3.1 Air Quality

This section describes existing air quality in the project vicinity and the region and analyzes the proposed project's potential air pollutant emissions and resulting impacts. For more information regarding the analysis methods and assumptions, refer to **Appendix C1**.

CEQA requires the analysis of potential adverse effects of a project on the surrounding environment. A CEQA evaluation is generally not required to consider potential effects of the environment on a project's future users or residents, except when the project may exacerbate existing hazards or existing conditions.[1] The Bay Area Air Quality Management District (BAAQMD) *California Environmental Quality Act Air Quality Guidelines* recommend evaluating the potential effects of existing air quality conditions on the project to provide information to decision-makers and the public.[2] As such, this section analyzes both the proposed project's impacts on air quality and the potential adverse effects of existing air pollution on the proposed project and the surrounding community.

3.1.1 Environmental Setting

Topography and Climate

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 site is located in the city of San José and is within the boundaries of the San Francisco Bay Area Air Basin (SFBAAB). 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 in the Bay Area accumulate as a result of the more stable conditions. The combination of abundant sunshine and the restraining influences of topography and subsidence inversions creates conditions conducive to the formation of photochemical pollutants, such as ground-level ozone and secondary particulates, including nitrates and sulfates.

Existing Air Quality

Air Monitoring Data

BAAQMD operates a regional monitoring network that measures the ambient concentrations of the six criteria air pollutants. The BAAQMD monitoring station closest to the project site is the

1 *California Building Industry Association v. Bay Area Air Quality Management District* (December 17, 2015) 62 Cal.4th 369.

2 Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2017. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed February 6, 2020.

San José–Jackson station, approximately 0.95 miles northeast of the project site. The San José–Jackson station monitors ozone, oxides of nitrogen (NO_X), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter 10 microns or less in diameter (PM_{10}), particulate matter 2.5 microns or less in diameter ($PM_{2.5}$) (measured using both a filter-based sampler and a continuous monitor), speciated $PM_{2.5}$, toxics, and lead.[3]

Pollutants of concern in the Bay Area include ozone and particulate matter (PM); the SFBAAB is in non-attainment with respect to the federal and state standards for these pollutants. **Table 3.1-1** provides a summary of maximum air pollutant concentrations for ozone, CO, nitrogen dioxide (NO_2), PM_{10}, and $PM_{2.5}$ measured at BAAQMD's San José–Jackson monitoring station for the years 2014–2018. Because of the proximity of the project site to the San José–Jackson monitoring station, air quality measurements collected at this station are understood to be generally representative of conditions in the project vicinity.

TABLE 3.1-1
HIGHEST MEASURED AIR POLLUTANT CONCENTRATIONS AT THE SAN JOSÉ–JACKSON MONITORING STATION (2014–2018)

			Measured Air Pollutant Levels				
Pollutant	**Time Period**	**Standard[a]**	**2014**	**2015**	**2016**	**2017**	**2018**
Ozone	1-hour (ppm)	0.090 ppm	0.089	**0.094**	0.087	**0.121**	0.078
	8-hour (ppm)	0.070 ppm	0.066	**0.081**	0.066	**0.098**	0.061
Carbon Monoxide	1-hour (ppm)	20 ppm	2.4	2.4	2.0	2.1	2.5
	8-hour (ppm)	9.0 ppm	1.9	1.8	1.4	1.8	2.1
Nitrogen Dioxide	1-hour (ppm)	0.18 ppm	0.058	0.049	0.051	0.068	0.088
Particulate Matter (PM_{10})	24-hour (µg/m^3)	50 µg/m^3	**55**	**58**	41	**70**	**122**
Fine Particulate Matter ($PM_{2.5}$)	24-hour (µg/m^3)	35 µg/m^3	**60.4**	**49.4**	22.6	**49.7**	**133.9**
	Annual (µg/m^3)	12 µg/m^3	8.4	10.0	8.4	9.5	12.8

NOTES:
µg/m^3 = micrograms per cubic meter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ppm = parts per million
Bold indicates values that exceed the ambient air quality standard.
[a] Generally, national and state standards are not to be exceeded more than once per year.

SOURCES:
Bay Area Air Quality Management District, *Bay Area Air Pollution Summary—2014*, February 2020. Available at https://www.baaqmd.gov/~/media/Files/Communications%20and%20Outreach/Annual%20Bay%20Area%20Air%20Quality%20Summaries/pollsum2014.ashx?la=en. Accessed February 7, 2020;
———, *Bay Area Air Pollution Summary—2015*, May 2016. Available at https://www.baaqmd.gov/~/media/files/communications-and-outreach/annual-bay-area-air-quality-summaries/pollsum2015-pdf.pdf?la=en. Accessed February 7, 2020;
———, *Bay Area Air Pollution Summary—2016*, May 2017. Available at https://www.baaqmd.gov/~/media/files/communications-and-outreach/annual-bay-area-air-quality-summaries/pollsum2016-pdf.pdf?la=en. Accessed February 7, 2020;
———, *Bay Area Air Pollution Summary—2017*, April 2018. Available at https://www.baaqmd.gov/~/media/files/communications-and-outreach/annual-bay-area-air-quality-summaries/pollsum2017-pdf.pdf?la=en. Accessed February 7, 2020; and
———, *Bay Area Air Pollution Summary—2018*, May 2019. Available at Https://Www.Baaqmd.Gov/~/Media/Files/Communications-And-Outreach/Annual-Bay-Area-Air-Quality-Summaries/Pollsum2018-Pdf.Pdf?La=En. Accessed February 7, 2020.

As shown in Table 3.1-1, both the 1-hour and 8-hour ozone concentrations at the San José–Jackson monitoring station peaked in 2017 at 0.121 parts per million (ppm) and 0.098 ppm,

[3] Bay Area Air Quality Management District, *2018 Air Monitoring Network Plan,* July 1, 2019. Available at https://www.baaqmd.gov/~/media/files/technical-services/2018_network_plan-pdf.pdf?la=en. Accessed January 14, 2020.

respectively. PM concentrations at the San José–Jackson monitoring station peaked in 2018 with a 24-hour PM_{10} concentration of 122 micrograms per cubic meter ($\mu g/m^3$) and a $PM_{2.5}$ concentration of 133.9 $\mu g/m^3$.

Table 3.1-2 summarizes the number of days from 2014 through 2018 when the federal and/or state standards were exceeded. The results shown reflect measurements at the San José–Jackson station for ozone and PM, pollutants for which the SFBAAB is non-attainment; for NO_2, an ozone precursor; and for CO, for which the Bay Area has achieved attainment status. The California ambient air quality standards (CAAQS or "state standards") and the national ambient air quality standards (NAAQS or "national standards") are discussed further in Section 3.1.2, *Regulatory Framework*.

TABLE 3.1-2
AMBIENT AIR QUALITY STANDARD EXCEEDANCE DAYS AT THE SAN JOSÉ–JACKSON MONITORING STATION (2014–2018)

		Days Exceeding Standard				
Pollutant	**Standard[a]**	**2014**	**2015**	**2016**	**2017**	**2018**
Ozone	State 1-hour	0	0	0	3	0
	Federal 8-hour	0	2	0	4	0
	State 8-hour	0	2	0	4	0
Carbon Monoxide	Federal 8-hour	0	0	0	0	0
	State 8-hour	0	0	0	0	0
Nitrogen Dioxide	State 1-hour	0	0	0	0	0
	Federal 1-hour	0	0	0	0	0
Particulate Matter (PM_{10})	Federal 24-hour	0	0	0	0	0
	State 24-hour	1	1	0	6	4
Fine Particulate Matter ($PM_{2.5}$)	Federal 24-hour	2	2	0	6	15

NOTES:
$\mu g/m^3$ = micrograms per cubic meter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ppm = parts per million
[a] Generally, national and state standards are not to be exceeded more than once per year.

SOURCES:
Bay Area Air Quality Management District, *Bay Area Air Pollution Summary—2014*, February 2020. Available at https://www.baaqmd.gov/~/media/Files/Communications%20and%20Outreach/Annual%20Bay%20Area%20Air%20Quality%20Summaries/pollsum2014.ashx?la=en. Accessed February 7, 2020;
———, *Bay Area Air Pollution Summary—2015*, May 2016. Available at https://www.baaqmd.gov/~/media/files/communications-and-outreach/annual-bay-area-air-quality-summaries/pollsum2015-pdf.pdf?la=en. Accessed February 7, 2020;
———, *Bay Area Air Pollution Summary—2016*, May 2017. Available at https://www.baaqmd.gov/~/media/files/communications-and-outreach/annual-bay-area-air-quality-summaries/pollsum2016-pdf.pdf?la=en. Accessed February 7, 2020;
———, *Bay Area Air Pollution Summary—2017*, April 2018. Available at https://www.baaqmd.gov/~/media/files/communications-and-outreach/annual-bay-area-air-quality-summaries/pollsum2017-pdf.pdf?la=en. Accessed February 7, 2020; and
———, *Bay Area Air Pollution Summary—2018*, May 2019. Available at Https://Www.Baaqmd.Gov/~/Media/Files/Communications-And-Outreach/Annual-Bay-Area-Air-Quality-Summaries/Pollsum2018-Pdf.Pdf?La=En. Accessed February 7, 2020.

As shown in Table 3.1-2, the San José–Jackson monitoring station recorded six exceedances of the federal 8-hour ozone standard, three exceedances of the state 1-hour ozone standard, and six exceedances of the state 8-hour ozone standard. The station also recorded 25 exceedances of the federal 24-hour $PM_{2.5}$ standard and 12 exceedances of the state 24-hour PM_{10} standard. Fifteen of these $PM_{2.5}$ standard exceedances occurred in 2018.

Types of Sources

As detailed in the air quality management plan (AQMP), the major sources of air pollution in the SFBAAB are classified into the following nine economic sectors: stationary (industrial) sources, transportation, energy, buildings, agriculture, natural and working lands, waste management, water, and super–greenhouse gas (GHG) pollutants:

- *Stationary sources* include oil refineries, cement, plants, natural gas distribution facilities, crude oil and natural gas production facilities, gas stations, dry cleaners, metal fabricators, chemical and pharmaceutical production facilities, diesel generators, and large boilers used in commercial and industrial facilities.
- *Transportation* includes on-road motor vehicles, such as light-duty automobiles or heavy-duty trucks; off-road vehicles, including airplanes, locomotives, ships, and boats; and off-road equipment, such as airport ground-support equipment, construction equipment, and farm equipment.
- *Energy* includes emissions from electricity generated and used in the Bay Area, as well as GHG emissions from electricity generated outside the Bay Area that is imported and used in the region.
- *Buildings* include residential, commercial, governmental, and institutional buildings. Emissions occur through energy use for building heating, cooling, and operation, and from the materials used for building construction and maintenance.
- *Agriculture* includes on- and off-road trucks and farming equipment, aircraft for crop spraying, animal waste, pesticide and fertilizer use, crop residue burning, travel on unpaved roads, and soil tillage.
- *Natural and working lands* include carbon sequestration and storage in forests, woodlands, shrub lands, grasslands, rangelands, and wetlands.
- *Waste management* includes GHG emissions from landfills and composting activities.
- *Water* includes indirect emissions associated with energy used to pump, convey, recycle, and treat water and wastewater throughout the Bay Area and direct emissions from the combustion of fossil fuels and digester gas for the operation of engines, boilers, and turbines at publicly owned treatment works.
- *Super GHGs* include methane, black carbon, and fluorinated gases.

Existing Health Risk in the Surrounding Area

As discussed below, the U.S. Environmental Protection Agency (EPA) and California Air Resources Board (CARB) recognize that exposure to elevated levels of ground-level ozone and PM can be a cause of respiratory and cardiovascular health effects. Respiratory health impacts include throat irritation, reduced lung function, emphysema, bronchitis, chronic obstructive pulmonary disease (COPD), and possibly lung cancer.

A strong correlation between long-term exposure to air pollutants, such as ozone and NO_2, to the aggravation of asthma is widely recognized; these pollutants are believed to be one of many causes of asthma development. Other common asthma triggers include indoor and outdoor allergens and irritants, such as tobacco smoke, mold, pets, dust, dust mites, NO_X and wood smoke, chemicals, and cleaning solvents.[4,5] In response to the novel coronavirus 2019 disease (COVID-19) epidemic, research is studying the potential link between COVID-19 and air pollution. One recent study from Harvard University found a correlation between COVID-19 outcomes and exposure to elevated $PM_{2.5}$ concentrations.[6] The science on the relationship between COVID-19 outcomes and exposure to $PM_{2.5}$ concentrations and other forms of air pollution is extremely new and constantly evolving, and these results may be replaced with more robust and comprehensive scientific findings.

The Santa Clara County (County) Department of Public Health tracks many health indicators, such as the incidence of cancer, heart disease, and diabetes; the number of people who have experienced a heart attack or stroke; and the incidence of respiratory diseases, such as COPD and asthma.[7] These data represent occurrence rates and do not attribute causation to the incidence rate. Regardless of cause, the County's 2010 Health Profile Report indicates that in 2009, public health in Santa Clara County was largely at the same level as, or slightly better than, national and statewide norms for health indices such as mortality rate from lung and bronchus cancer, adults with heart disease, adults who have experienced a heart attack or stroke, adults diagnosed with diabetes, and adults with asthma.

The County Department of Public Health also tracks mortality rate statistics for individual cities in Santa Clara County. The department determined that San José's death rate per 100,000 people is 150.5 for cancer, 126.2 for heart disease, 30.5 for stroke, 29 for chronic lower respiratory disease, and 29.2 for diabetes.[8] These mortality rates are generally lower than the national death rates reported for 2017, with the exception of diabetes-related deaths. National death rates per 100,000 people were 183.9 for cancer, 198.8 for heart disease, 44.9 for stroke, 49.2 for chronic lower respiratory disease, and 25.7 for diabetes.[9]

Further, according to health surveys conducted in 2009, the rate of asthma in the adult population of Santa Clara County is 14 percent. The same survey reports the state's adult asthma incidence rate to be 14 percent and the national rate to be 14 percent;[10] however, the Centers for Disease Control and Prevention, relying on a different survey, reported the rate of asthma in adults to be

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4 U.S. Environmental Protection Agency, *Asthma*, May 1, 2028. Available at https://www.epa.gov/asthma/asthma-triggers-gain-control. Accessed February 19, 2019.

5 Asthma and Allergy Foundation of America, Air Pollution, October 2015. Available at https://www.aafa.org/air-pollution-smog-asthma/. Accessed May 2020.

6 Wu, X., R. C. Nethery, B. M. Sabath, D. Braun, and F. Dominici, *Exposure to Air Pollution and COVID-19 Mortality in the United States*, April 24, 2020, medRxiv 2020.04.05.20054502. Available at https://doi.org/10.1101/2020.04.05.20054502. Note that this article has not yet been peer-reviewed.

7 Santa Clara County Public Health Department, *Santa Clara County 2010 Health Profile Report*, August 2010. Available at https://www.sccgov.org/sites/phd/hi/hd/Documents/Health%20Profile%20Report%202010/SCC_Health_Profile_Report_online_final_092410.pdf. Accessed in May 2020.

8 Santa Clara County Public Health Department, *Health Status Statistics–Cities*, last updated June 29, 2018. Available at https://data-sccphd.opendata.arcgis.com/datasets/health-status-statistics-cities?geometry=-123.594%2C36.842%2C-120.125%2C37.607. Accessed July 9, 2020.

9 U.S. Department of Health and Human Services, *National Vital Statistics Reports*, Volume 68, Number 9, Deaths: Final Data for 2017, June 24, 2019. Available at https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_09-508.pdf. Accessed July 9, 2020.

10 Santa Clara County Public Health Department, *Santa Clara County 2010 Health Profile Report*, August 2010. Available at https://www.sccgov.org/sites/phd/hi/hd/Documents/Health%20Profile%20Report%202010/SCC_Health_Profile_Report_online_final_092410.pdf. Accessed May 2020.

approximately 8 percent nationwide.[11] The CDC does not have data for Santa Clara County specifically. A subset of these health indices is tracked at the sub-regional level. For example, the annual rate of chronic lower respiratory disease deaths in San José is 29.0 and 25.5 per 100,000 people in the county.[12]

Through its Community Air Risk Evaluation (CARE) program, BAAQMD compiled estimates of toxic air contaminant (TAC) emissions in the Bay Area for all major source categories including oil refineries, power plants, landfills, dry cleaners, gasoline stations, on-road vehicles, off-road vehicles and equipment, ships, and trains. BAAQMD's cancer-risk weighted emissions inventory shows that a small subset of TACs account for approximately 95 percent of the total cancer risk from air pollutants in the Bay Area, and that diesel particulate matter (DPM) in itself greatly dominates the cancer risk from TACs at 82 percent.[13] These estimates used the cancer risk calculation methods adopted by the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) in 2015. This methodology supersedes the 2003 guidelines and takes into account the sensitivity of children to TAC emissions, breathing rates, and time spent at home because children have higher breathing rates compared to adults and would likely spend more time at home, resulting in longer durations of exposure.[14]

The Bay Area has benefited from dramatic reductions in public exposure to TACs over time. Based on ambient air quality monitoring, the estimated lifetime cancer risk from all TACs for Bay Area residents declined from 4,100 cases per million in 1990 to 690 cases per million people in 2014. This represents an 83 percent decrease between 1990 and 2014. The cancer risk from DPM, which accounts for most of the cancer risk from TACs as discussed above, has declined substantially over the past 15 to 20 years as a result of CARB regulations and air district programs to reduce emissions from diesel engines. However, DPM still accounts for roughly 82 percent of the total cancer risk related to TACs.[15]

Air Pollutants of Concern

Criteria Air Pollutants

Carbon Monoxide

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles, which have their highest emissions during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Ambient CO

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[11] Centers for Disease Control and Prevention, *2018 National Health Interview Survey (NHIS) Data*, December 2019. Available at https://www.cdc.gov/asthma/nhis/2018/table4-1.htm. Accessed May 2020.

[12] Santa Clara County Public Health Department, *San Jose Profile 2016*, 2016. Available at https://www.sccgov.org/sites/phd/hi/hd/Pages/san-jose.aspx. Accessed May 2020.

[13] Bay Area Air Quality Management District, *Clean Air Plan, Spare the Air, Cool the Climate*, April 19, 2017. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed January 16, 2020.

[14] California Environmental Protection Agency, Office of Health Hazard Assessment, *Air Toxics Hot Spots Program, Guidance Manual for Preparation of Health Risk Assessments*, February 2015. Available at https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0. Accessed May 2020.

[15] Bay Area Air Quality Management District, *Clean Air Plan, Spare the Air, Cool the Climate*, April 19, 2017. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed January 16, 2020.

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,[16] 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 blood's oxygen-carrying capacity. This reduces the amount of oxygen that reaches the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, and for fetuses. 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, because it is already more difficult for oxygenated blood to reach the hearts of these people, and they 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.[17]

The most common effects of CO exposure are fatigue, headaches, confusion, and dizziness caused by 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.[18]

In the past few decades, CO concentrations in California have declined dramatically as a result of regulatory controls and programs. Most areas of the state, including the region encompassing the project site, are in full compliance with the federal and state CO standards. CO measurements and modeling were important 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 for most California air districts because of the retirement of older polluting vehicles, lower emissions from new vehicles, and improvements in fuels.

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) (also referred to by some regulatory agencies as volatile organic compounds [VOCs]) and NO_X in the presence of sunlight. The main sources of ROG and NO_X, often referred to as ozone precursors, are the evaporation of solvents, paints, and fuels and combustion processes (including motor vehicle engines). In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as a

[16] "Inversion conditions" refer to temperature inversion, whereby cold air lies below warmer air at higher altitudes (i.e., temperature increases with height).

[17] U.S. Environmental Protection Agency, Carbon Monoxide (CO) Pollution in Outdoor Air, 2016. Available at https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution. Accessed April 2019.

[18] California Air Resources Board, Carbon Monoxide & Health, 2019. Available at https://ww2.arb.ca.gov/resources/carbon-monoxide-and-health. Accessed April 2019.

regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process.

Ozone concentrations 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, like ozone. Short-term exposure to ozone can irritate the eyes and constrict the airways. Besides causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately 3 hours. The SFBAAB has been designated as non-attainment for the federal and state ozone standards. As a result, BAAQMD has implemented air quality plans, discussed below, to address ozone concentrations within the region.

According to EPA and CARB, 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 COPD.

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.[19,20] EPA states that the 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.[21]

Nitrogen Dioxide and Oxides of Nitrogen

NO_2 is a reddish brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. NO_2 may be visible as a coloring component of a brown cloud on high-pollution days, especially in conjunction with high ozone levels. Nitrogen

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19 U.S. Environmental Protection Agency, *Health Effects of Ozone Pollution*, October 10, 2018. Available at https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution. Accessed April 2019.

20 California Air Resources Board, Ozone & Health, *Health Effects of Ozone*, 2019. Available at https://ww2.arb.ca.gov/resources/ozone-and-health. Accessed April 2019.

21 U.S. Environmental Protection Agency, *Health Effects of Ozone Pollution*, October 10, 2018. Available at https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution. Accessed April 2019.

dioxide is a major component of the group of gaseous nitrogen compounds commonly referred to as NO_X, which also includes nitric oxide (NO).

Oxides of nitrogen are produced by fuel combustion in motor vehicles, industrial stationary sources (such as refineries and cement kilns), ships, aircraft, and rail transit. Typically, NO_X emitted from fuel combustion is in the form of NO and NO_2. NO is often converted to NO_2 when it reacts with ozone or undergoes photochemical reactions in the atmosphere. Therefore, NO_2 emissions from combustion sources are typically evaluated based on the amount of NO_X emitted from the source.

Nitrogen dioxide is of concern for air quality because it acts as a respiratory irritant and is a precursor of ozone.[22] 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 because of their more rapid breathing rate for their body weight and their typically greater duration of outdoor exposure. In adults, the greatest risk is to people who have chronic respiratory diseases, such as asthma and COPD.[23]

Much of the information on distribution in air, human exposure and dose, and health effects is specifically for NO_2 and only limited information is available for NO_X, and substantial uncertainty remains regarding the health effects of NO or NO_X exposure.[24] As discussed in Section 3.1.2, *Regulatory Framework*, the SFBAAB is in compliance with the federal and state NO_2 standards.

Particulate Matter

PM_{10} and $PM_{2.5}$ consist of particulate matter that is 10 microns or less in diameter and 2.5 microns[25] or less in diameter, respectively. PM_{10} and $PM_{2.5}$ represent fractions of PM that can be inhaled into the air passages and the lungs and can cause adverse health effects. Larger 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 than as 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. Some sources of PM, such as wood burning in

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22 U.S. Environmental Protection Agency, Nitrogen Dioxide (NO_2) Pollution, September 8, 2016. Available at https://www.epa.gov/no2-pollution/basic-information-about-no2. Accessed April 2019.

23 California Air Resources Board, Nitrogen Dioxide & Health, 2019. Available at https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health. Accessed April 2019 and January 13, 2020.

24 California Air Resources Board, Nitrogen Dioxide & Health, 2019. Available at https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health. Accessed April 2019 and January 13, 2020.

25 A micron is one-millionth of a meter.

fireplaces, demolition, and construction activities, are more local, 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. $PM_{2.5}$ (including diesel exhaust particles) is thought to have greater effects on health because these particles are so small and thus can penetrate to the deepest parts of the lungs.

In 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's 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.[26,27]

Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, and acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Children are more susceptible to the health risks of PM_{10} and $PM_{2.5}$ because their immune and respiratory systems are still developing. Recent studies have shown an association between morbidity and mortality and daily concentrations of PM in the air.

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) exposure to PM_{10} has been associated primarily with worsening of respiratory diseases, including asthma and COPD, 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. The International Agency for Research on Cancer published a review in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer.[28]

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, the populations most likely to

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26 Bay Area Air Quality Management District, *Air Quality Standards and Attainment Status*, updated January 5, 2017. Available at http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status. Accessed April 2019.

27 California Air Resources Board, *Inhalable Particulate Matter and Health ($PM_{2.5}$ and PM_{10})*, last reviewed August 10, 2017. Available at https://www.arb.ca.gov/research/aaqs/common-pollutants/pm/pm.htm. Accessed April 2019.

28 Loomis, D., W. Huang, and G. Chen, The International Agency for Research on Cancer (IARC) Evaluation of the Carcinogenicity of Outdoor Air Pollution: Focus on China, *Chinese Journal of Cancer* 33(4):189–196. Available at https://www.ncbi.nlm.nih.gov/pubmed/24694836. Accessed March 2020.

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 more susceptible to harm from inhaling pollutants such as PM_{10} and $PM_{2.5}$ than healthy adults because they inhale more air per pound of body weight than do adults, they spend more time outdoors, and their developing immune systems are more susceptible to external toxins.[29]

Mortality studies conducted since the 1990s have shown a statistically significant direct association between mortality (premature deaths) and daily concentrations of PM in the air. Despite important gaps in scientific knowledge, a comprehensive evaluation of research findings provides persuasive evidence that exposure to fine particulate air pollution adversely affects cardiopulmonary health and can lead to premature death.[30]

The SFBAAB is designated as non-attainment for both the federal and state PM_{10} standards. In addition, the SFBAAB is not in compliance with either the federal 24-hour $PM_{2.5}$ standard or the state annual average $PM_{2.5}$ standard.

Sulfur Dioxide

SO_2 is a colorless, acidic gas with a strong odor. It is produced by the combustion of sulfur-containing fuels such as oil, coal, and diesel. SO_2 has the potential to damage materials and can cause health effects at high concentrations. According to EPA, short-term exposures to SO_2 can harm the human respiratory system and make breathing difficult.[31] It can irritate lung tissue and increase the risk of acute and chronic respiratory disease.[32]

According to CARB, health effects at levels near the state one-hour standard for SO_2 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.[33] 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.[34,35]

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29 California Air Resources Board, Inhalable Particulate Matter and Health ($PM_{2.5}$ and PM_{10}), last reviewed August 10, 2017. Available at https://www.arb.ca.gov/research/aaqs/common-pollutants/pm/pm.htm. Accessed April 2019.

30 Dockery, D. W., and C.A. Pope III, Health Effects of Fine Particulate Air Pollution: Lines that Connect, *Journal of the Air & Waste Management Association*, June 2006, pp. 30–37.

31 U.S. Environmental Protection Agency, Sulfur Dioxide (SO_2) Pollution, June 28, 2018. Available at https://www.epa.gov/so2-pollution/sulfur-dioxide-basics. Accessed April 2019.

32 Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2017, p. C-16. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed January 13, 2020.

33 California Air Resources Board, Sulfur Dioxide & Health, 2019. Available at https://ww2.arb.ca.gov/resources/sulfur-dioxide-and-health. Accessed April 2019.

34 California Air Resources Board, Sulfur Dioxide & Health, 2019. Available at https://ww2.arb.ca.gov/resources/sulfur-dioxide-and-health. Accessed April 2019.

35 U.S. Environmental Protection Agency, Sulfur Dioxide (SO_2) Pollution, June 28, 2018. Available at https://www.epa.gov/so2-pollution/sulfur-dioxide-basics. Accessed April 2019.

SO_2 is also a precursor to the formation of atmospheric sulfate and PM, and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain. As discussed in Section 3.1.2, *Regulatory Framework*, the SFBAAB is in compliance with the federal and state SO_2 standards.

Lead

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 reduced levels of lead in the atmosphere. In the Bay Area, high concentrations of lead are only a concern in areas close to general aviation airports. Ambient lead concentrations in the SFBAAB meet both the federal and state standards.

Lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems, and cardiovascular system, and affects the oxygen-carrying capacity of the blood.[36] 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.[37]

Existing structures on the project site may contain lead-based paint and other hazardous materials. The presence of hazardous materials, including lead-based paint, is discussed in Section 3.7, *Hazards and Hazardous Materials*, and is not evaluated further in this section.

Sulfates

Sulfates are formed in the atmosphere through a series of chemical reactions involving SO_2. The primary source of SO_2 emissions in California is the combustion of sulfur-containing compounds in gasoline and diesel fuels. Meteorological conditions in urban areas of California allow for the rapid conversion of emitted SO_2 to ambient sulfate, which can cause a variety of harmful effects.

Sulfates make up a portion of $PM_{2.5}$ and thus have health impacts similar to those associated with $PM_{2.5}$, including premature mortality, increased hospital admissions for heart- or lung-related causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted-activity days. As is the case with $PM_{2.5}$, sulfate exposure poses greater health risk to sensitive populations such as children, the elderly, asthmatics, and others with underlying health conditions. In addition to adverse human health impacts, sulfates in the atmosphere degrade visibility and contribute to acid deposition, which is associated with a variety of harmful effects on property and ecosystems.[38]

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36 U.S. Environmental Protection Agency, Lead Air Pollution, last updated November 29, 2017. Available at https://www.epa.gov/lead-air-pollution/basic-information-about-lead-air-pollution. Accessed April 2019.

37 California Air Resources Board, Lead & Health, 2019. Available at https://ww2.arb.ca.gov/resources/lead-and-health. Accessed April 2019.

38 California Air Resources Board, *Sulfate & Health*. Available at https://ww2.arb.ca.gov/resources/sulfate-and-health. Accessed July 9, 2020.

Hydrogen Sulfide

Hydrogen sulfide is a colorless gas that smells of rotten eggs and is emitted from a variety of sources. Hydrogen sulfide occurs naturally in coal, natural gas, and oil and is emitted during extraction and processing of these materials. In addition, hydrogen sulfide is emitted from sewage treatment facilities from decomposition of organic matter. Other sources of hydrogen sulfide emissions include petrochemical plants, coke oven plants, and kraft paper mills.[39,40]

Hydrogen sulfide is a pollutant of concern and is considered a nuisance because of its strong smell that can induce headache, nausea, or vomiting. Greater exposure to hydrogen sulfide can cause eye irrigation and, in extreme cases, can cause serious adverse health impacts. Because hydrogen sulfide is emitted primarily by outdoor sources, it is rarely an issue indoors.[41]

Vinyl Chloride

Vinyl chloride is a flammable, colorless gas generally emitted by industrial processes, particularly from the process of making polyvinyl chloride (PVC) plastic and vinyl products. Low levels of vinyl chloride have been measured near landfills, sewage treatment plants, and hazardous waste sites, but vinyl chloride levels have not exceeded the state standards since the 1970s. Emissions of vinyl chloride are associated exclusively with occupational and industrial settings. Although ambient concentrations of vinyl chloride are generally low, high levels of vinyl chloride can cause serious health effects.[42,43]

Acute effects of vinyl chloride exposure include eye irritation and impacts on the central nervous system such as dizziness, drowsiness, headaches, and giddiness. Chronic exposure to vinyl chloride can cause liver damage; central nervous system effects including dizziness, drowsiness, fatigue, headache, visual/auditory disturbances, memory loss, and sleep disturbances; effects on the peripheral nervous system including peripheral neuropathy, tingling, numbness, weakness, and pain in fingers; reproductive and developmental effects; and increased cancer risk. EPA has classified vinyl chloride as a Group A human carcinogen.[44]

Toxic Air Contaminants, $PM_{2.5}$, and Health Risks

In addition to criteria air pollutants, individual projects may emit TACs, a diverse group of air pollutants that may cause chronic and acute adverse effects on human health, including carcinogenic effects. There are hundreds of different types of TACs with varying degrees of

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39 California Air Resources Board, *Hydrogen Sulfide and Health*. Available at https://ww2.arb.ca.gov/resources/hydrogen-sulfide-and-health. Accessed July 9, 2020.

40 U.S. Environmental Protection Agency, *Environmental Health Effects Research Series: Hydrogen Sulfide*, February 1978. Available at https://nepis.epa.gov/Exe/ZyPDF.cgi/9100B2YD.PDF?Dockey=9100B2YD.PDF. Accessed July 9, 2020.

41 California Air Resources Board, *Hydrogen Sulfide and Health*. Available at https://ww2.arb.ca.gov/resources/hydrogen-sulfide-and-health. Accessed July 9, 2020.

42 California Air Resources Board, *Vinyl Chloride and Health*. Available at https://ww2.arb.ca.gov/resources/vinyl-chloride-and-health. Accessed July 9, 2020.

43 U.S. Environmental Protection Agency, *Vinyl Chloride*. Available at https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/vinyl-chloride.pdf. Last updated January 2000. Accessed July 9, 2020.

44 U.S. Environmental Protection Agency, *Vinyl Chloride*. Available at https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/vinyl-chloride.pdf. Last updated January 2000. Accessed July 9, 2020.

toxicity. Thus, the health risks of individual TACs vary greatly; at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

The main TAC of concern is diesel particulate matter. The main sources of DPM emissions near the project site are heavy-duty truck activity along Interstates 880 and 280, as well as Amtrak trains, which operate directly west of the project site. Permitted stationary sources of TACs near the project site include auto body shops, a coffee roaster, backup generators, and gasoline dispensing facilities, but these are sources of TACs from ROGs in addition to DPM.

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. The State of California has identified more than 200 TACs with varying degrees of toxicity.[45]

The ambient background of TACs is the combined result of many diverse human sources and activities, including gasoline stations, automobiles, dry cleaners, industrial operations, solvent use, and painting operations. In general, mobile sources contribute more substantially than stationary sources to health risks. Both BAAQMD and CARB operate a network of monitoring stations that measure ambient concentrations of certain TACs that are associated with strong health-related effects and are present in appreciable concentrations in the Bay Area, as in all urban areas.

The most recent estimate (2011–2016) of cancer rates from all causes in the SFBAAB, presented by the Cancer Prevention Institute of California, shows cancer rates for males at 428 per 100,000 and for females at 382 per 100,000.[46] These levels are below the national average annual cancer rate of 442.0 new cases of cancer per 100,000 men and women per year.[47] This is the *rate* of new cancer cases per year per 100,000 individuals, not the lifetime risk of an individual to develop cancer.

