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO

Scenario/Emissions Source/Location/Year[a]	Excess Lifetime Cancer Risk (per million)[b,c]	Chronic Hazard Index[b,c]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[b,c,d]
Significance Threshold	**10.0**	**1.0**	**0.3**
Scenario 1: Construction Plus Operations			
Existing Howard Terminal[e]	-2.2	-5.9E-04	-4.6E-03
MRS Construction	**77**	0.058	2.8E-01
MRS Operational Generators	6.3	9.1E-04	4.4E-03
MRS Operational Traffic	1.4	2.1E-03	0.1
MRS Operational TRUs[f]	0.035	9.3E-06	4.3E-05
Potential Truck Parking Relocation to Roundhouse[g]	0.38	1.0E-04	8.0E-04
Total Unmitigated MRS Project	**84**	0.061	**0.38**
Total Unmitigated Net New MRS Project w/Roundhouse[h]	**82**	0.060	**0.38**
MEIR (UTM – X)	563080	563080	563080
MEIR (UTM – Y)	4183660	4183660	4183660
Year of Maximum Exposure[i]	n/a	Year 7	Year 7
Scenario 3: Full Buildout Operations			
Existing Howard Terminal[e]	-2.2	-8.1E-05	-6.4E-04
MRS Construction	—	—	—
MRS Operational Generators	9.0	5.3E-04	0.0026
MRS Operational Traffic	2.0	3.7E-03	0.18
MRS Operational TRUs[f]	0.035	2.3E-06	1.1E-05
Potential Truck Parking Relocation to Roundhouse[g]	0.38	5.2E-05	4.1E-04
Total Unmitigated MRS Project	**11.0**	0.0042	0.19
Total Unmitigated Net New MRS Project w/Roundhouse[h]	9.2	0.0042	0.19
MEIR Location (UTM – X)	563080	563180	563180
MEIR Location (UTM – Y)	4183660	4183920	4183920
Year of Maximum Exposure[i]	n/a	Year 9	Year 9

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; TRU = transportation refrigeration unit; UTM = universal transverse Mercator; — = no value reported; MRS = Maritime Reservation Scenario.

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

b **Bold values** = threshold exceedance

c Health risks include the 20% trip reduction required by AB 734 and construction of the pedestrian and bicycle overcrossing required as mitigation in the Transportation section.

d For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a (Dust Controls). For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at off-site receptors in Scenario 1 include contributions from multiple phases of Project construction and subsequent Project operations since Year 7 includes construction and operation. In Scenario 3, $PM_{2.5}$ concentrations at off-site receptors in Scenario 3 include only contributions from Project operations.

e Existing Howard Terminal operations include truck activity at the Project site that would be relocated, including on-site truck idling and truck movement. Because this activity would be removed from the site with implementation of the Project, the TAC emissions associated with this activity would also be removed, and the corresponding health risks for exposure of existing off-site receptors to these TAC emissions would also be removed.

f Delivery truck idling and TRU operations were only included for the ballpark and performance venue, given data limitations for non-ballpark delivery trucks. Performance venue TRUs were modeled at the ballpark loading docks since the location of the performance venue loading docks is not yet known. This table does not include event shuttles operating at the Transit Mobility Hub, as discussed in the TMP; health risks from these shuttles would be negligible. See Appendix AIR for more detail.

TABLE 4.2-18 (CONTINUED)
UNMITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE EXISTING OFF-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO

g Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region. Note that Roundhouse health risk is less than existing Howard Terminal health risk because the existing off-site MEIR is located further away from the Roundhouse than from Howard Terminal.
h Total unmitigated net new MRS Project w/Roundhouse represents total MRS health risks *minus* health risks from existing Howard Terminal truck activity *plus* potential health risks from relocated truck parking to the Roundhouse.
i For cancer risk, the exposure is excess lifetime 30-year exposure; for non-cancer chronic HI and $PM_{2.5}$ concentrations, this represents the year when the maximum value occurs at the MEIR.

SOURCE: Appendix AIR, *Air Quality Supporting Information*.

TABLE 4.2-19
MITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE EXISTING OFF-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO

Emissions Source/Receptor Type/Year[a]	Excess Lifetime Cancer Risk (per million)[b,c]	Chronic Hazard Index[b,c]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[b,c,d]
Significance Threshold	**10.0**	**1.0**	**0.3**
Scenario 1: Construction Plus Operations			
Existing Howard Terminal[e]	-2.2	-5.9E-04	-6.4E-04
MRS Construction	8.4	6.4E-03	3.5E-03
MRS Operational Generators	0.23	3.7E-05	6.5E-05
MRS Operational Traffic	1.4	2.1E-03	0.18
MRS Ballpark TRUs[f]	0.035	9.3E-06	1.1E-05
Potential Truck Parking Relocation to Roundhouse[g]	0.38	1.0E-04	4.1E-04
Total Mitigated MRS Project	**10.1**	0.0085	0.19
Total Mitigated Net New MRS Project w/Roundhouse[g]	8.3	0.0080	0.19
MEIR Location (UTM – X)	563080	563080	563180
MEIR Location (UTM – Y)	4183660	4183660	4183920
Year of Maximum Exposure[i]	n/a	Year 7	Year 8
Scenario 3: Full Buildout Operations			
Existing Howard Terminal[e]	-0.3	-8.1E-05	-6.4E-04
MRS Construction	—	—	—
MRS Operational Generators	0.049	1.3E-05	6.5E-05
MRS Operational Traffic	3.5	3.7E-03	0.18
Project Ballpark TRUs[f]	0.0086	2.3E-06	1.1E-05
Potential Truck Parking Relocation to Roundhouse[g]	0.19	5.2E-05	4.1E-04
Total Mitigated MRS Project	3.6	0.0037	0.18
Total Mitigated Net New MRS Project w/Roundhouse[h]	3.5	0.0037	0.18
MEIR Location (UTM – X)	563180	563180	563180
MEIR Location (UTM – Y)	4183920	4183920	4183920
Year of Maximum Exposure[i]	n/a	Year 9	Year 9

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; TRU = transportation refrigeration unit; UTM = universal transverse Mercator; — = no value reported; MRS = Maritime Reservation Scenario.

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

TABLE 4.2-19 (CONTINUED)
MITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE EXISTING OFF-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO

b **Bold values** = threshold exceedance
c Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) and Mitigation Measure AIR-2c (Diesel Backup Generator Specifications). This table also includes the 20% trip reduction required by AB 734 and construction of the pedestrian and bicycle overcrossing required as mitigation in the Transportation section.
d For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a. For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at off-site receptors in Scenario 1 include contributions from multiple phases of Project construction and subsequent Project operations since Year 8 includes construction and operation. In Scenario 3, $PM_{2.5}$ concentrations at off-site receptors in Scenario 3 include only contributions from Project operations.
e Existing Howard Terminal operations include truck activity at the Project site that would be relocated, including on-site truck idling and truck movement. Because this activity would be removed from the site with implementation of the Project, the TAC emissions associated with this activity would also be removed, and the corresponding health risks for exposure of existing off-site receptors to these TAC emissions would also be removed.
f Delivery truck idling and TRU operations were only included for the ballpark and performance venue, given data limitations for non-ballpark delivery trucks. Performance venue TRUs were modeled at the ballpark loading docks since the location of the performance venue loading docks is not yet known. This table does not include event shuttles operating at the Transit Mobility Hub, as discussed in the TMP; health risks from these shuttles would be negligible. See Appendix AIR for more detail.
g Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region. Note that Roundhouse health risk is less than existing Howard Terminal health risk because the existing off-site MEIR is located further away from the Roundhouse than from Howard Terminal.
h Total mitigated Project net new MRS Project w/Roundhouse represents total MRS health risks *minus* health risks from existing Howard Terminal truck activity *plus* potential health risks from relocated truck parking to the Roundhouse.
i For cancer risk, the exposure is excess lifetime 30-year exposure; for non-cancer chronic HI and $PM_{2.5}$ concentrations, this represents the year when the maximum value occurs at the MEIR.

SOURCES: Appendix AIR, *Air Quality Supporting Information*.

TABLE 4.2-20
UNMITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE NEW ON-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO

Scenario/Emissions Source/ Location/Year[a]	Excess Lifetime Cancer Risk (per million)[b,c]	Chronic Hazard Index[b,c]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$) [b,c,d]
Significance Threshold	**10.0**	**1.0**	**0.3**
Scenario 2: Construction Plus Operations			
MRS Construction	**15**	0.049	0.23
MRS Operational Generators	**191**	0.16	**0.78**
MRS Operational Traffic	0.48	4.8E-04	0.025
MRS Ballpark TRUs[e]	0.030	6.3E-06	2.9E-05
Potential Truck Parking Relocation to Roundhouse[f]	0.22	1.8E-04	1.4E-03
Total Unmitigated MRS Project	**206.0**	0.21	**1.03**
Total Unmitigated MRS Project w/Roundhouse[g]	**206.2**	0.21	**1.03**
MEIR Location (UTM – X)	563420	562820	562820
MEIR Location (UTM – Y)	4183440	4183580	4183580
Year of Exposure[h]	n/a	Year 8	Year 8
Scenario 3: Full Buildout Operations			
MRS Construction	—	—	—
MRS Operational Generators	**591**	0.16	**0.78**
MRS Operational Traffic	0.51	4.8E-04	0.025
MRS Ballpark TRUs[e]	0.023	6.3E-06	2.9E-05

TABLE 4.2-20 (CONTINUED)
UNMITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE NEW ON-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO

Scenario/Emissions Source/ Location/Year[a]	Excess Lifetime Cancer Risk (per million)[b,c]	Chronic Hazard Index[b,c]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$) [b,c,d]
Potential Truck Parking Relocation to Roundhouse[f]	0.65	1.8E-04	1.4E-03
Total Unmitigated MRS Project	**591.7**	0.16	**0.80**
Total Unmitigated MRS Project w/Roundhouse[g]	**592.3**	0.16	**0.80**
MEIR Location (UTM – X)	562820	562820	562820
MEIR Location (UTM – Y)	4183580	4183580	4183580
Year of Exposure[h]	n/a	Year 9	Year 9

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; TRU = transportation refrigeration unit; UTM = universal transverse Mercator; — = no value reported; MRS = Maritime Reservation Scenario.

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

b **Bold values** = threshold exceedance

c Health risks include the 20% trip reduction required by AB 734 and construction of the pedestrian and bicycle overcrossing required as mitigation in the Transportation section.

d For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a (Dust Controls). For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at on-site receptors in Scenario 2 include contributions from multiple phases of Project construction and subsequent Project operations since Year 8 includes construction and operation. In Scenario 3, $PM_{2.5}$ concentrations at on-site receptors in Scenario 3 include only contributions from Project operations.

e Delivery truck idling and TRU operations were only included for the ballpark and performance venue, given data limitations for non-ballpark delivery trucks. Performance venue TRUs were modeled at the ballpark loading docks since the location of the performance venue loading docks is not yet known. This table does not include event shuttles operating at the Transit Mobility Hub, as discussed in the TMP; health risks from these shuttles would be negligible. See Appendix AIR for more detail.

f Health risk associated with potential relocation of truck parking to the Roundhouse represent a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region.

g Total unmitigated MRS Project w/Roundhouse represents total MRS health risks *plus* potential health risks from relocated truck parking to the Roundhouse.

h For cancer risk, the exposure is excess lifetime 30-year exposure; for non-cancer chronic HI and $PM_{2.5}$ concentrations, this represents the year when the maximum value occurs at the MEIR.

SOURCES: Appendix AIR, *Air Quality Supporting Information*; Ramboll US Corporation, 2020.

Table 4.2-21 shows the mitigated HRA results for new on-site receptors for Scenario 2 exposure from construction and operational activities along with Scenario 3 exposure for full buildout operations under the Maritime Reservation Scenario taking into account the implementation of Mitigation Measures AIR-1c, AIR-2c, and AIR-4a (Install MERV16 Filtration Systems). Because the effectiveness of Mitigation Measure AIR-2d and AIR-3 on health risks is not known, Table 4.2-21 does not quantify reductions potentially associated with Mitigation Measures AIR-2d and AIR-3. In addition, because the CPM Plan under Mitigation Measure AIR-2e has not yet been developed, Table 4.2-21 does not quantify AIR-2e. Similar to the Project, when accounting for mitigation measures, both cancer risk and annual average $PM_{2.5}$ concentrations would be reduced below the significance thresholds. These exceedances are slightly greater than the Project. As such, this impact would be greater than the Project and less than significant with mitigation.

TABLE 4.2-21
MITIGATED EXCESS LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION OF THE PROPOSED PROJECT AT THE NEW ON-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO

Scenario/Emissions Source/Location/Year[a]	Excess Lifetime Cancer Risk (per million)[b]	Chronic Hazard Index[b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[b,c,d]
Significance Threshold	**10.0**	**1.0**	**0.3**
Scenario 2: Construction Plus Operations			
MRS Construction	3.6	2.4E-03	9.5E-03
MRS Operational Generators	0.10	3.1E-05	1.6E-04
MRS Operational Traffic	0.17	1.1E-03	0.020
MRS Ballpark TRUs[e]	0.031	2.3E-06	1.1E-05
Potential Truck Parking Relocation to Roundhouse[f]	0.10	2.7E-05	2.2E-04
Total Mitigated MRS Project	3.9	0.0035	0.029
Total Mitigated MRS Project w/Roundhouse[g]	4.0	0.0036	0.030
MEIR Location (UTM – X)	563040	563020	563020
MEIR Location (UTM – Y)	4183540	4183640	4183640
Year of Exposure[g]	v	Year 8	Year 8
Scenario 3: Full Buildout Operations			
MRS Construction	—	—	—
MRS Operational Generators	1.5	3.1E-05	1.6E-04
MRS Operational Traffic	0.058	1.4E-03	0.020
MRS Ballpark TRUs[e]	0.0011	2.5E-06	1.1E-05
Potential Truck Parking Relocation to Roundhouse[f]	0.014	2.8E-05	2.2E-04
Total Mitigated MRS Project	1.60	0.0014	0.020
Total Mitigated MRS Project w/Roundhouse [g]	1.62	0.0014	0.020
MEIR Location (UTM – X)	563420	563020	563020
MEIR Location (UTM – Y)	4183440	4183640	4183640
Year of Exposure[g]	n/a	Year 9	Year 9

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; TRU = transportation refrigeration unit; UTM = universal transverse Mercator; — = no value reported; MRS = Maritime Reservation Scenario.

a The technical analysis assumes Phase 1 construction begins in 2020 rather than 2022 as now anticipated, and also assumes that all construction is completed by 2027 rather than 2029 as now anticipated. Therefore, the health risk estimates presented in this table are conservative because emissions and the associated risks are expected to decrease over time due to improvements in technology and regulatory requirements.

b **Bold values** = threshold exceedance

c Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), Mitigation Measure AIR-2c (Diesel Backup Generator Specifications), and Mitigation Measure AIR-4a (Install MERV16 Filtration Systems). This table also includes the 20% trip reduction required by AB 734 and construction of the pedestrian and bicycle overcrossing required as mitigation in the Transportation section.

d For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a (Dust Controls). For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at on-site receptors in Scenario 2 include contributions from multiple phases of Project construction and subsequent Project operations since Year 8 includes construction and operation. In Scenario 3, $PM_{2.5}$ concentrations at on-site receptors in Scenario 3 include only contributions from Project operations.

e Delivery truck idling and TRU operations were only included for the ballpark and performance venue, given data limitations for non-ballpark delivery trucks. Performance venue TRUs were modeled at the ballpark loading docks since the location of the performance venue loading docks is not yet known. This table does not include event shuttles operating at the Transit Mobility Hub, as discussed in the TMP; health risks from these shuttles would be negligible. See Appendix AIR for more detail.

f Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region.

g Total mitigated MRS Project w/Roundhouse represents total MRS health risks *plus* potential health risks from relocated truck parking to the Roundhouse.

h For cancer risk, the exposure is excess lifetime 30-year exposure; for non-cancer chronic HI and $PM_{2.5}$ concentrations, this represents the year when the maximum value occurs at the MEIR.

SOURCES: Appendix AIR, *Air Quality Supporting Information*; Ramboll US Corporation, 2020.

Odors

The Maritime Reservation Scenario would not change odor sources compared to the Project, because the land uses, activities, attendance and population data are the same as the Project. In addition, the Maritime Reservation Scenario would site the same number of residential users (though in slightly different locations based on the change to the site layout), and new residential development under the Maritime Reservation Scenario would occur well within the recommended odor buffer of numerous existing sources. Therefore, the impacts and analysis for the Maritime Reservation Scenario associated with odors would be the same as those discussed above for the Project.

4.2.5 Cumulative Impacts

Impact AIR-1.CU: The Project, combined with cumulative development in the Project vicinity and citywide, would contribute to cumulative regional air quality impacts associated with criteria pollutants. (Criteria 1, 2, and 3) (*Significant and Unavoidable with Mitigation*)

Geographic Context

The cumulative geographic context for cumulative air quality impacts related to criteria pollutants is the regional San Francisco Bay Area Air Basin, which is considered a nonattainment area for both State and federal ambient air quality standards for ozone and particulate matter. Cumulative air quality impacts related to criteria pollutants are evaluated based on 1) consistency of the Project with local and regional air quality plans (i.e., the 2017 Clean Air Plan), and 2) a quantification of Project-related air quality impacts.

As noted earlier, the contribution of a project's individual air emissions to regional air quality impacts is, by its nature, a cumulative effect. Emissions from past, present, and reasonably foreseeable future projects in the region also have or will contribute to adverse regional air quality impacts on a cumulative basis, resulting in a potentially significant cumulative air quality impact. No single project by itself would be sufficient in size to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative air quality conditions (BAAQMD, 2017c).

Construction Criteria Pollutant Emissions

Fugitive dust from all cumulative construction projects would be controlled by Mitigation Measure AIR-1a (Dust Controls) and reduced to less-than-significant levels accordingly. This impact determination is based on the City of Oakland Standard Condition of Approval 21 that requires the implementation of these dust controls for all new projects. This approach is consistent with BAAQMD guidance, which recommends that implementation of BMPs will reduce fugitive dust emissions such that they are not cumulatively considerable. (BAAQMD, 2017c.)

For criteria pollutants, as described in the *Approach to Analysis* section above, the project-level thresholds are based on levels by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants. Therefore, because the proposed Project's construction NO_X emissions would exceed the project-level thresholds as explained in Impact AIR-1, the Project would result in a considerable contribution to cumulative regional air quality NO_X impacts. Mitigation Measures AIR-1b (Criteria Air Pollutant Controls),

AIR-1c (Diesel Particulate Matter Controls), and AIR-1d (Super-Compliant VOC Architectural Coatings during Construction) have been identified to reduce this impact, though not to less-than-significant levels.

Operational Criteria Pollutant Emissions

Because the Project's emissions exceed the project-level thresholds as explained in Impact AIR-2, the Project would result in a considerable contribution to cumulative regional air quality impacts, a significant impact. Mitigation Measures AIR-2a (Use Low and Super-compliant VOC Architectural Coatings in Maintaining Buildings through Covenants, Conditions, and Restrictions), AIR-2b (Promote use of Green Consumer Products), AIR-2c (Diesel Backup Generator Specifications), AIR-2d (Diesel Truck Emission Reduction), and AIR-2e (Criteria Pollutant Mitigation Plan) have been identified to reduce this impact, though not to less-than-significant levels.

Carbon Monoxide

Because the Project would not contribute to CO concentrations exceeding CAAQS as explained in Impact AIR-3, the Project would not result in a considerable contribution to cumulative regional carbon monoxide impacts.

Consistency with Clean Air Plan

The most recently adopted air quality plan for the SFBAAB is the 2017 Clean Air Plan. The Clean Air Plan is a road map that demonstrates how the Bay Area will, in accordance with the requirements of the California Clean Air Act, implement all feasible measures to reduce ozone and bring the region into attainment for all pollutants. It also provides a control strategy to reduce ozone, PM, air toxics, and GHGs. In determining consistency with the Clean Air Plan, this analysis considers whether the Project would (1) support the primary goals of the Clean Air Plan, (2) include applicable control measures from the Clean Air Plan, and (3) avoid disrupting or hindering implementation of control measures identified in the Clean Air Plan.

The 2017 Clean Air Plan's primary goals are to protect public health and protect the climate, and it contains 85 measures some of which address the reduction of GHGs. These control strategies are grouped into the following categories:

- Stationary source measures;
- Transportation control measures;
- Energy control measures;
- Building control measures;
- Agricultural control measures;
- Natural and working lands control measures;
- Waste management control measures;
- Water control measures; and
- Super GHG control measures.

The Clean Air Plan recognizes that, to a great extent, community design[47] dictates individual travel modes and that a key long-term control strategy to reduce emissions of criteria pollutants,

[47] For people who live (and/or work) in low-density, car-oriented developments, the motor vehicle is often the only viable transportation option. In such situations, even the most robust strategy to promote alternative modes of travel can have, at best, only a very modest effect. In contrast, compact communities with a mixture of land uses make it much easier to walk, cycle, or take transit for at least some daily trips.

air toxics, and GHGs from motor vehicles is to channel future Bay Area growth into communities where goods and services are located nearby and people have a range of viable transportation options. To this end, the Clean Air Plan includes 85 control measures aimed at reducing air pollutants and GHGs in the San Francisco Bay Area Air Basin. Many of these measures address stationary sources and will be implemented by BAAQMD using its permit authority and therefore are not suited to implementation through local planning efforts or project approval actions. The potentially applicable Clean Air Plan measures are listed below.

- **TR1 – Clean Air Teleworking Initiative**. The primary objective of the TR1 measure is to increase the number of employees who telework in the Bay Area, especially on Spare the Air days, by providing outreach and assistance to employees and employers.
- **TR2 – Trip Reduction Programs**. TR2 includes a mandatory and voluntary trip reduction program. The regional Commuter Benefits Program, resulting from SB1339, and similar local programs in jurisdictions with ordinances that require employers to offer pre-tax transit benefits to their employees are mandatory programs. Voluntary programs include outreach to employers to encourage them to implement strategies that encourage their employees to use alternatives to driving alone.
- **TR3 – Local and Regional Bus Service**. TR3 strives to improve existing transit service on the region's core transit systems, and include new bus rapid transit lines in San Francisco.
- **TR4 – Local and Regional Rail Service**. TR4 strives to improve rail service by sustaining and expanding existing services and by providing funds to maintain rail-cars, stations, and other rail capital assets. Specific projects for implementation include BART extensions, Caltrain electrification, and Transbay Transit Center building and rail foundation.
- **TR5 – Transit Efficiency and Use**. TR5 will improve transit efficiency and make transit more convenient for riders through continued operation of 511 Transit, full implementation of Clipper® fare payment system and the Transit Hub Signage Program.
- **TR7 – Safe Routes to Schools and Safe Routes to Transit**. TR7 will facilitate safe routes to schools and transit by providing funds and working with transportation agencies, local governments, schools, and communities to implement safe access for pedestrians and cyclists. Likely projects will include implementation of youth outreach and educational programs to encourage walking and cycling, the construction of bicycle facilities and improvements to pedestrian facilities.
- **TR8 – Ridesharing**. TR8 will promote ridesharing services and incentives through the implementation of the 511 Regional Rideshare Program, as well as local rideshare programs implemented by Congestion Management Agencies. These activities will include marketing rideshare services, operating a rideshare information call center and website, and provide vanpool support services. In addition, this measure includes provisions for encouraging car sharing programs.
- **TR9 – Bicycle and Pedestrian Access and Facilities**. The bicycle component of TR9 strives to expand bicycle facilities serving employment sites, educational and cultural facilities, residential areas, shopping districts, and other activity centers. Typical improvements include bike lanes, routes, paths, and bicycle parking facilities. The bicycle component also includes a bike share pilot project that was developed to assess the feasibility of bicycle sharing as a first- and last-mile transit option. The pedestrian component of this measure is intended to improve pedestrian facilities and encourage walking by funding projects that improve pedestrian access to transit, employment sites, and major activity centers. Improvements may

include sidewalks/paths, benches, reduced street width and intersection turning radii, crosswalks with activated signals, curb extensions/bulbs, buffers between sidewalks and traffic lanes, and street trees.

- **TR10 – Land Use Strategies**. This measure supports land use patterns that reduce VMT and associated emissions and exposure to TACs, especially within infill locations and impacted communities.
- **TR13 - Parking Policies**. This control measure outlines how MTC and the Air District, in cooperation with regional agency partners, will 1) take actions at the regional level to implement parking policies that will benefit air quality, and 2) encourage and support local agency parking policies to reduce motor vehicle travel and promote focused growth.
- **TR14 – Cars and Light Trucks**. This control measures summarizes actions by the Air District, MTC, local businesses, city and county governments, and state and federal agencies to expand the use of Zero Emission Vehicles and Plug-in Electric passenger vehicles and light-duty trucks within the Bay Area.
- **TR15 – Public Outreach and Education**. TR15 includes activities to encourage Bay Area residents to make choices that benefit air quality. This measure includes various public outreach campaigns to educate the public about the health effects of air pollution and the air quality benefits of reducing motor-vehicle trips and choosing transportation modes that reduce motor vehicle emissions. The measure includes outreach and education regarding electric vehicles, smart driving, carpooling, vanpooling, taking public transit, biking, walking, and telecommuting.
- **TR22 – Construction, Freight and Farming Equipment**. TR22 directs the Bay Area Air Quality Management District to work to reduce emissions from off-road equipment used in the construction, freight handling and farming industries by pursuing the following strategies: 1) offering financial incentives between 2017 and 2030 to retrofit engines with diesel particulate filters or upgrade to equipment with electric or Tier IV off-road engines; 2) work with the California Air Resources Board, the California Energy Commission and others to develop more fuel-efficient off-road engines and drive trains; and 3) work with local communities to encourage use of renewable electricity and fuels.
- **EN1 – Decarbonize Electricity Production**. EN1 focuses on lowering carbon emissions by switching the fuel sources used in electricity generation. The measure would promote and expedite a transition away from fossil fuels used in electricity generation (i.e., natural gas) to a greater reliance on renewable energy sources (e.g., wind, solar). In addition, this measure would promote an increase in cogeneration, which results in useful heat in addition to electricity generation from a single fuel source.
- **BL1 – Green Buildings**. BL1 seeks to increase energy efficiency and the use of on-site renewable energy—as well as decarbonize existing end uses—for all types of existing and future buildings. The measure includes policy assistance, incentives, diffusion of public information, and targeted engagement and facilitation of partnerships in order to increase energy efficiency and on-site renewable energy in the buildings sector.
- **BL2 – Decarbonize Buildings**. BL2 seeks to reduce greenhouse gas emissions, criteria pollutants and TACs by limiting the installation of space- and water-heating systems and appliances powered by fossil fuels. This measure is to be implemented by developing model policies for local governments that support low- and zero-carbon technologies as well as potentially developing a rule limiting the sale of natural-gas furnaces and water heaters

- **BL4 – Urban Heat Island**. This control measure aims to reduce the "urban heat island" phenomenon by increasing the application of "cool roofing" and "cool paving" technologies, as well as increasing the prevalence of urban forests and vegetation, through voluntary approaches and educational outreach.
- **NW2 – Urban Tree Planting**. NW2 promotes the planting of trees in urbanized settings to take advantage of the myriad benefits provided by these trees, including: shading to reduce both the "urban heat island" phenomenon and the need for space cooling, and the absorption of ambient criteria air pollutants as well as carbon dioxide.
- **WA3 – Green Waste Diversion**; and **WA4 – Recycling and Waste Reduction**. WA3 seeks to reduce the total amount of green waste being disposed in landfills by supporting the diversion of green waste to other uses, while WA4 seeks to reduce greenhouse gas emissions by diverting recyclables and other materials from landfill.
- **WR2 – Support Water Conservation**. WR2 seeks to promote water conservation, including reduced water consumption and increased on-site water recycling, in residential, commercial and industrial buildings for the purpose of reducing greenhouse gas emissions.