In addition to exposure to ambient airborne sources of carcinogenic substances, individuals' lifetime risks of contracting cancer vary based on a wide number of factors, such as genetics, sex, age, diet, lifestyle (e.g., obesity, tobacco use, alcohol use), exposure to carcinogens, and pre-existing conditions. Approximately 38.7 percent of all females and 40.1 percent of all males in the United States will develop an invasive form of cancer in their lifetime.[48] Expressed as a chance of developing cancer, the population-averaged chance is 38.7 percent for women and 40.1 percent for men. These numbers are average risks for the overall U.S. population. An individual's risk may be higher or lower than these numbers, depending on particular risk factors.

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45 California Air Resources Board, Toxic Air Contaminant Identification List, July 2011. Available at https://www.arb.ca.gov/toxics/id/taclist.htm. Accessed January 13, 2020.

46 Cancer Prevention Institute of California, *The Greater Bay Area Cancer Registry Annual Report: Incidence and Mortality Review, 1988–2016*, 2019. Available at https://cancerregistry.ucsf.edu/sites/g/files/tkssra1781/f/wysiwyg/Cancer%20Incidence%20and%20Mortality%20in%20the%20Greater%20Bay%20Area%202019_v6.21.2019.pdf. Accessed March 2020.

47 National Cancer Institute, Cancer Stat Facts: Cancer of Any Site, 2020. Available at https://seer.cancer.gov/statfacts/html/all.html. Accessed April 2020.

48 American Cancer Society, Lifetime Risk of Developing or Dying from Cancer, last updated January 13, 2020. Available at https://www.cancer.org/cancer/cancer-basics/lifetime-probability-of-developing-or-dying-from-cancer.html. Accessed March 2020.

Thus, the *average* individual lifetime cancer risk from all causes is 387,000 in 1 million for women and 401,400 in 1 million for men.

$PM_{2.5}$ is considered the most harmful air pollutant in the SFBAAB in terms of the associated impact on public health, and can result in a wide range of health effects, as discussed above. Consequently, it is regarded as a hazardous pollutant.

BAAQMD regulates TACs and $PM_{2.5}$ by using a risk-based approach, rather than establishing an ambient concentrations standard. This risk-based approach uses a health risk assessment (HRA) to determine the specific sources and TACs to control and the level of control necessary to reduce risks to acceptable levels. An HRA analyzes exposure to toxic substances and human health risks based on the dose and potency of the toxic substances.[49]

Diesel Particulate Matter

CARB identified DPM as a TAC in 1998, based primarily 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 heavily traveled highways. Health risks from ambient concentrations of DPM are much higher than the risks 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.[50,51] These rates have declined as a result of better emissions controls, statewide and local regulatory actions, and more fuel-efficient technology.

In 2000, CARB approved the comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines.[52] Many of the measures of the Diesel Risk Reduction Plan have been approved and adopted, including the federal on-road and non-road diesel engine emission standards for new engines, as well as adoption of regulations for low sulfur fuel in California. Subsequent regulations regarding on-road diesel truck retrofits with particulate matter controls, 2010 or later engine standards, and fleet average emission rate standards to increase turnover have resulted in much lower DPM and $PM_{2.5}$ emissions. With new

49 An HRA is required for permit approval for a stationary source if 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, an HRA must be prepared for the source in question. 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.

50 California Air Resources Board, *California Almanac of Emissions and Air Quality—2009 Edition*, 2009, Table 5-44 and Figure 5-12. Available at https://www.cityofdavis.org/home/showdocument?id=4101. Accessed February 3, 2020.

51 California Air Resources Board, Overview: Diesel Exhaust and Health, n.d. Available at https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health. Accessed January 14, 2020. This calculated cancer risk value from ambient air exposure in the Bay Area can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which is approximately 40 percent, or greater than 400,000 in 1 million, according to the American Cancer Society (American Cancer Society, Lifetime Risk of Developing or Dying from Cancer, last updated January 13, 2020. Available at https://www.cancer.org/cancer/cancer-basics/lifetime-probability-of-developing-or-dying-from-cancer.html. Accessed March 2020).

52 California Air Resources Board, *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, 2000. Available at https://www.arb.ca.gov/diesel/documents/rrpfinal.pdf. Accessed January 14, 2020.

controls and fuel requirements, 60 trucks built in 2007 would have the same particulate exhaust emissions as one truck built in 1988.[53] The regulation is anticipated to result in an 80 percent decrease in statewide diesel health risk in 2020 as compared with the diesel risk in 2000.[54]

Despite notable emission reductions, CARB recommends considering proximity to sources of DPM emissions in the siting of new sensitive land uses. CARB notes that the siting guidelines 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 development, and other concepts that benefit regional air quality can be compatible with protecting the health of individuals at the neighborhood level.[55]

$PM_{2.5}$

Although not technically a TAC, $PM_{2.5}$ is a complex mix of materials and substances that include carbon, metals, nitrates, organics, sulfates, diesel exhaust, and wood smoke. $PM_{2.5}$ can both be directly emitted into the atmosphere through disturbance (such as road dust) and indirectly through secondary formation through reactions among different pollutants in the atmosphere.

Compelling evidence suggests that $PM_{2.5}$ is by far the most harmful air pollutant in the SFBAAB in terms of the associated impact on public health.[56] As discussed above, the scientific consensus is that both long-term and short-term exposure to $PM_{2.5}$ can cause a wide range of health effects, including premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, premature death, heart attacks, and reduced lung function growth in children.[57] $PM_{2.5}$ (including diesel exhaust particles) is thought to have greater effects on health because these particles are very small and thus can penetrate to the deepest parts of the lungs.

For additional discussion of the health effects of $PM_{2.5}$, refer to the *Particulate Matter* section above.

Asbestos

Asbestos is also a TAC of concern, particularly in association with the demolition of older buildings and structures. Asbestos is a fibrous mineral that both naturally occurs in ultramafic rock (a rock type commonly found in California) and was formerly used as a processed

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53 Pollution Engineering, New Clean Diesel Fuel Rules Start, July 2006.

54 California Air Resources Board, *Air Quality and Land Use Handbook: A Community Health Perspective*, April 2005. Available at http://www.arb.ca.gov/ch/handbook.pdf. Accessed April 2019 and January 14, 2020.

55 California Air Resources Board, *Air Quality and Land Use Handbook: A Community Health Perspective*, April 2005. Available at http://www.arb.ca.gov/ch/handbook.pdf. Accessed April 2019 and January 14, 2020.

56 Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2017. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed February 7, 2020.

57 California Air Resources Board, *Inhalable Particulate Matter and Health ($PM_{2.5}$ and PM_{10})*, 2020. Available at https://www.arb.ca.gov/research/aaqs/common-pollutants/pm/pm.htm. Accessed May 2020.

component of building materials. Asbestos is strictly regulated because it has been proven to cause serious adverse health effects, including asbestosis and lung cancer.

Existing structures on the project site may contain asbestos. The presence of hazardous materials, including asbestos, is discussed in Section 3.7, *Hazards and Hazardous Materials*, and is not evaluated further in this air quality analysis.

Visibility-Reducing Particles

Visibility-reducing particles are any particles in the atmosphere that obstruct the range of visibility by creating haze.[58] These particles vary in shape, size, and chemical composition, and come from a variety of natural and human-made sources including windblown metals, soil, dust, salt, and soot. Other haze-causing particles are formed in the air from gaseous pollutants (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*.

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 COPD; and those with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. BAAQMD defines sensitive receptors as children, adults, and seniors occupying or residing in residential dwellings, schools, childcare 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 Occupational Safety and Health Administration to ensure the health and well-being of their employees.[59]

The reasons for greater-than-average sensitivity may include age, pre-existing health problems, proximity to emissions sources, or duration of exposure to air pollutants. Schools, hospitals, and residential care centers are considered relatively sensitive to poor air quality because children, elderly people, and the infirm are more susceptible to respiratory distress and other air quality–related health problems than the general public. Residences are considered sensitive to poor air quality because people usually are present in their home for many hours per day over extended periods of time, resulting in longer exposure to ambient air. In addition, the susceptible individuals listed above could be present at a residence. Recreational uses are considered

58 California Air Resources Board, Visibility Reducing Particles and Health, October 2016. Available at https://ww2.arb.ca.gov/resources/vinyl-chloride-and-health. Accessed December 2019.

59 Bay Area Air Quality Management District, *Recommended Methods for Screening and Modeling Local Risks and Hazards*, May 2012. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf?la=en. Accessed January 14, 2020.

sensitive because of the greater exposure to ambient air, because vigorous exercise places a high demand on the human respiratory system.

Existing sensitive receptors evaluated in this draft EIR include a representative sample of known residents (child and adult) in the surrounding neighborhood, and other sensitive receptors (e.g., school children, childcare facilities) in the surrounding community and along the expected travel routes of the on-road delivery and haul trucks in the project vicinity. The HRA also includes discrete receptors in schools and childcare centers located up to 2,500 feet 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."[60]

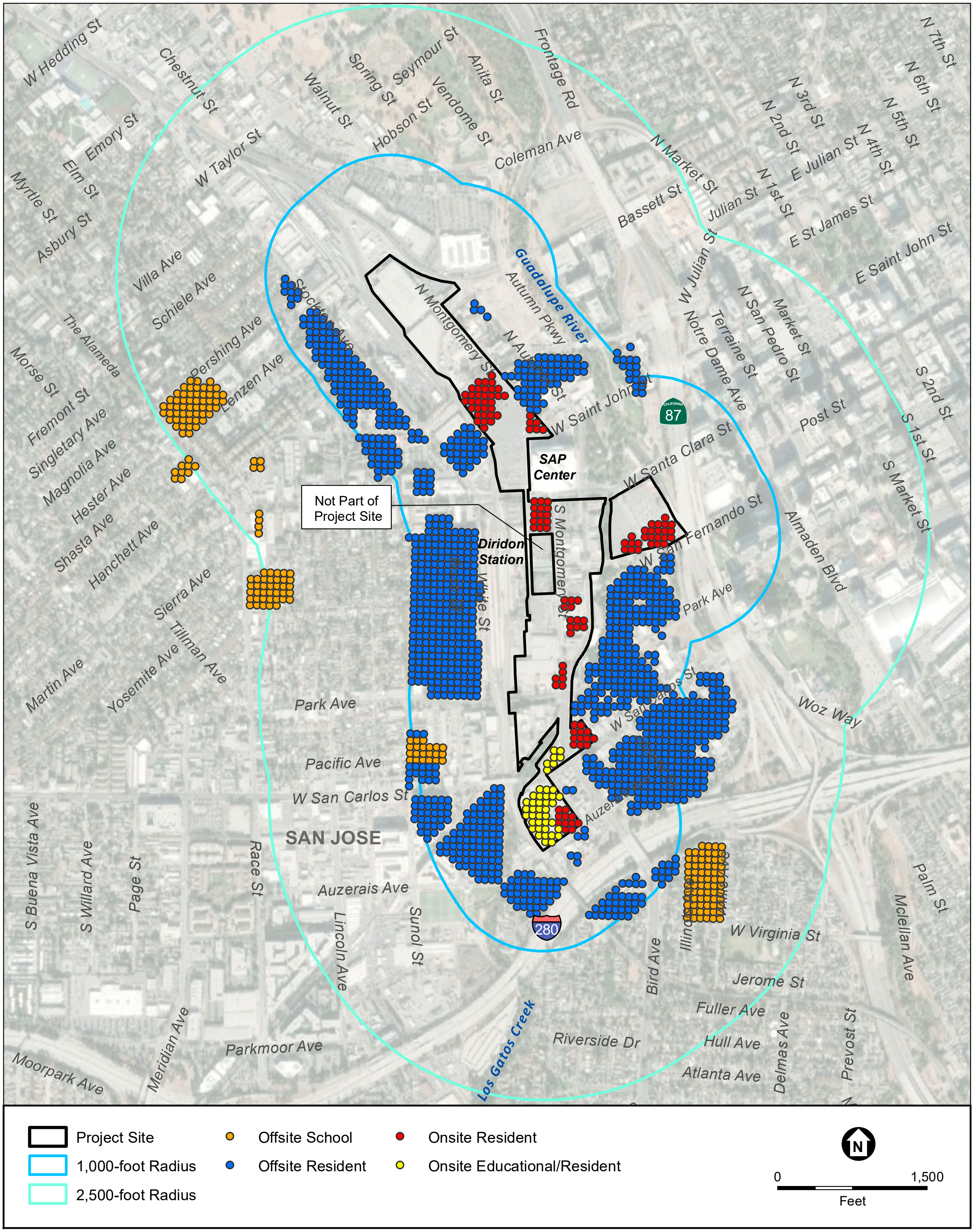
Based on the location of the proposed project in San José, the 1,000-foot zone of influence was conservatively extended to ensure that the HRA would include all nearby schools and childcare centers with the potential to be negatively affected by the project, especially since all schools and daycares are located more than 1,000 feet from the project site. Schools and childcare centers located within 2,500 feet of the project site include the Santa Clara County Community School (Sunol Community School), Gardner Elementary School, St. Leo the Great School, Park Avenue Preschool, Back to Basics Montessori Christian Preschool and Kindergarten, Carden Preparatory Preschool, and the Hester School. Residential areas in the vicinity of the project site are also considered sensitive receptors.

Figure 3.1-1 shows the locations of sensitive land uses planned on site, as well as existing sensitive receptors located within 2,500 feet of the project boundary.

Odors

Although offensive odors from stationary sources rarely cause any physical harm, they remain unpleasant and can lead to public distress, generating complaints by residents 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 recommend considering odor impacts for any new odor sources proposed near existing receptors, and for any new sensitive receptors located near existing odor sources. BAAQMD provides examples of odor sources, which include wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants. Generally, increasing the distance between the receptor and the odor source would mitigate odor impacts.

60 Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines.* May 2017. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed February 6, 2020.



SOURCES: Esri, 2019, City of San Jose, 2019, ESA, 2020

Downtown West Mixed-Use Plan

Figure 3.1-1
Existing and New Sensitive Receptors

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). Odor characterization can depend on a number of variables, including:

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

Odors can be generated and released from virtually all phases of wastewater collection, treatment, and disposal. Most odor-producing compounds found in domestic wastewater and in the removed solids result from anaerobic biological activity that consumes organic material, sulfur, and nitrogen found in wastewater. These odor-producing compounds can be organic or inorganic molecules. The two major inorganic odors are hydrogen sulfide and ammonia. Organic odors are usually the result of biological activity that decomposes organic matter and forms a variety of odors.

Hydrogen sulfide, which has a characteristic rotten-egg odor, is the most common odorous compound found in wastewater collection and treatment systems. Hydrogen sulfide monitoring can be considered a surrogate for the dilution-to-threshold ratio (D/T) measurements and thus provides useful information on the performance of odor control systems. Hydrogen sulfide is corrosive, toxic, and soluble in water. Sulfate is reduced to hydrogen sulfide by bacteria under anaerobic (or septic) conditions.

Other wastewater odorants that contribute to odors are organic sulfur compounds (e.g., methyl mercaptan and dimethyl sulfide), ammonia and nitrogen compounds (e.g., amines—dimethylamine and trimethylamine), volatile fatty acids, aldehydes, musty odorants (e.g., 2-methylisoborneol), fecal odorants (e.g., skatole), and ketones. Because these latter constituents are more costly and difficult to monitor, hydrogen sulfide has become the key compound targeted for removal and for monitoring. Ammonia and organic odors are also common.

Odors from wastewater and its residuals become much more intense and develop much higher concentrations of odorous compounds when the oxygen in the waste is consumed and anaerobic conditions develop. For this reason, most of the odor generated in wastewater collection and treatment is caused by the anaerobic conditions that can develop in wastewater collection systems, and by treatment plant unit processes where anaerobic conditions are likely to develop (e.g., clarifiers, gravity thickeners, and sludge storage tanks). Odor problems can be controlled through proper design, adequate ventilation, vapor-phase treatment, operational practices including process control and chemical treatment, and facility maintenance.

3.1.2 Regulatory Framework

Federal

Clean Air Act and National Ambient Air Quality Standards

The federal Clean Air Act (CAA) requires EPA to establish national ambient air quality standards to protect public health and the environment. NAAQS are classified as either primary or secondary. Primary standards are meant to provide public health protection, including protecting the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

EPA has set NAAQS for several criteria air pollutants: ozone, NO_2, SO_2, CO, PM, and lead. PM includes $PM_{2.5}$, which is 2.5 microns or smaller in diameter, and PM_{10}, which is 10 microns or smaller in diameter. **Table 3.1-3** summarizes the current NAAQS and CAAQS and indicates the principal sources for each of these pollutants.

EPA classifies geographic areas as either attainment or non-attainment for each criteria air pollutant, based on whether the NAAQS have been achieved. Air districts in areas that are designated non-attainment must prepare regional air quality plans, discussed in further detail below, to be included in the overall State Implementation Plan. Areas that have a "maintenance" designation have been non-attainment for a certain criteria pollutant but have been re-designated as attainment. As shown in Table 3.1-3, the SFBAAB has been classified as non-attainment for ozone and $PM_{2.5}$.

Hazardous Air Pollutants

Federal law uses the term "hazardous air pollutants" (HAPs) to refer to the same types of compounds that are referred to as TACs under state law; refer to the discussion of state-identified TACs, below. Currently, 187 substances are regulated as HAPs. The federal CAA requires EPA to identify the National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare. More than 125 types of stationary sources are regulated under the NESHAPS, while mobile-source emissions of HAPs are regulated through vehicle and fuel standards.

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

On May 19, 2009, President Barack Obama announced a national policy for fuel efficiency and emissions standards in the U.S. 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)[61] 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 EPA calculation methods. These standards were formally adopted on April 1, 2010. In August 2012, standards were adopted for model year 2017 through 2025

[61] The CAFE 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 CAFE standards.

TABLE 3.1-3
STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS AND THE SAN FRANCISCO BAY AREA AIR BASIN'S ATTAINMENT STATUS

		National Standards		California Standards	
Pollutant	**Averaging Time**	**Concentration**	**Attainment Status**	**Concentration**	**Attainment Status**
Ozone	1 hour	—	—	0.09 ppm	Nonattainment
	8 hours	0.07 ppm	Nonattainment	0.070 ppm	Nonattainment
Carbon Monoxide	1 hour	35 ppm	Attainment	20 ppm	Attainment
	8 hours[a]	9.0 ppm	Attainment	9.0 ppm	Attainment
Nitrogen Dioxide	1 hour	0.100 ppm	Unclassified	0.18 ppm	Attainment
	Annual Avg.	0.053 ppm	Attainment	0.030 ppm	Attainment
Sulfur Dioxide	1 hour	0.075 ppm	Attainment	0.25 ppm	Attainment
	24 hours	0.14 ppm	Attainment	0.04 ppm	Attainment
	Annual Avg.	0.030 ppm	Attainment	—	—
Respirable Particulate Matter (PM_{10})	24 hours	150 µg/m^3	Nonattainment	50 µg/m^3	Nonattainment
	Annual Avg.	—	—	20 µg/m^3	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	24 hours	35 µg/m^3	Nonattainment	—	—
	Annual Avg.	12 µg/m^3	Unclassified/ Attainment	12 µg/m^3	Nonattainment
Lead	Monthly Avg.	—	—	1.5 µg/m^3	Attainment
	Quarterly	1.5 µg/m^3	Attainment	—	—
Hydrogen Sulfide	1 hour	—	—	0.03 ppm	Unclassified
Sulfates	24 hours	—	—	25 µg/m^3	Attainment
Visibility-Reducing Particles	8 hours	—	—	Extinction of 0.23/km; visibility of 10 miles or more	Unclassified
Vinyl Chloride	24 hours	—	—	0.01 ppm	—

NOTES:
µg/m^3 = micrograms per cubic meter; Avg. = Average; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ppb = parts per billion; ppm = parts per million
[a] A more-stringent 8-hour carbon monoxide state standard exists around Lake Tahoe (6 ppm).

SOURCE: Bay Area Air Quality Management District, *Air Quality Standards and Attainment Status*, updated January 5, 2017. Available at https://www.baaqmd.gov/about-air-quality/research-and-data/air-quality-standards-and-attainment-status. Accessed January 2, 2020.

passenger cars and light-duty trucks. By 2020, new vehicles were projected to achieve 41.7 mpg (if GHG reductions were 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 EPA, under these standards, a model year 2025 vehicle would emit half the GHG emissions of a model year 2010 vehicle.[62] In 2017, EPA recommended no change to the GHG standards for light-duty vehicles for model years 2022–2025.

62 U.S. Environmental Protection Agency and National Highway Traffic Safety Administration, *Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule*, May 5, 2010. Available at https://www.govinfo.gov/content/pkg/FR-2010-05-07/pdf/2010-8159.pdf. Accessed January 10, 2020.

In August 2018, EPA and the U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) proposed the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule. If adopted, the SAFE Vehicles Rule would maintain the CAFE and CO_2 standards applicable in model year 2020 for model years 2021–2026. 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, EPA published the final rule in the *Federal Register*.[63] EPA also published the final rule for the One National Program on Federal Preemption of State Fuel Economy Standards, which finalizes critical parts of the SAFE Vehicles Rule, making clear that federal law preempts state and local standards for tailpipe GHG emissions as well as zero-emission vehicle mandates.

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

State

California Clean Air Act and California Ambient Air Quality Standards

At the state level, CARB oversees California air quality policies and regulations. California has adopted its own air quality standards, known as CAAQS, as shown in Table 3.1-3. California's ambient standards are at least as protective as the NAAQS and are often more stringent.

In 1988, California enacted the California Clean Air Act (California Health and Safety Code Section 39600 et seq.), which called for the designation of areas as attainment or non-attainment based on state ambient air quality standards (i.e., the CAAQS), rather than the federal standards. The California Clean Air Act requires each air district in which CAAQS are exceeded to prepare a plan that documents reasonable progress toward attainment. If an air basin (or portion thereof) exceeds the CAAQS for a particular criteria air pollutant, it is considered to be non-attainment for that criteria air pollutant until the area can demonstrate compliance. As indicated in Table 3.1-3, the SFBAAB is classified as non-attainment for 8-hour ozone, 1-hour ozone, annual average PM_{10}, 24-hour PM_{10}, and annual average $PM_{2.5}$.

With respect to the criteria air pollutants identified only by the State of California (sulfates, visibility-reducing particles, and vinyl chloride), either the proposed project would not use materials that generate these pollutants during construction or day-to-day operations, and therefore would not emit those pollutants; or such emissions would be accounted for as part of the pollutants estimated in this analysis (visibility-reducing particles are associated with PM emissions and sulfates are associated with SO_2). Vinyl chloride is used when making PVC plastic and vinyl products and is emitted primarily by industrial processes.[64] Vinyl chloride would not be emitted directly during project construction or operations; therefore, the proposed project would

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63 *Federal Register*, Vol. 84, No. 188, pp. 51310–51363, Friday, September 27, 2019.

64 California Air Resources Board, *Vinyl Chloride & Health*. Available at https://ww2.arb.ca.gov/resources/vinyl-chloride-and-health. Accessed May 2020.

not emit vinyl chloride. In addition, CARB determined that the scientific evidence available is insufficient to support identifying a threshold exposure level for vinyl chloride; therefore, CARB does not monitor or make status designations for this pollutant.[65] Consequently, this EIR does not analyze project emissions of sulfates, visibility-reducing particles, and vinyl chloride.

The project may emit hydrogen sulfide through the operation of the water reclamation facilities. This topic is addressed below in Impact AQ-5.

Mobile-Source Regulations

Because the transportation sector accounts for a large percentage of California's CO_2 emissions, Assembly Bill (AB) 1493 (Health and Safety Code Sections 42823 and 43018.5) (also referred to as the "Pavley standards"), enacted on July 22, 2002, required CARB to set GHG emissions standards for passenger vehicles, light-duty trucks, and other vehicles manufactured in and after 2009 whose primary use is non-commercial personal transportation. The federal CAA ordinarily preempts state regulation of motor vehicle emissions standards; however, California is allowed to set its own standards with a federal CAA waiver from EPA. In June 2009, EPA granted California the waiver.

The EPA and the U.S. Department of Transportation adopted federal standards for model year 2012–2016 light-duty vehicles, which corresponds to the vehicle model years regulated under the state's Pavley Phase I standards. In August 2012, EPA and the U.S. Department of Transportation adopted GHG emissions standards for model year 2017–2025 vehicles; however, these standards were rescinded and replaced under the SAFE Vehicles Rule as discussed above.

In September 2019, 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 filed lawsuits in the U.S. District Court in Washington, D.C., challenging the federal determination that California cannot set vehicle emissions standards and zero-emission vehicle mandates.

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

Toxic Air Contaminants

The California Health and Safety Code defines TACs as air pollutants that may cause or contribute to an increase in mortality or in serious illness, or that may pose a present or potential hazard to human health. The State Air Toxics Program was established in 1983 under AB 1807. A total of 243 substances have been designated TACs under California law; they include the 187 (federal) HAPs adopted in accordance with state law. The Air Toxics "Hot Spots" Information

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65 California Air Resources Board, *Toxic Air Contaminant Identification List*, July 2011. Available at https://www.arb.ca.gov/toxics/id/taclist.htm. Accessed May 2020.

and Assessment Act of 1987 (AB 2588) seeks to identify, quantify, and evaluate risks from air toxics sources; however, AB 2588 does not regulate air toxics emissions.

In August 1998, CARB identified DPM emissions from diesel-fueled engines as a TAC.[66] Following this designation, in 2000, CARB approved its comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. Further regulations of diesel emissions by CARB include the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression Ignition Diesel Engines and Equipment Program. All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment (refer to the detailed discussion below).

California Air Resources Board On-Road and Off-Road Vehicle Rules

In 2004, CARB adopted an Airborne Toxic Control Measure (ATCM) to limit idling by heavy-duty diesel motor vehicles to reduce public exposure to DPM and other TACs. The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. This measure prohibits such vehicles from idling for more than 5 minutes at any given time.

In 2008 CARB approved the Truck and Bus Regulation to reduce NO_X, PM_{10}, and $PM_{2.5}$ emissions from existing diesel vehicles operating in California. The requirements, amended in December 2010, apply to nearly all diesel-fueled trucks and buses with a gross vehicle weight rating greater than 14,000 pounds. For the largest trucks in the fleet (those with a gross vehicle weight rating greater than 26,000 pounds), fleet owners could choose one of two methods to comply with the Truck and Bus Regulation's requirements:

- *Method 1:* The fleet owner could retrofit or replace engines, starting with the oldest engine model year, to meet 2010 engine standards or better. These retrofits or replacements are phased over 8 years, starting in 2015, and the entire fleet would be retrofitted or replaced by 2023. Thus, all trucks operating in California for fleet operators choosing this option must meet or exceed the 2010 engine emissions standards for NO_X and PM by 2023.
- *Method 2:* Starting in 2012, fleet owners choosing this option were required to retrofit a portion of their fleet with diesel particulate filters achieving at least 85 percent removal efficiency, so that by January 1, 2016, their entire fleet would be equipped with diesel particulate filters. However, diesel particulate filters do not typically lower NO_X emissions. Thus, fleet owners choosing this method would still have to comply with the 2010 engine emission standards for their trucks and buses by 2020. As of January 1, 2020, this requirement is enforced by the California Department of Motor Vehicles (DMV) through the vehicle registration process.

Senate Bill (SB) 1, the Road Repair and Accountability Act of 2017, was signed into law on April 28, 2017. SB 1 authorizes the DMV to check that vehicles are compliant with or exempt

66 California Air Resources Board, Overview: Diesel Exhaust and Health. Available at https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health. Accessed January 14, 2020.

from CARB's Truck and Bus Regulation. As of January 1, 2020, if a vehicle is not compliant with the rule, DMV will no longer register that vehicle.

In addition to limiting exhaust from idling trucks, CARB promulgated emission standards for off-road diesel construction equipment of greater than 25 horsepower such as bulldozers, loaders, backhoes and forklifts, as well as many other self-propelled off-road diesel vehicles. The regulation adopted by CARB on July 26, 2007, aims to reduce emissions by calling for installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission-controlled models. Implementation is staggered based on fleet size (the total of all off-road horsepower under common ownership or control). The largest fleets were to begin compliance by January 1, 2014. Each fleet must demonstrate compliance through one of two methods:

- *Method 1:* Calculate and maintain fleet-average emissions targets. This method encourages the retirement or repowering of older equipment and rewards the introduction of newer cleaner units into the fleet.
- *Method 2:* Meet the Best Available Control Technology (BACT) requirements by turning over or installing Verified Diesel Emission Control Strategies (e.g., engine retrofits) on a certain percentage of the total fleet horsepower. The compliance schedule requires full implementation of BACT turn-overs or retrofits by 2023 in all equipment in large and medium fleets and across 100 percent of small fleets by 2028.

Sustainable Communities and Climate Protection Act of 2008 (Senate Bill 375)

SB 375 directs CARB to set regional targets for reducing GHG emissions from cars and light trucks.[67] As part of the transportation planning process, each region's Metropolitan Planning Organization is responsible for preparing a Sustainable Communities Strategy that integrates transportation, land use, and housing policies to plan for achievement of the emissions target for their region. Specifically, SB 375 focuses on reducing vehicle miles traveled (VMT) and encouraging more compact, complete, and efficient communities. Further, SB 375 established CEQA streamlining and relevant exemptions for projects that are determined to be consistent with the land use assumptions and other relevant policies of an adopted Sustainable Communities Strategy.

Assembly Bill 900

AB 900, signed by Governor Jerry Brown in September 2011, established specified judicial review procedures for judicial review of EIRs and approvals granted for leadership projects related to the development of residential, retail, commercial, sports, cultural, entertainment, or recreational use projects, or clean renewable energy or clean energy manufacturing projects. The law authorizes the governor to certify a leadership project for streamlining if certain conditions are met. To qualify for certification as an environmental leadership development project, the project must:

- Exceed $100 million in investment in California;
- Satisfy the prevailing and living wage requirements of Public Resources Code Section 21183(b);

[67] Governor's Office of Planning and Research, *Senate Bill 375 CEQA Provision Flow Charts*, February 2011.

- Achieve Leadership in Energy and Environmental Design (LEED) Gold certification;
- Result in "no net additional" GHG emissions; and
- Achieve at least 15 percent greater transportation efficiency than comparable projects.

The proposed project sought AB 900 certification and obtained the certification as of December 30, 2019. This certification is voluntary and provides streamlined CEQA judicial review.[68]

Through the AB 900 certification process, CARB confirmed that the various project commitments to reduce GHG emissions, including the acquisition of carbon credits, will result in "no net additional" GHG emissions for the life of the project. In making this determination, CARB has required the project applicant to purchase GHG offset credits to fully offset the projected net increase in GHG emissions attributable to the proposed project on a prorated basis at the time each phase is permitted by the lead agency (the City of San José). The City has committed to monitor and enforce the applicant's commitment that the project result in no net additional GHG emissions for the life of the obligation, including the extent to which the applicant relies on GHG offsets, as a condition of project approval.

These reductions in GHG emissions will result in the co-benefit of reducing emissions of criteria pollutant and TACs, given that many of the processes that result in GHG emissions (e.g., fuel combustion) also emit criteria pollutants and TACs.

California Building and Energy Efficiency Standards (Title 24)

The California Energy Commission first adopted Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the state. Although not originally intended to reduce emissions of criteria pollutants or TACs, increased energy efficiency and reduced consumption of natural gas and other fuels would result in fewer criteria pollutant and TAC emissions from residential and non-residential buildings subject to the standard. The standards are updated periodically (typically every three years) to allow for the consideration and inclusion of new energy efficiency technologies and methods.[69]

The Title 24, Part 6, standards (2016 standards) became effective on January 1, 2017. The most recent update to the Title 24 energy efficiency standards (2019 standards) went into effect on January 1, 2020. The proposed project would adhere to the applicable version of Title 24 as conditions of approval for subdivision maps, site development and planned development permits, grading permits, and demolition permits.

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68 Governor's Office of Planning and Research, *Downtown West Mixed-Use Plan*, 2019. Available at http://opr.ca.gov/ceqa/california-jobs.html. Accessed February 4, 2020.

69 California Energy Commission, *California's 2016 Building Energy Efficiency Standards for Residential and Nonresidential Buildings*, 2016. Available at http://www.energy.ca.gov/2015publications/CEC-400-2015-037/CEC-400-2015-037-CMF.pdf. Accessed March 5, 2019.

California Green Buildings Standards Code

Part 11 of the Title 24 Building Energy Efficiency Standards is referred to as the California Green Building Standards (CALGreen) Code. The CALGreen Code is intended to encourage more sustainable and environmentally friendly building practices, require low-pollution emitting substances that cause less harm to the environment, conserve natural resources, and promote the use of energy-efficient materials and equipment.

Since 2011, the CALGreen Code has been mandatory for all new residential and non-residential buildings constructed in the state. Such mandatory measures include energy efficiency, water conservation, material conservation, planning and design, and overall environmental quality. The CALGreen Code was most recently updated in 2019 to include new mandatory measures for residential and non-residential uses; the new measures took effect on January 1, 2020.[70]

Regional

BAAQMD has jurisdiction over the SFBAAB and monitors and regulates air quality in the region by inspecting and issuing permits for stationary sources of air pollution, responding to citizen complaints, and executing programs to reduce air pollution throughout the region.

BAAQMD Air Quality Plans

As demonstrated in Table 3.1-3, the SFBAAB is designated as nonattainment for both the federal and state ozone standards. As a result, BAAQMD is required to prepare air quality plans under the CAA and the California Clean Air Act to meet the federal and state air quality standards in areas that are designated non-attainment. Maintenance plans are required for attainment areas that had previously been designated non-attainment to ensure continued attainment of the standards. Because of the SFBAAB's classification as "serious" non-attainment for the 1-hour ozone standard, BAAQMD is required to update its Clean Air Plan every three years to reflect progress toward meeting attainment status. The SFBAAB currently has four air quality plans in place, discussed below.