City of Oakland Green Building Requirements require new large commercial projects, new high-rise residential projects and commercial interior projects to provide designated parking for low-emitting, fuel efficient, and carpool/van pool vehicles and mark 8 percent of parking stalls for such vehicles.

All buildings at the Project site, including the new ballpark, would be designed to meet LEED Gold certification or the equivalent, which would include the installation of cool roofing and cool paving technologies. The proposed Project would comply with the City of Oakland's Building Requirements by providing for recycling, compost, and solid waste collection and loading that is convenient for all users.

The Project proposes building a dense, walkable, mixed-use, transit-oriented development, and prioritizing safety, especially for bicyclists and pedestrians consistent with the regional goals and targets expressed in the *Plan Bay Area 2040 Sustainable Communities Strategy.* As discussed in Section 4.15, *Transportation and Circulation*, per-capita VMT for the Project would be 6.4 for residential and 16.5 for commercial (2020 analysis), compared to the regional average of 15.0 for residential and 21.8 for commercial. The Project values are therefore significantly lower than the regional average, and would therefore result in reduced VMT per capita than average land uses in the City.

The Project is consistent with Plan Bay Area 2040 by virtue of being located within the "Oakland Downtown & Jack London Square" PDA—the area bounded generally by 28th Street on the north, I-980 on the west, the Estuary on the south, and Lake Merritt on the east, excepting the Chinatown area between Sixth and Eleventh Streets east of Franklin Street. The Project site is in close proximity to many transit services. This includes AC Transit which provides local bus service in the East Bay and Transbay bus service to the Transbay Terminal in San Francisco; there are 13 AC Transit local lines, two Transbay lines and a Broadway shuttle which operate within a 15-minute walk from the Project site. Bay Area Rapid Transit (BART) provides regional rail service connecting San Francisco, northern San Mateo county, and the East Bay; the 12th Street Oakland City Center Station is located about 0.8 miles from the Project's eastern boundary and the West

Oakland Station is about 0.8 miles from the Project's northern boundary. Amtrak also provides regional rail service within the San Francisco Bay Area and beyond while the San Francisco Bay Ferry, operated by the Water Emergency; the Oakland Jack London Square Station is about 0.6 miles from the Project site. Transportation Authority (WETA), provides ferry service; the Oakland Jack London Square Ferry Terminal is less than 1,000 feet from the eastern edge of the Project site. Additionally, the Project would implement shuttle bus service as part of the TDM Plan.

The TDM Plan will encourage sustainable land use development and reduce vehicle trips generated by the Project. As part of the proposed TDM Plan for the Project, the Project would provide a shuttle service program to provide access to the 12th Street Oakland City Center BART Station and the Lake Merritt BART station. The TDM Plan would prioritize pedestrian and bicycle access and implement measures to encourage alternative modes of transportation by building a dense, walkable, mixed-use, transit-oriented development, and prioritizing safety, especially for bicyclists and pedestrians. The proposed TDM Plan calls for designated carshare spaces, and free bicycle and scooter parking with security oversight and the ability to serve 500 bicycles and scooters and would promote accessible car sharing programs, such as Zipcar and Getaround. In addition, the TDM Plan would construct physical improvements, such as corridor-level bikeway and pedestrian improvements, that help facilitate travel by modes other than automobiles.

Mitigation Measures AIR-1a, AIR-1b, AIR-1c, AIR-1d, AIR-2a, AIR-2b, AIR-2c, AIR-2d, AIR-2e, AIR-3, AIR-4a, AIR-4b, and AIR-1.CU, as well as Mitigation Measures TRANS-1a, TRANS-1b, TRANS-1c, TRANS-1d, TRANS-1e, TRANS-2a, TRANS-2b, TRANS-2c, TRANS-3a, and TRANS-3b are identified to reduce the Project's contribution to cumulative air quality impacts.

Mitigation Measure AIR-1a: Dust Controls. (See Impact AIR-1)

Mitigation Measure AIR-1b: Criteria Air Pollutant Controls. (See Impact AIR-1)

Mitigation Measure AIR-1c: Diesel Particulate Matter Controls. (See Impact AIR-1)

Mitigation Measure AIR-1d: Super-Compliant VOC Architectural Coatings during Construction. (See Impact AIR-1)

Mitigation Measure AIR-2a: Use Low and Super-compliant VOC Architectural Coatings in Maintaining Buildings through Covenants, Conditions, and Restrictions. (See Impact AIR-2)

Mitigation Measure AIR-2b: Promote use of Green Consumer Products. (See Impact AIR-2)

Mitigation Measure AIR-2c: Diesel Backup Generator Specifications. (See Impact AIR-2)

Mitigation Measure AIR-2d: Diesel Truck Emission Reduction. (See Impact AIR-2)

Mitigation Measure AIR-2e: Criteria Pollutant Mitigation Plan. (See Impact AIR-2)

Mitigation Measure AIR-3: Truck-Related Risk Reduction Measures – Toxic Air Contaminants. (See Impact AIR-4)

Mitigation Measure AIR-4a: Install MERV16 Filtration Systems. (See Impact AIR-5)

Mitigation Measure AIR-4b: Exposure to Air Pollution – Toxic Air Contaminants. (See Impact AIR-5)

Mitigation Measure AIR-1.CU: Include Spare the Air Telecommuting Information in Transportation Welcome Packets.

The Project sponsor shall include dissemination of information on Spare the Air Days within the San Francisco Bay Area Air Basin as part of transportation welcome packets and ongoing transportation marketing campaigns. This information shall encourage employers and employees, as allowed by their workplaces, to telecommute on Spare the Air Days.

Mitigation Measure TRANS-1a: Transportation Demand Management (TDM) Plan. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1b: Transportation Management Plan. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1c: Implement a Transportation Hub on 2nd Street. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1d: Implement Bus-Only Lanes on Broadway. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1e: Implement Pedestrian Improvements. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-2a: Implement Buffered Bike Lanes Consistent with the Bike Plan on 7th Street from Mandela Parkway to Martin Luther King Jr. Way. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-2b: Implement Bike Lanes Consistent with the Bike Plan on Martin Luther King Jr. Way from Embarcadero West to 8th Street. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-2c: Implement Bike Lanes Consistent with the Bike Plan on Washington Street from Embarcadero West to 10th Street. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-3a: Implement At-Grade Railroad Crossing Improvements. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-3b: Pedestrian and Bicycle Overcrossing. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure Effectiveness

As discussed above, implementation of Mitigation Measures AIR-1a, AIR-1b, AIR-1c, AIR-1d, AIR-2a through AIR-2e, AIR-3, AIR-4a, AIR-4b, and AIR-1.CU, as well as Mitigation Measures TRANS-1a, TRANS-1b, TRANS-1c, TRANS-1d, TRANS-1e, TRANS-2a, TRANS-2b, TRANS-2c, and TRANS-3b, would reduce the severity of this impact; however, because of uncertainties in the implementation of these measures (particularly Mitigation Measure AIR-2e), these measures would not reduce the Project's contribution to the cumulative impact to a less-than-significant level.

Mitigation Measure AIR-2e would require the development and implementation of the CPM Plan which would incorporate a wide variety of emission reduction measures into the Project design prior to the start of construction, but the specific measures to be implemented through the CPM Plan are currently not known and therefore the criteria pollutant emission reductions that will be achieved through these measures is not known. AIR-2e also includes the potential to use offsets as air quality mitigation, and although offsets would be implemented through a known verifiable program well established by the BAAQMD, implementation of the mitigation measure is beyond the control of the Project sponsor. Therefore, the Project's emissions of criteria air pollutants would be cumulatively considerable, and would be significant and unavoidable with mitigation.

Significance after Mitigation: Significant and Unavoidable with mitigation.

Impact AIR-2.CU: The Project, combined with cumulative development would contribute to cumulative health risk impacts on sensitive receptors. (Criteria 4 and 5) (*Significant and Unavoidable with Mitigation*)

Geographic Context

As described in the Approach to Analysis section above, cumulative risks were estimated by taking total background risk values and adding the Project's contribution at the on-site and off-site MEIR locations. Background risk values were determined using two independent methods: (1) the standard BAAQMD CEQA Guidelines approach using the 1,000-foot radius and risk values from the BAAQMD's online screening tools; and (2) specific health risks for all major TAC sources in West Oakland included in the BAAQMD's health risk modeling for the WOCAP. The first method employs the standard modeling procedure recommended by the BAAQMD in its CEQA Guidelines, and the second method employs the more comprehensive health risk modeling prepared by the BAAQMD which represents a more up-to-date and scientifically rigorous approach.

Section 4.0.4, *Cumulative Analysis*, in Chapter 4, presents the list of reasonably foreseeable future projects in the vicinity that could contribute to cumulative criteria pollutant emissions. All but two of the listed cumulative projects are well beyond the 1,000-foot BAAQMD radius guidance from the Project site.

In addition to the cumulative projects list, the analysis of cumulative health risks considers Project-related risks in the context of the projects and projections included in the BAAQMD's health risk modelling for the WOCAP, which includes the major background sources described below.

Local TAC Sources Included in this Analysis

The following existing local TAC sources were modeled by the BAAQMD in the HRA for the WOCAP and were included in the cumulative HRA for the Project. As discussed in the *Methods for Analysis of Cumulative Impacts* section above, the WOCAP modeling files provided by the BAAQMD represent a BAU scenario without implementation of any TAC emission reduction actions. In particular, the modeling performed for the WOCAP did not take into account any of the TAC emission reduction strategies set forth in that plan. Therefore, this analysis presents a

highly conservative estimate of background cancer risk and $PM_{2.5}$ concentrations. Additional modeling methods and details are available from the BAAQMD's Technical Support Document for the WOCAP (BAAQMD and WOEIP, 2019c).

Schnitzer Steel Metal Recycling Facility

The Schnitzer Steel site is adjacent and west of the Project site at 1101 Embarcadero West in Oakland, California (Terraphase, 2017). Schnitzer Steel operates a scrap-metal recycling facility, occupying approximately 26.5 acres of flat-lying land. Schnitzer Steel operations include the shredding of automobiles, appliances, and other recyclable light steel materials; shearing and torch-cutting of heavy recyclable steel products; preparation and sorting of ferrous and non-ferrous metal recycling feedstock; temporary storage of finished recycled metal products and shredder residue; and maintenance of facility equipment.

The facility is a major emitter of TAC emissions (including DPM) and $PM_{2.5}$ through its metal recycling processes (stationary sources), truck activity (mobile sources), and ocean-going vessel activity (marine sources). In order to comply with the BAAQMD Rule 11-18, Schnitzer Steel is currently in the process of designing and installing emissions controls to reduce its stationary source TAC emissions. According to the BAAQMD, the installation of a thermal oxidizer and a wet scrubber is expected to reduce certain TAC emissions (those affected by the control technology) by around 70 percent, thereby reducing excess lifetime cancer risk and annual average $PM_{2.5}$ concentrations at nearby sensitive receptor locations, including new on-site receptors at the Project residential areas. However, because there are other sources of TACs that are emitted from the facility that will not be diverted through the new emissions controls, the overall reduction in TAC emissions from Schnitzer Steel is expected to be less than 70 percent. Although the BAAQMD has estimated the emission reductions associated with these controls,[48] the BAAQMD did not model health risks associated with these anticipated TAC emission reductions for use in this EIR. Based on this projected reduction in TAC emissions, the cumulative HRA overestimates the health risk impacts associated with Schnitzer Steel on existing off-site and new on-site sensitive receptors, as presented below.

It should also be noted that Schnitzer Steel produces Light Fibrous Material (LFM) during normal operations. LFM is a byproduct of the metal shredding operation which currently discharges into the surrounding environment. LFM can be observed on paved surfaces in certain areas of Howard Terminal, particularly on the western edge, closest to the Schnitzer facility. Terraphase, working on behalf of Schnitzer, has conducted activities to remove visible LFM from Howard Terminal. In addition, Schnitzer has installed an LFM capture and control system on its shredder as part of the Schnitzer Steel Facility Upgrade Project, which removes LFM prior to discharging air into the surrounding environment. For their health risk modeling for the WOCAP, the BAAQMD evaluated respirable emissions of TACs from the shredder. In addition, ongoing enforcement and regulatory efforts to require Schnitzer's compliance with the numerous laws and regulations that govern hazardous materials would limit the potential for creation of hazardous conditions due to the use release of LFM, and reduce Schnizter's air quality impacts.

[48] See Table 6-1 of the WOCAP Action Plan, Volume 1 (BAAQMD and WOEIP, 2019b).

Port of Oakland

Activity at the Port of Oakland is a major emitter of TACs through a number of source types, including permitted diesel backup generators, cargo handling equipment, ocean-going vessels, harbor craft, railyards, locomotives, and truck activity. Emissions from these sources were included in BAAQMD's health risk modeling for the WOCAP. BAAQMD assumed an average annual growth rate at the Port of 5 percent, which is likely an overestimate of actual growth in Port activity. According to the 2019-2050 Bay Area Seaport Forecast, a more likely average annual growth rate is 2.2 percent (The Tioga Group and Hackett Associates, 2020). However, due to a lack of data available to make this modeling adjustment, and to provide conservative cumulative results, analysis prepared for this EIR did not adjust the BAAQMD's growth assumptions for the Port; instead, the five-percent growth rate assumed in the WOCAP was used.

The BAAMQD requested that this cumulative analysis consider the effects of the new Eagle Rock Aggregates Oakland Terminal Project on the background health risk. In November 2020, the Port of Oakland released a Draft Supplemental Environmental Impact Report (DSEIR) for the Eagle Rock Aggregates (ERA) Oakland Terminal Project to construct and operate a marine terminal at the Port of Oakland that would import, store, and distribute bulk construction aggregates (i.e., sand and gravel) (Port of Oakland, 2020). The ERA Project site lies within the boundary of the Oakland Army Base (OAB) Area Redevelopment Plan. An EIR for the OAB Area Redevelopment Plan (henceforth referred to as the 2002 EIR) was certified by the City in July 2002 (SCH# 2001082058). As the 2002 EIR and subsequent addenda were completed prior to BAAQMD's WOCAP evaluation, the BAAQMD likely included growth associated with the OAB in its estimates of background health risk. However, as a conservative approach, the high end of these ranges (cancer risk of 4.9 in a million and PM2.5 concentration of 0.099 µg/m3) could be added to the cumulative impacts presented in Tables 4.2-23 and 4.2-25 below. This approach likely overstates the cumulative effect of the ERA project, because these values are at the high end of the range of values in the area encompassing the Howard Terminal site. Although adding these values to the cumulative background would slightly increase the existing health risks at the MEIR locations, it would not affect the project's contribution to the cumulative health risks, the project would still be considered to be cumulatively considerable, and the impact would remain significant and unavoidable with mitigation.[49]

Railyards and Locomotives

Diesel locomotives operating on rail lines and in railyards emit TACs which contribute to the background health risks at the Project site. The Port has two railyards on its property: Oakland International Gateway railyard, which is leased by the Burlington Northern Santa Fe (BNSF) railway, and Outer Harbor Intermodal Terminal, which is operated by Oakland Global Rail Enterprise LLC (OGRE). TAC emissions from both railyards were included in the analysis. There are also two freight rail carriers in the Bay Area: BNSF, and Union Pacific (UP). TAC emissions

[49] For the existing off-site MEIR (Table 4.2-23), adding these values would increase the cumulative contribution of excess lifetime cancer risk from 326 to 331 and of annual average $PM_{2.5}$ concentration from 3.0 to 3.1; the total project plus cumulative values would increase from 332 to 337 for the excess lifetime cancer risk and from 3.1 to 3.2 for the annual average $PM_{2.5}$ concentration. For the new on-site MEIR (Table 4.2-25), adding these values would increase the cumulative contribution of excess lifetime cancer risk from 321 to 326 and of annual average $PM_{2.5}$ concentration from 2.4 to 2.5; the total project plus cumulative values would increase from 324 to 329 for the excess lifetime cancer risk and from 2.4 to 2.5 for the annual average $PM_{2.5}$ concentration.

from switcher locomotives, line-haul engines, and other railyard sources were included. In addition, TAC emissions from passenger rail locomotives were included; passenger rail lines include Amtrak along the Capital Corridor, California Zephyr, Coastal Starlight, and San Joaquin.

On-Road Mobile Sources

Vehicles travelling on roadways within West Oakland represent a major TAC emissions source in the community. TAC emissions were included for fuel combustion sources, including running exhaust; fugitive fuel vapor sources, including running loss processes; and fugitive particulate sources, including tire wear, brake wear, and re-entrained road dust. Roadways evaluated in the cumulative analysis include highways (such as I-80 and I-880) and surface streets (such as Market Street). The analysis included truck routes for heavy-duty vehicles operating out of the Port of Oakland, Schnitzer Steel, and truck-related businesses in the area. TAC emissions from all vehicle types operating in the community were included, such as passenger cars, passenger trucks, medium-duty trucks, heavy-duty trucks, and buses.

Commuter Ferries and Excursion Vessels

TAC emissions from ferry and excursion vessel operations were included in the analysis. These emissions were based on information gathered from CARB, WETA, ferry and excursion vessel schedules, and field studies. The two commuter ferry terminals included are the Oakland Jack London Square ferry terminal (in Oakland), and the Alameda Main Street ferry terminal (in Alameda). Emissions were included for navigating and berthing activities. As discussed in *Methods for Analysis of Impacts* above, additional ferry service for ballgames associated with the Project is not anticipated to occur with the possible exception of a post-game ferry on weekdays and ferry service for weekend games. Any planned increase in service would fall within the level of service previously analyzed in the Downtown San Francisco Ferry Terminal Expansion Project Draft EIR (URS Corporation, 2013).

Other Regional Emission Sources

There are many more regional emissions sources that contribute to TAC concentrations and health impacts at the Project site beyond those located in West Oakland, including sources located in other parts of Alameda County, the Bay Area, and beyond. These include on-road mobile sources on highways and freeways, off-road sources and equipment, marine vehicles, stationary sources, truck activity, airports, and many other smaller scale area sources. The BAAQMD modeled background concentrations for these regional sources in its health risk analysis for the WOCAP, and thus these background concentrations are included in the cumulative HRA for the Project. The BAAQMD estimates that the background $PM_{2.5}$ concentration from regional sources outside of West Oakland is 6.9 $\mu g/m^3$ and the background cancer risk is 421 per million (BAAQMD and WOEIP, 2019a). This compares to local West Oakland TAC sources contributing annual average $PM_{2.5}$ concentrations of 1.71 $\mu g/m^3$ (1.74 $\mu g/m^3$ weighted by population) and excess lifetime cancer risks of 307 per million (203 per million weighted by population), for a total annual average $PM_{2.5}$ concentrations of 8.6 $\mu g/m^3$ and total excess lifetime cancer risks of 728 per million.

Other Local Emissions Sources Not Included in this Analysis

The BAAQMD's health risk modeling for the WOCAP does not include other local TAC emissions sources such as construction activities, commercial and residential cooking, residential wood burning, lawn and home gardening equipment, or emissions associated with other land use development projects or projects that have recently undergone (or are undergoing) CEQA review and are not yet operational. The BAAQMD did not include TAC emissions from these sources because "emission information was not readily available" and "they are either (a) difficult to analyze (e.g., for wood burning and cooking, the spatial and temporal distribution of emissions are poorly understood), or (b) deemed to be less important than similar sources that are included in the emissions inventory" (BAAQMD and WOEIP, 2019c).

Calculating these TAC emissions and the resulting health risks would be speculative given the uncertainty in the activities generating these TAC emissions, as described by the BAAQMD in the WOCAP. As such, these additional local sources of TAC emissions are not included in this analysis.

Construction

The BAAQMD did not include TAC emissions from construction of other future regional projects because of data limitations. The same limitations are present for this analysis, because modeling future construction activity within the City for new development projects would be speculative at the level of detail needed for a refined health risk assessment. There are limited completed CEQA documents available for these future projects, and most of them have not performed detailed construction HRAs. As such, TAC emissions from future construction projects were not included in the cumulative HRA for the Project.

Restaurants and Cooking

Emissions from restaurants primarily include combustion-related organic TACs from charbroiling and cooking are excluded. Due to required emissions control devices and the scale of TAC emission from charbroiling overall, these emissions are typically small and result in minimal health risks when compared to major sources of DPM and $PM_{2.5}$.[50] In addition, quantifying TAC emissions from city-wide cooking operations is not feasible given the proprietary nature of commercial cooking operations, the wide variety of cooking methods and equipment, and the varying emissions control technologies in place and the thousands of restaurants dispersed throughout West Oakland. As such, TAC emissions from commercial and residential cooking were not included in the cumulative HRA for the Project.

Other Cumulative Projects

As discussed in Chapter 4.0, *Introduction to the Environmental Analysis*, and as presented in Appendix DEV, there are 184 projects that have been identified as cumulative major development projects. The status of these projects varies greatly and includes, but is not limited to, pre-applications, applications under review, applications approved, projects approved, building permits filed, projects under construction, and projects complete. Most of these projects do not have published CEQA documents or quantified emissions analyses. Therefore, the TAC

[50] Per BAAQMD Regulation 6 Rule 2: Commercial Cooking Equipment, certified emissions control devices are required to be installed on all under-fired charbroilers at restaurants that meet certain criteria. These controls significantly reduce TAC emissions from cooking.

emissions and health risks associated with these projects are not readily available, and estimating these emissions and health risks would be speculative. Consequently, TAC emissions from these cumulative projects were not included in the cumulative HRA for the Project. Any cumulative project that was considered by the BAAQMD in the health risk modeling for the WOCAP is also included in the cumulative analysis presented below for the Project.

Impacts on Existing Sensitive Receptors

As discussed in Impact AIR-4, existing sensitive receptors evaluated in the HRA include all existing off-site sensitive receptors within 2,000 feet of the proposed Project boundary and other parts of West Oakland in the vicinity of nearby freeways. See Appendix AIR, *Air Quality Supporting Information*, for a figure presenting the location of sensitive receptors include in the HRA. As discussed in the *Approach to Analysis* section above, the air pollutant exposure to residents typically results in the greatest adverse health outcome for all population groups. As such, a conservative approach of considering all off-site sensitive receptors as residential receptors was used in this analysis.

As previously discussed under *Sensitive Receptors* in the *Environmental Setting*, off-site sensitive receptors close to the Project site primarily include residential uses to the north across Embarcadero Street (the Phoenix Lofts). Existing residences are located as close as 100 feet from the Project site boundary. Other residential areas throughout West Oakland were also considered.

Additionally, as discussed in Impact AIR-4, health risks associated with existing local truck activity at Howard Terminal were subtracted from the Project's total health risks to determine impacts of the Project for the off-site MEIR because the Project would remove these existing TAC emission sources at Howard Terminal.

The DOSP Preliminary Draft Plan indicates that there could be new downtown residential sensitive receptors in new mixed-use designated areas across Embarcadero West approximately 100 feet north of the Project site from Brush Street to Clay Street. Because the exact location of new future residential sensitive receptors (and when those future receptors would be present and exposed to the Project's TAC emissions) is currently not known, it would be speculative to assume that there would be sensitive receptors at these locations. Therefore, potential future residential locations associated with the DOSP were not considered to be existing off-site sensitive receptors for analyzing cumulative impacts. In addition, City of Oakland building code and standard conditions of approval would require that any new residential buildings constructed as part of the DOSP would install MERV 13 or better air filtration systems. This would reduce the total exposure and health risks for these future sensitive receptors.

Cancer Risk Impacts

Method 1: Standard BAAQMD Approach

Table 4.2-22 shows the HRA results for the existing off-site MEIR under mitigated conditions along with the cumulative background health risks using the standard BAAQMD approach. As shown in the table, the maximum cancer risk at the off-site MEIR would be 6.5 per million from the Project and 91 for cumulative background sources for a total of 97 per million when accounting for the removal of existing health risks associated with existing on-site port truck idling and truck

movement at Howard Terminal and taking into account the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse. The off-site MEIR is located at the Phoenix Lofts building approximately 100 feet to the north of the Project across Embarcadero Street. The majority of background risk is from railways (73–74 percent at 67 per million) and highways (21 percent at 19 per million), representing a total of 94–95 percent.

TABLE 4.2-22
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK, NON-CANCER CHRONIC RISK, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION AT THE EXISTING OFF-SITE MEIR USING THE STANDARD BAAQMD APPROACH

Emissions Source/Receptor Type	Excess Lifetime Cancer Risk (per million)[a,b]	Non-Cancer Chronic Hazard Index (unitless)[a]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b,c]
Significance Threshold	**100**	**10**	**0.8**
Project Contributions – Mitigated			
Existing Howard Terminal[d]	-2.2	-8.1E-05	-6.4E-04
Project Construction	7.2	2.2E-04	2.5E-03
Project Operations	1.0	0.0037	0.18
Potential Truck Parking Relocation to Roundhouse[e]	0.38	5.2E-05	4.1E-04
Total Mitigated Project	8.3	0.0039	0.19
Total Mitigated Net New Project w/Roundhouse[f]	6.5	0.0039	0.19
MEIR Location (UTM – X)	563080	563180	563180
MEIR Location (UTM – Y)	4183660	4183920	4183920
Cumulative Contributions			
Existing Stationary Sources[g]	0.93	0.0023	0.076
Roadways[h]	0	—	0.11
Highways[i]	19	—	0.56
Major Streets[i,j]	4.1	—	0.060
Railways[i]	67	—	0.017
Total Cumulative	*91*	*0.0023*	***0.82***
Project Plus Cumulative			
Mitigated Net New Project w/Roundhouse	6.5	0.0039	0.19
Cumulative Contributions	91	0.0023	**0.8**
Cumulative Total	*97*	*0.0062*	***1.0***

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; UTM = universal transverse Mercator; — = no risk was calculated or data was missing; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance
b Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) and Mitigation Measure AIR-2c (Diesel Backup Generator Specifications). This table also includes implementation of the 20% trip reduction requirement of AB 734 and includes construction activities associated with implementation of the pedestrian and bicycle overcrossing required as mitigation in the Transportation section.
c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a. For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at off-site receptors include contributions from multiple phases of Project construction and subsequent Project operations.
d Existing Howard Terminal operations include truck activity at the Project site that would be relocated, including on-site truck idling and truck movement. Because this activity would be removed from the site with implementation of the Project, the TAC emissions associated with this activity would also be removed, and the corresponding health risks for exposure of existing off-site receptors to these TAC emissions would also be removed.
e Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region. Note that Roundhouse health risk is less than existing Howard Terminal health risk because the existing off-site MEIR is located further away from the Roundhouse than from Howard Terminal.

TABLE 4.2-22 (CONTINUED)
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK, NON-CANCER CHRONIC RISK, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION AT THE EXISTING OFF-SITE MEIR USING THE STANDARD BAAQMD APPROACH

f Total mitigated net new Project w/Roundhouse represents total mitigated Project health risks *minus* health risks from existing Howard Terminal truck activity *plus* potential health risks from relocated truck parking to the Roundhouse.

g Existing stationary sources includes all facilities within 1,000 feet of the MEIRs as per the BAAQMD Stationary Source Screening Analysis Tool. Facility information was obtained from the Alameda Stationary Source Screening Tool with additional details provided by BAAQMD. Values have been adjusted accordingly for distance from the MEIRs using BAAQMD guidance.

h Roadways include nearby roads between 10,000 to 30,000 average daily trips. However, there were no roadways with average daily traffic between 10,000 and 30,000 trips per day within 1,000 feet of the off-site cancer MEIR.

i Includes nearby major streets, highway, and railways. Cancer and $PM_{2.5}$ impacts were taken from BAAQMD raster files for the Project area. The BAAQMD's raster screening tools do not estimate chronic hazards since the screening levels were found to be extremely low. Thus, there are no chronic hazard values associated with highways, railways, or major streets.

j Major streets, as evaluated in the BAAQMD raster screening tools, include all streets with average daily traffic above 30,000 trips per day.