2001 Ozone Attainment Plan. The 2001 Ozone Attainment Plan was developed for compliance with the NAAQS for the 1-hour ozone standard. In June 2005, EPA revoked the standard for 1-hour ozone; however, the state standard for 1-hour ozone remains. Therefore, BAAQMD continues to implement the strategies outlined in the 2001 Ozone Attainment Plan.

2005 Bay Area Ozone Strategy. The 2005 Bay Area Ozone Strategy served as an update to the 2001 Ozone Attainment Plan and expanded on strategies to achieve compliance with the state 1-hour ozone standard.

2010 Clean Air Plan. The 2010 Clean Air Plan addresses various pollutants including ozone, PM, and air toxics, as well as GHGs within the SFBAAB.

[70] As adopted by the San José City Council in October 2019, the 2019 California Building Standard Codes, including CALGreen, do not apply to already filed building permits. The new codes do, however, apply to projects that have filed for planning permits but not building permits.

Clean Air Plan. In April 2017, BAAQMD adopted the *2017 Clean Air Plan*, whose primary goals are to protect public health and to protect the climate.[71] 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 three-year update requirement of the code). 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, PM, air toxics, and GHGs. Other measures focus on a single type of pollutant: super GHGs such as methane and black carbon that consist 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
- Super GHG Control Measures

BAAQMD CEQA Guidelines and Thresholds of Significance

The *BAAQMD CEQA Air Quality Guidelines* is an advisory document that provides lead agencies, consultants, and project proponents with procedures for assessing air quality impacts and preparing environmental review documents. The document describes the criteria that 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 methods for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts.

BAAQMD updated the 1999 CEQA Air Quality Guidelines in 2010. In May 2011, 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 its 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 methods for evaluating risks and hazards for the siting of stationary sources and of sensitive receptors.

71 Bay Area Air Quality Management District, *Clean Air Plan, Spare the Air, Cool the Climate*, April 19, 2017. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed January 16, 2020.

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] 62 Cal.4th 369). 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.

BAAQMD most recently updated its *CEQA Air Quality Guidelines* in May 2017. These guidelines provide recommend quantitative significance thresholds along with direction on recommended analysis methods. BAAQMD states that the quantitative significance thresholds are "advisory and should be followed by local governments at their own discretion," and that lead agencies are fully within their authority to develop their own thresholds of significance. However, BAAQMD offers these thresholds for lead agencies to use in order to inform environmental review for development projects in the Bay Area. Lead agencies may also reference the *CEQA Thresholds Options and Justification Report* developed by BAAQMD staff in 2009. This option provides lead agencies with a justification for continuing to rely on the BAAQMD 2011 thresholds.

Bay Area Air Quality Management District Rule 1-301

BAAQMD regulates odorous emissions that could be generated by wastewater treatment plants. Rule 1-301 (Public Nuisance) states that sources cannot emit air contaminants that cause nuisance to a considerable number of persons. Nuisance is defined as three or more violation notices validly issued in a 30-day period to a facility for public nuisance.

Bay Area Air Quality Management District Regulation 2, Rules 1, 2, and 5

BAAQMD regulates stationary-source emissions of TACs through Regulation 2, Rule 1 (General Permit Requirements), Rule 2 (New Source Review), and Rule 5 (New Source Review of Toxic Air Contaminants). Under these rules, all stationary sources that have the potential to emit TACs above a certain level are required to obtain permits from BAAQMD. These rules provide guidance for the review of new and modified stationary sources of TAC emissions, including evaluation of health risks and potential mitigation measures.

The regulation also reduces health risks by requiring improved pollution control when existing sources are modified or replaced. If it is determined that a facility's emissions would exceed BAAQMD's threshold of significance for TACs, the source would then be required to implement BACT for Toxics to reduce emissions. Sources of HAPs may also be required to implement Maximum Achievable Control Technology.

Bay Area Air Quality Management District Regulation 6, Rule 2

BAAQMD reduces emissions from commercial cooking equipment through Regulation 6, Rule 2 (Commercial Cooking Equipment). This rule applies to operators of both chain-driven and under-fired charbroilers; it includes requirements for the installation of emission control devices and imposes emissions limits for PM_{10} and organic compounds per pounds of beef cooked. This rule also includes requirements for the maintenance of emissions control devices installed or operated under this rule.

Bay Area Air Quality Management District Regulation 6, Rule 6

BAAQMD regulates the quantity of PM in the atmosphere through Regulation 6, Rule 6 (Prohibition of Trackout). This measure controls trackout of solid material onto public paved roads from three types of sites: large bulk material sites, large construction sites, and large disturbed area sites. Under this regulation, the owners and operators of a construction site are required to clean up trackout on public roadways within four hours of identification and at the conclusion of each workday. The rule also includes requirements regarding the emission of fugitive dust during cleanup of trackout, and requirements for monitoring and reporting trackout at regulated sites.

Bay Area Air Quality Management District Regulation 7

Regulation 7 (Odorous Substances) specifies limits for the discharge of odorous substances where BAAQMD receives complaints from 10 or more complainants within a 90-day period. Among other things, Regulation 7 prohibits the discharge of an odorous substance that causes the ambient air at or beyond the property line to be odorous after dilution with four parts of odor-free air (i.e., 5 D/T), and specifies maximum limits on the emission of certain odorous compounds.

Bay Area Air Quality Management District Regulation 8, Rule 3

Through Regulation 8, Rule 3 (Architectural Coatings), BAAQMD regulates the quantity of VOCs in architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured. This rule imposes VOC content limits on architectural coatings and includes requirements for painting practices, solvent usage and storage, and compliance monitoring and reporting practices.

Bay Area Air Quality Management District Regulation 8, Rule 8

BAAQMD regulates emissions of organic compounds from wastewater collection and separation systems through Regulation 8, Rule 8 (Wastewater Collection and Separation Systems). This rule requires that wastewater separators be operated within their maximum allowable capacity and that separators be outfitted with certain equipment. The rule also includes equipment requirements for certain types of accessory devices and units to reduce emissions of organic compounds.

Bay Area Air Quality Management District Regulation 9, Rule 2

BAAQMD regulates ground-level concentrations of hydrogen sulfide through Regulation 9, Rule 2 (Inorganic Gaseous Pollutants: Hydrogen Sulfide). Regulation 9, Rule 2 requires that hydrogen sulfide emissions not result in ground-level concentrations in excess of 0.06 ppm averaged over three consecutive minutes or 0.03 ppm averaged over any 60 consecutive minutes.

Bay Area Air Quality Management District Regulation 9, Rule 3

BAAQMD regulates NO_X emissions from heat transfer operations through Regulation 9, Rule 3 (Nitrogen Oxides from Heat Transfer Operations). This rule sets limits on emissions of NO_X from new heat transfer operations by requiring that heat transfer operations designed for a maximum heat output of 264 gigajoules per hour not exceed 125 ppm of NO_X when burning gaseous fuel, and not exceed 225 ppm of NO_X when burning liquid fuel.

Bay Area Air Quality Management District Regulation 9, Rule 8

BAAQMD regulates emissions of NO_X and CO from stationary internal combustion engines through Regulation 9, Rule 8 (Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines). The rule imposes emissions limits on spark-ignited engines powered by waste and fossil-derived fuels, compression-ignited engines, and dual fuel pilot compression-ignited engines. The rule also limits the hours of operation for emergency standby engines, which must be equipped with a non-resettable totalizing meter that measures either hours of operation or fuel usage. Usage records must be kept for two years and be available for inspection by BAAQMD.

Bay Area Air Quality Management District Regulation 11, Rule 1

BAAQMD controls emissions of lead into the atmosphere through Regulation 11, Rule 1 (Lead). This rule limits emissions of lead to 6.75 kilograms per day and prohibits the discharge of lead that would result in ground-level concentrations greater than 1.0 $\mu g/m^3$ averaged over 24 hours.

Bay Area Air Quality Management District Regulation Rule 11-2

BAAQMD controls emissions of asbestos to the atmosphere during demolition, renovation, milling, and manufacturing through Regulation 11, Rule 2 (Asbestos Demolition, Renovation, and Manufacturing). This rule prohibits the use of asbestos on certain roadways, in molded insulating materials, and on buildings during construction, alteration, and/or repair.

The rule also prohibits visible emissions from any operation involving the demolition, renovation, removal, manufacture, or fabrication of asbestos-containing products. During demolition, renovation, or removal of any asbestos-containing materials, the responsible party must implement procedures that may specify the following details:

- The wetting method
- The exhaust and collection method
- Certain scheduling of demolition activities
- Procedures for removal in units
- Removal by chute or container
- Fulfillment of the containment requirement
- Fulfillment of the clean work site requirement
- Required surveys
- Inclusion of an on-site representative
- Procedures for regulated asbestos-containing material discovered after demolition

- Procedures for ordered demolition
- Procedures for intentional burning
- Procedures for emergency renovation

This rule also includes required procedures for waste disposal and requirements for waste disposal sites to prevent emissions from asbestos-containing materials.

Bay Area Air Quality Management District Regulation 14, Rule 1

BAAQMD improves air quality, reduces emissions of GHGs and other air pollutants, and decreases traffic congestion in the SFBAAB through Regulation 14, Rule 1 (Bay Area Commuter Benefits Program). This program encourages employees to commute to work using alternative transportation modes by requiring employers to offer commuter benefits to all covered employees. Employers comply with this rule by offering a pre-tax benefit, and employer-paid benefit, or employer-provided transit. Alternatively, employers can comply with this rule through an alternative commuter benefit program that must be proposed in writing, must comply with the guidelines issued by the Air Pollution Control Officer, and must be approved in writing by the Air Pollution Control Officer. Employers are required to notify employees of which benefits will be offered and how to obtain these benefits.

Planning Healthy Places

In 2016, BAAQMD prepared its *Planning Healthy Places* guidebook to assist local governments, planners, elected officials, developers, community groups, and other parties in addressing and minimizing potential air quality issues associated with local sources of air pollutants, especially TACs and PM. The guidebook provides best management strategies to reduce emissions and human exposure to pollutants that can be implemented in city or county general plans, neighborhood or specific plans, land use development ordinances, or individual projects.

BAAQMD has developed a map identifying areas where best management practices should be applied, and where further study is needed.[72] As shown on the Planning Healthy Places map, the project site is located in an area where the recommended best management practices should be applied to reduce exposure and subsequent health impacts associated with air pollution. Best management practices recommended by the Planning Healthy Places guidebook include a number of emissions reduction strategies, some of which have been incorporated into the *Envision San José 2040 General Plan* (General Plan), discussed in further detail below.

Community Air Risk Evaluation Program

Under the CARE program, BAAQMD has identified areas with high TAC emissions (referred to in this context as “priority” or “impacted” communities) and sensitive populations that could be affected by them, and to uses this information to establish policies and programs to reduce TAC

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[72] Bay Area Air Quality Management District, *Planning Healthy Places. Interactive Map of Location of Communities and Places Estimated to Have Elevated Levels of Fine Particulates and/or Toxic Air Contaminants*, May 20, 2016. Available at https://www.arcgis.com/home/webmap/viewer.html?webmap=9b240e706e6545e0996be9df227a5b8c &extent=-122.5158,37.5806,-122.0087,37.8427. Accessed January 21, 2020.

emissions and exposures.[73,74] To date, BAAQMD has identified Concord, Richmond/San Pablo, central San José, eastern San Francisco, western Alameda County, Vallejo, San Rafael, and Pittsburg/Antioch as CARE-impacted communities where TACs, $PM_{2.5}$, and ozone have the greatest impact on human health.[75] The main objectives of the program are:

- Evaluate potential health risks associated with exposure to TACs from both stationary and mobile sources.
- Assess potential exposures to sensitive receptors and identify impacted communities.
- Prioritize TAC reduction measures for significant TAC sources in impacted communities.
- Develop and implement mitigation measures—such as grants, guidelines, or regulations—to improve air quality, focusing initially on priority communities.

Metropolitan Transportation Commission/Association of Bay Area Governments Sustainable Communities Strategy

The Metropolitan Transportation Commission (MTC) is the federally recognized Metropolitan Planning Organization for the nine-county Bay Area, which includes Santa Clara County and the city of San José. On July 18, 2013, *Plan Bay Area* was jointly approved by the Association of Bay Area Governments' Executive Board and by MTC.[76] The plan includes the region's Sustainable Communities Strategy, as required under SB 375, and the 2040 Regional Transportation Plan.

The Sustainable Communities Strategy lays out how the region will meet GHG emissions reduction targets set by CARB. CARB's current targets call for the region to reduce per capita vehicular GHG emissions 10 percent by 2020 and 19 percent by 2035 from a 2005 baseline.[77]

A central GHG reduction strategy of *Plan Bay Area* (2013) is the concentration of future growth within Priority Development Areas and Transit Priority Areas. To be eligible for designation as a Priority Development Area, an area must be within an existing community, near existing or planned fixed transit or served by comparable bus service, and planned for more housing. A Transit Priority Area is an area within one-half mile of an existing or planned major transit stop such as a rail transit station, a ferry terminal served by transit, or the intersection of two or more

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73 Bay Area Air Quality Management District, CARE Program, 2014. Available at http://www.baaqmd.gov/plans-and-climate/community-air-risk-evaluation-care-program. Accessed January 21, 2020.

74 Bay Area Air Quality Management District, *Identifying Areas with Cumulative Impacts from Air Pollution in the San Francisco Bay Area, Version 2*, March 2014. Available at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CARE%20Program/Documents/ImpactCommunities_2_Methodology.ashx?la=en. Accessed January 21, 2020.

75 Bay Area Air Quality Management District, Community Air Risk Evaluation Program, 2020. Available at https://www.baaqmd.gov/community-health/community-health-protection-program/community-air-risk-evaluation-care-program. Accessed February 3, 2020.

76 Metropolitan Transportation Commission and Association of Bay Area Governments, *Plan Bay Area: Strategy for a Sustainable Region*, adopted July 18, 2013. Available at http://files.mtc.ca.gov/pdf/Plan_Bay_Area_FINAL/Plan_Bay_Area.pdf, accessed June 2020.

77 California Air Resources Board, *SB 375 Regional Greenhouse Gas Emissions Reduction Targets*, 2018. Available at https://www.arb.ca.gov/cc/sb375/finaltargets2018.pdf. Accessed June 2020.

major bus routes.[78] The project site is located within both a Priority Development Area and a Transit Priority Area.

On July 26, 2017, MTC adopted *Plan Bay Area 2040*, a focused update that builds upon the growth pattern and strategies developed in the original *Plan Bay Area* (2013), but with updated planning assumptions that incorporate key economic, demographic, and financial trends since the original plan was adopted.[79]

Local

City of San José Municipal Code

Per Chapter 17.84.220, Green Building Compliance Requirements, of the City of San José Municipal Code[80]:

A. No building permit shall be issued for a tier one project unless the application for building permit contains a completed GreenPoint Rated Checklist or LEED Checklist.

B. All tier two commercial industrial projects for which this chapter is applicable must receive the minimum green building certification of LEED Silver and tier two residential projects shall receive the minimum green building certification of LEED Certified or GreenPoint Rated.[81]

C. High-rise residential projects for which this chapter is applicable shall receive certification as the minimum green building performance requirement of USGBC [U.S. Green Building Council] LEED™ Certified.

D. Mixed-use new construction projects, for which this chapter is applicable, must submit a checklist and receive the minimum green building new construction certification designation for the portion of the building under the requirements of the applicable subsections of this section above.

These green building requirements are further regulated through the San José Reach Code, which is a building code that is more advanced than those required by the state. The Reach Code encourages building electrification and energy efficiency, requires solar readiness on non-residential buildings, and requires electric vehicle (EV) readiness and installation of EV equipment.

As of October 2019, Chapter 24 (24.10.200) of the City's Municipal Code requires that for all new high-rise and low-rise multifamily buildings, 10 percent of the total number of parking spaces on a building site provided for all types of parking facilities shall be EV supply equipment spaces, 20 percent of the total number of parking spaces provided for all types of parking facilities shall be EV Ready spaces, and 70 percent of the total number of parking spaces for all

78 Metropolitan Transportation Commission and Association of Bay Area Governments, *Plan Bay Area*, adopted July 18, 2013. Available at http://files.mtc.ca.gov/pdf/Plan_Bay_Area_FINAL/Plan_Bay_Area.pdf, accessed June 2020.

79 Metropolitan Transportation Commission and Association of Bay Area Governments, *Plan Bay Area 2040*, adopted July 26, 2017. Available at https://www.planbayarea.org/, accessed March 6, 2019. Accessed June 2020.

80 City of San José, *San José Municipal Code*, Chapter 17.84, Green Building Regulations for Private Development. Available at https://library.municode.com/ca/san_jose/codes/code_of_ordinances?nodeId=TIT17BUCO_CH17.84GRBUREPRDE.

81 A tier two commercial/industrial project is a non-residential building of 25,000 gsf or more and not a high-rise building (i.e., less than 75 feet in height), in accordance with San José Municipal Code Sections 17,81.112 and 17.84.121.

types of parking facilities shall be EV Capable spaces. For all non-residential buildings, 10 percent of total parking spaces shall be EV supply equipment spaces and an additional 40 percent shall be EV Capable spaces. 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 pollutant emissions associated with traditional vehicle fuel combustion.

In November 2019, the City of San José adopted Municipal Code Chapter 17.845, also known as Ordinance No. 30330. Chapter 17.845 prohibits natural gas infrastructure in newly constructed single-family dwellings, low-rise residential buildings (three stories or less), and detached accessory dwelling units. This requirement became effective on January 1, 2020.[82]

Other relevant regulations that would reduce emissions include: water efficient landscape standards for new and rehabilitated landscaping (Chapter 15.10), transportation demand management programs for employers with more than 100 employees (Chapter 11.105), construction and demolition diversion deposit program (Chapter 9.10), and wood burning ordinance (Chapter 9.10).

Envision San José 2040 General Plan

The General Plan, adopted November 1, 2011, and amended on March 16, 2020, lays out 12 interrelated, mutually supportive major strategies that provide a basis for the City's vision for future development. The strategies relate to economic development through job creation, providing more housing so that people who work in San José will also reside there, and developing Downtown as a social and cultural center. The General Plan also describes five major strategies directly related to air quality:

- **Major Strategy #3, Focused Growth**, aims to focus significant growth "in areas surrounding the City's regional Employment Center… and to maximize the use of transit systems within the region."
- **Major Strategy #5, Urban Villages**, aims to create Urban Villages that are walkable, bike friendly, transit accessible, and located near existing infrastructure and facilities.
- **Major Strategy #6, Streetscapes for People**, aims to increase the walkability of the city through maintenance of "a land use and transportation network and transportation facilities that promote increased walking, bicycling, and public transit use."
- **Major Strategy #7, Measurable Sustainability/Environmental Stewardship**, aims to support environmental best practices to "minimize waste, efficiently use its natural resources, and manage and conserve resources for use by present and future generations" including participation in "regional efforts intended to improve the quality of air."
- **Major Strategy #11, Design for a Healthful Community**, aims to support the health of the community by promoting alternative modes of transportation, including walking and bicycling which will support healthful air quality within the community.

The General Plan includes policies to minimize impacts on environmental resources, including air quality. To achieve goals related to reduction of air pollutant emissions, TACs, objectionable

[82] City of San José, Ordinance No. 30330, 2019. Available at https://records.sanjoseca.gov/Ordinances/ORD30330.pdf.

odors, and construction air pollutant emissions, the General Plan has outlined various policies and actions to be implemented by the City and project proponents. **Table 3.1-4** summarizes the General Plan policies that address air quality.

TABLE 3.1-4
ENVISION SAN JOSÉ 2040 GENERAL PLAN POLICIES PERTAINING TO THE PROJECT'S AIR QUALITY

Environmental Resource Policy	Description
Green Building	
Policy MS-1.2	Continually increase the number and proportion of buildings within San José that make use of green building practices by incorporating those practices into both new construction and retrofit of existing structures.
Policy MS-1.7	Encourage retrofits for existing buildings throughout San José to use green building principles in order to mitigate the environmental, economic, and social impact of those buildings, to achieve greenhouse gas reductions, and to improve air and water quality.
Policy MS-1.8	Document and report on green building new construction and retrofits as a means to show progress toward the Green Vision Goal of 50 million square feet of green buildings in San José by 2022 and 100 million square feet by 2040.
Policy MS-2.6	Promote roofing design and surface treatments that reduce the heat island effect of new and existing development and support reduced energy use, reduced air pollution, and a healthy urban forest. Connect businesses and residents with cool roof rebate programs through City outreach efforts.
Policy MS-2.12	Update the Green Building Ordinance to require use of energy efficient plumbing fixtures and appliances that are WaterSense certified, Energy Star rated, or equivalent, in new construction and renovation projects.
Policy MS-5.5	Maximize recycling and composting from all residents, businesses, and institutions in the City.
Policy MS-5.6	Enhance the construction and demolition debris recycling program to increase diversion from the building sector.
Healthful Indoor Environment	
Policy MS-4.1	Promote the use of building materials that maintain healthful indoor air quality in an effort to reduce irritation and exposure to toxins and allergens for building occupants.
Policy MS-4.2	Encourage construction and pre-occupancy practices to improve indoor air quality upon occupancy of the structure.
Action MS-4.3	Develop and implement policies and ordinances to promote the use of building materials, furniture and paint that maintain healthful indoor air quality and to discourage the use of materials that degrade indoor air quality.
Action MS-4.4	Develop and implement policies and ordinances to promote beneficial construction and pre-occupancy practices such as sealing of the HVAC system during construction, air flush-outs prior to occupancy, and/or air quality testing and corrections prior to occupancy.
Air Quality	
Policy MS-10.1	Assess projected air emissions from new development in conformance with the Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines and relative to state and federal standards. Identify and implement feasible air emission reduction measures.
Policy MS-10.2	Consider the cumulative air quality impacts from proposed developments for proposed land use designation changes and new development, consistent with the region's Clean Air Plan and state law.
Policy MS-10.3	Promote the expansion and improvement of public transportation services and facilities, where appropriate, to both encourage energy conservation and reduce air pollution.
Policy MS-10.4	Encourage effective regulation of mobile and stationary sources of air pollution, both inside and outside of San José. In particular, support federal and state regulations to improve automobile emission controls.
Policy MS-10.5	In order to reduce vehicle miles traveled and traffic congestion, require new development within 2,000 feet of an existing or planned transit station to encourage the use of public transit and minimize the dependence on the automobile through the application of site design guidelines and transit incentives.

TABLE 3.1-4
ENVISION SAN JOSÉ 2040 GENERAL PLAN POLICIES PERTAINING TO THE PROJECT'S AIR QUALITY

Environmental Resource Policy	Description
Policy MS-10.6	Encourage mixed land use development near transit lines and provide retail and other types of service oriented uses within walking distance to minimize automobile dependent development.
Policy MS-10.7	Encourage regional and statewide air pollutant emission reduction through energy conservation to improve air quality.
Policy MS-10.8	Minimize vegetation removal required for fire prevention. Require alternatives to discing, such as mowing, to the extent feasible. Where vegetation removal is required for property maintenance purposes, encourage alternatives that limit the exposure of bare soil.
Policy MS-10.9	Foster educational programs about air pollution problems and solutions
Action MS-10.10	Actively enforce the City's ozone-depleting compound ordinance and supporting policy to ban the use of chlorofluorocarbon compounds (CFCs) in packaging and in building construction and remodeling. The City may consider adopting other policies or ordinances to reinforce this effort to help reduce damage to the global atmospheric ozone layer.
Action MS-10.11	Enforce the City's wood-burning appliance ordinance to limit air pollutant emissions from residential and commercial buildings.
Action MS-10.12	Increase the City's alternative fuel vehicle fleet with the co-benefit of reducing local air emissions. Implement the City's Environmentally Preferable Procurement Policy (Council Policy 4-6) and Pollution Prevention Policy (Council Policy 4-5) in a manner that reduces air emissions from municipal operations. Support policies that reduce vehicle use by City employees.
Action MS-10.13	As a part of City of San José Sustainable City efforts, educate the public about air polluting household consumer products and activities that generate air pollution. Increase public awareness about the alternative products and activities that reduce air pollutant emissions.
Action MS-10.14	Review and evaluate the effectiveness of site design measures, transit incentives, and new transportation technologies and encourage those that most successfully reduce air pollutant emissions.
Policy MS-11.1	Require completion of air quality modeling for sensitive land uses such as new residential developments that are located near sources of pollution such as freeways and industrial uses. Require new residential development projects and projects categorized as sensitive receptors to incorporate effective mitigation into project designs or be located an adequate distance from sources of toxic air contaminants (TACs) to avoid significant risks to health and safety.
Policy MS-11.2	For projects that emit toxic air contaminants, require project proponents to prepare health risk assessments in accordance with BAAQMD-recommended procedures as part of environmental review and employ effective mitigation to reduce possible health risks to a less than significant level. Alternatively, require new projects (such as, but not limited to, industrial, manufacturing, and processing facilities) that are sources of TACs to be located an adequate distance from residential areas and other sensitive receptors.
Policy MS-11.3	Review projects generating significant heavy duty truck traffic to designate truck routes that minimize exposure of sensitive receptors to TACs and particulate matter.
Policy MS-11.4	Encourage the installation of appropriate air filtration at existing schools, residences, and other sensitive receptor uses adversely affected by pollution sources.
Policy MS-11.5	Encourage the use of pollution absorbing trees and vegetation in buffer areas between substantial sources of TACs and sensitive land uses.
Action MS-11.6	Develop and adopt a comprehensive Community Risk Reduction Plan that includes: baseline inventory of toxic air contaminants (TACs) and particulate matter smaller than 2.5 microns ($PM_{2.5}$), emissions from all sources, emissions reduction targets, and enforceable emission reduction strategies and performance measures. The Community Risk Reduction Plan will include enforcement and monitoring tools to ensure regular review of progress toward the emission reduction targets, progress reporting to the public and responsible agencies, and periodic updates of the plan, as appropriate.
Action MS-11.7	Consult with BAAQMD to identify stationary and mobile TAC sources and determine the need for and requirements of a health risk assessment for proposed developments.
Action MS-11.8	For new projects that generate truck traffic, require signage which reminds drivers that the State truck idling law limits truck idling to five minutes.

TABLE 3.1-4
ENVISION SAN JOSÉ 2040 GENERAL PLAN POLICIES PERTAINING TO THE PROJECT'S AIR QUALITY

Environmental Resource Policy	Description
Policy MS-12.1	For new, expanded, or modified facilities that are potential sources of objectionable odors (such as landfills, green waste and resource recovery facilities, wastewater treatment facilities, asphalt batch plants, and food processors), the City requires an analysis of possible odor impacts and the provision of odor minimization and control measures as mitigation.
Policy MS-12.2	Require new residential development projects and projects categorized as sensitive receptors to be located an adequate distance from facilities that are existing and potential sources of odor. An adequate separation distance will be determined based upon the type, size and operations of the facility.
Policy MS-13.1	Include dust, particulate matter, and construction equipment exhaust control measures as conditions of approval for subdivision maps, site development and planned development permits, grading permits, and demolition permits. At minimum, conditions shall conform to construction mitigation measures recommended in the current BAAQMD CEQA Guidelines for the relevant project size and type.
Policy MS-13.2	Construction and/or demolition projects that have the potential to disturb asbestos (from soil or building material) shall comply with all the requirements of the California Air Resources Board's air toxics control measures (ATCMs) for Construction, Grading, Quarrying, and Surface Mining Operations.
Policy MS-13.3	Require subdivision designs and site planning to minimize grading and use landform grading in hillside areas.
Action MS-13.4	Adopt and periodically update dust, particulate, and exhaust control standard measures for demolition and grading activities to include on project plans as conditions of approval based upon construction mitigation measures in the BAAQMD CEQA Guidelines.
Action MS-13.5	Prevent silt loading on roadways that generates particulate matter air pollution by prohibiting unpaved or unprotected access to public roadways from construction sites.
Action MS-13.6	Revise the grading ordinance and condition grading permits to require that graded areas be stabilized from the completion of grading to commencement of construction.
Action MS-15.9	Train City code enforcement and development review staff in state-of-the-art renewable energy installations, Heating, Ventilation, and Air Conditioning (HVAC) and insulation industry standards, best practices, and resources to ensure buildings are constructed in compliance with those industry standards and best practices.
Extractive Resources	
Policy ER-11.4	Carefully regulate the quarrying of commercially usable resources, including sand and gravel, to mitigate potential environmental effects such as dust, noise and erosion.
Environmental Contamination	
Action EC-7.10	Require review and approval of grading, erosion control and dust control plans prior to issuance of a grading permit by the Director of Public Works on sites with known soil contamination. Construction operations shall be conducted to limit the creation and dispersion of dust and sediment runoff.
Wastewater Treatment and Water Reclamation	
Policy IN-4.4	Maintain and operate wastewater treatment and water reclamation facilities in compliance with all applicable local, State and federal clean water, clean air, and health and safety regulatory requirements.
General Plan Annual Review and Measure Sustainability	
Policy IP-3.8	Consistent with the City's Green Vision, evaluate achievement of the following goals for environmental sustainability as part of each General Plan annual review process: Continue to increase the City's alternative fuel vehicle fleet with the co-benefit of reducing local air emissions and continue to implement the City's environmentally Preferable Procurement Policy (Council Policy 4-6) and Pollution Prevention Policy (Council Policy 4-5) in a manner that reduces air emissions from municipal operations. Continue to support policies that reduce vehicle use by City employees. (Air Pollutant Emission Reduction Action MS-10.12)

TABLE 3.1-4
ENVISION SAN JOSÉ 2040 GENERAL PLAN POLICIES PERTAINING TO THE PROJECT'S AIR QUALITY

Environmental Resource Policy	Description
Policy IP-17.1	Use San José's adopted Green Vision as a tool to advance the General Plan Vision for Environmental Leadership. San José's Green Vision is a comprehensive fifteen-year plan to create jobs, preserve the environment, and improve quality of life for our community, demonstrating that the goals of economic growth, environmental stewardship and fiscal sustainability are inextricably linked. Adopted in 2007, San José's Green Vision establishes the following Environmental Leadership goals through 2022: Receive 100 percent of our electrical power from clean renewable sources; The liabilities of fossil fuel usage are increasingly plain; in contrast, pursuing electrical power from clean, renewable sources is projected to reduce harmful air pollutants, long-term operating costs, and carbon emissions for the entire community.

In addition to the policies directly related to air quality, the General Plan includes the following measures that would indirectly reduce emissions and associated health risks through increased energy efficiency, encouraging alternative modes of transportation, and increased water efficiency: MS-1.1, MS-2.2, MS-2.3, MS-2.8, MS-2.11, MS-3.1, MS-3.3, MS-14.4, LU-1.1, LU-1.2, LU-1.3, LU-1.7, LU-3.5, LU-5.1, LU-9.1, LU-9.3, LU-10.3, LU-10.4, TR-1.1, TR-1.2, TR-1.3, TR-4.1, TR-4.3, and TR-9.1. For further discussion of these policies, refer to Section 3.4, *Energy*; Section 3.8, *Hydrology and Water Quality*; and Section 3.13, *Transportation*.

The General Plan also includes the following policies that address potentially airborne hazardous materials: EC-6.4, EC-6.6, EC-6.8, EC-6.9, EC-7.2, EC-7.4, EC-7.5, EC-7.8, and EC-7.10. For further discussion of these policies, refer to Section 3.7, *Hazards and Hazardous Materials*.

3.1.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR, an air quality impact would be significant if implementing the project would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

As discussed in CEQA Guidelines Section 15064(b), the determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the lead agency and must be based on scientific and factual data to the extent possible. The City of San José has determined that the BAAQMD significance thresholds for air quality, as described in the *CEQA Air Quality Guidelines* from May 2017, would be appropriate for the project. **Table 3.1-5** summarizes the significance thresholds used in this analysis.

TABLE 3.1-5
BAY AREA AIR QUALITY MANAGEMENT DISTRICT CEQA AIR QUALITY SIGNIFICANCE THRESHOLDS

Pollutant	Construction Thresholds Average Daily Emissions (pounds per day)	Operational Thresholds	
		Average Daily Emissions (pounds per day)	Maximum Annual Emissions (tons per year)
ROG	54	54	10
NO_X	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
Fugitive Dust	Construction Dust Ordinance or other best management practices	Not applicable	
CO	Not applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Risks and Hazards for New Sources and Receptors (Project)	Same as operational thresholds	• Increased cancer risk of > 10.0 in 1 million • Increased non-cancer risk of > 1.0 Hazard Index (chronic or acute) • Ambient $PM_{2.5}$ increase: > 0.3 μg/m^3 annual average (Zone of influence: 1,000-foot radius from property line of source or receptor)	
Risks and Hazards for New Sources and Receptors (Cumulative)	Same as operational thresholds	• Increased cancer risk of > 100 in 1 million • Increased non-cancer risk of > 10.0 Hazard Index (chronic or acute) • Ambient $PM_{2.5}$ increase: > 0.8 μg/m^3 annual average (Zone of influence: 1,000-foot radius from property line of source or receptor)	
Odors	Same as operational thresholds	5 confirmed complaints per year averaged over three years	

NOTES:
μg/m^3 = micrograms per cubic meter; BAAQMD = Bay Area Air Quality Management District; CEQA = California Environmental Quality Act; CO = carbon monoxide; NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ppm = parts per million; ROG = reactive organic gases

SOURCE: Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2017. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed February 7, 2020.