SOURCES: BAAQMD and WOEIP, 2019c; Appendix AIR, *Air Quality Supporting Information*.

Method 2: Detailed WOCAP Modeling Approach

Table 4.2-23 shows the HRA results for the existing off-site MEIR under mitigated conditions along with the cumulative background health risks using the detailed WOCAP modeling approach. As shown in the table, the maximum cancer risk at the off-site MEIR would be 6.5 per million from the Project and 326 for cumulative background sources for a total of 332 per million when accounting for the removal of existing health risks associated with existing on-site port truck idling and truck movement at Howard Terminal and taking into account the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse. The off-site MEIR is located at the Phoenix Lofts building approximately 100 feet to the north of the Project across Embarcadero Street.

The majority of the cumulative background cancer risk is from the Port of Oakland (39 percent at 128 per million) and rail (46 percent at 148 per million), representing a total of 85 percent. Schnitzer Steel contributes 8 percent of the cumulative background cancer risk (26 per million). As noted above, the contribution from Schnitzer Steel does not include planned emissions control technology as required by the BAAQMD through Rule 11-18, which is anticipated to reduce the facility's TAC emissions.

Conclusion: Cumulative Cancer Risk (Off Site)

As presented below, the total cumulative health risk under mitigated conditions at the off-site MEIR, is a maximum cancer risk level of 97 per million using the standard BAAQMD approach. The maximum cancer risk is 332 per million using the detailed WOCAP modeling approach. The standard BAAQMD approach value does not exceed the cumulative threshold of 100 per million, but the detailed WOCAP modeling approach value does exceed the threshold of 100 per million. Therefore, the Project is considered to be cumulatively considerable. Consequently, this impact would be potentially significant.

TABLE 4.2-23
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION AT THE EXISTING OFF-SITE MEIR USING THE DETAILED WOCAP MODELING APPROACH

Emissions Source/Receptor Type	Excess Lifetime Cancer Risk (per million)[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b,c]
Significance Threshold	**100**	**0.8**
Project Contributions – Mitigated		
Existing Howard Terminal[d]	-2.2	-6.4E-04
Project Construction	7.2	2.5E-03
Project Operations	1.0	1.8E-01
Potential Truck Parking Relocation to Roundhouse[e]	0.38	4.1E-04
Total Mitigated Project	8.3	0.19
Total Mitigated Net New Project w/Roundhouse[f]	6.5	0.19
MEIR Location (UTM – X)	563080	563180
MEIR Location (UTM – Y)	4183660	4183920
Cumulative Contributions – Year 2024		
Highway[g]	4.0	0.38
Other[h]	14	0.012
Permitted[i]	2.2	0.15
Dynegy[j]	0.010	8.2E-04
Schnitzer[k]	26	0.16
Port[l]	**128**	0.20
Rail[m]	**148**	0.055
Street[n]	4.0	**2.0**
Total Cumulative	***326***	***3.0***
Project Plus Cumulative		
Mitigated Net New Project w/Roundhouse	6.5	0.19
Cumulative Contributions	**326**	**3.0**
Cumulative Total	***332***	***3.1***

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; UTM = universal transverse Mercator; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance
b Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) and Mitigation Measure AIR-2c (Diesel Backup Generator Specifications). This table also includes the 20% trip reduction required by AB 734 and construction of the pedestrian and bicycle overcrossing required as mitigation in the Transportation section.
c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a. For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at off-site receptors include contributions from multiple phases of Project construction and subsequent Project operations.
d Existing Howard Terminal operations include truck activity at the Project site that would be relocated, including on-site truck idling and truck movement. Because this activity would be removed from the site with implementation of the Project, the TAC emissions associated with this activity would also be removed, and the corresponding health risks for exposure of existing off-site receptors to these TAC emissions would also be removed.
e Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region. Note that Roundhouse health risk is less than existing Howard Terminal health risk because the existing off-site MEIR is located further away from the Roundhouse than from Howard Terminal.
f Total mitigated net new Project w/Roundhouse represents total mitigated Project health risks *minus* health risks from Existing Howard Terminal activity *plus* potential health risks from relocated truck parking to the Roundhouse.
g Highway includes exhaust and fugitive dust emissions from vehicles and trucks driving on highways.
h Other includes ferries and truck-related businesses.
i Permitted includes all BAAQMD-permitted stationary sources in West Oakland except the Port of Oakland and Schnitzer Steel, such as Custom Alloy Scrap Sales, East Bay Municipal Utility District, and backup emergency generators.
j Dynegy includes TAC emissions from the BAAQMD-permitted existing Dynegy jet-fueled power plant currently operating on the Peaker Power Plant Variant site. This is discussed further in Section 5.0, *Variants*.
k Schnitzer includes TAC emissions sources associated with the Schnitzer Steel facility, including permitted stationary sources, ocean-going vessels and trucks.

TABLE 4.2-23 (CONTINUED)
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION AT THE EXISTING OFF-SITE MEIR USING THE DETAILED WOCAP MODELING APPROACH

l Port includes TAC emissions sources associated with the Port of Oakland, including permitted stationary sources, ocean-going vessels, harbor craft, dredging, cargo handling equipment, the BNSF railyard, and trucks.
m Rail includes the UP railyard and both freight and passenger locomotives operating on the various rail lines in the area.
n Street includes exhaust and fugitive dust emissions from vehicles and trucks driving on local roadways.
SOURCES: BAAQMD and WOEIP, 2019c; Appendix AIR, *Air Quality Supporting Information*.

As discussed above in Section 4.2.2, the Project is located in a CAPP community as designated under AB 617 and has disproportionally high concentrations of air pollution and health risk burden. Because the background health risk values of the Project site, and the entire West Oakland area, already exceed the cumulative risk levels presented above,[51] any incremental additional TAC emissions and associated health risks caused by the Project would be cumulatively considerable. Therefore, the Project's contribution to existing cumulative health risks for both existing off-site sensitive receptors and new on-site receptors is considered cumulatively considerable. It should also be noted, as discussed under Impact AIR-4, that the Project's contribution under mitigated conditions at the off-site MEIR is a maximum cancer risk level of 6.5 per million, which does not exceed the project-level threshold of 10 per million.

$PM_{2.5}$ Concentrations

Method 1: Standard BAAQMD Approach

Table 4.2-22 shows the results of the risk assessment for exposure to $PM_{2.5}$ at the maximally impacted off-site receptor under mitigated conditions using the standard BAAQMD approach. As shown in the table, the annual average $PM_{2.5}$ concentrations at the off-site MEIR would be 0.19 $\mu g/m^3$ from the Project and 0.82 $\mu g/m^3$ for cumulative background sources for a total of 1.0 $\mu g/m^3$ when accounting for the removal of existing health risks associated with existing on-site port truck idling and truck movement at Howard Terminal and taking into account the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse. The off-site MEIR is located at on Brush Street halfway between 4th Street and 5th Street. The majority of $PM_{2.5}$ emissions is from highways (68 percent at 0.56 $\mu g/m^3$) and local roadways (13 percent at 0.11 $\mu g/m^3$), representing a total of approximately 81 percent.

Method 2: Detailed WOCAP Modeling Approach

Table 4.2-23 shows the results of the risk assessment for exposure to $PM_{2.5}$ at the maximally impacted off-site receptor under mitigated conditions using the detailed WOCAP modeling approach. As shown in Table 4.2-23, the annual average $PM_{2.5}$ concentrations at the off-site MEIR was estimated to be 0.19 $\mu g/m^3$ for the Project and 3.0 $\mu g/m^3$ for cumulative background sources for a total of 3.1 $\mu g/m^3$ when accounting for the removal of existing health risks associated with existing on-site port truck idling and truck movement at Howard Terminal and

51 Under the standard BAAQMD approach, as presented in Table 4.2-22, background cumulative annual average $PM_{2.5}$ concentrations exceed the threshold of 0.8 $\mu g/m^3$ at 0.82 $\mu g/m^3$; background cumulative excess lifetime cancer risk and non-cancer chronic HI do not exceed the respective thresholds. Under the detailed WOCAP modeling approach, as presented in Table 4.2-23, background cumulative excess lifetime cancer risk exceeds the threshold of 100 per million at 326 per million, and annual average $PM_{2.5}$ concentrations exceed the threshold of 0.8 $\mu g/m^3$ at 3.0 $\mu g/m^3$.

taking into account the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse.

The majority of the cumulative background $PM_{2.5}$ concentration is from local streets (approximately 68 percent at 2.0 $\mu g/m^3$) and to a lesser degree local highways (approximately 13 percent at 0.38 $\mu g/m^3$), representing a total of 80 percent. The majority of $PM_{2.5}$ emissions from local streets is from road dust. The BAAQMD has indicated that the methods used to calculate road dust likely overestimate $PM_{2.5}$ emissions; BAAQMD is currently working on a more accurate method of accounting for these emissions. Therefore, the results for local streets are likely conservative. As noted above, the contribution from Schnitzer Steel does not include its planned emissions control technology as required by the BAAQMD Rule 11-18, which is anticipated to reduce the facility's TAC emissions.

Conclusion: Cumulative $PM_{2.5}$ Concentrations (Off Site)

As presented above, the total cumulative annual average $PM_{2.5}$ concentration at the off-site MEIR exceeds the City's currently adopted significance threshold of 0.8 $\mu g/m^3$. Given the background levels of $PM_{2.5}$ concentrations at the off-site MEIR (annual average $PM_{2.5}$ concentration of 0.8 $\mu g/m^3$ using the standard BAAQMD approach and annual average $PM_{2.5}$ concentration of 3.0 $\mu g/m^3$ using the detailed WOCAP modeling approach), as stated in Section 4.2.3 above, the Project's cumulative contribution would be considered significant if this contribution exceeds an annual average $PM_{2.5}$ concentration of 0.8 $\mu g/m^3$.

As analyzed above, the total cumulative annual average $PM_{2.5}$ concentration with the Project's contribution under mitigated conditions at the off-site MEIR is a maximum of 1.0 $\mu g/m^3$ using the standard BAAQMD approach. The annual average $PM_{2.5}$ concentration, using the detailed WOCAP modeling approach, is a maximum of 3.1 $\mu g/m^3$. Both values exceed the cumulative threshold of annual average $PM_{2.5}$ concentration of 0.8 $\mu g/m^3$. Therefore, the Project is considered to be cumulatively considerable. Consequently, this impact would be potentially significant.

As discussed above in Section 4.2.2, the Project is located in a CAPP community as designated by AB 617 and has disproportionally high concentrations of air pollution and health risk burden. It should also be noted, as discussed under Impact AIR-4, that the Project's contribution under mitigated conditions at the existing off-site MEIR is an annual average $PM_{2.5}$ concentration of 0.19 $\mu g/m^3$, which does not exceed the project-level threshold of 0.3 $\mu g/m^3$ used to determine significance under Impacts AIR-4 and AIR-5 above.

Non-cancer Chronic Hazard Index

Method 1: Standard BAAQMD Approach

Table 4.2-22 shows the results of the risk assessment for the non-cancer chronic hazard index at the maximally impacted off-site receptor under mitigated conditions using the standard BAAQMD approach. As shown in the table, the non-cancer chronic hazard index at the off-site MEIR would be 0.0039 from the Project and 0.0023 for cumulative background sources for a total of 0.0062. The off-site MEIR is located at on Brush Street halfway between 4th Street and 5th Street. The only BAAQMD source with impactful non-cancer chronic hazard risk is stationary sources.

Method 2: Detailed WOCAP Modeling Approach

As discussed in the *Approach to Analysis* section, the BAAQMD only included annual average $PM_{2.5}$ concentrations and excess lifetime cancer risk in its health risk modeling for the WOCAP, as such the cumulative analysis does not include acute or chronic health impacts (BAAQMD and WOEIP, 2019c). For this reason, this analysis uses Method 1 to assess cumulative non-cancer chronic hazards.

Conclusion: Cumulative Non-cancer Chronic Hazard Index (Off Site)

As presented above, the total cumulative non-cancer chronic hazard index with the Project's contribution under mitigated conditions at the off-site MEIR is a maximum non-cancer chronic hazard index of 0.0062, which does not exceed the threshold of 10.0. Therefore, the Project's non-cancer chronic hazard impact would not be cumulatively considerable. Consequently, this impact would be less than significant.

Impacts on New Sensitive Receptors

As discussed in Impact AIR-5, new on-site sensitive receptors evaluated in the HRA include all new on-site sensitive receptors located in residential and daycare land uses at the Project site. Receptors were assumed to be present at each non-ballpark building. See Appendix AIR, *Air Quality Supporting Information*, for a figure presenting the location of sensitive receptors included in the HRA. As discussed in the *Approach to Analysis* section above, the air pollutant exposure to residents typically results in the greatest adverse health outcome for all population groups. As such, a conservative approach of considering all sensitive receptors as residential receptors was used in this analysis. It was assumed that residential or daycare receptors could be present anywhere at the site in any non-ballpark building; therefore, all on-site receptors were assumed to be residential.

Cancer Risk Impacts

Method 1: Standard BAAQMD Approach

Table 4.2-24 shows the HRA results for the new on-site MEIR under mitigated conditions along with the cumulative background health risks using the standard BAAQMD approach. As shown in the table, the maximum cancer risk at the new on-site MEIR with Mitigation Measure AIR-4a would be 2.1 per million from the Project and 33.0 for cumulative background sources for a total of 35 per million when accounting for the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse. The on-site MEIR is located at Block 6. The majority of background risk is from railways (51 percent at 16.7 per million) and highways (40 percent at 13.3 per million), representing a total of 91 percent.

Method 2: Detailed WOCAP Modeling Approach

Table 4.2-25 shows the HRA results for the new on-site MEIR under mitigated conditions along with the cumulative background health risks using the detailed WOCAP modeling approach. As shown in the table, the maximum cancer risk at the new on-site MEIR with Mitigation Measure AIR-4a would be 2.3 per million from the Project and 321 for cumulative background sources for a total of 324 per million when accounting for the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse. The maximum cancer risk occurs at Block 6.

TABLE 4.2-24
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK, NON-CANCER CHRONIC RISK, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION AT THE NEW ON-SITE MEIR USING THE STANDARD BAAQMD APPROACH

Emissions Source/Receptor Type	Excess Lifetime Cancer Risk (per million)[a,b]	Non-Cancer Chronic Hazard Index (unitless)[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b,c]
Significance Threshold	**100**	**10.0**	**0.8**
Project Contributions – Mitigated			
Project Construction	2.0	6.8E-04	0.0038
Project Operations	0.19	0.0014	0.020
Potential Truck Parking Relocation to Roundhouse[d]	0.14	2.8E-05	2.2E-04
Total Mitigated Project	2.1	0.0021	0.024
Total Mitigated Project w/Roundhouse[e]	2.3	0.0021	0.024
MEIR Location (UTM – X)	562940	563020	563020
MEIR Location (UTM – Y)	4183440	4183640	4183640
Cumulative Contributions			
Existing Stationary Sources[f]	0.002	0.0055	0.60
Roadways[g]	0	—	0
Highways[h]	13.3	—	0.27
Major Streets[h,i]	2.9	—	0.029
Railways[h]	16.7	—	0.082
Cumulative Total	*33.0*	*0.0055*	***1.0***
Project Plus Cumulative			
Mitigated Project	2.3	0.0021	0.024
Cumulative Contributions	33	0.0055	**1.0**
Cumulative Total	*35*	*0.0076*	***1.0***

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; UTM = universal transverse Mercator; — = no risk was calculated or data was missing; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance
b Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), Mitigation Measure AIR-2c (Diesel Backup Generator Specifications), and Mitigation Measure AIR-4a (Install MERV16 Filtration Systems). This table also includes the 20% trip reduction required by AB 734 and construction of the pedestrian and bicycle overcrossing required as mitigation in the Transportation Section.
c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a. For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust.
d Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region.
e Total mitigated Project w/Roundhouse represents total mitigated Project health *plus* potential health risks from relocated truck parking to the Roundhouse.
f Existing stationary sources includes all facilities within 1,000 feet of the MEIRs as per the BAAQMD Stationary Source Screening Analysis Tool. Facility information was obtained from the Alameda Stationary Source Screening Tool with additional details provided by BAAQMD. Values have been adjusted accordingly for distance from the MEIRs using BAAQMD guidance.
g Roadways include nearby roads between 10,000 to 30,000 average daily trips. However, there were no roadways with average daily traffic between 10,000 and 30,000 trips per day within 1,000 feet of the on-site cancer and $PM_{2.5}$ MEIRs.
h Includes nearby major streets, highway, and railways. Cancer and $PM_{2.5}$ impacts were taken from BAAQMD raster files for the Project area. The BAAQMD's raster screening tools do not estimate chronic hazards since the screening levels were found to be extremely low. Thus, there are no chronic hazard values associated with highways, railways, or major streets.
i Major streets, as evaluated in the BAAQMD raster screening tools, include all streets with average daily traffic above 30,000 trips per day.

SOURCES: BAAQMD and WOEIP, 2019c; Appendix AIR, *Air Quality Supporting Information*.

TABLE 4.2-25
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION AT THE NEW ON-SITE MEIR USING THE DETAILED WOCAP MODELING APPROACH

Emissions Source/Receptor Type	Excess Lifetime Cancer Risk (per million)[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b,c]
Significance Threshold	**100**	**0.8**
Project Contributions – Mitigated		
Project Construction	2.0	0.0038
Project Operations	0.19	0.02
Potential Truck Parking Relocation to Roundhouse[d]	0.14	2.2E-04
Total Mitigated Project	2.1	0.024
Total Mitigated Project w/Roundhouse[e]	2.3	0.024
MEIR Location (UTM – X)	562940	563020
MEIR Location (UTM – Y)	4183440	4183640
Cumulative Contributions – Year 2024		
Highway[f]	2.9	0.19
Other[g]	21	0.020
Permitted[h]	1.9	0.14
Dynegy[i]	0.0033	3.8E-04
Schnitzer[j]	53	0.36
Port[k]	**186**	0.24
Rail[l]	54	0.14
Street[m]	2.2	**1.3**
Cumulative Total	***321***	***2.4***
Project Plus Cumulative		
Mitigated Project	2.3	0.024
Cumulative Contributions	**321**	**2.4**
Cumulative Total	***324***	***2.4***

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; UTM = universal transverse Mercator; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance
b Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), Mitigation Measure AIR-2c (Diesel Backup Generator Specifications), and Mitigation Measure AIR-4a (Install MERV16 Filtration Systems). This table also includes the 20% trip reduction required by AB 734 and construction of the pedestrian and bicycle overcrossing required as mitigation in the Transportation section.
c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a. For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust.
d Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region.
e Total mitigated Project w/Roundhouse represents total mitigated Project health *plus* potential health risks from relocated truck parking to the Roundhouse.
f Highway includes exhaust and fugitive dust emissions from vehicles and trucks driving on highways.
g Other includes ferries and truck-related businesses.
h Permitted includes all BAAQMD-permitted stationary sources in West Oakland except the Port of Oakland and Schnitzer Steel, such as Custom Alloy Scrap Sales, East Bay Municipal Utility District, and backup emergency generators.
i Dynegy includes TAC emissions from BAAQMD-permitted existing Dynegy jet-fueled power plant currently operating on the Peaker Power Plant Variant site. This is discussed further in Chapter 5, *Project Variants*.
j Schnitzer includes TAC emissions sources associated with the Schnitzer Steel facility, including permitted stationary sources, ocean-going vessels and trucks.
k Port includes TAC emissions sources associated with the Port of Oakland, including permitted stationary sources, ocean-going vessels, harbor craft, dredging, cargo handling equipment, the BNSF railyard, and trucks.
l Rail includes the UP railyard and both freight and passenger locomotives operating on the various rail lines in the area.
m Street includes exhaust and fugitive dust emissions from vehicles and trucks driving on local roadways.

SOURCES: BAAQMD and WOEIP, 2019c; Appendix AIR, *Air Quality Supporting Information*.

The majority of the cumulative background cancer risk is from the Port of Oakland (58 percent at 186 per million) and rail (17 percent at 54 per million), representing a total of 75 percent. Schnitzer Steel contributes 16 percent of the cumulative background cancer risk (53 per million). As noted above, the contribution from Schnitzer Steel does not include its planned emissions control technology as required by the BAAQMD through Rule 11-18, which is anticipated to reduce the facility's TAC emissions.

Conclusion: Cumulative Cancer Risk (On Site)

As stated above for existing off-site sensitive receptors, the total cumulative cancer risk at the on-site MEIR exceeds the City's currently adopted significance threshold of 100 per million. As presented above, the total cumulative health risk with the Project's contribution under mitigated conditions at the new on-site MEIR is a maximum cancer risk level of 35 per million using the standard BAAQMD approach and 324 per million using the detailed WOCAP modeling approach. The standard BAAQMD approach value does not exceed the cumulative threshold of 100 per million, but the detailed WOCAP modeling approach value does exceed the threshold of 100 per million. Therefore, the Project's cancer risk impact would be cumulatively considerable. Consequently, this impact would be potentially significant.

As discussed above in Section 4.2.2, the Project is located in a CAPP community designated under AB 617 and has a disproportionally high concentrations of air pollution and health risk burden. It should also be noted, as discussed under Impact AIR-4, that the Project's contribution under mitigated conditions at the on-site MEIR is a maximum cancer risk level of 2.4 per million, which does not exceed the project-level threshold of 10 per million.

$PM_{2.5}$ Concentrations

Method 1: Standard BAAQMD Approach

Table 4.2-24 shows the results of the risk assessment for exposure to $PM_{2.5}$ at the maximally impacted new on-site receptor under mitigated conditions using the standard BAAQMD approach. As shown in the table, the annual average $PM_{2.5}$ concentrations at the new on-site MEIR with Mitigation Measure AIR-4a would be 0.024 $\mu g/m^3$ from the Project and 1.0 $\mu g/m^3$ for cumulative background sources for a total of 1.0 $\mu g/m^3$ when accounting for the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse. The on-site MEIR is located at Block 6. The majority of $PM_{2.5}$ emissions is from stationary sources (61 percent at 0.60 $\mu g/m^3$) and highways (28 percent at 0.27 $\mu g/m^3$), representing a total of 89 percent.

Method 2: Detailed WOCAP Modeling Approach

Table 4.2-25 shows the results of the risk assessment for exposure to $PM_{2.5}$ at the maximally impacted new on-site receptor under mitigated conditions using the detailed WOCAP modeling approach. As shown in Table 4.2-25, the annual average $PM_{2.5}$ concentrations at the new on-site MEIR with Mitigation Measure AIR-4a was estimated to be 0.024 $\mu g/m^3$ for the Project and 2.4 $\mu g/m^3$ for cumulative background sources for a total of 2.4 $\mu g/m^3$ when accounting for the health risk associated with the potential relocation of truck parking from Howard Terminal to the Roundhouse.

The majority of the cumulative background $PM_{2.5}$ concentration is from local streets (54 percent at 1.3 µg/m^3) and Schnitzer Steel (15 percent at 0.36 µg/m^3), representing a total of 69 percent. As discussed above, the majority of $PM_{2.5}$ emissions from local streets is from road dust and the BAAQMD has indicated that the methods used to calculate road dust likely significantly overestimate $PM_{2.5}$ emissions. Therefore, the results for local streets are likely conservative. As noted above, the contribution from Schnitzer Steel does not include its planned emissions control technology as required by the BAAQMD through Rule 11-18, which is anticipated to reduce the facility's TAC emissions.

Conclusion: Cumulative $PM_{2.5}$ Concentrations (Future On Site Receptors)

As stated above for existing off-site sensitive receptors, the total cumulative annual average $PM_{2.5}$ concentration at the future on-site MEIR would exceed the City's currently adopted significance threshold of 0.8 µg/m^3. As presented above, the total cumulative annual average $PM_{2.5}$ concentration with the Project's contribution under mitigated conditions at the new on-site MEIR is a maximum annual average $PM_{2.5}$ concentration of 1.0 µg/m^3 using the standard BAAQMD approach and annual average $PM_{2.5}$ concentration of 2.4 µg/m^3 using the detailed WOCAP modeling approach. Both values exceed the cumulative threshold of annual average $PM_{2.5}$ concentration of 0.8 µg/m^3. Therefore, the Project's $PM_{2.5}$ impact would be cumulatively considerable. Consequently, this impact would be potentially significant.

As discussed above in Section 4.2.2, the Project is located in a CAPP community designated under AB 617 and has a disproportionally high amount concentration of air pollution and health risk burden. It should also be noted, as discussed under Impact AIR-4, that the Project's contribution under mitigated conditions at the new on-site MEIR is an annual average $PM_{2.5}$ concentration of 0.024 µg/m^3, which does not exceed the project-level threshold of 0.3 µg/m^3.

Non-cancer Chronic Hazard Index

Method 1: Standard BAAQMD Approach

Table 4.2-24 also shows the results of the risk assessment for the non-cancer chronic hazard index at the maximally impacted new on-site receptor under mitigated conditions using the standard BAAQMD approach. As shown in the table, the non-cancer chronic hazard index at the new on-site MEIR with Mitigation Measure AIR-4a would be 0.0021 from the Project and 0.0055 for cumulative background sources for a total of 0.0076. The on-site MEIR is located at the Block 6. All background non-cancer chronic hazard risk is from existing stationary sources.

Method 2: Detailed WOCAP Modeling Approach

As discussed in the *Approach to Analysis* section, the BAAQMD only included annual average $PM_{2.5}$ concentrations and excess lifetime cancer risk in its health risk modeling for the WOCAP, so the cumulative analysis does not include acute or chronic health impacts (BAAQMD and WOEIP, 2019c).

Conclusion: Cumulative Non-cancer Chronic Hazard Index (On Site)

As presented above, the total cumulative non-cancer chronic hazard index with the Project's contribution under mitigated conditions at the new on-site MEIR with Mitigation Measure AIR-4a is a maximum non-cancer chronic hazard index of 0.0076. This does not exceed the threshold

of 1.0. Therefore, the Project's non-cancer chronic hazard impact would not be cumulatively considerable. Consequently, this impact would be less than significant.

Mitigation Measures AIR-1b, AIR-1c, AIR-2c, AIR-2d, AIR-2e, AIR-3, AIR-4a, AIR-4b, and AIR-2.CU, as well as Mitigation Measures TRANS-1a, TRANS-1b, TRANS-1c, TRANS-1d, TRANS-1e, TRANS-2a, TRANS-2b, TRANS-2c, TRANS-3a, and TRANS-3b are identified to reduce the Project's contribution to cumulative air quality impacts.

Mitigation Measure AIR-1b: Criteria Air Pollutant Controls. (See Impact AIR-1)

Mitigation Measure AIR-1c: Diesel Particulate Matter Controls. (See Impact AIR-1)

Mitigation Measure AIR-2c: Diesel Backup Generator Specifications. (See Impact AIR-2)

Mitigation Measure AIR-2d: Diesel Truck Emission Reduction. (See Impact AIR-2)

Mitigation Measure AIR-2e: Criteria Pollutant Mitigation Plan. (See Impact AIR-2)

Mitigation Measure AIR-3: Truck-Related Risk Reduction Measures – Toxic Air Contaminants. (See Impact AIR-4)

Mitigation Measure AIR-4a: Install MERV16 Filtration Systems. (See Impact AIR-5)

Mitigation Measure AIR-4b: Exposure to Air Pollution – Toxic Air Contaminants. (See Impact AIR-5)

Mitigation Measure AIR-2.CU: Implement Applicable Strategies from the West Oakland Community Action Plan.