Criteria Pollutant Emissions

Except for impacts related to TACs, localized CO, and odors, air quality impacts are by their nature cumulative impacts; one project by itself generally cannot generate air pollution in a mass and volume that would violate regional air quality standards. The proposed project's emissions are compared to specific, quantitative thresholds for criteria pollutants as presented above. 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*.[83]

As noted in Section 3.1.2, *Regulatory Framework*, 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. Use of these thresholds is consistent with and authorized by

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

CEQA Guidelines Section 15064. 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 federal, state, and regional regulatory agencies.[84]

Project-Level Risks and Hazards

Incremental Increase in Lifetime Cancer Risk

The incremental increase in lifetime cancer risk is estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to carcinogens. The risk is expressed as a unitless probability. BAAQMD established its threshold of 10 in 1 million to ensure that no source creates, or receptor endures, a significant adverse impact from any individual project.[85] This threshold for a single source is supported by EPA's guidance for conducting air toxics analyses and making risk management decisions at the facility and community-scale level. It is also the level set by the Project Risk Requirement in BAAQMD's Regulation 2, Rule 5, New and Modified Stationary Sources of TACs, which states that the Air Pollution Control Officer shall deny an Authority to Construct or Permit to Operate for any new or modified source of TACs if the project risk exceeds a cancer risk of 10.0 in 1 million.

To provide perspective on the 10 in 1 million threshold established by BAAQMD for incremental increase in lifetime cancer risk:

- When compared to the *average* individual lifetime cancer risk from all causes, 387,000–401,400 in 1 million, 10 in 1 million represents a 0.0025 percent increase in lifetime cancer risk.
- When compared to the average individual lifetime cancer risk from exposure to DPM statewide, 520 in 1 million, 10 in 1 million represents a 1.9 percent increase in lifetime cancer risk.
- When compared to the average individual lifetime cancer risk from exposure to DPM within the area of BAAQMD jurisdiction, 690 in 1 million, 10 in 1 million represents a 1.4 percent increase in lifetime cancer risk.

The State of California recognizes that "Risk estimates generated by an HRA should not be interpreted as the expected rates of disease in the exposed population but rather as estimates of potential for disease, based on current knowledge and a number of assumptions."[86]

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[84] Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2017. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed February 6, 2020.

[85] Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2017. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed February 6, 2020.

[86] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments*, February 2015. Available at http://oehha.ca.gov/air/hot_spots/hotspots2015.html. Accessed February 5, 2020.

Chronic Health Impacts

Chronic health impacts refer to non-cancer effects of chronic (i.e., long-term) exposure to DPM and other TACs. These include things such as birth defects, neurological damage, asthma, bronchitis, or genetic damage. Non-cancer health hazards for chronic diseases are expressed in terms of a hazard index (HI), a ratio of TAC concentration to a reference exposure level (REL), below which no adverse health effects are expected, even for sensitive individuals. As such, OEHHA has defined acceptable concentration levels, and also significant concentration increments, for compounds that pose non-cancer health hazards. If the HI for a compound is less than one, non-cancer chronic health impacts have been determined to be less than significant.[87]

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 RELs for TACs associated with tailpipe and evaporative total organic gases (TOGs) were based on BAAQMD's weighted toxicity calculation methods and the latest data in CARB's Hotspots Analysis and Reporting Program database.

Acute Health Impacts

Acute health impacts include short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches. Similar to chronic health impacts, non-cancer health hazards for acute diseases are also expressed in terms of an HI. If the HI for a compound is less than one, non-cancer acute health impacts have been determined to be less than significant.

Acute health impacts of 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. DPM does not have an acute REL, and the acute health risks of exposure to TAC emissions from diesel exhaust are already accounted for in the assessment of DPM as the primary TAC of concern.[88,89,90] For organic TACs which are components of TOG emissions from light-duty gasoline vehicles traveling during project operations, acute health impacts are not considered a risk driver.[91] Therefore, the HRA does not assess acute health risks, but instead evaluates cancer risk, $PM_{2.5}$ concentrations, and chronic risk.

Annual Average $PM_{2.5}$ Concentrations

For $PM_{2.5}$ emissions, BAAQMD established its threshold of an ambient increase of 0.3 $\mu g/m^3$ annual average to ensure that no source will create, and no receptor will endure, a significant

87 Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, Appendix D (Threshold of Significance Justification), June 2010. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed May 2020.

88 Bay Area Air Quality Management District, *Regulation 2 Permits Rule 5 New Source Review of Toxic Air Contaminants*, December 7 2016. Available at http://www.baaqmd.gov/~/media/dotgov/files/rules/reg-2-rule-5-new-source-review-of-toxic-air-contaminants/documents/rg0205_120716-pdf.pdf?la=en. Accessed May 2019.

89 California Air Resources Board, *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values*, August 2018. Available at https://www.arb.ca.gov/toxics/healthval/contable.pdf. Accessed April 2019.

90 Allen, Carol, Assistant Manager, Engineering Division, Bay Area Air Quality Management District, email correspondence with Environmental Science Associates on November 29, 2018.

91 Bay Area Air Quality Management District, *Recommended Methods for Screening and Modeling Local Risks and Hazards*, May 2012. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf?la=en. Accessed April 2019.

adverse impact from any individual project. Like the cancer risk threshold, the $PM_{2.5}$ threshold for a single source is based on EPA guidance for conducting air toxics analyses and making risk management decisions at the facility and community levels. The thresholds consider reviews of recent health-effects studies that link increased concentrations of fine particulate matter to increased mortality, and apply to both siting new sources and siting new receptors. For new sources of $PM_{2.5}$, the thresholds are designed to ensure that $PM_{2.5}$ concentrations are maintained below federal and state standards in all areas where sensitive receptors or members of the public live or may foreseeably live, even if at the local or community scale where sources of TACs and PM may be nearby.[92]

The specific $PM_{2.5}$ threshold, an ambient increase of 0.3 $\mu g/m^3$ annual average, is based on the lower range of an EPA-proposed Significant Impact Level (SIL).[93] The SIL is a threshold that would be applied to individual facilities that apply for a permit to emit a regulated pollutant in an area that meets the NAAQS. EPA interprets the SIL to be the level at which a $PM_{2.5}$ increment represents a "significant contribution" to regional non-attainment.

Although SIL options were not designed to be thresholds for assessing community risk and hazards, they are being considered to protect public health regionally by helping an area to maintain the NAAQS. Furthermore, because BAAQMD's goal is to achieve and maintain the NAAQS and CAAQS at both the regional and local scales, the SILs may be reasonably be considered as thresholds of significance under CEQA for local-scale increments of $PM_{2.5}$.

Cumulative Risks and Hazards

Cumulative health risk thresholds are designed so that the risk and hazard from an individual new source, when combined with the total of all nearby directly emitted risk and hazard emissions, does not pose a significant adverse impact. The criterion of 100 per 1 million persons is based on EPA guidance for conducting air toxic analyses and making risk management decisions at the facility and community-scale levels.[94]

As described by BAAQMD, EPA considers a cancer risk of 100 per 1 million or less to be within the "acceptable" range of cancer risk. The criterion for $PM_{2.5}$ of an ambient increase of 0.8 $\mu g/m^3$ annual average is also based on EPA guidance for conducting air toxics analyses, and represents the middle range of an EPA SIL,[95] which, as mentioned above, is the level of ambient impact that is considered to represent a significant contribution to regional non-attainment.

In December 2015, the California Supreme Court issued an opinion in *California Building Industry Association v. Bay Area Air Quality Management District* (December 17, 2015), 62 Cal.4th 369, holding that CEQA is concerned primarily with the impacts of a project on the environment and

[92] Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, Appendix D (Threshold of Significance Justification), June 2010. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed May 2020.
[93] *Federal Register*, 40 CFR Parts 51 and 52, September 21, 2007.
[94] Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2017. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed February 6, 2020.
[95] In Class II and Class III areas, a $PM_{2.5}$ concentration of 0.3, 0.8, and 1 $\mu g/m^3$ has been proposed as a SIL. 0.8 $\mu g/m^3$ falls in the middle of this range.

generally does not require agencies to analyze the impact of existing conditions on a project's future users or residents unless the project's risks exacerbate those environmental hazards or risks that already exist. However, the Supreme Court upheld "evaluating a project's potentially significant exacerbating effects on existing environmental hazards… Because this type of inquiry still focuses on the project's impacts on the environment—how a project might worsen existing conditions—directing an agency to evaluate how such worsened conditions could affect a project's future users or residents is entirely consistent with this focus and with CEQA as a whole."

Consequently, because the proposed project could worsen existing conditions by producing new TAC emissions to which future new on-site sensitive receptors would be exposed, this analysis quantifies the project-level and background health risks for new residential receptors as well as existing receptors.

Approach to Analysis

Construction and operation of the proposed project would result in emissions of criteria air pollutants, which are generally regional in nature. Construction-related and operational TAC emissions, including DPM, can result in a localized health impact, expressed as $PM_{2.5}$ annual average concentrations and the increased probability of contracting cancer per 1 million persons exposed to TAC concentrations.

The following assessment of criteria air pollutant impacts addresses the significance criteria presented above in Table 3.1-5 for ROG, NO_X, $PM_{2.5}$, PM_{10}, and CO. The assessment of localized health risk and exposure to $PM_{2.5}$ concentrations addresses the significance criteria, also presented in Table 3.1-5, for risks and hazards for new sources and receptors.

With respect to odors, 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 emissions factors, models, and tools distributed by a variety of industry experts and agencies including CARB, the California Air Pollution Control Officers Association, the OEHHA, and EPA. The analysis also uses methods identified in BAAQMD's *CEQA Air Quality Guidelines*.[96] The air district is currently developing an update to its *CEQA Air Quality Guidelines*, which will likely include changes to its thresholds of significance; however, no draft has yet been made public. Therefore, this analysis applies the most recent guidance available, and deemed relevant and applicable by the City of San José.

[96] In Class II and Class III areas, a $PM_{2.5}$ concentration of 0.3, 0.8, and 1 $\mu g/m^3$ has been proposed as a SIL. 0.8 $\mu g/m^3$ falls in the middle of this range.

As noted previously, in the *California Building Industry Association v. Bay Area Air Quality Management District* case decided in 2015,[97] the California Supreme Court held that CEQA does not generally require lead agencies to consider how existing environmental conditions might affect a project's users or residents, except where the project would exacerbate an existing environmental condition. Accordingly, the significance criteria above related to exposure of new sensitive receptors to substantial pollutant concentrations are applicable only to the extent that the proposed project would exacerbate existing air quality conditions. An impact would be significant if the project would exacerbate existing or future air quality conditions.

Consistency with Applicable Air Quality Plans

The applicable air quality plan is BAAQMD's 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. Consistency with the Clean Air Plan and air quality–related policies of the *Envision San José 2040 General Plan* is the primary basis for determining whether the proposed project would conflict with or obstruct implementation of an applicable air quality plan, the first bulleted significance criterion identified above.

Project Features Incorporated into the Analysis

The following design features have been included in the modeling for the proposed project, and are discussed in greater detail below. These features would be included as conditions of approval so that they will be enforceable by the City:

- Construction:
  - Certification of all diesel-powered construction equipment to Tier 4 Final emission standards; and
  - Use of electric equipment for concrete/industrial saws, sweepers/scrubbers, aerial lifts, welders, and air compressors.
- Operations:
  - LEED for Neighborhood Development (ND) Gold Certification (which requires that at least one building in each phase be certified LEED Gold), construction of all office buildings to meet LEED Gold standards, and compliance with the City's New Construction Green Building Requirements;
  - Electrification (no natural gas use) of all buildings at the site, including all office space, all residential space, and all retail space, with the exception of 20,000 square feet of restaurant kitchens;
  - Constrained parking (less parking than required by the City code, based both on the base parking requirement and the Code-permitted reductions in parking for transit-accessible and Downtown projects available in Municipal Code Section 20.90.220 and 20.70.330, respectively), with no more than 4,800 spaces for commercial uses (including potential access to a portion of the residential spaces that could be shared with office uses);

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

- On-site solar photovoltaic system achieving at least 7.8 megawatts of electricity production;
- Installation of electric vehicle supply equipment for a minimum of 10 percent of parking spaces;
- Installation of Minimum Efficiency Reporting Value (MERV) 13 filtration for all new on-site buildings;
- Use of recycled water for all non-potable water demands for the project including toilet flushing, irrigation, and cooling; and
- A potential district water reuse facility that would treat wastewater to California Code of Regulations Title 22 disinfected tertiary (unrestricted reuse) recycled-water standards.

In addition, the modeling for the proposed project assumes transportation activity consistent with the project's location in a transit-accessible area with bike and pedestrian street improvements and implementation of all applicable regulatory requirements (such as 2019 Title 24 Building Standards, including the CALGreen Code, American Society of Heating, Refrigerating and Air-Conditioning Engineers [ASHRAE] 2019 energy efficiency standards, and the San José Reach Code).

Construction Activities

Construction of the proposed 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.

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. 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. Construction of the proposed project would also require some pile driving.

The project applicant has committed to requiring that all diesel-powered construction equipment be certified to Tier 4 Final emission standards, as commercially available. In addition, certain pieces of equipment would be electrically powered, as specified in the construction equipment lists provided by the project applicant. However, given that some Tier 4 Final off-road equipment may not be available during all phases of construction, the analysis presented below conservatively assumes that some equipment may only meet Tier 4 Interim or Tier 3 engine standards. Refer to Appendix C1 for the complete construction equipment mix.

Project Operations, Stationary Sources, and Transportation Sources

The proposed project would generate operational emissions from a variety of sources:

- Stationary sources (diesel emergency generators and restaurant charbroilers);
- Energy sources (natural gas combustion cooking in restaurant kitchens);
- Area sources (consumer products, architectural coatings, and landscape equipment); and
- Mobile sources (daily automobile and truck trips).

The project is expected to require up to 47 diesel backup generators. All diesel backup generator exhaust must 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. This was included in the HRA modeling.

Except for 20,000 square feet of commercial kitchens in restaurants throughout the proposed project site, all buildings at the project site would be 100 percent electric; this includes all office space, all residential space, and all retail space. As such, no natural gas combustion was assumed for these uses. Restaurants were assumed to be scattered across the project site, but mainly concentrated in the central zone. Up to five charbroilers were modeled, which would emit VOCs and PM. In addition, an on-site solar photovoltaic system achieving at least 7.8 megawatts of electricity production was included in the modeling. These features were quantified for the air quality analysis.

Recycled water would be used for all non-potable water demands for the project including toilet flushing, irrigation, and cooling. In addition, potential district water reuse facility(s) would treat wastewater to California Code of Regulations Title 22 disinfected tertiary (unrestricted reuse) recycled-water standards. No criteria pollutant or TAC emissions are associated with the district water reuse facility(s), only GHG emissions.

Finally, the modeling considers constrained parking with no more than 4,800 spaces for commercial uses (including potential access to a portion of the residential parking spaces that could be shared with office uses).

LEED Certification

The proposed project would include measures necessary to qualify for LEED ND Gold certification, and would also achieve LEED Gold certification for all new office buildings. As part of the project's LEED ND Gold certification, at least one building in each phase would be certified LEED Gold.

Not all of the measures that would be used to achieve these certifications have been identified; however, the project's construction methods and operational characteristics would be sufficient to meet these standards or the comparable GreenPoint rating, including meeting sustainability standards for access to quality transit. At a minimum, the project would comply with the City's New Construction Green Building Requirements.

The primary air quality benefit of LEED certification is a reduction in natural gas use through energy efficiency and building design features. However, because the project would be almost entirely electric (and electricity use does not produce local air pollutants), and because LEED certification can be obtained through a variety of means outside of energy efficiency, this feature was not quantified in the air quality analysis.

Minimum Efficiency Reporting Value 13 Air Filtration

To comply with the California Energy Code, the proposed project must install a mechanical ventilation system at all on-site residential and childcare buildings at the project site capable of achieving protection from particulate matter ($PM_{2.5}$) equivalent to that associated with a MERV 13 filtration (as defined by ASHRAE Standard 52.2). As part of this action, an ongoing maintenance plan for the building's heating, ventilation, and air conditioning (HVAC) air filtration system is required. Health risks for residential and childcare receptors evaluated in the project's HRA were estimated assuming the implementation of MERV 13 filters in all residential and childcare receptor locations.

Electric Vehicle Chargers

As discussed in Section 3.1.2, *Regulatory Framework*, the City of San José Reach Code requires the installation of EV supply equipment on 10 percent of all parking spaces for new multi-family and non-residential buildings. As such, project parking would be equipped with EV chargers at 10 percent of the total number of parking spaces.[98] 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.

Cooling Towers

Cooling towers would be required to service the on-site central utility plants. Cooling towers emit PM when the total dissolved solids in the circulating water that are carried out with the water are entrained in the air discharged from the tower. The cooling tower capacity was determined from four potential central utility plant scenarios:

- One central utility plant in the Southern Infrastructure Zone
- Two central utility plants, one in the Northern Infrastructure Zone and one in the Southern Infrastructure Zone
- The business-as-usual setback with one central utility plants
- The business-as-usual setback with two central utility plants[99]

In the most conservative scenario—the business-as-usual setback with one central utility plant—a total of 18,920 HVAC tons located in the Southern Infrastructure Zone, Blocks C1, D1, E1, E3, and H1 would be required to service the project. To control the PM emissions from these

[98] Note that Mitigation Measure AQ 2g (Electric Vehicle Charging) goes beyond city code by requiring that the project applicant install EV charging equipment on 15 percent or more of all parking spaces at the project site.
[99] In the business-as-usual setback scenarios, a number of buildings would have independent district systems because of physical or phasing considerations.

locations, drift eliminators would be installed at all cooling towers. These drift eliminators reduce drift loss to 0.005 percent, far below the uncontrolled drift loss value.

Transportation Management Plan and Transportation Demand Management

The proposed project's VMT and trips were calculated using the City of San José Travel Demand Forecasting Model for the base year (2015), interim year (2026, coinciding with the first full calendar year of project operations), and future buildout year (2040). The resulting VMT and trips data reflect the project's location in a transit-served area, as well as the proposed density of development, and limited parking. To provide for a conservative analysis, however, the data do not include the project's commitment to implement a transportation demand management (TDM) program sufficient to meet the 15 percent improvement in transportation efficiency required by AB 900 (refer to the discussion in Section 3.13, *Transportation*). A 15 percent improvement in transportation efficiency means a reduction in total vehicle trips and VMT by 15 percent, compared to the proposed project without a TDM program. It should be noted that because the proposed project is located in a transit-rich infill area with many mixed land uses, and because it includes both residential and employment opportunities, the proposed project would inherently result in fewer vehicle trips than a hypothetical project in a different location.

Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program, detailed further below, would provide for monitoring and enforcement of this requirement, and would increase the efficiency of the TDM program well beyond 15 percent.

Existing Conditions

As described in Chapter 2, *Project Description*, the approximately 81-acre project site currently contains approximately 100 individual assessor's parcels. The built environment of the project site and vicinity is characterized by a pattern of one- and two-story buildings that cover only portions of their lots, with the remaining unbuilt lot space used as surface parking. The total floor area of buildings currently on the project site accounts for approximately 755,00 square feet, although only approximately 480,000 gross square feet is currently occupied. In all, approximately 40 percent of the project site is currently devoted to parking lots.

In the northern portion of the project site, a variety of light and heavy industrial uses are present, including a food wholesale warehouse, along with one occupied residential property. In the central portion of the project site, immediately north and south of the SAP Center, surface parking lots provide parking for surrounding uses that serve Diridon Station and the SAP Center. Adjacent to the surface parking lots south of the SAP Center are a variety of light industrial and commercial uses, a church, and food-related uses. Immediately south of West San Fernando Street is a Pacific Gas and Electric Company substation. South of Park Avenue, existing uses include a San José Fire Department training facility (to be relocated at lease expiration in 2022), retail, and vacant properties.

Operation of these existing on-site businesses emits air pollutants during vehicle trips to and from the project site, on-site combustion of natural gas for cooking, and fugitive emissions of VOCs from the use of aerosol products and coatings and landscaping. However, data were not readily available regarding the exact activity level (i.e., utility consumption) at each business, so existing emissions were based on default values. Air pollutant emissions associated with these existing activities were estimated using the California Emissions Estimator Model software (CalEEMod) (Version 2016.3.2), a California-based computer model designed to calculate emissions typically generated by various land uses. This model is designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential emissions of criteria air pollutants and GHGs from land use projects of various types and in various air basins. CalEEMod was developed in collaboration with California's air districts and is recommended by BAAQMD for evaluating projects' GHG emissions under CEQA.[100] Regional data (e.g., emissions factors, trip lengths, meteorology, source inventory) were provided by the various California air districts to account for local requirements and conditions. According to the California Air Pollution Control Officers Association, the model is an established, accurate, and comprehensive tool for quantifying air quality and GHG impacts from land use projects throughout California.[101]

CalEEMod was used to estimate the existing on-site emissions from natural gas appliances and equipment, as well as fugitive emissions. Default electricity and natural gas usage rates were used based on building land use and square footage.[102] Mobile-source emissions associated with existing operations were not separately calculated and are not considered in the analysis, consistent with the project transportation analysis, which did not deduct trips from the relatively few existing uses operating on the project site. However, as discussed in Impact AQ-2 below, these emissions are effectively netted out in the transportation modeling on which project mobile-source emissions are based. Emissions from existing conditions are presented in Impact AQ-2 below.

Existing uses may continue to operate throughout part of construction. To determine the net new impact of the proposed project in this EIR analysis, existing non-mobile-source emissions of criteria pollutants were subtracted from the total new emissions associated with the proposed project starting in 2029. This is highly conservative because it is likely that most existing sources would cease operations well before 2029. For exposure to TAC emissions, which is analyzed locally in the project-level HRA, this EIR *does not* subtract the health risks associated with exposure to existing TAC emissions from the proposed project's contribution to health risks, with the exception of mobile sources. This is because existing non-mobile emissions sources are not anticipated to result in substantial TAC emissions (these activities consist primarily of energy use, which has negligible TAC emissions).

Construction Emissions Methods

As described in Chapter 2, *Project Description*, the proposed project would be developed in three phases. Although market demand and other factors would ultimately determine how long it would

[100] Bay Area Air Quality Management District, *Tools and Methodologies*, 2012. Available at https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools. Accessed February 2020.
[101] California Air Pollution Control Officers Association, *California Emissions Estimator Model*, 2017. Available at http://www.aqmd.gov/caleemod/. Accessed May 2020.
[102] California Air Pollution Control Officers Association, *California Emissions Estimator Model User's Guide*, 2017. http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, Accessed May 2020.

take to develop each phase, this analysis conservatively assumes an aggressive schedule that construction would be completed by the end of 2031 as follows:

- Phase 1 would start in 2021 and end in 2027.
- Phase 2 is split into Phases 2a and 2b. Phase 2a would start in 2025 and end in 2029. Phase 2b would start in 2027 and end in 2031.
- Phase 3 would start in 2027 and end in 2032.

This schedule results in conservative air quality impacts from construction emissions because emission factors generally improve with time as stricter standards become applicable.

Phase 2 was separated into two sub-phases to more accurately capture construction activity and detailed schedules of equipment operation. Total construction emissions by phase and sub-phase were calculated using the estimated duration of each construction phase for comparison against the significance thresholds. Unique schedules for demolition, excavation, and vertical construction were provided by the project applicant. Because there would be overlapping construction and operational activities during Phase 1 buildout and after Phase 1 is complete (starting in 2025), both average daily and total annual construction emissions were estimated for comparison to the BAAQMD significance thresholds.

It was conservatively assumed that construction activities would occur over 11 years total, which is the fastest potential period over which the proposed project could be constructed; if construction were to occur over a longer time frame, actual average daily or maximum annual emissions could be less than those estimated in this analysis.[103] For the purposes of this analysis, the proposed project is assumed to be developed in three phases, although actual phasing may be in two or more phases or sub-phases.

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 (starting in 2025), the operational analysis (refer to Impact AQ-2) accounts for Phase 1 operational emissions that would occur simultaneously with construction of Phase 2, and Phase 2 operational emissions that would occur simultaneously with construction of Phase 3. This allows for an analysis of the total emissions that would occur from construction activities and simultaneous operations during the 11-year construction period.

This analysis considers emissions of criteria air pollutants from project-related net increases in the use of gasoline and diesel fuel in both off-road equipment and on-road vehicles compared to

[103] The phasing of project implementation would be subject to change as a result of market conditions and other unanticipated factors. If construction is delayed or occurs over a longer period, extending beyond 2031, 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, the construction schedule represents an aggressive phasing schedule for the proposed project for the purposes of conservatively assessing impacts, so it is unlikely that construction would occur at a more rapid pace than is analyzed.

existing conditions. This includes emissions from heavy-duty off-road construction equipment during demolition, excavation, building construction, paving, construction of a replacement bridge over Los Gatos Creek, construction of the West San Fernando Street bridge, off-site transportation improvements, and landscaping, and from on-road haul, vendor, and worker mobile trips to and from the project site.

Construction equipment would vary by activity and may include but would not be limited to dump trucks, excavators, bulldozers, compactors, forklifts, and cranes. All diesel-powered construction equipment would be certified to Tier 4 Final emission standards. Certain pieces of equipment would be electrically powered, as specified in the construction equipment lists provided by the project applicant. A complete list of construction equipment, construction phasing, and detailed emission calculations is included in Appendix C1.

In addition, a number of federal and state regulations require increasingly cleaner off-road equipment. Specifically, both EPA and CARB have set emissions standards for new off-road equipment engines, ranging from Tier 1 to Tier 4. Tier 1 emissions standards were phased in from 1996 to 2000, and Tier 4 interim and final emission standards for all new engines were phased in between 2008 and 2015. To meet the Tier 4 Final emissions 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 Final equipment replaces older equipment, EPA estimates that implementing the federal Tier 4 Final standards will reduce NO_X and PM emissions by more than 90 percent. Furthermore, California regulations limit maximum idling times to 5 minutes, which further reduces public exposure to NO_X and PM emissions (California Code of Regulations, Title 13, Section 2485).

Construction emissions for demolition and bridge construction were estimated using methods consistent with CalEEMod. Construction emissions for vertical construction and excavation were based on calculation methods in CalEEMod, but performed separately in Excel workbooks. Emissions from construction equipment usage were estimated to occur for 8 hours per day, 6 days per week on average. This represents the proposed average construction activity over the course of the 11-year construction period. The City of San José restricts construction within 500 feet of residential units to between 7 a.m. and 7 p.m. on weekdays, with no construction on weekends, although overnight and weekend construction is permitted if expressly allowed in the development permit or other planning approval.

To provide a conservative analysis, the quantity of excavated material and the associated number of haul truck trips to export this material, as provided by the applicant, were adjusted upward slightly for residential building foundations, to allow flexibility of building footprints. Similarly, excavated material and associated haul truck trips required for parking structures, as provided by the applicant, were adjusted upward by 5 percent to provide additional contingency. For vertical construction associated with each project site parcel, slightly over a month of activity (38 days) was added to each parcel's construction schedule, as provided by the applicant, to provide both a conservative assessment of construction emissions and additional flexibility for building floor area.

Over the course of the construction schedule, the length of workdays would vary in range from 8 hours to 24 hours. Over the course of a day or shift, usage would vary depending on the equipment and type of work being performed. For example, during each 8-hour shift, equipment would operate for 7 hours per shift because the workday would include equipment downtime for lunch breaks and safety meetings. It is possible that occasional construction activities would occur for longer hours on certain days, including a few 24-hour concrete pours. The 24-hour workdays would be required for a number of reasons, including technical requirements of certain construction techniques, worker safety, labor rules, and avoidance of conflicts on city streets and highways in the vicinity. However, this is not anticipated to occur with enough frequency to materially affect average daily emissions associated with overall construction activities.

A few 24-hour concrete pours each year and a few 10- or 12-hour construction days each month would represent less than 1 percent of total construction equipment activity hours on an annual basis, and average daily emissions on an annual basis is the metric by which impacts are determined (based on BAAQMD's thresholds of significance for construction emissions). Because it is anticipated that certain construction activities may require work outside normally permitted construction hours, the project's Planned Development Permit would allow for such construction activities, subject to conditions of approval.

On-road mobile emissions for hauling, vendor, and worker trips were calculated separate from CalEEMod to enable the use of CARB's EMFAC2017 emission factors. In November 2019, CARB released off-model adjustment factors to EMFAC2017 to account for the SAFE Rule by EPA and the National Highway Traffic Safety Administration.[104] The SAFE Rule results in a 0 to 3 percent increase in emissions from light-duty vehicles compared to EMFAC2017 emission factors. These SAFE Rule adjustments were incorporated into the analysis. However, this adjustment does not alter any of the significance conclusions reached herein.

For on-road mobile-source emissions from hauling trips, up to approximately 172,450 cubic yards of Class 1 hazardous soil would be exported from the site to the Kettleman Hills Hazardous Waste Facility (170 miles from the project site), and 1,287,059 cubic yards of Class 2 non-hazardous soil would be exported to Republic's Newby Island Landfill or Waste Management's Kirby Canyon Landfill (approximately 15 miles from the project site). The number of hauling trips was determined based on estimated maximum soil off-haul volumes by phase as provided by the project applicant.[105] For worker and vendor trips, CalEEMod default trip distances and number of trips were used.

It is assumed that water trucks would water twice a day for off-road dust control during construction. This is consistent with BAAQMD best management practices for dust control.[106] Emissions from water truck operations were estimated using CalEEMod emission factors for

[104] California Air Resources Board, *EMFAC Off-Model Adjustment Factors to Account for the Safe Vehicle Rule Part One*. Available at https://ww3.arb.ca.gov/msei/emfac_off_model_adjustment_factors_final_draft.pdf?_ga=2.128974668.1790635815.1579730169-1794392908.1559174732. Accessed February 7, 2020.

[105] Google LLC, updated excavation quantities by phase, email to Environmental Science Associates, December 16, 2019.

[106] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2017. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed February 7, 2020.

"off-highway trucks," following the same methods as discussed above. For construction on-road and operational mobile-source emissions, a location-specific composite silt loading factor was used to determine the amount of road dust. Detailed calculations are included in Appendix C1.

As discussed in Chapter 2, *Project Description*, parking for the SAP Center that would be displaced by the proposed project would be replaced within the project vicinity, potentially including developing a group of assessor's parcels known as "Lot E." This could also take place elsewhere nearby or through a shared parking arrangement with other projects.

Providing replacement parking in the vicinity is considered a reasonably foreseeable, if indirect, future consequence of the proposed project; however, the details of the relocated parking are not known. Therefore, it is not possible to quantify construction emissions associated with providing replacement parking, whether through the development of Lot E or elsewhere. Associated emissions are discussed qualitatively in the context of cumulative impacts associated with buildout of the Diridon Station Area Plan (DSAP) amendments. Also, if the City provides replacement parking in a new parking structure in the future, such as on Lot E, such a project would undergo independent environmental review.

Operational Emissions Methods

Operation of the proposed project would result in emissions of criteria air pollutants from a variety of sources, including on-road mobile sources, stationary sources such as cooling towers, and other characteristics of proposed buildings and uses, as described further below. A variety of tools were used to quantify criteria air pollutant emissions; the methods used to estimate their emissions are also included below. Detailed calculations are included in Appendix C1.

Operational emissions were estimated starting when the first buildings are anticipated to be complete, occupied, and fully operational. This would begin in 2025 with the completion of the first buildings constructed during Phase 1, and would continue through 2032 at full buildout. Although Phase 1 would end in December 2027 (with complete annual operations starting in 2028), partial buildout of Phase 1 areas would occur from 2025 through 2027.

Consequently, operational emissions before 2028 from Phase 1 for all emissions sources (as described below) were scaled based on the anticipated partial buildout of the Phase 1 areas. The scaling factors for partial buildout are as follows: 20 percent in 2025, 60 percent in 2026, 90 percent in 2027, and 100 percent in 2028. From 2028 through 2032, 100 percent of Phase 1 operational emissions were assumed. Because the exact buildout of each individual parcel in Phase 1 in 2025–2027 is unknown, the scaling factors were applied evenly to all sources of emissions. In 2032, full-buildout emissions from Phases 1, 2, and 3 were assumed.

Mobile Sources

Emissions from mobile sources were calculated from project-specific total VMT and total trips based on the City of San José VMT Evaluation Tool and Travel Demand Model.[107] This VMT includes new VMT associated with the proposed project, modeled as the difference between future cumulative "with project" VMT and future cumulative "without project" VMT. Therefore,

[107] Fehr & Peers, RE: Spreadsheet, email to Environmental Science Associates, December 20, 2019.

mobile-source emissions for the proposed project net out VMT from existing conditions already. Both residents and employees would travel to, from, and within the project site. EMFAC2017 emission factors, average EMFAC2017 fleet mixes, and trip generation percentages by vehicle type were used to calculate mobile-source emissions for each year of analysis from 2021 to full buildout in 2032. Emissions are based on net new VMT and trips associated with the project compared to existing conditions.[108]

To provide for a conservative analysis, mobile-source emissions were calculated for an "unmitigated scenario" that captures the benefits of the site's proximity to transit and other compatible land uses, but does not include a project-specific TDM program. The "mitigated scenario" includes emissions reductions from vehicle trip reductions, as required by AB 900, and as monitored and enforced via implementation of Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program. Under this scenario, for interim project operations in 2025–2031, total vehicle trips and VMT were reduced by 24 percent (consistent with a non–single occupancy vehicle [SOV] mode share of 55 percent), and for full-buildout project operations in 2032, total vehicle trips and VMT were reduced by 27 percent (consistent with a non-SOV mode share of 65 percent).

Electric Vehicle Chargers

The analysis quantified the emissions benefit of providing on-site EV charging stations for 10 percent of the total number of parking spaces, which equals 656 spaces. Convenient access to EV chargers is expected to encourage EV use, thereby replacing emissions of criteria pollutants from conventional fossil-fueled vehicles.

The benefit of the project chargers was calculated by determining the average EV VMT charged per charger each day, and calculating the displaced VMT associated with gasoline light-duty vehicles that the EVs would replace. According to Chargepoint and the National Renewable Energy Laboratory, each charger has a charge rate of 6.25 kilowatt-hours (kWh) per hour[109] and the fuel economy of EVs is 0.25 kWh per mile,[110] resulting in 25 EV range miles per hour of charging.

It was assumed that each residential charger is used 2 hours per day (representing 50 EV miles traveled per day per home) for 365 days per year, and each non-residential charger is used 8 hours per day (representing 200 EV miles traveled per day per charging space) for 240 days per year. Total EV VMT was calculated using this method and compared to the project-level EV VMT assumed in the EMFAC2017 model through business-as-usual EV fleet penetration over time.

Only the net new EV VMT for the proposed project beyond the EMFAC business-as-usual EV fleet penetration was quantified for emission reductions. This approach only accounted for emissions reductions from EV charger use that would occur as a result of the project; it excluded the reductions from the charger use that would be expected to occur with default EV fleet

[108] The net new VMT is calculated as the difference between the future Project VMT and the future No-Build VMT.
[109] Chargepoint, *Level Up Your EV Charging Knowledge*, March 2017. Available at https://www.chargepoint.com/blog/level-your-ev-charging-knowledge/. Accessed May 2020.
[110] National Renewable Energy Laboratory, *California Plug-In Electric Vehicle Infrastructure Projections: 2017–2025* (Table C.1), August 2018. Available at https://www.nrel.gov/docs/fy18osti/70893.pdf. Accessed May 2020.

penetration, as embodied in the EMFAC2017 model. Refer to Appendix C1 for additional information on this quantification method.

Stationary Sources

Central Utility Plant

On-site central utility plants would be located within the infrastructure zones, as denoted in Chapter 2, *Project Description*, Figure 2-9. There would be two infrastructure zones, one in the southwest portion of the site and one in the northern portion of the site. The project's phasing strategy may require a satellite or temporary thermal-only central utility plant, to be included within the site northeast of Los Gatos Creek, and east of Santa Clara Street. The infrastructure zones would contain central utility plants that would provide heating and cooling through an on-site district systems approach. The utility plants would be operated on electricity from the grid and would, therefore, not be a direct source of air pollutant emissions. The utility plants would also house mechanical, thermal, power, water reuse, and supporting equipment to serve the project site using electricity from the grid.

Cooling towers would be required to service the central utility plants. Cooling towers emit PM when the total dissolved solids in the circulating water that are carried out with the water are entrained in the air being discharged from the tower. PM emissions were calculated based on the total full load flow of 30,272 gallons per minute (representing a cooling tower load of 18,920 HVAC tons) for all cooling towers at the project site (including those used outside of the CUPs), using the AP-42 and BAAQMD Permit Handbook emission calculation methods.[111,112]

PM emissions from the cooling towers were calculated assuming that the total dissolved solids in circulating water would be 166.7 ppm (based on a limit of 1,000 ppm after filtration and six cycles of concentration), the annual operating time at full load would be 2,100 hours per year, and the drift loss would be 0.005 percent. The low drift loss value assumes that drift eliminators would be installed at all cooling towers. The analysis conservatively assumes that both cooling towers would be operational in 2028 at the end of Phase 1.[113] The cooling towers are not expected to produce emissions of VOCs or other criteria pollutants.[114]

Additional Cooling Towers

In addition to the cooling towers at the central utility plants, four cooling towers at the project site would provide HVAC service on parcels C1, D1, E3, and F5 as well as a temporary cooling tower

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[111] U.S. Environmental Protection Agency, *AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, Section 13.4 Wet Cooling Towers*, January 1995. Available at https://www3.epa.gov/ttn/chief/ap42/ch13/index.html. Accessed May 2020.

[112] Bay Area Air Quality Management District, *Permit Handbook*, 11.4 Cooling Towers, October 23, 2018.

[113] If additional cooling towers are required, the impact to air quality would not be substantial as emissions from cooling towers are minimal relative to total project emissions.

[114] According to the South Coast Air Quality Management District, "VOC emissions typically result from the leakage from process heat exchangers that service hydrocarbon (HC) process streams as well as from chemical treatment with VOC containing material added to the circulating water. VOC emissions are expected from cooling towers used in refineries and chemical plants, where the circulating water is used to cool down the process stream. VOC emissions are not expected from cooling towers used in Heating, Ventilating, and Air Conditioning (HVAC) and other industries such as power plant facilities, high rise buildings, hotels, hospitals, etc.)." South Coast Air Quality Management District, *Guidelines for Calculating Emissions from Cooling Towers*, November 2019. Available at https://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/guidelines-for-calculating-emissions-from-cooling-towers---november-2017-final.pdf?sfvrsn=12. Accessed May 2020.

located on parcel E1. PM emissions from these cooling towers were estimated as described above. The total flow of all cooling towers, including those at the central utility plants, would be 30,272 gallons per minute (representing a total cooling tower load of 18,920 HVAC tons).

Wastewater Treatment Plant

The wastewater treatment plant would produce odors from the nature of the wastewater treatment processes. The two proposed water reuse facilities (WRFs) would be enclosed within the central utility plant, would be soundproofed to alleviate potential noise issues, and would include appropriate odor controls (air blowers and odor control units [e.g., carbon filters]) to manage any objectionable odors that may be experienced in the project vicinity. Further, wastewater treatment plant odors are subject to the jurisdiction of BAAQMD. Therefore, the analysis includes a qualitative discussion of potential odor impacts and any project design odor control features. The wastewater treatment plant would not produce emissions of criteria pollutants or TAC emissions, and was therefore not modeled as an air pollutant source.

Emergency Generators

The analysis assumes that there would be a total of 47 emergency diesel generators on the project site, or approximately one in each building more than 75 feet in height and would wither be roof-mounted or the exhaust would be vented to the building roof. Emergency generators would provide building electricity to life safety systems such as elevators and fire pumps in the event of a power outage. Phase 1 would include 26 generators, Phase 2a would have 9, Phase 2b would have 5, and Phase 3 would have 7 generators. Generators must be tested monthly, and would be permitted to operate annually for no more than 50 hours per year for testing and maintenance purposes, typically for 2 hours on one day each month. It was assumed that each generator would have a power rating of 650 kilowatts, or 872 horsepower and would operate for 50 hours each year. The project applicant would be required to obtain a permit from BAAQMD to operate each generator.

Charbroilers

Given the estimated 500,000 gross square feet of active uses, the project assumes the installation and operation of five restaurant charbroilers on Parcels F1, D10, H4, D4, and C1. VOC and PM emissions were calculated for commercial cooking operations using an estimated quantity of meats cooked per restaurant with charbroilers, based on restaurant survey data from the San Joaquin Valley Air Pollution Control District.[115] Commercial restaurant operations would be consistent with BAAQMD Regulation 6, Rule 2, Commercial Cooking Equipment, which regulates emissions of PM_{10} and organic compounds from charbroilers.

Area Sources

The development program proposes various land uses including offices, residential units, district systems and logistics, limited-term corporate accommodations, retail and other active uses, a hotel, and event/conference space. These uses would generate building-related operational emissions of criteria air pollutants from area sources including architectural coating, consumer products, and landscaping equipment. As described in Chapter 2, *Project Description*, the project

[115] San Joaquin Valley Air Pollution Control District, *Final Draft Staff Report: Rule 4692 (Commercial Charbroiling)*, 2002. Available at https://planning.lacity.org/eir/8150Sunset/References/4.B.%20Air%20Quality/AQ.14_SJVAPCD%20Charbroiling%20EF%20by%20Meat.pdf. Accessed March 2020.

is being planned and designed to achieve LEED ND Gold Certification. Although the exact strategies that would be used to accomplish this certification have not been identified with specificity, the project would integrate low-impact development, transportation demand management, energy efficiency, water conservation, and other green building practices.

Odors

As indicated in the significance criteria above, CEQA Guidelines Appendix G recommends the following significance threshold for odor impacts: *Would a project create objectionable odors affecting a substantial number of people?* The proposed project would include siting of a new source of potentially objectionable odors associated with the wastewater treatment facility. For this EIR, the analysis of the change in odor conditions associated with solids handling involved assessing whether the wastewater treatment facility and operations would generate objectionable odors and, if so, based on design features, whether the proposed project's odor conditions (a) would likely worsen or improve existing conditions and (b) would likely affect a substantial number of people. In addition, this analysis is necessary to comply with General Plan Policy MS-12.1, which requires "an analysis of possible odor impacts and the provision of odor minimization and control measures as mitigation."

Local Health Risk Methods

Provided as Appendix C2 to this EIR, the HRA prepared for the project focuses on $PM_{2.5}$ and TACs because these pollutants pose potential significant health impacts at the local level.[116] 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 EPA's American Meteorological Society/EPA Regulatory Air Dispersion (AERMOD) model, along with the most recent BAAQMD *Health Risk Assessment Guidelines*.[117,118] The HRA also follows the most recent (2015) *Air Toxics Hot Spots Program Risk Assessment Guidelines* from OEHHA.[119]

This analysis calculates the incremental increase in lifetime cancer risk, chronic health impacts, and annual average $PM_{2.5}$ concentrations resulting from project construction and operations to estimate project-specific and cumulative health risks. These calculations are based on the emissions calculation methods identified above, annual average pollutant concentrations from AERMOD, and dose and risk calculations from OEHHA and BAAQMD, as discussed below.

The HRA examines all existing sensitive land uses, such as residences, within 1,000 feet of the project boundary and in the vicinity of nearby freeways, and, because of the sensitivity to TAC

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116 Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2017, p. C-16. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed January 13, 2020.

117 Bay Area Air Quality Management District, *Recommended Methods for Screening and Modeling Local Risks and Hazards*, May 2012. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf?la=en. Accessed January 14, 2020.

118 Bay Area Air Quality Management District, *BAAQMD Air Toxics NSR Program Health Risk Assessment Guidelines*, December 2016. Available at http://www.baaqmd.gov/~/media/files/planning-and-research/permit-modeling/hra_guidelines_12_7_2016_clean-pdf.pdf. Accessed March 2020.

119 Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments*, February 2015. Available at http://oehha.ca.gov/air/hot_spots/hotspots2015.html. Accessed February 5, 2020.

exposure in early life, all existing schools and childcare centers within 2,500 feet of the project boundary. The project would create new sensitive receptors, primarily residential and childcare uses on-site, that would be exposed to TAC emissions from later phases of construction; these were also considered. Figure 3.1-1 presents the sensitive receptors considered as part of the HRA. For each exposure scenario (as described below) and health risk type (incremental increase in lifetime cancer risk, chronic health impacts, and annual average $PM_{2.5}$ exhaust concentrations), the HRA identifies 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 C1 for specific locations of existing and proposed on-site residential uses.

Concentrations of Toxic Air Contaminants

The HRA evaluates health risks and effects of $PM_{2.5}$ concentrations resulting from the project on the surrounding community, as well as on receptors on the project site that would be occupied during construction of other phases. Emission sources would include construction emissions over the course of buildout, traffic from project operations, including heavy-duty delivery truck travel and idling, and stationary sources (emergency generators, transportation refrigeration units [TRUs], cooling towers, and charbroilers). All of these sources were modeled in the HRA. The methods used to evaluate emissions for the project and cumulative HRA are based on BAAQMD's most recent *Recommended Methods for Screening and Modeling Local Risks and Hazards* and the most recent *Air Toxics Hot Spots Program Risk Assessment Guidelines*.[120,121] The HRA modeling information is provided in detail in Appendix C1.

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; operational DPM concentrations from the emergency generators; operational TAC emissions from the five restaurant charbroilers; and DPM concentrations from delivery truck travel and idling, including TRU operations. Construction haul routes were modeled within the modeling radius to capture impacts for all modeled receptors. The area along the haul route, nearest to the project site, would present the higher impact because of the contributions from both on-site and off-site project construction sources. The modeled haul routes are presented in **Figure 3.1-2**.

Volatile organic TAC emissions speciated from evaporative and exhaust TOGs from on-road emissions from gasoline vehicles during operations were also included in the cancer risk analysis. The speciation profiles were developed using CARB's databases.[122] TAC concentrations were estimated using EPA's preferred model, AERMOD.[123]

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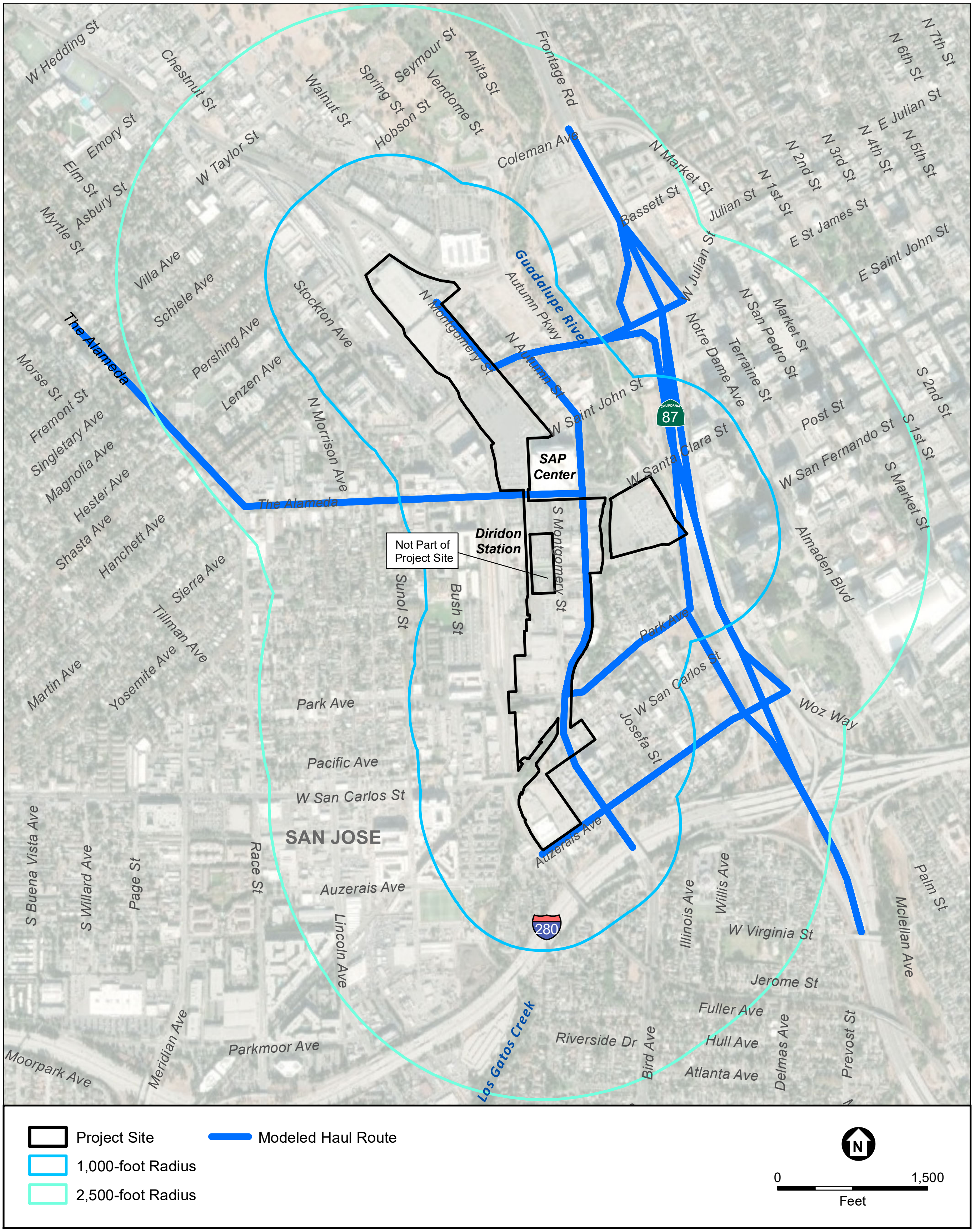
[120] Bay Area Air Quality Management District, *Recommended Methods for Screening and Modeling Local Risks and Hazards*, May 2012. Available at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en. Accessed February 5, 2020.

[121] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments*, February 2015. Available at http://oehha.ca.gov/air/hot_spots/hotspots2015.html. Accessed February 5, 2020.

[122] California Air Resources Board, Speciation Profiles Used in ARB Modeling. Available at https://ww3.arb.ca.gov/ei/speciate/speciate.htm.

[123] U.S. Environmental Protection Agency, Support Center for Regulatory Atmospheric Modeling (SCRAM), Air Quality Dispersion Modeling—Preferred and Recommended Models, 2019. Available at https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models. Accessed February 5, 2020.



SOURCES: Esri, 2019, City of San Jose, 2019, ESA, 2020

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Figure 3.1-2
Modeled Construction Haul Routes

Annual average $PM_{2.5}$ concentrations for construction were estimated based on exhaust emissions from off-road diesel construction equipment and both exhaust emissions and fugitive dust emissions (road dust, tire wear, and brake wear) from on-road diesel haul trucks, vendor trucks, and worker trips. Annual average $PM_{2.5}$ concentrations for operations were estimated based on exhaust emissions from all fuel combustion sources, such as emergency generators, charbroilers, and delivery vehicles, as well as fugitive emissions from cooling towers, tire wear, brake wear, and road dust from mobile sources.

For details regarding terrain and land use considerations, emission rates, source parameters, and risk characterization methods applied in the assessment, refer to Appendix C1.

Sensitive Receptors

As discussed in Section 3.1.1, *Environmental Setting*, to evaluate health impacts on new on-site and existing off-site receptors, potential new on-site and nearby existing off-site sensitive receptor populations were identified. For new on-site sensitive receptors, it was assumed that any building or parcel identified as residential would have residential child receptors. Two parcels (H2 and H3) were assumed to have childcare receptors and are designated for this use in the Downtown West Design Standards and Guidelines. Existing off-site sensitive receptors included residences, schools, childcare centers, nursing homes, and hospitals near the project site. 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 Occupational Safety and Health Administration. These protections guarantee the health and safety of workers; therefore, potential worker health risks are not evaluated in the HRA, per the BAAQMD CEQA Guidelines.[124]

Homeless individuals who may be temporarily living in the project area 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 and adjacent to the project site. These nearby locations would likely capture the worst-case exposure of any nearby sensitive receptor.

Existing sensitive receptors include residential locations modeled using fine-grid spacing of 66 feet (20 meters) within 1,000 feet of the project site, as well as discrete receptors placed at schools and childcare centers located up to 2,500 feet from the project site boundary. The areas of the project site that could potentially develop into residences were assessed as a potential sensitive receptor area using a fine receptor grid, consistent with the San Francisco Citywide

124 Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2017, p. C-16. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed January 13, 2020.

HRA database, as documented in the draft *San Francisco Citywide Health Risk Assessment: Technical Support Documentation*.[125,126]

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 HRAs. The child in childcare is assumed to be exposed for 6 years, 8 hours per day and 5 days per week. The schoolchild is assumed to be exposed for 9 years, 8 hours per day and 5 days per week.[127]

The exposure rate for the residential receptors is generally more conservative than those for other sensitive receptor types (i.e., schoolchildren, children in childcare, and patients) because residents have the highest exposure frequency, exposure time, and exposure duration.[128] Thus, the air pollutant exposure to residents typically results in the greatest adverse health outcome for all population groups. It also represents a highly conservative assessment, as the typical resident spends time away from the residence.

TAC exposure and resulting health risks were quantified for residents, childcare centers, and students for the project, using three exposure scenarios to determine the MEIR location. These three scenarios are needed to identify the sensitive receptor location where maximum health risk values would occur because TAC emissions vary substantially with each year of construction and operation. Each scenario was evaluated under a "worst-case" exposure start date.

A worst-case exposure start date represents the highest impact of construction emissions on the more sensitive age groups of third trimester to age 2. Therefore, for example, a receptor that starts its exposure in different years would experience different health risks, based on the amount of construction equipment in use, haul truck trips nearby, etc. These three exposure scenarios are as follows:

- **Scenario 1: Off-Site Receptors—Construction Plus Operations.** The analysis of Scenario 1 assumes that off-site receptors (residents, childcare centers, and schools) would be present near the project site. Consistent with OEHHA guidance, the cancer risk analysis for off-site receptors starts by assuming that a fetus in its third trimester could be

[125] San Francisco Department of Public Health, San Francisco Planning Department, and Ramboll, *Draft San Francisco Citywide Health Risk Assessment: Technical Support Documentation*, February 2020. Available at https://www.sfdph.org/dph/files/EHSdocs/AirQuality/Air_Pollutant_Exposure_Zone_Technical_Documentation_2020.pdf. Accessed March 2020.

[126] Modeling methods from the San Francisco Citywide HRA were used because these are the most recent and comprehensive HRA methods used for any jurisdiction within BAAQMD, and because they follow BAAQMD modeling and risk assessment protocol.

[127] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments*, February 2015. Available at http://oehha.ca.gov/air/hot_spots/hotspots2015.html. Accessed February 5, 2020.

[128] For example, residents are assumed to be exposed for 30 years, as compared to the child in childcare who is assumed to be exposed for 6 years; resident children are assumed to be exposed 24 hours a day, 7 days a week, as compared to the childcare child, who is assumed to be exposed 8 hours a day, 5 days a week.

present when construction begins for Phase 1.[129] Impacts under Scenario 1 were evaluated at different exposure start dates during the construction years to determine when maximum exposure would occur. For cancer risk, a total exposure of 30 years was evaluated, beginning at the "worst-case" start date,[130] and continuing through the remainder of the construction phases, plus the interim operational buildout years from 2028 to 2031 into the full operational conditions. For chronic HI and annual average $PM_{2.5}$ concentrations, the maximum annual values for each Scenario 1 off-site receptor location was identified.

- **Scenario 2: On-Site Receptors—Construction Plus Operations.** The analysis of Scenario 2 assumes that on-site receptors (residents) would be present at the project site after partial construction. For cancer risks, the analysis of on-site receptors starts by assuming that a fetus in its third trimester would be present when construction of any on-site residential uses is completed and occupancy can begin. This occurs throughout the construction duration starting in 2025. Similar to Scenario 1, impacts were evaluated at different exposure start dates during the construction years to determine when maximum (i.e., "worst-case") exposure would occur. For cancer risks, the duration of exposure to construction emissions would vary by unit, and then the on-site receptor would be exposed to operational emissions for a total exposure of 30 years beginning as early as 2028. For chronic HI and annual average $PM_{2.5}$ concentrations, the maximum annual values for each Scenario 2 on-site receptor location was identified.
- **Scenario 3: Off-Site and On-Site Receptors Operations.** The analysis of Scenario 3 assumes that off-site receptors (residents, childcare centers, and school) and on-site receptors (residents and childcare centers created as part of the project) would be present at the project site. For cancer risks, the analysis of receptors starts by assuming that a fetus in its third trimester would be present when construction for all phases concludes in 2032 and would be exposed to operational emissions for full project buildout (2032–2062), for a total exposure of 30 years. For cancer risks, Scenario 3 represents a full 30-year operational exposure to document lifetime exposure of residents to full project buildout emissions once construction is complete. For chronic HI and annual average $PM_{2.5}$ concentrations, the maximum annual values for each Scenario 3 off-site and on-site receptor location was identified.

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 a relatively large amount of construction would take place during a relatively intensive and overlapping schedule. Because of this conservative assumption, actual TAC emission rates and sensitive receptor exposure during construction could be less than those estimated in this analysis. Should construction be delayed or occur over a longer period, extending beyond 2031, TAC emissions could be reduced because of a newer and cleaner-burning construction equipment fleet mix. TAC exposure could be reduced because of a less intensive and overlapping buildout schedule (i.e., fewer daily TAC emissions occurring over a longer period, spreading exposure into less susceptible, older sensitive receptor age groups).

[129] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments*, February 2015. Available at http://oehha.ca.gov/air/hot_spots/hotspots2015.html. Accessed February 5, 2020.
[130] The "worst-case" start date was determined by calculating the maximum incremental increase in lifetime cancer risks for all receptors starting each year from the start of construction in 2021 through the end of construction. The exposure start year that produces the highest risk is presented in this EIR.

Health Risk Calculations

The health risk calculations used in the HRA for the project are summarized below. Refer to Appendix C1 for additional supporting technical information regarding the HRA.

Cancer Risk

The HRA evaluated the incremental increase in lifetime cancer risk as a result of exposure to both construction and operational emissions. These lifetime "excess" 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 of a specific chemical was calculated by multiplying the chemical intake or dose from human inhalation by the chemical's cancer potency factor. The incremental increase in lifetime cancer risk is based on DPM emissions from construction sources (off-road diesel construction equipment and on-road diesel hauling trucks) and operational sources (diesel emergency generators, TRU idling), and speciated TOG emissions from operational gasoline vehicles.[131] For operational traffic, TAC emissions were included for gasoline vehicles, including from running exhaust; fugitive fuel vapor sources, including running loss processes; and fugitive particulate sources, including tire wear, brake wear, and re-entrained road dust. Other operational sources of particulates include cooling towers and charbroilers. 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 for DPM emissions, as recommended by the California Environmental Protection Agency.[132]

Lifetime excess cancer risk from exposure to DPM occurs exclusively through inhalation, so only the inhalation pathway was considered in the HRA. Other pollutants, such as toxic organic gases that result from the use of gasoline, were assessed through the inhalation pathway as well. Estimated excess cancer risks were calculated using the sensitivity factors and breathing rates recommended by OEHHA.[133]

For the purposes of this analysis, all off-site and on-site residents, adults and children, were assumed to be present at one location for 30 years, consistent with OEHHA guidance. Exposure assessment for childcare centers and schools followed OEHHA and BAAQMD guidance and methods.[134] The duration of exposure for childcare centers and schools is dependent on the age range of the students; for example, for a kindergarten to sixth grade school, exposure duration could be up to 8 years.

Chronic Health Impacts

The non-cancer effects of chronic (i.e., long-term) exposure to DPM and other TACs were evaluated using the HI approach, consistent with OEHHA guidance. The chronic HI is calculated

131 Refer to Appendix C1 for a list of TACs.
132 Refer to Appendix C1 for a list of TACs.
133 Refer to Appendix C1 for a list of TACs.
134 Bay Area Air Quality Management District, *Air Toxics NSR Program Health Risk Assessment Guidelines*, December 2016. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/permit-modeling/hra_guidelines_12_7_2016_clean-pdf.pdf?la=en. Accessed February 5, 2020.

by dividing the maximum modeled annual average concentration at the maximum impacted receptor by the 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 RELs for TACs from tailpipe and evaporative TOG emissions were based on BAAQMD's weighted toxicity calculation methods and the latest data in CARB's Hotspots Analysis and Reporting Program database.[135]

$PM_{2.5}$ Concentrations

The HRA also analyzes annual average $PM_{2.5}$ concentrations resulting from exposure to both construction-related and operational emissions. The exposure assessment considers $PM_{2.5}$ 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. The $PM_{2.5}$ annual concentration presented is the highest annual year for the MEIR location.

Cumulative Health Risk Assessment Impacts

For each exposure scenario, the cumulative HRA tabulates the impact of project-related risks plus off-site sources (stationary and mobile) near the locations of the maximally impacted off-site and on-site sensitive receptors. 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 site. As such, this evaluation identifies all sources within 1,000 feet of the project boundary. Because mobile sources follow pathways along the roadway network, some of the mobile-source links included in the modeling extend past the 1,000-foot zone of influence to ensure that their impacts would be captured for all receptor locations within the modeling domain. Additionally, since there are permitted stationary sources beyond the 1,000-foot zone of influence, the modeling includes permitted stationary sources at an approximate radius of 1,500 feet.

In addition to the evaluation of each single source, the combined health risks from all TAC and $PM_{2.5}$ sources were evaluated. Sources evaluated included any BAAQMD-permitted stationary source, roadways with more than 10,000 vehicles per day, and any other major source of emissions within the zone of influence such as railways.

BAAQMD provides tools for screening background health risk impacts for stationary sources, roadways and highways; however, these tools use emissions factors from EMFAC2014, which has been superseded by EMFAC2017. Because EMFAC2017 is more recent and often results in higher calculated emissions, it was used for the cumulative HRA instead of the BAAQMD screening tools.

The cumulative impact analysis specifically modeled the following off-site TAC emissions sources to determine health risks at the project-level MEIRs identified in the HRA: railyards and

[135] California Air Resources Board, *HARP Air Dispersion Modeling and Risk Tool*, May 2019. Available at https://ww2.arb.ca.gov/resources/documents/harp-air-dispersion-modeling-and-risk-tool. Accessed May 2015.

locomotives, including activity at the San José Diridon Station from Caltrain, Altamont Corridor Express (ACE), and Amtrak locomotives; permitted stationary sources, including auto body shops, a coffee roaster, backup generators, and gasoline dispensing facilities; and on-road mobile sources, including Interstate 280, State Route 87, and surface streets such as West Santa Clara Street.

Caltrain, ACE, and Amtrak emissions were estimated based on current public schedules and future projections.[136,137] Data on Union Pacific Railroad traffic through Diridon Station are less accessible by the public. Emissions were estimated using the 2018 fleet percentage, as reported to CARB under the Rail Emissions Reduction Agreement, and by acquiring information from the Peninsula Corridor Electrification Project EIR.[138,139] Mobile-source emissions from the rail routes and emissions from idling at Diridon Station were incorporated into the dispersion model and risk at the MEIRs was assessed.

Similarly, emissions from on-road mobile sources were estimated using traffic data for existing conditions and modeled in AERMOD to determine the impacts at the MEIR locations. Consistent with BAAQMD CEQA guidelines for cumulative analyses, emissions from roadways with an existing annual average daily traffic volume of 10,000 vehicles or roadways within 1,000 feet of the project site were calculated and subsequently modeled in AERMOD to determine associated TAC concentrations at MEIR locations. Existing conditions (2018) traffic volumes on all nearby roadway segments were used in the cumulative assessment. This traffic was assumed to remain constant through the entire exposure duration of 30 years for each modeled receptor. Mobile emission factors from EMFAC2017 for the year 2021 were used for all years of exposure through 2062. This is a simplified method for calculating the incremental increase in lifetime cancer risk and is highly conservative, because vehicle emission rates decline steadily over time due to fleet turnover, more stringent vehicle fleet emission standards, and technology improvements.

For permitted stationary sources, because of the variation in sources, and because data on source parameters are not readily available, an approach akin to the BAAQMD screening tools was implemented. Risk values for each permitted stationary source within 1,500 feet of the project boundary were provided by BAAQMD. BAAQMD's Health Risk Calculator with Distance Multipliers was used to determine the impact from each permitted station source onto the MEIRs.[140]

Cumulative major development projects (including Bay Area Rapid Transit [BART], Caltrain Modernization, and new development under the proposed DSAP Amendment) and other smaller nearby cumulative projects were evaluated to determine whether their health risk impacts would

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136 Capital Corridor Joint Powers Authority, *Capitol Corridor Train Schedule, Weekdays*, Effective October 28, 2019.
137 Peninsula Corridor Joint Powers Board, *Peninsula Corridor Electrification Project EIR*, 2014, Section 3.2, *Air Quality*. Available at http://www.caltrain.com/Assets/Caltrain+Modernization+Program/FEIR/3.2+Air+Quality.pdf. Accessed June 2020.
138 California Air Resources Board, *2018 UP Locomotive Summary*, 2018. Available at https://ww2.arb.ca.gov/resources/documents/rail-emission-reduction-agreements. Accessed February 2020.
139 Peninsula Corridor Joint Powers Board, *Peninsula Corridor Electrification Project EIR*, 2014, Section 3.2, *Air Quality*. Available at http://www.caltrain.com/Assets/Caltrain+Modernization+Program/FEIR/3.2+Air+Quality.pdf. Accessed June 2020.
140 Bay Area Air Quality District, *Health Risk Calculator with Distance Multipliers*, 2020. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/tools/baaqmd-health-risk-calculator-beta-4-0-xlsx.xlsx?la=en. Accessed June 2020.

contribute to the health risks of the project MEIR. For each cumulative project with available data, the individual project locations and MEIR health risk results (as reported in their respective CEQA documents) were scaled based on distance and added to the health risk results for the proposed project MEIR locations, where applicable. BAAQMD's Health Risk Calculator with Distance Multipliers was used to scale the cumulative project health risks to the project-level MEIR locations, to estimate the health risk from each cumulative project at the project-level MEIR locations.[141]

A cumulative analysis was completed for the MEIRs produced under mitigated conditions for all three scenarios.

Cancer Burden

As an informational assessment, this EIR includes a cancer burden analysis. The cancer burden is the estimated increase in the occurrence of total cancer cases in a population as a result of exposures to TAC emissions from the proposed project. Cancer burden analyses are commonly performed for industrial facilities subject to the State's Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987), and OEHHA has developed applicable guidelines. The BAAQMD does not have a regulatory procedure, specific requirements, or CEQA threshold for analyzing cancer burden resulting from mixed-use development projects. Nonetheless, this analysis was conducted to provide additional context to the health risk assessment results discussed above. An estimate of the number of people exposed at various cancer risk levels can provide perspective on the magnitude of the potential public health impact posed by a project or other TAC sources. A project in a sparsely populated area can have a public health impact different from the health impact of the same project in a highly populated area.

The purpose of a cancer burden analysis is to calculate population-wide total cancer cases. This differs from the individual incremental increase in lifetime cancer risk typically calculated as part of a standard HRA, which is generally reported in terms of risk per million individuals. In other words, the HRA identifies the MEI and presents the single worst-case incremental increase in cancer risk to one person, while cancer burden is the population-weighted cancer risk and represents the total anticipated cancer cases in an exposed population. The exposed population is defined as the number of persons within a facility's zone of impact (ZOI), which is defined as the area exposed to an incremental increase in lifetime cancer risk of one in a million from the project. Another difference between a cancer burden analysis and a probabilistic HRA is that OEHHA recommends cancer burden calculations provide an estimate of the increased number of total cancer cases in a given population as a result of exposures to TAC emissions over a 70-year duration.[142]

The total cancer burden is the product of the number of persons in a population area (such as a census tract) and the estimated maximum individual incremental increase in lifetime cancer risk

[141] Bay Area Air Quality District, *Health Risk Calculator with Distance Multipliers*, 2020. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/tools/baaqmd-health-risk-calculator-beta-4-0-xlsx.xlsx?la=en. Accessed June 2020.