The Project sponsor shall incorporate the following health risk reduction measures to the extent necessary to achieve the equivalent toxicity-weighted TAC emissions emitted from the Project or population-weighted TAC exposure reductions resulting from the Project, such that the Project does not result in a cumulatively considerable contribution to health risks associated with TAC emissions. These measures, derived from the West Oakland Community Action Plan, shall be incorporated into the Project design. As an added benefit, these measures may also reduce health risks associated with existing background sources of TACs within the West Oakland community, to lessen the degree to which the Project exacerbates these existing TAC health risks (given than these measures will not reduce Project-generated TAC emissions to zero). These measures shall be specified on the Project plans for confirmation by the City's building official at the time of plan check and would be subject to periodic inspection.

1. *Action 14a:* The Project sponsor shall work with the BAAQMD to help distribute information to future tenants about subsidized loans for local businesses to install energy storage systems (e.g., batteries, fuel cells) to replace stationary sources of pollution (e.g., back-up generators).
2. *Action 14b:* The Project sponsor shall install energy storage systems (e.g., batteries, fuel cells) instead of diesel backup generators, if feasible.
3. *Action 18:* The Project sponsor shall install truck charging stations for electric vendor and delivery trucks serving the Project site.

4. *Action 29:* The Project sponsor shall provide incentives to future tenants to retrofit their truck fleets to zero-emission vehicles.
5. *Action 36:* The Project sponsor shall work with the BAAQMD and CARB to help distribute information about financial incentives for fueling infrastructure, and for low and zero-emission equipment.
6. *Action 49:* The Project sponsor shall work with the BAAQMD to help distribute information to future tenants about funding incentives to pay for the cost of purchasing cleaner equipment in West Oakland potentially including: electric lawn and garden equipment and battery electric Transportation Refrigeration Units.
7. *Action 52:* The Project sponsor shall offer incentives for the purchase of electric bicycles for bike share programs.
8. *Additional measures and technology.* The Project sponsor shall implement additional measures and technology to reduce TAC emissions from Project operations that are not currently known or available. This may include new transportation systems (such as autonomous vehicle networks) to reduce fossil-fueled vehicles or other technology (such as alternatively-fueled emergency generators or renewable backup energy supply) that is not currently available or feasible at the project-level, provided that the Project sponsor demonstrates to the City's satisfaction that such measures are as or more effective as the measures above.
9. *Directly fund or implement a specific emissions or exposure reduction project(s) within the City of Oakland* to achieve the equivalent toxicity-weighted TAC emissions emitted from the Project or population-weighted TAC exposure reductions resulting from the Project, such that the Project does not result in a cumulatively considerable contribution to health risks associated with TAC emissions. The emissions or exposure reduction measures will be evaluated after implementation of all other emission reduction measures implemented above. To qualify under this mitigation measure, any emissions reduction project must result in TAC emission reductions that would not otherwise be achieved through compliance with existing regulatory requirements. A preferred offset project would be one implemented locally within West Oakland or the surrounding community. Such projects could include community-level strategies and control measures identified in BAAQMD's AB 617 West Oakland Community Action Plan (or any future AB 617 plan for nearby communities), such as zero-emission trucks (Action 29); upgrading locomotives with cleaner engines (Actions 51, 62, 64, and 65); replacing existing diesel stationary and standby engines with Tier 4 diesel or cleaner engines (Action 70); installing high-efficiency air filtration systems at schools, daycare facilities, and homes (Actions 75 and 78); expanding or installing energy storage systems such as batteries, fuel cells, etc. (Action 14); or providing increased electrical infrastructure and power storage to support electric trucks (Action 18). The offset project shall be approved by the City of Oakland Bureau of Planning prior to its implementation. The Project sponsor shall notify the City of Oakland Bureau of Planning within six months of completion of the offset project for verification.

Mitigation Measure TRANS-1a: Transportation Demand Management (TDM) Plan. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1b: Transportation Management Plan. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1c: Implement a Transportation Hub on 2nd Street. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1d: Implement Bus-Only Lanes on Broadway. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-1e: Implement Pedestrian Improvements. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-2a: Implement Buffered Bike Lanes Consistent with the Bike Plan on 7th Street from Mandela Parkway to Martin Luther King Jr. Way. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-2b: Implement Bike Lanes Consistent with the Bike Plan on Martin Luther King Jr. Way from Embarcadero West to 8th Street. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-2c: Implement Bike Lanes Consistent with the Bike Plan on Washington Street from Embarcadero West to 10th Street. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-3a: Implement At-Grade Railroad Crossing Improvements. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure TRANS-3b: Pedestrian and Bicycle Overcrossing. (See Section 4.15, *Transportation and Circulation*)

Mitigation Measure Effectiveness

As discussed under Impact AIR-4 and AIR-5, Mitigation Measures AIR-1b (Criteria Air Pollutant Controls), AIR-2c (Diesel Backup Generator Specifications), AIR-2d (Diesel Truck Emission Reduction), AIR-2e (Criteria Pollutant Mitigation Plan), and AIR-3 (Truck-Related Risk Reduction Measures – Toxic Air Contaminants), would reduce DPM and $PM_{2.5}$ emissions associated with off-road diesel construction equipment, operational emergency generators, and on-road heavy-duty truck travel and idling, thereby reducing Project-related excess lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations at both the off-site MEIR and new on-site MEIR.

As discussed under Impact AIR-5, Mitigation Measure AIR-4a (Install MERV16 Filtration Systems) and AIR-4b (Exposure to Air Pollution – Toxic Air Contaminants) would reduce the exposure of new on-site sensitive receptors to TAC emissions associated with Project construction and operations. As allowed under Mitigation Measure AIR-4a, the Project sponsor may install alternative air filtration systems during final design when the exact level of TAC exposure is known, if the Project sponsor can quantitatively demonstrate that any alternative filtration systems would result in health risks at or below acceptable levels, as required in the West Oakland Specific Plan, for new onsite sensitive receptors, once the final Project design is known (City of Oakland, 2014).

The results of these mitigation measures are presented in Tables 4.2-23 through 4.2-25 above.

Mitigation Measure AIR-2.CU, Implement Applicable Strategies from the West Oakland Community Action Plan, would further reduce TAC emissions associated with the Project and the existing TAC sources in the surrounding community, and thereby reduce cumulative cancer risk, non-cancer chronic hazards, and annual average PM2.5 emissions at the existing off-site and new on-site MEIR. However, the exact amount of TAC emission reductions and associated health risks from implementation of MM AIR-2.CU is not currently known, because specific feasible emission reduction measures have not yet been identified or quantified. In addition, implementation of offsite community TAC emission reduction project(s) could be conducted by BAAQMD or other governmental entities, and would therefore be outside the jurisdiction and control of the City and not fully within the control of the Project sponsor. As a result, excess lifetime cancer risk for both existing (offsite) and new (onsite) sensitive receptors would be considered significant and unavoidable with mitigation.

Additional mitigation measures included in Section 4.15, *Transportation and Circulation*, would also serve to reduce the Project's TAC emissions and associated health risk impacts. These include TRANS-1a (Transportation Demand Management [TDM] Plan), TRANS-1b (Transportation Management Plan), TRANS-1c (Implement a Transportation Hub on 2nd Street), TRANS-1d (Implement Bus-Only Lanes on Broadway), TRANS-1e (Implement Pedestrian Improvements), TRANS-2a (Implement Buffered Bike Lanes on 7th Street from Mandela Parkway to Martin Luther King Jr. Way), TRANS-2b (Implement Bike Lanes Consistent with the Bike Plan on Martin Luther King Jr. Way from Embarcadero West to 8th Street), TRANS-2c (Implement Bike Lanes Consistent with the Bike Plan on Washington Street from Embarcadero West to 10th Street), TRANS-3a (Implement At-Grade Railroad Crossing Improvements), and TRANS-3b (Pedestrian and Bicycle Overcrossing). However, the precise effect on vehicle travel and the associated reduction in TAC emissions, the exact locations where such reductions in TAC emissions will occur, and the exact reduction in associated health risks from implementation of these measures is not currently known. Therefore, reductions from these mitigation measures are not included in the mitigated emissions tables above.

Significance after Mitigation: Significant and Unavoidable with mitigation.

Maritime Reservation Scenario – Cumulative

Regional Criteria Pollutant Emissions

As discussed above, construction and operational emissions associated with the Maritime Reservation Scenario would be very similar to the Project, though slightly different because of the location of development on the site. As such, criteria pollutant emissions for the Maritime Reservation Scenario would be the same as those discussed above for the Project and the same mitigation measures would be required. As for the Project, the Maritime Reservation Scenario's emissions of criteria air pollutants would be cumulatively considerable, and this cumulative impact would be significant and unavoidable with mitigation.

Toxic Air Contaminants

As discussed above, health risks associated with the Maritime Reservation Scenario would be very similar to the Project, though slightly different because of the location of development on the site.

Impacts on Existing Sensitive Receptors

Table 4.2-26 summarizes the MRS HRA results for the existing off-site MEIR under mitigated conditions along with the cumulative background health risks using the standard BAAQMD approach. **Table 4.2-27** summarizes the MRS HRA results for the existing off-site MEIR under mitigated conditions along with the cumulative background health risks using the detailed WOCAP modeling approach. Similar to the Project, total cumulative cancer risk and annual average $PM_{2.5}$ concentrations, with the contribution from the MRS, would exceed the significance thresholds (non-cancer chronic risk would not exceed the thresholds). As such, the same mitigation measures for the Project would be required for the Maritime Reservation Scenario. These include Mitigation Measure AIR-1b (Criteria Air Pollutant Controls), AIR-1c (Diesel Particulate Matter Controls), AIR-2c (Diesel Backup Generator Specifications), AIR-2d (Diesel Truck Emission Reduction), AIR-2e (Criteria Pollutant Mitigation Plan), AIR-3 (Truck-Related Risk Reduction Measures – Toxic Air Contaminants), AIR-4a (Install MERV16 Filtration Systems), AIR-4b (Exposure to Air Pollution – Toxic Air Contaminants), and AIR-2.CU (Implement Applicable Strategies from the West Oakland Community Action Plan).

Similar to the Project, when accounting for mitigation measures, both total cumulative cancer risk and annual average $PM_{2.5}$ concentrations would still exceed the significance thresholds. These exceedances are slightly greater than the Project. Therefore, same as the Project impact, the Maritime Reservation Scenario's cancer risk and $PM_{2.5}$ impact would be cumulatively considerable. Consequently, this impact would be greater under the Maritime Reserve Scenario than the Project and significant and unavoidable with mitigation.

Impacts on New Sensitive Receptors

Table 4.2-28 summarizes the MRS HRA results for the new on-site MEIR under mitigated conditions along with the cumulative background health risks using the standard BAAQMD approach. **Table 4.2-29** summarizes the MRS HRA results for the new on-site MEIR under mitigated conditions along with the cumulative background health risks using the detailed WOCAP modeling approach. Similar to the Project, total cumulative cancer risk and annual average $PM_{2.5}$ concentrations with the contribution from the MRS would exceed the significance thresholds (non-cancer chronic risk would not exceed the thresholds). As such, the same mitigation measures for the Project would be required for the Maritime Reservation Scenario. These include Mitigation Measure AIR-1b (Criteria Air Pollutant Controls), AIR-1c (Diesel Particulate Matter Controls), AIR-2c (Diesel Backup Generator Specifications), AIR-2d (Diesel Truck Emission Reduction), AIR-2e (Criteria Pollutant Mitigation Plan), AIR-3 (Truck-Related Risk Reduction Measures – Toxic Air Contaminants), AIR-4a (Install MERV16 Filtration Systems), AIR-4b (Exposure to Air Pollution – Toxic Air Contaminants), and AIR-2.CU (Implement Applicable Strategies from the West Oakland Community Action Plan).