[142] Because the ZOI is limited to those locations at which increased cancer risk due to the project over a 70-year lifetime would be one in million or greater, the geographic area of the ZOI encompasses only the project vicinity and does not extend to locations where increased cancer risk would be less than one in one million.

from TACs in that geographic boundary, summed over all of the population areas (or census tracts) studied.

The incremental increase in 70-year lifetime cancer risk from mitigated project-related TAC emissions was estimated at the geographical center (centroid) of census tracts. The census tract receptors have populations assigned to each based on census data.[143] The expected residential population growth associated with the proposed project is added to the census tract receptors located at the project site. The study area for the HRA, which represents the geographic resolution and potentially exposed population to the proposed project's TAC emissions, was determined based on a number of factors including the project site, the surrounding sensitive population locations, and professional judgment.[144] From the census data, the total population analyzed in the study area is currently 53,227 people. The expected population growth attributable to the proposed project is 12,958 people, for a total analyzed population of 66,185 at full project buildout within the HRA study area. The total population within the ZOI is somewhat less, with a total of 38,916 people at buildout, 33 percent of which is project-related growth in residential population.

The worst-case mitigated construction and operational emissions were used in the cancer burden analysis. Because proposed project construction spans a large period of time (approximately 11 years from 2021 through 2032), the incremental increase in lifetime cancer risk was evaluated with different exposure start years to determine each sensitive receptor's maximum cancer risk. As a conservative approach, full buildout operational emissions were applied starting in 2025 (the proposed project is anticipated to be fully built out in 2032). The maximum incremental increase in lifetime cancer risk for each receptor was applied to the total exposed population within the ZOI to calculate the worst-case mitigated cancer burden of the proposed project.

Minimum Efficiency Reporting Value (MERV) 13 Air Filtration

MERV 13 filters have a removal efficiency of 90 percent for particles ranging from 1 to 3 microns and less than 75 percent for particles ranging from 0.3 to 1 microns.[145,146] The BAAQMD's Planning Healthy Places guidance indicates that MERV 13 air filtration devices installed on an HVAC air intake system can remove 80 to 90 percent of indoor particulate matter (greater than 0.3 microns in diameter).[147] MERV 13 filters are required to be installed in new homes built on the project site per the 2019 California Energy Code.

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[143] California Air Resources Board, *HARP Air Dispersion Modeling Tool*, May 1, 2019. Available at https://ww2.arb.ca.gov/resources/documents/harp-air-dispersion-modeling-and-risk-tool. Accessed July 2020.

[144] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments*, February 2015. Available at http://oehha.ca.gov/air/hot_spots/hotspots2015.html. Accessed July 4, 2020.

[145] American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*, 2007. ANSI/ASHRAE Addendum b to Standard 52.2-2007.

[146] United States Environmental Protection Agency, Residential Air Cleaners: A Technical Summary, 3rd edition, August 2018. U.S. EPA 402-F-09-002. Available at https://www.epa.gov/sites/production/files/2018-07/documents/residential_air_cleaners_-_a_technical_summary_3rd_edition.pdf. Accessed August 2020.

[147] Bay Area Air Quality Management District, Planning Healthy Places *A Guidebook for addressing local sources of air pollutants in community planning.* May 2016. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/planning-healthy-places/php_may20_2016-pdf.pdf?la=en. Accessed August 2020.

Based evidence documented in Appendix C2, new on-site residential and childcare buildings at the project site with MERV 13 filters installed would significantly reduce outdoor DPM and $PM_{2.5}$ concentrations for indoor occupants. Based on a thorough literature review, as discussed above, it is expected that these concentrations would be reduced by a minimum of 65 to 70 percent, and a maximum of 85 to 95 percent. Consequently, it was conservatively assumed that MERV 13 filters would reduce the total exposure of new on-site receptors to DPM and $PM_{2.5}$ concentrations by 60 percent. This is a conservative assumption because it represents the low range of particulate removal efficiency evidenced by recent studies, and doesn't account for the extremely low particulate matter infiltration rates through the building envelope of new construction.

Health Effects Assessment for Criteria Air Pollutants

In a 2018 decision (*Sierra Club v. County of Fresno*, 6 Cal.5th 502, also referred to as *Friant Ranch*), the California Supreme Court decided that CEQA requires disclosure of the potential for a project's emissions to affect human health when the project's criteria air pollutant emissions exceed applicable thresholds and contribute considerably to a significant cumulative impact. The decision requires EIRs to either (1) make a "reasonable effort" to substantively connect the estimated amount of a given air pollutant a project will produce and the health effects associated with that pollutant, or (2) explain why such an analysis is infeasible.[148]

However, the Court also clarified that CEQA "does not mandate" that EIRs include "an in-depth risk assessment" that provides "a detailed comprehensive analysis … to evaluate and predict the dispersion of hazardous substances in the environment and the potential for exposure of human populations and to assess and quantify both the individual and population wide health risks associated with those levels of exposure."[149]

Typically, the health impact of a particular criteria pollutant is analyzed by air districts on a regional scale, based on how close the area is to attaining the NAAQS. Because air districts' attainment plans and supporting air model tools are regional in nature, they are not typically used to evaluate the impacts of individual projects on ambient concentrations of criteria air pollutants, or to correlate those impacts to potential resultant effects on public health. The complex nature of criteria air pollutants' dispersion and the complex atmospheric chemistry (especially in the case of ozone and fine particulate matter) limit the usefulness of applying the available models to predict health impacts on a project level.

The accumulation and dispersion of air pollutant emissions within an air basin depends on the size and distribution of emission sources in the region and meteorological factors such as wind, sunlight, temperature, humidity, rainfall, atmospheric pressure, and topography. Various air districts in California agree that it is very difficult to quantify health impacts and that the specific tools and methods to use are still under development.

[148] 6 Cal.5th at 510–511.
[149] 6 Cal.5th at 521.

Nonetheless, it is recognized, for example, that health effects from ozone are correlated with increases in the ambient level of ozone in the air a person breathes.[150] Thus, to correlate the proposed project–related change in regional air emissions with specific types of health effects, regional-level tools were integrated into a quantitative health impacts assessment (HIA), where feasible, to provide information on possible health effects that may result from the project's emissions of criteria air pollutants.

The regional-level tools used included the Comprehensive Air Quality Model with extensions (CAMx) model and EPA's Environmental Benefits Mapping and Analysis Program–Community Edition (BenMAP-CE) model.[151,152] The current version of EPA's BenMAP-CE model only has health impact functions associated with ozone and $PM_{2.5}$; therefore, the quantitative HIA analyzed only those two pollutants quantitatively, and the other criteria pollutants were evaluated qualitatively. For this reason, it was infeasible to perform a quantitative analysis of other criteria air pollutant emissions based on existing modeling tools.

The HIA for the proposed project analyzed five data sets:

- Future No Project (base case);
- Future with Project without mitigation: both Interim Year 2029 and First Operation Year 2032; and
- Future with Project with mitigation: both Interim Year 2029 and First Operation Year 2032.

The modeling domain used for the HIA is the same one used by the BAAQMD for the 2016 AQMP. Data from the final modeling grid used by BAAQMD was used for the CAMx run. This final grid covered an area 740 by 740 kilometers, using a 4 km grid size and 185 by 185 cells. Appendix C3 presents a figure of the modeling domain.

Rates of ozone precursor and $PM_{2.5}$ emissions from operation of the proposed project were distributed spatially and temporally in the photochemical grid model, CAMx, to estimate the small increases in ozone and $PM_{2.5}$ concentrations in the region that would result from the proposed project's emissions. Meteorological data for the year 2016 were used to evaluate the dispersion of criteria pollutant emissions that can be compared to and validated against the 2016 AQMP modeling performed by BAAQMD.

A "base case" CAMx photochemical model was run using emissions inventory data from BAAQMD's 2016 AQMP efforts to represent pollutant dispersion and the corresponding health

[150] U.S. Environmental Protection Agency, *Health Effects of Ozone in the General Population*, last updated September 12, 2016, Figure 9. The number of emergency or urgent daily respiratory admissions to acute care hospitals is related to estimated ozone exposure. Available at https://www.epa.gov/ozone-pollution-and-your-patients-health/health-effects-ozone-general-population.

[151] U.S. Environmental Protection Agency, CMAQ: The Community Multiscale Air Quality Modeling System, last updated March 18, 2019. Available at https://www.epa.gov/cmaq. Accessed July 22, 2019.

[152] U.S. Environmental Protection Agency, Environmental Benefits Mapping and Analysis Program—Community Edition (BenMAP-CE), last updated August 17, 2017. Available at https://www.epa.gov/benmap/benmap-ce-manual-and-appendices. Accessed July 22, 2019.

effects (e.g., asthma-related or respiratory-related hospital admissions) for the proposed project area only, but without the contribution of the proposed project.[153] The project's ozone precursor and $PM_{2.5}$ emissions were then combined spatially and temporally with the BAAQMD emission inventory data and run in a second modeling run, as described below. The two sets of results were then compared to analyze the difference in health impacts and the corresponding contribution from project operation.

Daily $PM_{2.5}$, NO_X, and VOC emissions profiles for a maximum annual period were established by analyzing the estimated worst-case annual construction emissions and operational emissions at the project site. Fugitive dust emissions from both on-road and off-road sources were included in the construction calculations provided in Appendix C1. Fugitive dust from off-road activities were estimated using CalEEMod default values during material movement and grading; fugitive dust emissions from on-road vehicle travel were estimated using EMFAC2017 tire wear and brake wear emission rates, along with re-entrained road dust using CARB methods.[154] The interim year 2029 study included combined construction and operational emissions, and the year 2032 study included operational emissions from the first year of operations to conservatively generate the worst-case incremental concentrations that could be induced by the proposed project.

This analysis used the comprehensive construction and operational data provided in **Appendix C3** for the project. Background regional emissions were obtained from the BAAQMD 2016 AQMP, as described above. The project's interim year 2029 is expected to generate the highest levels of emissions because it would include construction emissions, and emissions are expected to decline over time as vehicle emissions rates fall. Emissions from the proposed project were allocated spatially and temporally and then added to the BAAQMD inventories.

Next, the analyses used EPA's BenMAP-CE (version 1.5.0) model to estimate the resulting health impacts of minor changes in regional ambient $PM_{2.5}$ and ozone concentrations. BenMAP-CE uses the concentration estimates produced by CAMx, along with population and health effect concentration-response functions, to estimate various health effects of the concentration increases. BenMAP-CE outputs included ozone- and PM-related health endpoints such as mortality, hospital admissions, and emergency room visits.

The BenMAP-CE modeling used air quality grids that match the CAMx modeling grids, and used BenMAP-CE–ready population datasets (generated using EPA's PopGrid software based on 2010 U.S. Census data) corresponding to these modeling grids. Besides the model's default parameters, datasets, and EPA-standard health impact functions, region-specific data were used to the extent possible to obtain health endpoint results that reflect the population and demographic characteristics of the region around the project site. In addition, the default pooling method was applied to synthesize the estimated incidence changes predicted by several studies for the same pollutant-health endpoint group combination. The quantitative HIA results are presented in Appendix C3.

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153 2016 was used as a modeling year basis because it allows for more reliable model performance verification against BAAQMD's AQMP modeling efforts to ensure that the results obtained are accurate.

154 California Air Resources Board, *Miscellaneous Process Methodology 7.9: Entrained Road Travel, Paved Road Dust*, March 2018. Available at https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2018.pdf. Accessed May 2020.

The HIA for the project evaluated health impacts associated with ozone and $PM_{2.5}$, and did not assess CO and NO_2. Although exposures 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 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."[155] That is, 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 EPA at levels that are "requisite to protect the public health" (U.S. Code Title 42, Section 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 visibility and damage to animals, crops, vegetation, and buildings. Thus, the closer a region is to attaining a particular NAAQS or CAAQS, the lower the human health impact is from that pollutant. Generally, as non-reactive pollutants travel away from the source, they disperse and their concentrations diminish rather quickly.

As presented in Section 3.1.2, *Regulatory Framework*, and in Table 3.1-3, the SFBAAB is designated non-attainment for both the 1- and 8-hour state ozone standards and non-attainment for the federal 8-hour ozone standard. In terms of PM, the SFBAAB 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 because of 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 EPA has developed tools such as BenMAP-CE that allow the numerical correlation of NO_X, VOCs, and $PM_{2.5}$ to potential effects on human health. The emissions of VOC and NO_X are analyzed because they contribute to the formation of ozone and secondary $PM_{2.5}$.

A number of conservative assumptions have been built into the HIA. Those assumptions include but are not limited to the following:

- Maximum annual average emissions were used in the modeling and were assumed to occur for the same year for each pollutant.
- Emissions from activities currently occurring on the project site were not removed from the model (although emissions from project-related VMT are effectively net of existing mobile-source emissions in the traffic study area).

[155] California Air Resources Board, California Ambient Air Quality Standards (CAAQS), 2019. Available at https://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm. Accessed December 2019.

- Health effects can occur at any concentration, including small incremental concentrations.[156]
- All $PM_{2.5}$, including fugitive dust and exhaust from fuel combustion, is of equal toxicity.[157]

As a result of the conservative assumptions presented above, the results of the modeling are intended to represent an upper boundary of potential impacts. In addition, the complex nature of criteria air pollutant dispersion and the atmospheric chemistry should be considered when interpreting the results. Even with the conservative assumptions noted above, the minor project emissions relative to background and the uncertainties inherent in the models correspond to health effects that would be small and may fall within the range of statistical uncertainty.

This EIR uses the thresholds of significance for mass emissions of criteria pollutants recommended by BAAQMD. The purpose of this health impact analysis is not to create a new threshold or establish new impacts, but rather to satisfy the direction of the California Supreme Court in *Sierra Club v. County of Fresno* to make a "reasonable effort" to substantively connect the estimated amount of a given air pollutant a project will produce and the health effects associated with that pollutant. Therefore, the analyses compared the BenMAP results to background health incident rates to estimate the health effects.[158] The predicted health effects are provided for informational purposes to enhance understanding of the effects of impacts determined to be significant (e.g., Impact AQ-2) based on other measurable criteria. The quantitative HIA results, along with detailed modeling methods, are presented in Appendix C1.

Impact Analysis

Impact AQ-1: The project would not conflict with or obstruct implementation of the applicable air quality plan. ***(Less than Significant with Mitigation)***

Consistency with the BAAQMD 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 implement all feasible

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156 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 method of linearly scaling impacts is broadly accepted for use in regulatory evaluations and is considered as being health protective. (U.S. Environmental Protection Agency, *Quantitative Health Risk Assessment for Particulate Matter*, EPA-452/R-10-005, June 2010. Available at https://www3.epa.gov/ttn/naaqs/standards/pm/data/PM_RA_FINAL_June_2010.pdf. Accessed September 2019.)

157 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. Environmental Protection Agency, *Integrated Science Assessment [ISA] For Particulate Matter [Final Report]*, December 2009, EPA/600/R-08/139F. Available at https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=216546. Accessed October 2019.) 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 by the proposed project would be 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. Refer to Appendix C3 for further discussion.

158 The "background health incidence" is an estimate of the average number of people who 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 and the World Health Organization.

measures to reduce ozone in accordance with the requirements of the California Clean Air Act. 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:

- Support the primary goals of the Clean Air Plan;
- Include applicable control measures from the Clean Air Plan; and
- Avoid disrupting or hindering implementation of control measures identified in the Clean Air Plan.

The Clean Air Plan recognizes that, to a great extent, community design[159] dictates individual travel modes, and that a key long-term control strategy for reducing emissions of criteria pollutants, 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 SFBAAB. Many of these measures address stationary sources and will be implemented by BAAQMD using its permit authority, and therefore, are not suited for implementation through local planning efforts or project approval actions.

Table 3.1-6 identifies the Clean Air Plan measures that may apply to the proposed project. This table identifies each control strategy and correlates it with specific elements of the proposed project or explains why the strategy does or does not apply to the proposed project.

TABLE 3.1-6
PROJECT CONSISTENCY WITH POTENTIALLY APPLICABLE 2017 CLEAN AIR PLAN CONTROL MEASURES

Control Measure	Measure Description	Existing or Proposed Implementation Mechanism	Project Consistent with Measure?
SS25—Coatings, Solvents, Lubricants, Sealants and Adhesives	SS25 will reduce emissions of ROG from architectural coatings and other materials by proposing more stringent ROG limits as appropriate.	The project would comply with all applicable BAAQMD rules and regulations regarding ROG emission limits. Additionally, the project would implement Mitigation Measure AQ-2d, Low-VOC Coatings, which would require the use of low VOC (i.e., ROG) coatings beyond the local requirements (i.e., Regulation 8, Rule 3: Architectural Coatings).	Yes, with implementation of Mitigation Measure AQ-2d

159 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, in compact communities with a mixture of land uses, it is much easier to walk, cycle, or take transit for at least some daily trips.

TABLE 3.1-6
PROJECT CONSISTENCY WITH POTENTIALLY APPLICABLE 2017 CLEAN AIR PLAN CONTROL MEASURES

Control Measure	Measure Description	Existing or Proposed Implementation Mechanism	Project Consistent with Measure?
SS30—Residential Fan Type Furnaces	SS30 will reduce emissions of NOx by creating more stringent limits on new and replacement central furnace installations. Strategies may include regulations regarding sale of fossil fuel-based space and water heating systems for residential and commercial use.	The project would use all-electric space and water heating systems for residential and commercial use. Natural gas would be used only for 20,000 square feet of commercial kitchens. Additionally, the project would be subject to San José's Reach Code, which requires, among other things, that new residential and non-residential construction achieve increased energy efficiency, including for building heating, and provides incentivizes for all-electric construction.	Yes
SS32—Emergency Backup Generators	S32 will reduce emissions of DPM, TACs, and criteria pollutants from emergency backup generators by enforcing Rule 11-18, resulting in reduced health risks to impacted individuals. This measure will also have climate protection benefits through reduces GHG emissions.	All emergency backup generators would be compliant with the regulations set forth in Rule 11-18. Additionally, Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators, states that all emergency generators shall use the best available technology controls and alternative fuels, such as renewable diesel or biodiesel, if feasible.	Yes, with implementation of Mitigation Measure AQ-2e
TR1—Clean Air Teleworking Initiative	The primary objective of TR1 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. It directs MTC to provide support to employers for regional telecommuting programs in partnership with 511 Rideshare and the Bay Area Commuter Benefits Program and the Bay Area Air Quality Management District to include Spare the Air notifications to all Employer Program members that include the promotion of teleworking/telecommuting on Spare the Air Days.	As required by Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program, the project applicant would distribute information about Spare the Air Days in the SFBAAB as part of transportation welcome packets and ongoing transportation marketing campaigns. This information would encourage employers and employees, as allowed by their workplaces, to telecommute on Spare the Air Days.	Yes, with implementation of Mitigation Measure AQ-2h, with implementation of Mitigation Measure AQ-2h
TR2—Trip Reduction Programs	TR2 includes a mandatory and voluntary trip reduction program. The regional Commuter Benefits Program, resulting from SB 1339, 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.	With implementation of Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program, the project would include employer incentives to promote multimodal transportation. The strategies outlined in the TDM program include providing employee transit passes for the multiple transit options at Diridon Station and providing first- and last-mile employee subsidies to and from transit stations.	Yes, with implementation of Mitigation Measure AQ-2h

TABLE 3.1-6
PROJECT CONSISTENCY WITH POTENTIALLY APPLICABLE 2017 CLEAN AIR PLAN CONTROL MEASURES

Control Measure	Measure Description	Existing or Proposed Implementation Mechanism	Project Consistent with Measure?
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.	The project would be located adjacent to Diridon Station, where the Clipper® fare payment system can be used on various transit operators. It is noted that 511 no longer provides trip planner service or transit agency schedules.	Yes
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.	The project would comply with this measure with implementation of Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program. The project's TDM program 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 would prioritize safety, especially for bicyclists and pedestrians.	Yes, with implementation of Mitigation Measure AQ-2h
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.	The project would comply with this measure with implementation of Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program. Under the TDM program, the project would also include implementation of the 511 Regional Rideshare Program or its equivalent.	Yes, with implementation of Mitigation Measure AQ-2h

TABLE 3.1-6
PROJECT CONSISTENCY WITH POTENTIALLY APPLICABLE 2017 CLEAN AIR PLAN CONTROL MEASURES

Control Measure	Measure Description	Existing or Proposed Implementation Mechanism	Project Consistent with Measure?
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.	The project would include an on-site pedestrian and bicycle network that includes Class I, II, III, and IV bicycle facilities. The project proposes to build a footbridge over Los Gatos Creek south of West Santa Clara Street; add mid-block passages at several locations to facilitate pedestrian and bicycle access through the site; and improve bicycle and pedestrian linkages to Downtown, adjacent neighborhoods, and regional trails. In addition, the central portion of the project site, near Diridon Station, would contain a pedestrian-focused mix of the project's program uses and would contain a variety of civic-oriented uses. The project would encourage pedestrian movement through improvements to public areas through sidewalk widening, construction of plazas, and inclusion of street trees.	Yes
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.	The project would comply with this measure by being a dense, transit-oriented, mixed use project in an infill location. It would increase residential density; include up to 7.3 million gsf of office combined with up to 5,900 dwelling units and other retails, arts, and cultural spaces in a mixed-use development. The program development would place a mix of land uses including residential, office, and retail uses in close proximity, thereby reducing the number of VMT and trips. The project site is also located in a Priority Development Area and Transit Priority Area. The project site is adjacent to Diridon Station, a central passenger rail hub that is served by Caltrain, ACE, VTA light rail, Amtrak Capitol Corridor, and Amtrak Coast Starlight.	Yes

TABLE 3.1-6
PROJECT CONSISTENCY WITH POTENTIALLY APPLICABLE 2017 CLEAN AIR PLAN CONTROL MEASURES

Control Measure	Measure Description	Existing or Proposed Implementation Mechanism	Project Consistent with Measure?
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.	The project would comply with this measure with implementation of Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program. The TDM program would include market-rate pricing and unbundled parking for market-rate residential units. It would also include a limited parking supply (i.e., less than the code requirement) and implement strategies to drive down the demand for parking, including providing Google employees with pre-tax commuter benefits.	Yes, with implementation of Mitigation Measure AQ-2h
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.	The project would designate a minimum of 10 percent of total parking spaces for EV charging to promote the use of zero-emission vehicles and plug-in electric passenger vehicles. Implementation of Mitigation Measure AQ-2g, Electric Vehicle Charging, would increase this percentage to 15 percent. Additionally, the project would be subject to San José's Reach Code, which requires, among other things, that new residential and non-residential construction provide additional electric vehicle charging readiness and/or electric vehicle service equipment.	Yes
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.	As required by Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program, and as part of a broader transportation marketing campaign, the project would provide new residents and employees with a transportation welcome packet upon move-in or upon starting work at the site. These informational packets would be continuously updated as local transportation options change.	Yes, with implementation of Mitigation Measure AQ-2h

TABLE 3.1-6
PROJECT CONSISTENCY WITH POTENTIALLY APPLICABLE 2017 CLEAN AIR PLAN CONTROL MEASURES

Control Measure	Measure Description	Existing or Proposed Implementation Mechanism	Project Consistent with Measure?
TR 19—Medium and Heavy Duty Trucks	TR19 would reduce emissions by providing incentives for purchase of (1) new trucks with engines that exceed ARB's 2010 NOx emission standards for heavy-duty engines, (2) new hybrid trucks, and (3) new zero-emission trucks. The Air District will work with truck owners, industry, ARB, the California Energy Commission, and others to demonstrate additional battery-electric and hydrogen fuel cell zero-emission trucks.	With Implementation of Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction, refrigerated delivery trucks serving the project site would not need to operated diesel-powered transportation refrigeration units during loading or unloading activities. Additionally, the project would reduce truck traffic and associated emissions by improving the efficiency of deliveries to the project site and distributing materials using small-scale natural gas or electric-powered trucks, thereby reducing emissions.	Yes, with implementation of Mitigation Measure AQ-2f
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.	The project would reduce emissions from off-road construction equipment through the implementation of Mitigation Measure AQ-2a, Construction Emissions Minimization Plan, and Mitigation Measure AQ-2b, Construction Equipment Maintenance and Tuning. These measures would include the implementation of a construction emissions minimization plan that would include dust control requirements, consistent with the San José Downtown Strategy, and ensure that engines on construction vehicles are property maintained. Additionally, all construction equipment would be certified to Tier 4 Final emission standards or electric as specified in the construction equipment lists in Appendix C1. Finally, with implementation of Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement, all on-road heavy-duty trucks with a gross vehicle weight rating of 33,000 pounds or greater (EMFAC2007 Category HDDT) used at the project site (such as haul trucks, water trucks, dump trucks) would be model year 2014 or newer.	Yes, with implementation of Mitigation Measures AQ-2a, AQ-2b, and AQ-2c

TABLE 3.1-6
PROJECT CONSISTENCY WITH POTENTIALLY APPLICABLE 2017 CLEAN AIR PLAN CONTROL MEASURES

Control Measure	Measure Description	Existing or Proposed Implementation Mechanism	Project Consistent with Measure?
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.	The project's districtwide thermal network would be consistent with the City's Climate Smart plan, enabling the project to be combustion-free by providing heating and cooling only through electric equipment. The project applicant is considering various technologies for renewable power generation, including solar photovoltaic arrays that may be located on building rooftops and facades. The project anticipates 7.8 MW of on-site solar PV panels.	Yes
EN2—Decrease Electricity Demand	EN2 would decrease electricity demand through the adoption of additional energy efficiency policies and programs.	The project would reduce energy use as necessary to obtain LEED ND Gold Certification and by implementing all applicable regulatory requirements included in the 2019 Title 24 Building Standards and the San José Reach Code. The project would also meet or exceed the standards of the 2019 American Society of Heating, Refrigeration and Air Conditioning Engineers with respect to building equipment energy use.	Yes
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.	The project would reduce energy use through renewable power generation features exceeding Title 24 Green Building Requirements, all buildings would comply with the City's New Construction Green Building Requirements, and all office buildings would meet LEED Gold standards. The project would also include shared infrastructure and logistics systems to reduce energy demand, therefore, the project would be consistent with this policy. The project would also incorporate on-site PV generation by using both building integrated and PV and rooftop arrays.	Yes

TABLE 3.1-6
PROJECT CONSISTENCY WITH POTENTIALLY APPLICABLE 2017 CLEAN AIR PLAN CONTROL MEASURES

Control Measure	Measure Description	Existing or Proposed Implementation Mechanism	Project Consistent with Measure?
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.	The proposed project would reduce greenhouse gas emissions, criteria pollutants and TACs through the use of all-electric heating systems. Additionally, the project would be subject to San José's Reach Code, which requires, among other things, that new residential and non-residential construction achieve increased energy efficiency, including for building heating, requires electrification-readiness for new buildings that use natural gas. along with solar readiness for non-residential construction, and provides incentivizes for all-electric construction.	Yes
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.	In accordance with the City's Green Stormwater Infrastructure and the Santa Clara Valley Urban Runoff Pollution Prevention Programs, the project is anticipated to include pervious paving and green roofs. The project would also include landscaping and new planting on an aggregate 15 acres of new park and open space on the project site.	Yes
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.	The project would include planting of new street trees to improve pedestrian spaces in compliance with City regulations.	Yes
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 landfills.	The proposed project would achieve 84 percent waste diversion (27 percent compost, 13 percent recycling, 44 percent other recoverables, and 16 percent landfill). Other recoverables typically include the following: metal, foam, wood, e-waste, paper (shredded), cardboard, and kitchen grease; refer to Section 3.14, *Utilities and Service Systems*, for more information. The proposed project would also comply with diversion targets in accordance with the City's Zero Waste Strategic Plan 2022. Other types of diversion would include donating edible food to local charitable organizations for redistribution.	Yes

TABLE 3.1-6
PROJECT CONSISTENCY WITH POTENTIALLY APPLICABLE 2017 CLEAN AIR PLAN CONTROL MEASURES

Control Measure	Measure Description	Existing or Proposed Implementation Mechanism	Project Consistent with Measure?
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.	The project would use recycled water, whether generated by the on-site water treatment plants or obtained from the City's recycled water system, for toilet flushing, irrigation, and as a make-up supply to evaporative cooling tower use for building air conditioning systems.	Yes

NOTES:
ACE = Altamont Corridor Express; Air District, BAAQMD = Bay Area Air Quality Management District; ARB = California Air Resources Board (CARB); City = City of San José; DPM = diesel particulate matter; EMFAC2007 = Emission Factor Model for On-Road Emissions, 2007; EV = electric vehicle; GHG = greenhouse gas; gsf = gross square feet; LEED ND = Leadership in Energy and Environmental Design for Neighborhood Development; MTC = Metropolitan Transportation Commission; MW = megawatts; NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PV = photovoltaic; ROG = reactive organic gas; SB = Senate Bill; TAC = toxic air contaminant; TDM = transportation demand management; TOG = total organic gas; VMT = vehicle miles traveled; VOC = volatile organic compound; VTA = Santa Clara Valley Transportation Authority

SOURCE: Bay Area Air Quality Management District, *Clean Air Plan, Spare the Air, Cool the Climate*, April 19, 2017. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed January 21, 2020.

As shown in Table 3.1-6, certain mitigation measures proposed for adoption as part of the project to reduce the effects described under Impacts AQ-2 and AQ-3 support applicable control measures from the 2017 Clean Air Plan. With implementation of these mitigation measures, the proposed project would comply with applicable control strategies contained in the 2017 Clean Air Plan for the basin, and the impact would be **less than significant with mitigation incorporated**. Specifically, the project would implement the following mitigation measures:

- **Mitigation Measure AQ-2a, Construction Emissions Minimization Plan**
- **Mitigation Measure AQ-2b, Construction Equipment Maintenance and Tuning**
- **Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement**
- **Mitigation Measure AQ-2d, Super-Compliant VOC Architectural Coatings during Operations**
- **Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators**
- **Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction**
- **Mitigation Measure AQ-2g, Electric Vehicle Charging**
- **Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program**

Implementing these mitigation measures would reduce this impact to a **less-than-significant** level. (These measures are discussed in detail under Impact AQ-2 below.)

As discussed in Impact AQ-2 below, the proposed project would result in a net increase in emissions of criteria air pollutants that would exceed significance thresholds for ROG, NO_X,

PM_{10}, and $PM_{2.5}$, even after mitigation. This would result in a significant and unavoidable impact with regard to regional criteria pollutant emissions. However, these emissions—and the conclusion that a significant impact would result—do not in and of themselves indicate a conflict with the Clean Air Plan, with its emphasis on reducing VMT, reducing energy demand, encouraging smart land use and building design, and other objectives.

Examples of a project that could cause the disruption or delay of Clean Air Plan control measures are projects that would preclude the extension of a transit line or bike path or projects that propose excessive parking beyond City parking requirements. The project proposes a development that would be a dense, walkable urban area near a concentration of regional and local transit services, including Diridon Station, which is currently served by Caltrain, ACE, Santa Clara Valley Transportation Authority (VTA) light rail, Amtrak, and bus services. Furthermore, Diridon Station is planned for BART service following the completion of the Silicon Valley BART extension, as well as high-speed rail service to San José.

In addition, the project site is designated as a Priority Development Area pursuant to the Association of Bay Area Governments' Sustainable Communities Strategy: *Plan Bay Area 2040*. This designation applies to new development areas that would support the day-to-day needs of residents and workers in a pedestrian-friendly environment served by transit. The project would include bike lanes, bike safety–oriented street design, and bike-parking facilities to promote bicycling on and around the project site. It would not preclude the extension of a transit line or a bike path or any other transit improvement. Thus, the proposed project would not disrupt or hinder implementation of control measures identified in the Clean Air Plan.

The project would include rezoning of the entire site to the Planned Development Zoning District, which would allow for site-specific development through the approval of a Planned Development Permit. According to the City's Zoning Code, "each structure or facility used for off-street parking and off-street loading shall have the exact number of off-street parking and off-street loading spaces, and other areas, specified for it" in the applicable Planned Development Permit. The project plans to provide up to 4,800 parking spaces for public and/or commercial use, and up to 2,360 spaces for residential uses, for approximately 7,160 total parking spaces on-site.[160] These parking spaces would be required by City-issued Planned Development Permits; therefore, the project would not provide excessive parking beyond the City's requirements.

Consistency with the Envision San José 2040 General Plan

The General Plan includes various goals, policies, and actions to address air quality issues and reduce pollutant emissions. **Table 3.1-7** summarizes the proposed project's consistency with the applicable General Plan policies and actions.

[160] As noted previously, a portion of the residential spacers could be available for shared use by office employees, and some commercial parking could be provided at off-site location(s), should such off-site parking be developed separately from the project in the future.

TABLE 3.1-7
ENVISION SAN JOSÉ 2040 GENERAL PLAN AIR QUALITY POLICIES

Policies and Actions		Project Consistency Measures
Air Pollutant Emission Reduction		
MS-10.1	Assess projected air emissions from new development in conformance with the Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines and relative to state and federal standards. Identify and implement feasible air emission reduction measures.	The project would include feasible mitigation measures to reduce air quality impacts: Mitigation Measures AQ-2a, AQ-2b, AQ-2c, AQ-2d, AQ-2e, AQ-2f, AQ-2g, and AQ-2h. Therefore, the project would be consistent with this policy.
MS-10.3	Promote the expansion and improvement of public transportation services and facilities, where appropriate, to both encourage energy conservation and reduce air pollution.	Under the strategies of the TDM program and Mitigation Measure AQ-2h, the project would undertake public/private partnerships with transit providers to improve the frequency and range of transit services. Therefore, the project would be consistent with this policy.
MS-10.5	In order to reduce vehicle miles traveled and traffic congestion, require new development within 2,000 feet of an existing or planned transit station to encourage the use of public transit and minimize the dependence on the automobile through the application of site design guidelines and transit incentives.	The project is located adjacent to Diridon Station; the project's TDM plan and Mitigation Measure AQ-2h would provide transit incentives, including providing employee transit passes for transit options at Diridon Station and providing first- and last-mile employee subsidies to and from transit stations. Therefore, the project would be consistent with this policy.
MS-10.6	Encourage mixed land use development near transit lines and provide retail and other types of service oriented uses within walking distance to minimize automobile dependent development.	The project would include office, residential, and hotel land uses, as well as active land uses such as retail, arts, cultural, educational, and institutional facilities. This mixed-use development would be located adjacent to Diridon Station, which is a major transit hub served by Caltrain, ACE, VTA light rail, Amtrak, and various bus lines. Therefore, the project would not be an automobile-dependent development and would be consistent with this policy.
MS-10.7	Encourage regional and statewide air pollutant emission reduction through energy conservation to improve air quality	The project would reduce energy use by obtaining LEED ND Gold Certification and implementing all applicable regulatory requirements included in the 2019 Title 24 Building Standards and the San José Reach Code. The project would also meet or exceed the standards of the 2019 American Society of Heating, Refrigeration and Air Conditioning Engineers with respect to building equipment energy use.
MS-10.10	Actively enforce the City's ozone-depleting compound ordinance and supporting policy to ban the use of chlorofluorocarbon compounds (CFCs) in packaging and in building construction and remodeling. The City may consider adopting other policies or ordinances to reinforce this effort to help reduce damage to the global atmospheric ozone layer.	The project would comply with the ozone-depleting compound ordinance. Therefore, the project would be compliant with this policy.
MS-10.11	Enforce the City's wood-burning appliance ordinance to limit air pollutant emissions from residential and commercial buildings.	The project would be compliant with the City's wood-burning ordinance to limit emissions.
MS-10.14	Review and evaluate the effectiveness of site design measures, transit incentives, and new transportation technologies and encourage those that most successfully reduce air pollutant emissions.	The project would be compliant with this program with implementation of Mitigation Measure AQ-2h. The project's TDM program would include site design measures and transit incentives to encourage the use of public transit and reduce air pollutant emissions. In addition, there would be ongoing monitoring of the TDM, with additional measures if vehicle trip reduction targets are not met.

TABLE 3.1-7
ENVISION SAN JOSÉ 2040 GENERAL PLAN AIR QUALITY POLICIES

Policies and Actions		Project Consistency Measures
Toxic Air Contaminants		
MS-11.1	Require completion of air quality modeling for sensitive land uses such as new residential developments that are located near sources of pollution such as freeways and industrial uses. Require new residential development projects and projects categorized as sensitive receptors to incorporate effective mitigation into project designs or be located an adequate distance from sources of toxic air contaminants (TACs) to avoid significant risks to health and safety.	Air quality modeling for sensitive land uses, and impacts of the project on sensitive receptors, including proposed new residential development, are discussed in the evaluation of Impact AQ-3. The project would implement Mitigation Measures AQ-2a, AQ-2b, AQ-2c, AQ-2d, AQ-2e, AQ-2f, AQ-2g, AQ-2h, and AQ-3 to minimize risks to health and safety.
MS-11.2	For projects that emit toxic air contaminants, require project proponents to prepare health risk assessments in accordance with BAAQMD-recommended procedures as part of environmental review and employ effective mitigation to reduce possible health risks to a less than significant level. Alternatively, require new projects (such as, but not limited to, industrial, manufacturing, and processing facilities) that are sources of TACs to be located an adequate distance from residential areas and other sensitive receptors.	Air quality modeling for sensitive land uses, and the results of the HRA are discussed in the evaluation of Impact AQ-3. The project would implement Mitigation Measures AQ-2a, AQ-2b, AQ-2c, AQ-2d, AQ-2e, AQ-2f, AQ-2g, AQ-2h, and AQ-3 to minimize risks to health and safety.
MS-11.3	Review projects generating significant heavy duty truck traffic to designate truck routes that minimize exposure of sensitive receptors to TACs and particulate matter.	The project would designate operational truck routes to minimize exposure of sensitive receptors to TACs and particulate matter through implementation of Mitigation Measure AQ-2f. In addition, the project would reduce waste collection truck traffic by consolidating waste to one or more centralized collection terminal(s), compared to a conventional system in which waste collection trucks travel to each building. Finally, the project would reduce truck traffic and associated emissions by improving the efficiency of deliveries to the project site and distributing materials using small-scale natural gas or electric-powered trucks. Therefore, the project would reduce emissions of TACs and PM from truck traffic and would be consistent with this policy.
MS-11.4	Encourage the installation of appropriate air filtration at existing schools, residences, and other sensitive receptor uses adversely affected by pollution sources.	Consistent with California Energy Code, the project would install MERV 13 air filtration systems at all on-site buildings. Therefore, the project would be consistent with this policy.
MS-11.5	Encourage the use of pollution absorbing trees and vegetation in buffer areas between substantial sources of TACs and sensitive land uses.	The project would include new street trees, parks, and riparian buffers throughout the project site, which would provide a buffer between sources of TACs and sensitive land uses. Therefore, the project would be consistent with this policy.
MS-11.7	Consult with BAAQMD to identify stationary and mobile TAC sources and determine the need for and requirements of a health risk assessment for proposed developments.	The project has identified stationary and mobile sources of TACs, and an HRA was completed. The results of the HRA and the project's impact on sensitive receptors are evaluated in the discussion of Impact AQ-3.
MS-11.8	For new projects that generate truck traffic, require signage which reminds drivers that the State truck idling law limits truck idling to five minutes.	The project would include signage to remind truck drivers that the state idling law limits truck idling to five minutes. Mitigation Measure AQ-2a requires a maximum idling time of two minutes for all construction trucks and equipment, and Mitigation Measure AQ-2f requires a maximum idling time of two minutes for all operational trucks. Therefore, the project would be consistent with this policy.

TABLE 3.1-7
ENVISION SAN JOSÉ 2040 GENERAL PLAN AIR QUALITY POLICIES

Policies and Actions		Project Consistency Measures
Objectionable Odors		
MS-12.1	Require new facilities that are potential sources of odors to prepare an analysis of possible odor impacts and the provision of odor minimization and control measures as mitigation.	The project's potential water reuse (wastewater treatment) facility(s) would be a potential odor source. Odor impacts are discussed below under Impact AQ-5. The facility would have odor controls to manage any objectionable odors. In addition, Mitigation Measure AQ-5b would require that air blowers and odor control units (e.g., carbon filters) be incorporated into the wastewater treatment design. Also, the automatic waste collection system terminal(s) would have air filtration and odor point controls in place for pneumatic exhaust.
MS-12.2	Require new residential development projects and projects categorized as sensitive receptors to be located an adequate distance from facilities that are existing and potential sources of odor. An adequate separation distance will be determined based upon the type, size and operations of the facility.	The project's potential water reuse (wastewater treatment) facility(s) would be a potential odor source. However, Mitigation Measure AQ-5b would require best management practices and emissions controls to address objectionable odors. Also, the automatic waste collection system terminal(s) would have air filtration and odor point controls in place for pneumatic exhaust.
Construction Air Emissions		
MS-13.1	Include dust, particulate matter, and construction equipment exhaust control measures as conditions of approval for subdivision maps, site development and planned development permits, grading permits, and demolition permits. At minimum, conditions shall conform to construction mitigation measures recommended in the current BAAQMD CEQA Guidelines for the relevant project size and type.	As described in Mitigation Measure AQ-2a, the project would include a construction emission minimization plan that would include dust control requirements, consistent with the San José Downtown Strategy. Additionally, all construction equipment would be certified to Tier 4 Final emission standards or electric, as feasible. Therefore, the project would be consistent with this policy.
MS-13.2	Construction and/or demolition projects that have the potential to disturb asbestos (from soil or building material) shall comply with all the requirements of the California Air Resources Board's air toxics control measures (ATCMs) for Construction, Grading, Quarrying, and Surface Mining Operations.	The project applicant would determine the presence of hazardous building materials, including asbestos, prior to receipt of demolition permits. The project would comply with all requirements of CARB's ATCMs for all construction/demolition activities that have the potential to disturb asbestos.
MS-13.3	Require subdivision designs and site planning to minimize grading and use landform grading in hillside areas.	The project would limit grading to development blocks and would conform to existing grades at the edge conditions along the block boundaries and rights-of-way. The project applicant would minimize elevation changes within the existing street rights-of-way. Therefore, the project would be compliant with this policy.
MS-13.4	Adopt and periodically update dust, particulate, and exhaust control standard measures for demolition and grading activities to include on project plans as conditions of approval based upon construction mitigation measures in the BAAQMD CEQA Guidelines.	The project would comply with all applicable dust, particulate, and exhaust control measures for demolition and grading activities as a condition of project approval. Therefore, the project would be compliant with this policy.
MS-13.5	Prevent silt loading on roadways that generates particulate matter air pollution by prohibiting unpaved or unprotected access to public roadways from construction sites.	The project would prohibit unpaved and unprotected access to public roadways from construction sites. In addition, the water trucks would water twice a day for off-road dust control during project construction. Therefore, the project would be compliant with this policy.

TABLE 3.1-7
ENVISION SAN JOSÉ 2040 GENERAL PLAN AIR QUALITY POLICIES

Policies and Actions		Project Consistency Measures
MS-13.6	Revise the grading ordinance and condition grading permits to require that graded areas be stabilized from the completion of grading to commencement of construction.	The project would comply with all requirements set forth in the grading ordinance; therefore, the project would be compliant with this policy.

NOTES:
ATCM = air toxics control measure; BAAQMD = Bay Area Air Quality Management District; CARB = California Air Resources Board; CEQA = California Environmental Quality Act; HRA = health risk assessment; LEED ND = Leadership in Energy and Environmental Design for Neighborhood Development; MERV = Minimum Efficiency Reporting Value; PM = particulate matter; TAC = toxic air contaminant; TDM = transportation demand management; VTA = Santa Clara Valley Transportation Authority

SOURCE: City of San José, *Envision San José 2040 General Plan*, adopted November 2011 (amended December 2018). Available at https://www.sanjoseca.gov/home/showdocument?id=22359. Accessed January 7, 2020.

In addition, the General Plan includes policies to promote reductions in VMT and energy use, which contribute to emissions reductions. These policies and actions are described in Section 3.4, *Energy*; Section 3.6, *Greenhouse Gas Emissions*; and Section 3.13, *Transportation*.

Health Risks for New On-site Receptors

Although not a CEQA issue, the San José 2040 General Plan Policy MS-11.1 states that projects that site new residential receptors must "incorporate effective mitigation into project designs or be located an adequate distance from sources of TACs to avoid significant risks to health and safety." As indicated in Tables 3.1-22 and 3.1-23 later in this EIR section (under Impact C-AQ-2), the maximum mitigated total cumulative health risks, which represent project-level risks plus background cumulative risks, for all new on-site sensitive receptors would be less than BAAQMD's cumulative threshold of significance. Consequently, the proposed project complies with General Plan Policy MS-11.1.

As described above, without the mitigation measures identified in this EIR, the proposed project would support most but not all of the primary goals of the Clean Air Plan, and would not interfere with, disrupt, or hinder implementation of the Clean Air Plan. However, with implementation of the mitigation measures identified in this EIR and compliance with applicable regulations as described in Table 3.1-6, the project would include applicable control measures from the Clean Air Plan. As a result, the proposed project would support the primary goals of the Clean Air Plan and would not interfere with, disrupt, or hinder implementation of the Clean Air Plan. Furthermore, the project would be consistent with the applicable policies set forth in the General Plan, described in Table 3.1-7. Therefore, this impact would be **less than significant with mitigation incorporated**.

Mitigation Measures

Mitigation Measure AQ-2a: Construction Emissions Minimization Plan (refer to Impact AQ-2)

Mitigation Measure AQ-2b: Construction Equipment Maintenance and Tuning (refer to Impact AQ-2)

Mitigation Measure AQ-2c: Heavy-Duty Truck Model Year Requirement (refer to Impact AQ-2)

Mitigation Measure AQ-2d: Super-Compliant VOC Architectural Coatings during Operations (refer to Impact AQ-2)

Mitigation Measure AQ-2e: Best Available Emissions Controls for Stationary Emergency Generators (refer to Impact AQ-2)

Mitigation Measure AQ-2f: Operational Diesel Truck Emissions Reduction (refer to Impact AQ-2)

Mitigation Measure AQ-2g: Electric Vehicle Charging (refer to Impact AQ-2)

Mitigation Measure AQ-2h: Enhanced Transportation Demand Management Program (refer to Impact AQ-2)

Mitigation Measure AQ-3: Exposure to Air Pollution—Toxic Air Contaminants (refer to Impact AQ-3)

Mitigation Measure AQ-5: Hydrogen Sulfide and Odor Management Program for the Potential Water Reuse Facility(s) (refer to Impact AQ-5)

Significance after Mitigation: Less than significant.

Impact AQ-2: The proposed project would result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard. ***(Significant and Unavoidable)***

Project construction would emit air pollutants for which the SFBAAB is non-attainment, 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 by equipment such as excavators, bulldozers, loaders, drill rigs, graders, and trenchers during the demolition and excavation construction phases.
- During the building construction phases, emissions would be generated by equipment such as pile driving rigs, forklifts, excavators, cranes, saws, air compressors, pavers, 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 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.

Operation of the proposed project would also cause an increase in emissions of criteria air pollutants and precursors for which the air basin is non-attainment, including ROG, NO_X, PM_{10}, and $PM_{2.5}$, from a variety of emissions sources:

- On-site stationary sources (emergency generators);

- On-site energy sources (e.g., natural gas combustion for cooking in restaurant kitchens);
- On-site area sources (e.g., landscape maintenance, architectural coatings, use of consumer products such as hairsprays, deodorants, cleaning products); and
- Mobile on-road sources.

As discussed above under *Approach to Analysis*, these operational emissions associated with the proposed project were calculated using methods consistent with the CalEEMod land use emissions model. Impacts were determined by subtracting existing emissions from proposed project emissions to determine the net new emissions associated with the proposed project.

Existing Emissions

As described in Chapter 2, *Project Description*, the project site is an 81-acre area in Downtown San José that is mostly vacant. The built environment on the site and in its vicinity is characterized by a pattern of one- and two-story buildings that cover only portions of their lots, with the remainder of the unbuilt lot space used as surface parking. **Table 3.1-8** provides the approximate ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions for activities associated with the existing site, excluding mobile sources. The data is presented in this format because only emissions from non-mobile sources were subtracted from the proposed project's emissions to determine the net new emissions associated with the proposed project, consistent with the project transportation analysis, which did not deduct trips from existing uses on the project site. It is noted that the transportation modeling on which project mobile-source emissions are based effectively nets out existing mobile-source emissions because inputs to the City of San José traffic model replace existing uses with proposed uses.

TABLE 3.1-8
AVERAGE DAILY AND TOTAL ANNUAL OPERATIONAL CRITERIA POLLUTANT EMISSIONS ASSOCIATED WITH EXISTING (2019) CONDITIONS

Average Daily (Pounds per Day)				Annual (Tons per Year)			
ROG	NO_X	PM_{10} Total	$PM_{2.5}$ Total	ROG	NO_X	PM_{10} Total	$PM_{2.5}$ Total
12	2	0.2	0.2	2	0.4	<0.1	<0.1

NOTES:
Emissions exclude mobile sources.
NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases; VMT = vehicle miles traveled
The existing emissions include area sources and energy. Mobile-source emissions were not separately calculated but, as explained above, are effectively netted out in the transportation modeling on which mobile-source emissions are based.
SOURCE: Data compiled by Environmental Science Associates in 2019 (refer to Appendix C1).

Construction Emissions

Project construction would generate emissions of criteria air pollutants from heavy-duty construction equipment, architectural coating, paving, and on-road mobile sources from hauling, vendor, and worker trips. Criteria air pollutants emitted would include ROG, NO_X, PM_{10}, and $PM_{2.5}$. As discussed above under *Construction Emissions Methods*, emissions from construction equipment usage were estimated to occur for 8 hours per day, 6 days per week on average (312 days per year). Although it is possible that construction may occasionally occur beyond these days and hours, this is not anticipated to occur with enough frequency to materially affect average daily emissions associated with overall construction activities.

Table 3.1-9 presents the proposed project's average daily and total annual unmitigated emissions of construction-related criteria air pollutants by year. This table also compares emissions to BAAQMD's significance thresholds.

TABLE 3.1-9
AVERAGE DAILY AND TOTAL ANNUAL UNMITIGATED CONSTRUCTION CRITERIA POLLUTANT EMISSIONS BY YEAR

	Average Daily Emissions (Pounds per Day)[a,b,c]				Annual Emissions (Tons per Year)[c,d]			
Year	ROG	NO_X	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	ROG	NO_X	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
2021	5	**59**	1	1	1	9	<1	<1
2022	6	**85**	1	1	1	13	<1	<1
2023	7	**82**	1	1	1	13	<1	<1
2024	11	**106**	2	1	2	17	<1	<1
2025	**77**	**139**	2	2	12	22	<1	<1
2026	**161**	**122**	2	1	25	19	<1	<1
2027	**151**	**71**	1	1	23	11	<1	<1
2028	34	**43**	1	1	5	7	<1	<1
2029	**77**	**93**	1	1	12	15	<1	<1
2030	30	**103**	1	1	5	16	<1	<1
2031	**72**	**54**	1	1	11	8	<1	<1
2032	**78**	5	<1	<1	12	1	<1	<1
Threshold	**54**	**54**	**82**	**54**	N/A	N/A	N/A	N/A
Exceeds Threshold?	**Yes**	**Yes**	No	No				

NOTES:
N/A = not applicable; NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases
[a] **Bold values** = threshold exceedance.
[b] Average daily construction emissions represent total annual emissions divided by 312 work days per year.
[c] Emissions presented in this table include Tier 4 Final engines on all off-road equipment (as available) and certain electric equipment pieces. Emissions also assume that 3% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% of horsepower-hours would be associated with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% of horsepower-hours would be associated with Tier 3 off-road equipment engines. This is because Tier 4 Final and electric off-road equipment may not be available during certain phases of construction.
[d] Total annual construction emissions are shown because construction and operational emissions overlap for some years. There is no significance threshold for annual construction emissions.

SOURCE: Data compiled by Environmental Science Associates in 2020 (refer to Appendix C1).

Unmitigated project construction emissions would exceed BAAQMD's CEQA thresholds of significance for average daily ROG emissions during 2025–2027, 2029, and 2031–2032, and for average daily NO_X emissions during 2021–2027 and 2029–2031. PM_{10} and $PM_{2.5}$ exhaust emissions would be below the applicable thresholds of significance for all years of construction. Thus, construction impacts would be **potentially significant** for ROG and NO_X.

Operational Emissions

Operation of the proposed project would result in an increase in emissions of criteria air pollutants and precursors, including NO_X, PM_{10}, and $PM_{2.5}$ from a variety of emissions sources:

- On-site stationary sources (emergency generators)
- On-site energy sources (e.g., limited natural gas combustion for cooking in restaurant kitchens)
- On-site area sources (e.g., landscape maintenance, architectural coatings, and use of consumer products such as hairsprays, deodorants, and cleaning products)
- Mobile on-road sources

As discussed above under *Operational Emissions Methods*, these operational emissions associated with the proposed project were calculated either using methods consistent with the CalEEMod land use emissions model program, or using CalEEMod itself. Impacts were determined by subtracting existing emissions from project emissions to determine the net new emissions associated with the proposed project and (in the case of mobile emissions) using transportation modelling. Emissions from operations were assumed to occur for 365 days per year (i.e., annual emissions were divided by 365 days to arrive at average daily emissions).

Table 3.1-10 presents the proposed project's average daily and total annual unmitigated operational emissions of criteria air pollutants by year. Emissions are also compared to significance thresholds from the BAAQMD CEQA Guidelines. Table 3.1-10 assumes that Phase 1 would become fully operational in 2028; that Phase 2a would become fully operational in 2031; and that Phases 2b and 3 would become fully operational in 2032. However, emissions are also estimated for partial Phase 1 operations from 2024–2027. The project's operational emissions would exceed BAAQMD's mass daily and annual significance thresholds for ROG, NO_X, PM_{10}, and $PM_{2.5}$ for all years except for 2025 for PM_{10} and 2025–2026 for $PM_{2.5}$. Thus, the proposed project would result in **potentially significant** impacts with respect to operational emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$.

Net New Combined Construction and Operational Emissions

The net increase in criteria air pollutant emissions was derived by adding the construction-related and operational emissions for each calendar year and subtracting existing emissions. **Table 3.1-11** shows that the net increase in emissions attributable to implementation of the proposed project would exceed the significance thresholds for ROG from 2025 to 2032, NO_X from 2021 to 2032, PM_{10} from 2025 to 2032, and $PM_{2.5}$ from 2027 to 2032. Thus, the proposed project would result in **potentially significant** impacts with respect to operational emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$. Consequently, implementation of Mitigation Measures AQ-2a through AQ-2h is required.

TABLE 3.1-10
AVERAGE DAILY AND TOTAL ANNUAL UNMITIGATED OPERATIONAL CRITERIA POLLUTANT EMISSIONS BY YEAR

	Average Daily Emissions (Pounds per Day)[a,b]				Annual Emissions (Tons per Year)			
Year	**ROG**	**NO_X**	**PM_{10} Total**	**$PM_{2.5}$ Total**	**ROG**	**NO_X**	**PM_{10} Total**	**$PM_{2.5}$ Total**
2025 [c]	**66**	**55**	53	12	**11**	9	8	2
2026 [c]	**198**	**165**	**158**	37	**34**	**26**	**25**	6
2027 [c]	**296**	**248**	**237**	**56**	**51**	**40**	**37**	9
2028 [d]	**329**	**276**	**263**	**62**	**57**	**44**	**42**	**10**
2029 [d]	**329**	**276**	**263**	**62**	**57**	**44**	**42**	**10**
2030 [d]	**391**	**284**	**264**	**63**	**68**	**46**	**42**	**10**
2031	**391**	**284**	**264**	**63**	**68**	**46**	**42**	**10**
2032+[e]	**471**	**306**	**327**	**77**	**83**	**49**	**52**	**12**
Threshold	**54**	**54**	**82**	**54**	**10**	**10**	**15**	**10**
Exceeds Threshold?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

NOTES:
NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases; VMT = vehicle miles traveled

[a] **Bold values** = threshold exceedance

[b] Average daily construction emissions represent total annual emissions divided by 312 work days per year.

[c] Emissions for 2024–2027 are calculated assuming partial buildout scaling factors as follows: 20% in 2025, 60% in 2026, 90% in 2027, and 100% in 2028.

[d] Emissions for 2028–2030 are the same because the modeling assumes that the same VMT and mobile emissions factors would remain constant during these years. This is likely an overestimate because emission factors would decrease over time as a result of vehicle fleet turnover and technology improvements.

[e] Emissions reported for “2032+” would occur at full buildout in 2032 and each subsequent year of project operations.

SOURCE: Data compiled by Environmental Science Associates in 2020 (refer to Appendix C1).

TABLE 3.1-11
AVERAGE DAILY AND TOTAL ANNUAL UNMITIGATED NET NEW CONSTRUCTION AND OPERATIONAL CRITERIA POLLUTANT EMISSIONS BY YEAR

	Average Daily Emissions (Pounds per Day) [a,b,c]				Annual Emissions (Tons per Year) [a,b,c]			
Year	**ROG**	**NO_X**	**PM_{10} Total**	**$PM_{2.5}$ Total**	**ROG**	**NO_X**	**PM_{10} Total**	**$PM_{2.5}$ Total**
Existing Conditions								
Including Mobile	70	124	66	16	11	20	10	3
Excluding Mobile	12	2	0.2	0.2	2	0.4	<0.1	<0.1
Net New Emissions								
2021	5	**59**	1	1	1	9	0	0
2022	6	**85**	1	1	1	**13**	0	0
2023	7	**82**	1	1	1	**13**	0	0
2024	11	**106**	2	1	2	**17**	0	0
2025	**143**	**194**	55	14	**23**	**31**	9	2
2026	**358**	**287**	**159**	39	**59**	**45**	**25**	6
2027	**447**	**319**	**238**	**57**	**74**	**51**	**38**	9
2028	**363**	**318**	**264**	**63**	**62**	**51**	**42**	**10**
2029	**395**	**367**	**264**	**63**	**67**	**58**	**42**	**10**
2030	**410**	**385**	**265**	**64**	**71**	**61**	**42**	**10**
2031	**452**	**336**	**265**	**64**	**77**	**54**	**42**	**10**
2032+	**537**	**309**	**327**	**77**	**93**	**50**	**52**	**12**
Threshold	**54**	**54**	**82**	**54**	**10**	**10**	**15**	**10**
Exceeds Threshold?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

NOTES:
NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases

[a] **Bold values** = threshold exceedance.
[b] Net new emissions = construction + operation – existing conditions. Existing uses are assumed to operate on-site through 2028. Existing-condition emissions for non-transportation sources were subtracted in 2029–2032.
[c] Construction emissions presented in this table include Tier 4 Final engines on all off-road equipment (as available) and certain electric equipment pieces.
[e] The operational emissions component of those emissions reported for "2032+" would occur at full buildout in 2032 and each subsequent year of project operations. Note that a portion of these emissions include construction in 2032 (see Table 3.1-9), which would cease in 2033 and subsequent years.

SOURCE: Data compiled by Environmental Science Associates in 2020 (refer to Appendix C1).

Mitigation Measures

Mitigation Measure AQ-2a: Construction Emissions Minimization Plan

To ensure that the project features assumed in the analysis of air pollutant emissions are implemented, and to further reduce criteria pollutant emissions from construction activities, the project applicant shall implement the following measures prior to the issuance of any demolition, grading, or building permits for each phase of the project:

1. *Engine Requirements.*

   a. As part of the project design, all off-road construction equipment with engines greater than 25 horsepower must adhere to Tier 4 Final off-road emissions standards, if commercially available (refer to Item #2, *Engine Requirement Waivers*, below, for the definition of "commercially available"). This adherence shall be verified through submittal of an equipment inventory and Certification Statement to the Director of Planning, Building and Code Enforcement or the Director's designee. The Certification Statement must state that each contractor agrees to compliance and acknowledges that a significant violation of this requirement shall constitute a material breach of the contractor's agreement and/or the general contract with the project applicant.

   b. The project applicant shall use alternative fuels as commercially available, such as renewable diesel, biodiesel, natural gas, propane, and electric equipment. The applicant must demonstrate to the satisfaction of the Director of Planning, Building and Code Enforcement, or the Director's designee, that any alternative fuels used in any construction equipment, such as biodiesel, renewable diesel, natural gas, or other biofuels, reduce ROG, NO_X, and PM emissions compared to traditional diesel fuel.

   c. The project applicant shall use electricity to power off-road equipment, specifically for all concrete/industrial saws, sweepers/scrubbers, aerial lifts, welders, air compressors, fixed cranes, forklifts, and cement and mortar mixers, along with 90 percent of pressure washers and 70 percent of pumps, in all but isolated cases where diesel powered equipment is used as an interim measure prior to the availability of grid power at more remote areas of the site. Portable equipment shall be powered by grid electricity or alternative fuels (i.e., not diesel) instead of by diesel generators.

2. *Engine Requirement Waivers.*

   If engines that comply with Tier 4 Final off-road emission standards are not commercially available for specific off-road equipment necessary during construction, the project applicant shall provide the next cleanest piece of off-road equipment, as provided by the step-down schedule identified in Table M-AQ-2a. The project applicant shall provide to the Director of Planning, Building and Code Enforcement, or the Director's designee, for review and approval documentation showing that engines that comply with Tier 4 Final off-road emission standards are not commercially available for the specific off-road equipment necessary during construction.

TABLE M-AQ-2A
OFF-ROAD EQUIPMENT COMPLIANCE STEP-DOWN SCHEDULE

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

NOTES: CARB = California Air Resources Board; N/A = not applicable; VDECS = Verified Diesel Emissions Control Strategies

How to use the table: If engines that comply with Tier 4 Final off-road emission standards are not commercially available, the project applicant shall meet Compliance Alternative 1. If off-road equipment meeting Compliance Alternative 1 is not commercially available, the project applicant shall meet Compliance Alternative 2. If off-road equipment meeting Compliance Alternative 2 is not commercially available, the project applicant shall meet Compliance Alternative 3.

For purposes of this mitigation measure, “commercially available” shall take into consideration the following factors: (i) potential significant delays to critical-path timing of construction and (ii) the geographic proximity to the project site of Tier 4 Final equipment.

The project applicant shall maintain records of its efforts to comply with this requirement.

3. *Additional Exhaust Emissions Control Measures*.

   The Emissions Plan (described in greater detail under Item #5, *Construction Emissions Minimization Plan*, below) shall include the applicable measures for controlling criteria air pollutants and toxic air contaminants during construction of the proposed project. Control measures shall include but are not limited to the following:

   a. Idling times on all diesel-fueled commercial vehicles weighing more than 10,000 pounds shall be minimized either by shutting equipment off when not in use or by reducing the maximum idling time to two minutes, exceeding the five-minute limit required by the California airborne toxics control measure (California Code of Regulations Title 13, Section 2485s). Clear signage to this effect shall be provided for construction workers at all access points.

   b. Idling times on all diesel-fueled off-road vehicles exceeding 25 horsepower shall be minimized either by shutting equipment off when not in use or by reducing the maximum idling time to two minutes. Fleet operators must develop a written policy as required by California Code of Regulations Title 23, Section 2449 (“California Air Resources Board Off-Road Diesel Regulations”).

   c. Portable equipment shall be powered by grid electricity if available, instead of diesel generators. If grid electricity is not available, batteries or fuel cell systems or other non-diesel fuels shall be used for backup power.

   d. The project applicant shall use super-compliant volatile organic compound (VOC) architectural coatings during construction for all interior and exterior spaces and shall include this requirement on plans submitted for review by the City's building official. "Super-compliant" coatings are those that meet a limit of 10 grams VOC per liter (http://www.aqmd.gov/home/regulations/compliance/architectural-coatings/super-compliant-coatings).

e. All equipment to be used on the construction site shall comply with the requirements of California Code of Regulations Title 13, Section 2449 ("California Air Resources Board Off-Road Diesel Regulations"). This regulation imposes idling limits; requires that all off-road equipment be reported to California Air Resources Board and labeled; restricts adding older vehicles to fleets starting January 1, 2014; and requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emissions Control Strategies. Upon request by the City (and Bay Area Air Quality Management District if specifically requested), the project applicant and/or its contractor shall provide written documentation that fleet requirements have been met.

f. Truck routes shall be established to avoid both on-site and off-site sensitive receptors. A truck route program, along with truck calming, parking, and delivery restrictions, shall be implemented. This program must demonstrate how the project applicant will locate the truck routes as far from on-site receptors as possible and how truck activity (travel, idling, and deliveries) will be minimized. The Construction Emissions Minimization Plan must include the location of construction truck routes and must demonstrate that routes have been established as far as possible from the locations of all on-site and off-site sensitive receptors.

g. The project applicant shall encourage walking, bicycling, and transit use by construction employees by offering incentives such as on-site bike parking, transit subsidies, and additional shuttles. The project shall achieve a performance standard of diverting at least 50 percent of construction employee trips from single-occupant vehicles. This may include the use of carpools and vanpools for construction workers.

4. *Dust Control Measures*.

The project applicant shall implement the following dust control requirements during construction of the project, consistent with the San José Downtown Strategy:

a. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent (verified by lab samples or moisture probe).

b. All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 miles per hour (mph).

c. All trucks and equipment, including tires, shall be washed off before they leave the project site.

d. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

e. 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.

f. All vehicle speeds on unpaved roads shall be limited to 15 mph.

g. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

h. A publicly visible sign shall be posted, listing the telephone number and person to contact at the lead agency (the City) regarding dust complaints. This person shall respond and take corrective action within 48 hours. The sign shall also include the telephone number of the on-site construction manager. BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

i. Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.

j. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.

k. 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.

l. Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than 1 percent.

5. *Construction Emissions Minimization Plan*.

Before starting each phase of on-site ground disturbance, demolition, or construction activities, the project applicant shall submit a Construction Emissions Minimization Plan (Emissions Plan) to the Director of the City of San José Department of Planning, Building and Code Enforcement, or the Director's designee, for review and approval. The Emissions Plan shall state, in reasonable detail, how the project applicant and/or its contractor shall meet the requirements of Section 1, Engine Requirements; Section 3, Additional Exhaust Emissions Control Measures; and Section 4, Dust Control Measures.

a. The Emissions Plan shall include estimates of the construction timeline, with a description of each piece of off-road equipment required. The description shall include but not be limited to equipment type, equipment manufacturer, engine model year, engine certification (tier rating), horsepower, and expected fuel usage and hours of operation.

b. For off-road equipment using alternative fuels, the description shall also specify the type of alternative fuel being used.

c. The project applicant shall ensure that all applicable requirements of the Emissions Plan have been incorporated into the contract specifications. The plan shall include a certification statement that each contractor agrees to comply fully with the plan.

d. The Emissions Plan shall be verified through an equipment inventory and Certification Statement submitted to the Director of Planning, Building and

Code Enforcement or the Director's designee. The Certification Statement must state that the project applicant agrees to compliance and acknowledges that a significant violation of this requirement shall constitute a material breach of the contractor's agreement with the project applicant and/or the general contractor.

e. The project applicant and/or its contractor shall make the Emissions Plan available to the public for review on-site during working hours. The project applicant and/or its contractor shall post at the construction site a legible and visible sign summarizing the Emissions Plan. The sign shall also state that the public may ask to inspect the project's Emissions Plan at any time during working hours and shall explain how to request to inspect the Emissions Plan. The project applicant and/or its contractor shall post at least one copy of the sign in a visible location on each side of the construction site facing a public right-of-way. The sign shall include contact information for an on-site construction coordinator if any member of the public has complaints or concerns.