TABLE 4.2-26
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK, NON-CANCER CHRONIC RISK, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION AT THE EXISTING OFF-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO USING THE STANDARD BAAQMD APPROACH

Emissions Source/ Receptor Type	Excess Lifetime Cancer Risk (per million)[a,b]	Non-Cancer Chronic Hazard Index (unitless)[a]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b,c]
Significance Threshold	**100**	**10**	**0.8**
Project Contributions – Mitigated			
Existing Howard Terminal[d]	-2.2	-5.9E-04	-6.4E-04
Project Construction	8.4	6.4E-03	3.5E-03
Project Operations	1.7	2.1E-03	0.18
Potential Truck Parking Relocation to Roundhouse[e]	0.4	1.0E-04	4.1E-04
Total Mitigated MRS Project	10.1	0.0085	0.19
Total Mitigated Net New MRS Project w/Roundhouse[f]	8.3	0.008	0.19
MEIR Location (UTM – X)	563080	563080	563180
MEIR Location (UTM – Y)	4183660	4183660	4183920
Cumulative Contributions			
Existing Stationary Sources[g]	0.93	0.0082	0.076
Roadways[h]	0	—	0.11
Highways[i]	19	—	0.56
Major Streets[i,j]	4.1	—	0.060
Railways[i]	67	—	0.017
Total Cumulative	*91*	*0.0082*	***0.82***
Project Plus Cumulative			
Mitigated Net New MRS Project w/Roundhouse	8.3	0.008	0.19
Cumulative Contributions	91	0.0082	**0.8**
Cumulative Total	*99*	*0.0162*	***1.0***

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; UTM = universal transverse Mercator; — = no risk was calculated or data was missing; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance
b Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) and Mitigation Measure AIR-2c (Diesel Backup Generator Specifications). This table also includes the 20% trip reduction requirement of AB 734 and construction of the pedestrian and bicycle overcrossing required as mitigation in the transportation section.
c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a. For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at off-site receptors include contributions from multiple phases of Project construction and subsequent Project operations.
d Existing Howard Terminal operations include truck activity at the Project site that would be relocated, including on-site truck idling and truck movement. Because this activity would be removed from the site with implementation of the Project, the TAC emissions associated with this activity would also be removed, and the corresponding health risks for exposure of existing off-site receptors to these TAC emissions would also be removed.
e Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region. Note that Roundhouse health risk is less than existing Howard Terminal health risk because the existing off-site MEIR is located further away from the Roundhouse than from Howard Terminal.
f Total mitigated net new MRS Project w/Roundhouse represents total mitigated MRS Project health risks *minus* health risks from existing Howard Terminal truck activity *plus* potential health risks from relocated truck parking to the Roundhouse.
g Existing stationary sources includes all facilities within 1,000 feet of the MEIRs as per the BAAQMD Stationary Source Screening Analysis Tool. Facility information was obtained from the Alameda Stationary Source Screening Tool with additional details provided by BAAQMD. Values have been adjusted accordingly for distance from the MEIRs using BAAQMD guidance.
h Roadways include nearby roads between 10,000 to 30,000 average daily trips. However, there were no roadways with average daily traffic between 10,000 and 30,000 trips per day within 1,000 feet of the off-site cancer MEIR.
i Includes nearby major streets, highway, and railways. Cancer and $PM_{2.5}$ impacts were taken from BAAQMD raster files for the Project area. The BAAQMD's raster screening tools do not estimate chronic hazards since the screening levels were found to be extremely low. Thus, there are no chronic hazard values associated with highways, railways, or major streets.
j Major streets, as evaluated in the BAAQMD raster screening tools, include all streets with average daily traffic above 30,000 trips per day.

SOURCES: BAAQMD and WOEIP, 2019c; Appendix AIR, *Air Quality Supporting Information*.

TABLE 4.2-27
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION AT THE EXISTING OFF-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO USING THE WOCAP APPROACH

Emissions Source/Receptor Type	Excess Lifetime Cancer Risk (per million)[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b,c]
Significance Threshold	**100**	**0.8**
Project Contributions – Mitigated		
Existing Howard Terminal[d]	-2.2	-6.4E-04
MRS Project Construction	8.4	3.5E-03
MRS Project Operations	1.7	1.8E-01
Potential Truck Parking Relocation to Roundhouse[e]	0.38	4.1E-04
Total Mitigated MRS Project	10.1	0.19
Total Mitigated Net New MRS Project w/Roundhouse[f]	8.3	0.19
MEIR Location (UTM – X)	563080	563180
MEIR Location (UTM – Y)	4183660	4183920
Cumulative Contributions – Year 2024		
Highway[g]	4.0	0.38
Other[h]	14	0.012
Permitted[i]	2.2	0.15
Dynegy[j]	0.010	8.2E-04
Schnitzer[k]	26	0.16
Port[l]	**128**	0.20
Rail[m]	**148**	0.055
Street[n]	4.0	**2.0**
Total Cumulative	***326***	***3.0***
Project Plus Cumulative		
Mitigated Net New MRS Project w/Roundhouse	8.3	0.19
Cumulative Contributions	**326**	**3.0**
Cumulative Total	***334***	***3.1***

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; UTM = universal transverse Mercator; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance
b Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls) and Mitigation Measure AIR-2c (Diesel Backup Generator Specifications). This table also includes the 20% trip reduction required by AB 734 and construction of the pedestrian and bicycle overcrossing required as mitigation in the Transportation section.
c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a. For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust.
d Existing Howard Terminal operations include truck activity at the Project site that would be relocated, including on-site truck idling and truck movement. Because this activity would be removed from the site with implementation of the Project, the TAC emissions associated with this activity would also be removed, and the corresponding health risks for exposure of existing off-site receptors to these TAC emissions would also be removed.
e Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region. Note that Roundhouse health risk is less than existing Howard Terminal health risk because the existing off-site MEIR is located further away from the Roundhouse than from Howard Terminal.
f Total mitigated net new MRS Project w/Roundhouse represents total mitigated MRS Project health risks *minus* health risks from Existing Howard Terminal activity *plus* potential health risks from relocated truck parking health to the Roundhouse.
g Highway includes exhaust and fugitive dust emissions from vehicles and trucks driving on highways.
h Other includes ferries and truck-related businesses.
i Permitted includes all BAAQMD-permitted stationary sources in West Oakland except the Port of Oakland and Schnitzer Steel, such as Custom Alloy Scrap Sales, East Bay Municipal Utility District, and backup emergency generators.
j Dynegy includes TAC emissions from the BAAQMD-permitted existing Dynegy jet-fueled power plant currently operating on the Peaker Power Plant Variant site. This is discussed further in Chapter 5, *Project Variants*.
k Schnitzer includes TAC emissions sources associated with the Schnitzer Steel facility, including permitted stationary sources, ocean-going vessels and trucks.

TABLE 4.2-27 (CONTINUED)
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION AT THE EXISTING OFF-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO USING THE WOCAP APPROACH

l Port includes TAC emissions sources associated with the Port of Oakland, including permitted stationary sources, ocean-going vessels, harbor craft, dredging, cargo handling equipment, the BNSF railyard, and trucks.
m Rail includes the UP railyard and both freight and passenger locomotives operating on the various rail lines in the area.
n Street includes exhaust and fugitive dust emissions from vehicles and trucks driving on local roadways.

SOURCES: BAAQMD and WOEIP, 2019c; Appendix AIR, *Air Quality Supporting Information*.

TABLE 4.2-28
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK, NON-CANCER CHRONIC RISK, AND ANNUAL AVERAGE PM2.5 CONCENTRATION AT THE NEW ON-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO USING THE STANDARD BAAQMD APPROACH

Emissions Source/Receptor Type	Excess Lifetime Cancer Risk (per million)[a,b]	Non-Cancer Chronic Hazard Index (unitless)[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b,c]
Significance Threshold	**100**	**10.0**	**0.8**
Project Contributions – Mitigated			
MRS Project Construction	3.6	2.4E-03	0.0095
MRS Project Operations	0.3	1.1E-03	0.020
Potential Truck Parking Relocation to Roundhouse[d]	0.1	2.7E-05	2.2E-04
Total Mitigated MRS Project	3.9	0.0035	0.029
Total Mitigated MRS Project w/Roundhouse[e]	4.0	0.0036	0.030
MEIR Location (UTM – X)	563040	563020	563020
MEIR Location (UTM – Y)	4183540	4183640	4183640
Cumulative Contributions			
Existing Stationary Sources[f]	0.82	0.0055	0.60
Roadways[g]	0	—	0
Highways[h]	15.8	—	0.27
Major Streets[g,h]	3.6	—	0.029
Railways[i]	26.5	—	0.082
Cumulative Total	*46.6*	*0.0055*	***1.0***
Project Plus Cumulative			
Mitigated MRS Project	4.0	0.0036	0.03
Cumulative Contributions	47	0.0055	**1.0**
Cumulative Total	51	0.0090	**1.0**

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; UTM = universal transverse Mercator; — = no risk was calculated or data was missing; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance
b Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), Mitigation Measure AIR-2c (Diesel Backup Generator Specifications), and Mitigation Measure AIR 5a (Install MERV16 Filtration Systems). This table also includes the 20% trip reduction required by AB 734 and construction of the pedestrian and bicycle overcrossing required as mitigation in the Transportation section.
c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a. For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust. $PM_{2.5}$ concentrations at on-site receptors include contributions from multiple phases of Project construction and subsequent Project operations.
d Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region.
e Total Mitigated MRS Project w/Roundhouse represents total MRS health risks *plus* potential health risks from relocated truck parking to the Roundhouse.
f Existing stationary sources includes all facilities within 1,000 feet of the MEIRs as per the BAAQMD Stationary Source Screening Analysis Tool. Facility information was obtained from the Alameda Stationary Source Screening Tool with additional details provided by BAAQMD. Values have been adjusted accordingly for distance from the MEIRs using BAAQMD guidance.

TABLE 4.2-28 (CONTINUED)
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK, NON-CANCER CHRONIC RISK, AND ANNUAL AVERAGE PM2.5 CONCENTRATION AT THE NEW ON-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO USING THE STANDARD BAAQMD APPROACH

g Roadways include nearby roads between 10,000 to 30,000 average daily trips. However, there were no roadways with average daily traffic between 10,000 and 30,000 trips per day within 1,000 feet of the on-site cancer and $PM_{2.5}$ MEIRs.
h Includes nearby major streets, highway, and railways. Cancer and $PM_{2.5}$ impacts were taken from BAAQMD raster files for the MRS Project area. The BAAQMD's raster screening tools do not estimate chronic hazards since the screening levels were found to be extremely low. Thus, there are no chronic hazard values associated with highways, railways, or major streets.
i Major streets, as evaluated in the BAAQMD raster screening tools, include all streets with average daily traffic above 30,000 trips per day.

SOURCES: BAAQMD and WOEIP, 2019c; Appendix AIR, *Air Quality Supporting Information*.

TABLE 4.2-29
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION AT THE NEW ON-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO USING THE WOCAP APPROACH

Emissions Source/Receptor Type	Excess Lifetime Cancer Risk (per million)[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$) [a,b,c]
Significance Threshold	**100**	**0.8**
Project Contributions – Mitigated		
MRS Project Construction	3.6	0.0095
MRS Project Operations	0.3	0.020
Potential Truck Parking Relocation to Roundhouse[d]	0.1	2.2E-04
Total Mitigated MRS Project	3.9	0.029
Total Mitigated MRS Project w/Roundhouse [e]	4.0	0.030
MEIR Location (UTM – X)	563040	563020
MEIR Location (UTM – Y)	4183540	4183640
Cumulative Contributions – Year 2024		
Highway[f]	3.4	0.19
Other[g]	32	0.020
Permitted[h]	2.0	0.14
Dynegy[i]	0.0044	3.8E-04
Schnitzer[j]	31	0.36
Port[k]	**148**	0.24
Rail[l]	67	0.14
Street[m]	2.9	**1.3**
Cumulative Total	*286*	***2.4***
Project Plus Cumulative		
Mitigated MRS Project	4.0	0.03
Cumulative Contributions	**286**	**2.4**
Cumulative Total	***290***	***2.4***

NOTES:

$PM_{2.5}$ = particulate matter that is 2.5 microns or less in diameter; = $\mu g/m^3$ micrograms per cubic meter; MEIR = maximally exposed individual receptor; UTM = universal transverse Mercator; E = In scientific notation, the letter E is used to mean "10 to the power of."

a **Bold values** = threshold exceedance
b Health risks include implementation of Mitigation Measure AIR-1c (Diesel Particulate Matter Controls), Mitigation Measure AIR-2c (Diesel Backup Generator Specifications), and Mitigation Measure AIR 5a (Install MERV16 Filtration Systems). This table also includes the 20% trip reduction required by AB 734 and construction of the pedestrian and bicycle overcrossing required as mitigation in the Transportation section.
c For construction, $PM_{2.5}$ concentrations include exhaust only because fugitive dust emissions are addressed through best management practices as required by Mitigation Measure AIR-1a. For operations, $PM_{2.5}$ concentrations include exhaust only, tire wear, brake wear, and road dust.

TABLE 4.2-29 (CONTINUED)
SUMMARY OF CUMULATIVE EXCESS LIFETIME CANCER RISK AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION AT THE NEW ON-SITE MEIR FOR THE MARITIME RESERVATION SCENARIO USING THE WOCAP APPROACH

d Health risk associated with potential relocation of truck parking to the Roundhouse represents a conservative analysis scenario because it assumes that 100% of existing truck activity would relocate to the Roundhouse, and risks would likely be less if some or all of the truck parking relocated elsewhere in the Seaport, the City or the region. Note that Roundhouse health risk is less than existing Howard Terminal health risk because the existing off-site MEIR is located further away from the Roundhouse than from Howard Terminal.
e Total Mitigated MRS Project w/Roundhouse represents total MRS health risks *plus* potential health risks from relocated truck parking to the Roundhouse.
f Highway includes exhaust and fugitive dust emissions from vehicles and trucks driving on highways.
g Other includes ferries and truck-related businesses.
h Permitted includes all BAAQMD-permitted stationary sources in West Oakland except the Port of Oakland and Schnitzer Steel, such as Custom Alloy Scrap Sales, East Bay Municipal Utility District, and backup emergency generators.
i Dynegy includes TAC emissions from the BAAQMD-permitted existing Dynegy jet-fueled power plant currently operating on the Peaker Power Plant Variant site. This is discussed further in Section 5.0, *Variants*.
j Schnitzer includes TAC emissions sources associated with the Schnitzer Steel facility, including permitted stationary sources, ocean-going vessels and trucks.
k Port includes TAC emissions sources associated with the Port of Oakland, including permitted stationary sources, ocean-going vessels, harbor craft, dredging, cargo handling equipment, the BNSF railyard, and trucks.
l Rail includes the UP railyard and both freight and passenger locomotives operating on the various rail lines in the area.
m Street includes exhaust and fugitive dust emissions from vehicles and trucks driving on local roadways.

SOURCES: BAAQMD and WOEIP, 2019c; Appendix AIR, *Air Quality Supporting Information*.

Similar to the Project, when accounting for mitigation measures, both total cumulative cancer risk and annual average $PM_{2.5}$ concentrations would still exceed the significance thresholds. These exceedances are slightly greater than the Project for all health risk values except excess lifetime cancer risk under the detailed WOCAP modeling approach. Therefore, same as the Project impacts, the Maritime Reservation Scenario's cancer risk and $PM_{2.5}$ impact would be cumulatively considerable. Consequently, this impact would generally be greater than the Project and significant and unavoidable with mitigation.

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