6. *Monitoring*.

   After the start of construction activities, the project applicant and/or its contractor shall submit annual reports to the Director of the City of San José Department of Planning, Building and Code Enforcement, or the Director's designee, documenting compliance with the Emissions Plan. The reports shall indicate the actual location of construction during each year and must demonstrate how construction of each project component is consistent with the Emissions Plan.

Mitigation Measure AQ-2b: Construction Equipment Maintenance and Tuning

Prior to the issuance of any demolition, grading, or building permits for each phase, the project applicant shall implement the following measures:

1. Instruct all construction workers and equipment operators on the maintenance and tuning of construction equipment and require such workers and operators to properly maintain and tune equipment in accordance with the manufacturers' specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition before operation. Equipment check documentation shall be kept at the construction site and be available for review by the City and Bay Area Air Quality Management District as needed.
2. Implement the construction minimization requirements of Mitigation Measure AQ-2a Item #5, *Construction Emissions Minimization Plan*.
3. Implement the monitoring requirements of Mitigation Measure AQ-2a Item #6, *Monitoring*.

Mitigation Measure AQ-2c: Heavy-Duty Truck Model Year Requirement

Prior to the issuance of any demolition, grading, or building permits for each phase, the project applicant shall ensure that all on-road heavy-duty trucks with a gross vehicle weight rating of 33,000 pounds or greater used at the project site during construction (such as haul trucks, water trucks, dump trucks, and vendor trucks) have engines that are model year 2014 or newer. This assurance shall be included in the construction contracts for all contractors and vendors using heavy-duty trucks for any construction-related activity.

Mitigation Measure AQ-2d: Super-Compliant VOC Architectural Coatings during Operations

Prior to the issuance of any building permits, the project applicant shall set an enforceable protocol for inclusion in all lease terms and/or building operation plans for all non-residential and residential developed blocks requiring all future interior and exterior spaces to be repainted only with "super-compliant" VOC (i.e., ROG) architectural coatings beyond BAAQMD requirements (i.e., Regulation 8, Rule 3: Architectural Coatings). "Super-compliant" coatings meet the standard of less than 10 grams VOC per liter (http://www.aqmd.gov/home/regulations/compliance/architectural-coatings/super-compliant-coatings). The Director of the City of San José Department of Planning, Building and Code Enforcement, or the Director's designee, shall review the mandatory protocol to ensure that this requirement is included, and shall mandate that this requirement be added if not included.

Mitigation Measure AQ-2e: Best Available Emissions Controls for Stationary Emergency Generators

To reduce emissions of criteria pollutants and TACs associated with operation of the proposed project, the project applicant shall implement the following measures. These features shall be submitted to the Director of the Department of Planning, Building and Code Enforcement, or the Director's designee, for review and approval, and shall be included on the project drawings submitted for the construction-related permit(s) or on other documentation submitted to the City prior to the issuance of any building permits:

1. Permanent stationary emergency generators installed on-site shall have engines that meet or exceed CARB Tier 4 Off-Road Compression Ignition Engine Standards (California Code of Regulations Title 13, Section 2423), which have the lowest NO_X and PM 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.
2. As non-diesel-fueled emergency generator technology becomes readily available and cost effective in the future, and subject to the review and approval of the City fire department for safety purposes, non-diesel-fueled generators shall be installed in new buildings, provided that alternative fuels used in generators, such as biodiesel, renewable diesel, natural gas, or other biofuels or other non-diesel emergency power systems, are demonstrated to reduce ROG, NO_X, and PM emissions compared to diesel fuel.
3. Permanent stationary emergency diesel backup generators shall have an annual maintenance testing limit of 50 hours, subject to any further restrictions as may be imposed by Bay Area Air Quality Management District (BAAQMD) in its permitting process.
4. For each new diesel backup generator permit submitted to BAAQMD for the proposed project, the project applicant shall submit the anticipated location and engine specifications to the Director of the City of San José Department of Planning, Building and Code Enforcement, or the Director's designee, for review and approval prior to issuance of a permit for the generator. 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 must be consistent with these emissions specifications. The operator of the facility at

which the generator is located shall maintain records of the testing schedule for each diesel backup generator for the life of that diesel backup generator and shall provide this information for review to the Director of the City of San José Department of Planning, Building and Code Enforcement, or the Director's designee, within three months of requesting such information.

Mitigation Measure AQ-2f: Operational Diesel Truck Emissions Reduction

The project applicant shall incorporate the following measures into the project design and construction contracts (as applicable) to reduce emissions associated with operational diesel trucks, along with the potential health risk caused by exposure to toxic air contaminants. These features shall be submitted to the Director of Planning, Building and Code Enforcement, or the Director's designee, for review and approval prior to the issuance of any building permits, and shall 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 by implementing the following measures:

1. Equip all truck delivery bays with electrical hook-ups for diesel trucks at loading docks to accommodate plug-in electric truck transportation refrigeration units (TRUs) during project operations. Ensure that intra-campus delivery vehicles traveling within the project site to serve the project applicant are all electric or natural gas.
2. Encourage the use of trucks equipped with TRUs that meet U.S. Environmental Protection Agency Tier 4 emission standards.
3. Prohibit TRUs from operating at loading docks for more than thirty minutes by posting signs at each loading dock presenting this TRU limit.
4. Prohibit trucks from idling for more than two minutes by posting "no idling" signs at the site entry point, at all loading locations, and throughout the project site.

Mitigation Measure AQ-2g: Electric Vehicle Charging

Prior to the issuance of the final building's certificate of occupancy for each phase of construction, the project applicant shall demonstrate that at least 15 percent of all parking spaces are equipped with electric vehicle (EV) charging equipment, which exceeds the San José Reach Code's requirement of 10 percent EV supply equipment spaces. The installation of all EV charging equipment shall be documented in a report submitted to the Director of the City of San José Department of Planning, Building and Code Enforcement, or the Director's designee, for review and approval, and shall be included on the project drawings submitted for the construction-related permit(s) or on other documentation submitted to the City.

Mitigation Measure AQ-2h: Enhanced Transportation Demand Management Program

The project applicant shall develop and submit a Transportation Demand Management (TDM) Program for review and approval by the Directors of Public Works and Planning, Building, and Code Enforcement or the Directors' designees prior to or concurrent with adoption of the PD Permit. The TDM program shall be designed such that all project-related daily vehicle trips are reduced with the primary focus on the office and residential components of the proposed project. (Office and residential trips would comprise approximately 85 percent of project vehicle trips and are assumed to serve as a proxy for all project trips.)

The TDM program shall:

(A) Be designed to meet performance standards that include exceeding the 15 percent transportation efficiency requirement of AB 900 *and* achieving additional vehicle trip reductions to mitigate transportation-related environmental impacts and reduce criteria pollutant emissions from mobile sources, as described below;

(B) Describe project features and TDM measures that shall and may be used to achieve the performance standard commitments;

(C) Describe a monitoring and reporting program, including a penalty structure for non-compliance; and

(D) Recognizing that commute patterns, behavior and technology continue to evolve, describe a process for amending and updating the TDM program as needed over time while continuing to achieve the performance standards described below.

These elements of the TDM Program are described further below.

A. **Performance Standards:** The project's TDM program shall be designed to achieve the performance standards described below:

   - Assuming currently available (pre-COVID-19) public transit service levels, achieve a non-single occupancy vehicle (SOV) rate of 50 percent, which is estimated to be equivalent to a 24 percent reduction in daily vehicle trips from the City of San José Travel Demand Forecasting Model's travel demand outputs.

   - Following completion of service enhancements related to Caltrain Electrification, achieve a non-SOV rate of 60 percent, which is estimated to be equivalent to a 26 percent reduction in daily vehicle trips from the City Travel Demand Forecasting Model's travel demand outputs.

   - Following completion of service enhancements related to the start of BART service to Diridon Station, achieve a non-SOV rate of 65 percent, which is estimated to be equivalent to a 27 percent reduction in daily vehicle trips from the City Travel Demand Forecasting Model's travel demand outputs.

B. **TDM Program:** Project features and required SOV trip reduction strategies shall include the following elements:

   1. Improvements to pedestrian and bicycle facilities on-site and connecting the site to surrounding areas, including construction/contribution to Los Gatos Creek Trail improvements and on-street connectors between West San Carlos Street and West Santa Clara Street;

   2. Limited parking supplies on-site, including no more than 4,800 parking spaces for commercial uses and no more than 2,360 spaces for residential development (a portion of the residential spaces could be available as shared-use spaces for office employees) and enforcement of parking maximums for new uses as a disincentive for employees and visitors to the site, encouraging them to carpool, take transit, bike, and walk instead of drive;

3. Market-rate parking pricing for non-residential uses and unbundled parking for market-rate residential uses;
4. Pre-tax commuter benefits for employees allowing employees to exclude their transit or vanpooling expenses from taxable income or an alternate commuter benefit option consistent with the MTC/BAAQMD Commuter Benefits Program required for employers with 50 or more full-time employees;
5. Marketing (encouragement and incentives) to encourage transit use, carpooling, vanpooling, and all non-SOV travel by employees and residents, including welcome packets for new employees and residents, and dissemination of information about Spare the Air Days in the San Francisco Bay Area Air Basin, as recommended by the 2017 Clean Air Plan; and
6. Rideshare coordination, such as implementation of the 511 Regional Rideshare Program or equivalent, as recommended by the 2017 Clean Air Plan.

Other supplemental SOV trip reduction strategies to meet performance standards shall include some combination of the following:

Transit Fare Subsidy	Make available transit passes to employees and residents to make transit an attractive, affordable mode of travel.
Parking Pricing Structure	Ensure that the parking pricing structure complements on-street parking pricing and encourages "park once" behavior for all uses.
Preferential Carpool and Vanpool Parking	Provide dedicated parking for carpool and vanpool vehicles near building and garage entrances.
On-Site Bicycle Storage	Provide additional security and convenience for bicycle parking, such as lockers or secured bicycle rooms.
Designated Ride-Hailing Waiting Areas	Dedicate curbside areas for passenger pickup by ride-hailing services, to minimize traffic intrusion and double-parking by rideshare vehicles.
Traffic Calming	Implement on-site traffic calming improvements to support the increased use of walking, biking, and transit.
Express Bus or Commuter Shuttle Services	Provide express bus or other commuter shuttle services to complement existing, high-quality, high-frequency public transit; service may also be provided through public/private partnerships with transit providers.
Alternative Work Schedules and Telecommuting	Allow and encourage employees to adopt alternative work schedules and telecommute when possible, reducing the need to travel to the office component of the project.

First-/Last-Mile Subsidy	Provide subsidies for first-/last-mile travel modes to employees to reduce barriers to the use of transit as a primary commute mode by making short connecting trips to and from longer transit trips less costly and more convenient. First-/last-mile subsidies could be used to access bicycle share, scooter share, ride hailing, and local bus and shuttle services, and could subsidize bicycling and walking.
On-Site Transportation Coordinators	Provide TDM program outreach and marketing via on-site transportation coordinators who can also give individualized directions, establish ridesharing connections, and provide other alternative travel information to project employees and residents.
Technology-Based Services	Use technology-based information, encouragement, and trip coordination services to encourage carpooling, transit, walking, and biking by project employees and visitors. These can include third-party apps to distribute incentives to people who choose to use these modes.
Employer-Sponsored Vanpools	Coordinate and provide subsidized vanpools for employees who cannot easily commute via transit.
Biking Incentives and On-Site Bike Repair Facilities	Provide additional incentives that encourage bicycle usage and ability to repair bikes on site.
Carshare Program	Provide car share subsidies to residents encourage the use of carshare programs (such as ZipCar, Car2Go, and Gig) and limit parking demand.
Building-Specific TDM Plans	Develop customized TDM plans for specific buildings and tenants to better address the needs of their users.
Transportation Management Agency Membership	Join a non-profit transportation management association if formed for Downtown San José, and leverage the larger pool of commuters and residents to improve TDM program marketing and coordinate TDM programs.

C. **Monitoring and Enforcement:** Starting in the calendar year after the City issues the first certificate of occupancy for the first office or residential building in the first development phase, the project applicant shall retain the services of an independent City-approved transportation planning/engineering firm to conduct an annual mode-share survey of the project's office and residential components each fall (mid-September through mid-November). The survey shall be conducted to determine whether the project is achieving the non-SOV mode share for office and residential uses sufficient to indicate the specified trip reductions. The applicant shall submit an annual report to the staff of the San José Department of Transportation each January 31 of the following year.

The annual report shall describe: (a) implementation of the TDM program; and (b) results of the annual mode split survey, including a summary of the methodology for collecting the mode split data, statistics on response rates, a summary conclusion, and an outline of additional TDM measures (i.e., a corrective action plan) to be implemented in subsequent years if the non-SOV mode split goal is not reached.

If timely reports are not submitted and/or reports indicate that the project office and residential uses have failed to achieve the non-SOV mode share specified above in two consecutive years after issuance of the certificates of occupancy for 50 percent of the office development, the project will be considered in violation of this mitigation measure. The City will issue a notice of non-compliance after the first year the project fails to meet monitoring requirements (submittal of timely reports and/or achieving specified non-SOV mode share), after which the applicant has one year to comply with the monitoring requirements.

After two years of not meeting monitoring requirements, the City may initiate enforcement action against the applicant and successors, including imposition of financial penalties to the owners and/or operators of the office and residential development that will support the funding and management of transportation improvements that would bring the non-SOV mode share to the targeted level. Penalties shall be consistent with the amounts defined by City Council Policy 5-1, although adjusted to reflect non-SOV mode share rather than VMT and to include a mutually agreed-upon monetary cap.

If timely reports are submitted and demonstrate that the applicant has achieved the non-SOV mode share specified above for five consecutive years after full project occupancy, monitoring shall no longer be required annually, and shall instead be required every five years, or upon request by the City of San José Planning, Building, and Code Enforcement Department or Department of Public Works for an annual update.

D. **Flexibility and Amendments:** The project applicant may propose amendments to the approved TDM program as part of its annual report each year, subject to review and approval by the Director of Public Works and Director of Planning, Building, and Code Enforcement or the Directors' designees. The applicant shall not be permitted to decrease the performance standards specified in Section A, above. The City and the project applicant expect that the TDM program will evolve as travel behavior changes and as new technologies become available. Any proposed changes will be considered approved unless the Director of Public Works and Director of Planning, Building, and Code Enforcement object to the proposed change within 30 days of receipt.

Mitigation Measure Effectiveness

Effectiveness of Mitigation Measure AQ-2a

Mitigation Measure AQ-2a, Construction Emissions Minimization Plan, would reduce emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ from on- and off-road construction equipment. Mitigation Measure AQ-2a would ensure that the project would use Tier 4 Final off-road engines (as assumed in the modeling for unmitigated project emissions, as discussed under *Project Features Analyzed* above) and other best available emissions controls.

The range of emissions reduction would vary depending on the construction activity and the number of haul, vendor, and worker trips at that time. For off-road equipment, compared to the default equipment engines in the construction fleet, the use of Tier 4 Final engines would reduce ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions by approximately 75 percent, 88 percent, 93 percent, and

92 percent, respectively. The large reduction in construction emissions is a result of starting with fleet-wide average emissions factors for the construction fleet from OFFROAD (embodied in CalEEMod) for the unmitigated scenario to applying Tier 4 Final emissions factors to off-road construction equipment for the mitigated scenario.

Mitigation Measure AQ-2a also requires additional electric equipment for all concrete/industrial saws, sweepers/scrubbers, aerial lifts, welders, air compressors, fixed cranes, forklifts, and cement and mortar mixers, along with 90 percent of pressure washers and 70 percent of pumps, in all but isolated cases where diesel powered equipment is used as an interim measure prior to the availability of grid power at more remote areas of the site. Further, portable equipment would be powered by grid electricity or alternative fuels (i.e., not diesel) instead of by diesel generators. The modeling assumed the removal of diesel generators in favor of grid electricity; alternative-fueled generators were not modeled. The reduction in emissions from electric off-road equipment was quantified.

To conservatively estimate real-world emissions reductions with implementation of this measure, acknowledging that some Tier 4 Final and electric off-road equipment may not be available during certain construction phases, and allowing for some compliance with Item #2, *Engine Equipment Waivers*, and Table M-AQ-2a, it was assumed that some equipment may meet Compliance Alternative 1 (Tier 4 Interim) or Compliance Alternative 2 (Tier 3 plus CARB Level 3 Verified Diesel Emissions Control Strategies).[161,162] This was modeled by assuming that 3 percent of total horsepower-hours would meet Compliance Alternative 1, 1 percent of total horsepower-hours would meet Compliance Alternative 2, and 1 percent of total horsepower-hours would meet Tier 3 engine standards. Given the high availability of Tier 4 engines in the Bay Area,[163] and the regulatory compliance schedule of CARB's ATCM for In-Use Off-Road Diesel-Fueled Fleets (California Code of Regulations Title 17, Section 2449),[164] the assumption that 95 percent of total horsepower-hours for all phases of construction would meet Tier 4 Final engine standards is conservative.

For electric equipment including concrete/industrial saws, sweepers/scrubbers, aerial lifts, welders, air compressors, and fixed cranes, it was assumed that 10 percent of this equipment would meet Tier 4 Final engine standards (and 90 percent would be electric). This was done to account for the possibility that during certain phases of construction, some electric pieces may not be readily available. It was assumed that all forklifts and cement and mortar mixers would be

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161 A Verified Diesel Emissions Control Strategy is an emissions control strategy evaluated and verified (pursuant to the verification procedure laid out in California Code of Regulations Title 13, Sections 2700–2710) by CARB to reduce emissions of either particulate matter (PM) or oxides of nitrogen (NO_X), or both. PM Verified Diesel Emissions Control Strategies are classified into three levels by the amount of verified emission reductions achieved: Levels 1, 2, and 3. Level 3 VDECS means a minimum reduction in PM of 85 percent or a PM emission level of 0.01 grams per brake-horsepower-hour (g/bhp-hr) or less.

162 California Air Resources Board, *Frequently Asked Questions: Regulation for In-Use Off-Road Diesel-Fueled Fleets (Off-Road Regulation); Verified Diesel Emission Control Strategy (VDECS)*, December 2015. Available at https://www.arb.ca.gov/msprog/ordiesel/faq/vdecsfaq.pdfw. Accessed May 2020.

163 San Francisco Planning Department, *2017 Update—In-Use, Off-Road Construction Equipment Emissions Tiers,* April 2018.

164 California Air Resources Board, *Final Regulation Order: Regulation for In-Use Off-Road Diesel-Fueled Fleets,* December 2011. Available at https://ww3.arb.ca.gov/msprog/offroadzone/landing/offroad.htm. Accessed April 2020.

100 percent electric. Pressure washers would be 90 percent electric and 10 percent gasoline, pumps would be 70 percent electric and 30 percent gasoline (with the exception of concrete pumps, which would be 100 percent diesel), and plate compactors would be 100 percent gasoline. This information was provided by the project applicant's construction team.

After accounting for Tier 4 Final engines as discussed above, all other components of this measure that were quantified would reduce exhaust emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions by approximately 84 percent, 18 percent, 8 percent, and 18 percent, respectively.

The use of renewable diesel to fuel all diesel engines was considered as a potential quantifiable 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 below the significance threshold.[165]

However, according to a recent study prepared for BAAQMD and the South Coast Air Quality Management District, 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."[166] 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 AR-2a) are typically equipped with DPF technology, it is possible that renewable diesel may not reduce overall emissions of criteria pollutants and TACs from off-road equipment. Given this uncertainty regarding the actual effects of renewable diesel on emissions from off-road construction equipment meeting Tier 4 engine standards, renewable diesel was not quantified as a mitigation measure to reduce NO_X emissions from construction. The use of other alternative fuels in construction equipment, such as biodiesel, propane, and natural gas, was also not quantified, given the current uncertainty about the effectiveness of these fuels in reducing ROG, NO_X, and PM emissions collectively.

The 2-minute idling limit required by Mitigation Measure AQ-2a (Items #3a and #3b) was included in the modeling for all non-concrete hauling trucks. None of the other exhaust control provisions of Mitigation Measure AQ-2a was quantified. Mitigation Measure AR-2a (Item #3d) also requires all architectural coatings used during construction be super-compliant coatings that meet the limit of 10 grams or less VOC per liter, as defined in the South Coast Air Quality Management District's Rule 1113 (Architectural Coatings).[167] All indoor and outdoor coating

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[165] California Air Resources Board, *Staff Report: Multimedia Evaluation of Renewable Diesel*, May 2015. Available at https://calepa.ca.gov/wp-content/uploads/sites/6/2016/10/CEPC-2015yr-RenDieselRpt.pdf. Accessed April 2020.

[166] Gladstein, Neandross & Associates, *Renewable Diesel as a Major Heavy-Duty Transportation Fuel in California: Opportunities, Benefits, and Challenges*, August 2017. Available at https://www.gladstein.org/gna_whitepapers/renewable-diesel-as-a-major-transportation-fuel-in-california-opportunities-benefits-challenges/. Accessed May 2019.

[167] South Coast Air Quality Management District, *Super-Compliant Architectural Coatings*, 2019. Available at http://www.aqmd.gov/home/rules-compliance/compliance/vocs/architectural-coatings/super-compliant-coatings. Accessed April 2020.

ROG emissions from construction were therefore estimated using the 10 grams VOC per liter limit. This requirement would reduce ROG emissions from architectural coatings by approximately 90 percent during the building construction sub-phases.

Dust control measures implemented through Mitigation Measure AQ-2a (Item #5) would reduce fugitive PM_{10} and $PM_{2.5}$ emissions substantially. No dust control measures were modeled for the calculation of the regional emissions for the project, per BAAQMD guidelines. Instead, BAAQMD recommends that analyses focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to a quantitative significance threshold. Therefore, implementation of these dust control requirements is the basis for determining the significance of air quality impacts from fugitive dust emissions, and fugitive dust emissions from construction are not quantified.

Effectiveness of Mitigation Measure AQ-2b

Mitigation Measure AQ-2b, Construction Equipment Maintenance and Tuning, would ensure the proper operation of construction equipment. While proper operation would help to minimize emissions, this measure was not quantified, given the limited methods available for calculating emissions associated with proper maintenance and tuning of construction equipment.

Effectiveness of Mitigation Measure AQ-2c

Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement, would require that all on-road heavy-duty trucks with a gross vehicle weight rating of 33,000 pounds or greater have engines that are model year 2014 or newer; this would include vendor trucks that exceed this weight limit.

This measure would reduce emissions from on-road heavy-duty trucks because of more stringent engine emissions standards and more fuel-efficient engines. This measure was quantified by assuming that 90 percent of all heavy-duty trucks used during construction would be model year 2014 or newer, based on emissions factors from EMFAC2017. For the project, on-road mobile sources used emissions factors aggregated for the model year for each year of construction. However, with implementation of Mitigation Measure AQ-2c, the model year was restricted to model year 2014 or newer up to the year of construction. Mitigation Measure AQ-2c would reduce construction mobile-source emissions by 24 percent for ROG, 17 percent for NO_X, and 12 percent for PM_{10}.

Effectiveness of Mitigation Measure AQ-2d

Mitigation Measure AQ-2d, Super-Compliant VOC Architectural Coatings during Operations, would reduce ROG emissions from architectural coatings by approximately 90 percent during operations because the coatings would have a lower VOC content. This mitigation measure was quantified by modeling all operational architectural coatings at a VOC content of 10 grams per liter in CalEEMod (the default values range from 100 to 150 grams VOC per liter).

Effectiveness of Mitigation Measure AQ-2e

Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators, would substantially reduce emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ from emergency diesel backup generators. However, generator emissions would make up only a small portion of the project's operational emissions (approximately 2 percent of NO_X emissions); thus, even with implementation of this mitigation measure, total operational emissions would still exceed the significance thresholds.

Similar to Mitigation Measure AQ-2a above, alternative fuels to diesel for emergency backup generators were not quantified (Item #1). Given this uncertainty regarding the feasibility of alternative-fueled emergency backup generators, and the unknown effects of alternative fuels such as renewable diesel on emissions from emergency backup generators, the use of alternative fuels was not quantified.

As discussed under Impact AQ-3, reductions of particulate emissions from this measure are necessary to reduce potential health risk impacts on on-site receptors to less-than-significant levels. Tier 4 stationary emergency generators are readily available, and CARB requires that all new stationary emergency generators greater than 560 kilowatts (750 horsepower) manufactured in 2015 or later meet Tier 4 exhaust emissions standards. Therefore, it was assumed that 100 percent of all new project emergency backup diesel generators would meet Tier 4 standards.

This mitigation measure was quantified in the mitigated scenario using Tier 4 stationary diesel engine standards from CARB's ATCM for stationary compression ignition engines.[168] This measure would reduce generator emissions by 37 percent for ROG, 89 percent for NO_X, and 87 percent for both PM_{10} and $PM_{2.5}$.

Effectiveness of Mitigation Measure AQ-2f

Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction, would reduce emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ from on-road heavy-duty truck travel and idling by requiring advanced exhaust technology, encouraging Tier 4 emission standards for TRUs, including installation of electrical hookups to replace TRU operations, and requiring idling limitations.

The amount of emission reductions associated with electrical hookups (Item #1) would depend on the number of actual deliveries from electrified refrigerated transport trucks. To quantify this measure, a constant market penetration rate of 25 percent electric TRUs was assumed; this means that 25 percent of all TRUs associated with deliveries to the project site would be electric instead of diesel.

This assumption is conservative, based on CARB's 2019 Draft Concept to convert all truck TRUs to full zero-emission technology by 2031 at a 15 percent turnover rate per year starting in 2025.[169] CARB is also drafting a new regulation for TRUs that would require all new truck TRUs built after 2023 to be zero-emission and all in-use truck TRU fleets to phase in zero-emission TRUs at

[168] California Air Resources Board, *Final Regulation Order: Amendments to the Airborne Toxic Control Measure for Stationary Compression Ignition Engines*, California Code of Regulations Title 17, Section 93115, May 19, 2011. Table 4. Available at https://www.arb.ca.gov/diesel/documents/FinalReg2011.pdf. Accessed June 2020.

[169] California Air Resources Board, *Draft 2019 Update to Emissions Inventory for Transport Refrigeration Units*, October 2019. Available at https://ww3.arb.ca.gov/cc/cold-storage/documents/hra_emissioninventory2019.pdf. Accessed July 2020.

15 percent per year over 7 years until all TRUs in the state are zero-emission by 2031.[170] If this regulation were to be adopted into law, the majority of TRUs serving the project site would likely be zero-emission. Therefore, the assumption that only 25 percent of all TRUs operating from 2028 through 2062 would be electric is extremely conservative. Electric TRUs are assumed to emit no criteria pollutants or TACs. As a result, this mitigation measure would result in a 25 percent reduction in TRU emissions for the project.

Regarding Tier 4 TRU engines (Item #2), at full buildout, DPM emissions from TRUs would account for less than 1 percent of all DPM emissions from project construction and project operations. Therefore, the contribution of Mitigation Measure AQ-2f toward reducing operational emissions would be minor. In addition, the project applicant has limited control over tenant and vendor delivery vehicles. Consequently, the emissions benefit of Tier 4 TRUs was not quantified.

The other components of this measure, including the two-minute idling limit and the location of loading docks, were not modeled. Idling emissions are already embodied in the EMFAC2017 emission factors used to estimate emissions from trucks, and because of the uncertainty regarding future truck idling activities and locations, this was not quantified; this approach likely overestimates mitigated emissions from trucks.

Effectiveness of Mitigation Measure AQ-2g

Mitigation Measure AQ-2g, Electric Vehicle Charging, would reduce mobile-source emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ by encouraging residents, employees, visitors, and patrons of the project to use EVs in place of gasoline- and diesel-powered vehicles. This measure was quantified using the same methods as described above under *Project Features Analyzed*, except that the total number of EV chargers was assumed to be 15 percent of the total parking spaces, or 984 total.

Effectiveness of Mitigation Measure AQ-2h

Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program, would reduce the total VMT and number of trips associated with proposed project operations by 24 percent during interim year operations (2025 through 2031) and by 27 percent at full buildout (2032), resulting in corresponding reductions of approximately 25 percent and 27 percent in ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions for operational mobile sources during interim and full buildout operational years, respectively.

The reduction in trips and VMT would be achieved through a variety of means, including improvements to pedestrian and bicycle facilities, market-rate parking pricing for commercial uses, limited parking supplies on site, unbundled parking for residential uses, preferential carshare and vanpool parking, and subsidized transit passes for employees and residents. This mitigation measure was quantified in the mitigated scenario.

[170] California Air Resources Board, *Transport Refrigeration Unit Regulation: Draft Regulatory Language for Stakeholder Review*, March 12, 2020. Available at https://ww2.arb.ca.gov/sites/default/files/classic//diesel/tru/documents/Draft%20TRU%20Regulatory%20Language_03122020.pdf. Accessed July 2020.

Additional Measures Considered

Additional measures to further reduce NO_X emissions were also considered and rejected as infeasible. The additional measures considered and rejected included:

- 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;
- Extending the overall schedule to reduce the emissions intensity in any given year; and
- Replacing the largest pieces of construction equipment with smaller pieces of construction equipment.

These actions were determined to be infeasible because they would not meet the project's buildout schedule and because of other financial and operational considerations. They were also determined to be infeasible because the equipment fleet proposed and modeled in this analysis represents the equipment most likely to be available at this time, including the proportion of electric and diesel equipment (refer to Appendix C1 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.

Analysis of Overall Mitigation Measure Effectiveness

Table 3.1-12 presents average daily and total annual construction-related emissions of criteria pollutants with implementation of Mitigation Measures AQ-2a, AQ-2c, and AQ-2d (the mitigation measures that were expressly quantified, as discussed above). The table also compares construction emissions with the significance thresholds. Mitigated project construction emissions would exceed BAAQMD's CEQA thresholds of significance for average daily NO_X emissions during 2023–2026 and 2029–2030. ROG, PM_{10}, and $PM_{2.5}$ exhaust emissions would be below the applicable thresholds of significance for all years of construction.

Table 3.1-13 presents average daily and total annual and operational emissions of criteria pollutants by year with implementation of Mitigation Measures AQ-2a, AQ-2c, AQ-2d, AQ-2e, AQ-2f, and AQ-2h (the mitigation measures applicable to operational emissions that were expressly quantified, as described above). **Table 3.1-14** presents the net increase in average daily and total annual construction-related plus operational criteria pollutant emissions by year with implementation of mitigation measures, compared to existing conditions. The tables also compare emissions to the BAAQMD thresholds. Implementing Mitigation Measures AQ-2a through AQ-2h would reduce emissions, but emissions would remain significant for ROG, NO_X, and PM_{10}. Mitigated net new combined project construction and operational emissions would exceed BAAQMD's CEQA thresholds of significance for average daily ROG emissions during 2026–2032, for average daily NO_X emissions during 2023–2032, for average daily PM_{10} emissions during 2026–2032, and for average daily $PM_{2.5}$ emissions during 2032.

TABLE 3.1-12
AVERAGE DAILY AND TOTAL ANNUAL MITIGATED CONSTRUCTION CRITERIA POLLUTANT EMISSIONS BY YEAR

Year	Average Daily Emissions (Pounds per Day)[a,b,c,d]				Annual Emissions (Tons per Year)[c,d,e]			
	ROG	NO_X	PM_{10} Exhaust	$PM_{2.5}$ Exhaust	ROG	NO_X	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
2021	3	37	1	1	<1	6	<1	<1
2022	4	50	1	1	1	8	<1	<1
2023	5	**56**	1	1	1	9	<1	<1
2024	6	**67**	1	1	1	12	<1	<1
2025	11	**85**	1	1	2	13	<1	<1
2026	18	**76**	1	1	3	12	<1	<1
2027	15	44	1	<1	2	7	<1	<1
2028	3	23	<1	<1	1	4	<1	<1
2029	11	**65**	1	1	2	10	<1	<1
2030	6	**66**	1	1	1	10	<1	<1
2031	8	34	<1	<1	1	5	<1	<1
2032	6	5	<1	<1	1	1	<1	<1
Threshold	**54**	**54**	**82**	**54**	n/a	n/a	n/a	n/a
Exceeds Threshold?	No	Yes	No	No				

NOTES:
NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases
a **Bold values** = threshold exceedance
b Average daily construction emissions represent total annual emissions divided by 312 work days per year.
c Emissions presented in this table include Tier 4 Final engines on all off-road equipment (as available) and certain electric equipment pieces. Emissions also assume that 3% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% of horsepower-hours would be associated with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% of horsepower-hours would be associated with Tier 3 off-road equipment engines. This is because Tier 4 Final and electric off-road equipment may not be available during certain phases of construction.
d Emissions include implementation of Mitigation Measure AQ-2a, Construction Emissions Minimization Plan; Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement; and Mitigation Measure AQ-2d, Super-Compliant VOC Architectural Coatings during Operations.
e Total annual construction emissions are shown because construction-related and operational emissions would overlap for some years. There is no significance threshold for annual construction emissions.
SOURCE: Data compiled by Environmental Science Associates in 2020 (refer to Appendix C1).

Health Impacts Assessment for Criteria Pollutant Emissions—Regional Effects

The types of adverse health effects known to occur as a result of exposure to criteria air pollutants and the potential for secondarily formed ozone are discussed in Section 3.1.1, *Environmental Setting*, under *Criteria Air Pollutants*. The analysis below uses available models to attempt to correlate the project's criteria air pollutant emissions to elevated concentrations of such pollutants in the region, and then to identify health effects that may result from the predicted increased concentrations. The following analysis reflects a reasonable effort, based on the best available 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.[171] The limitations and qualifications of the analysis are highlighted after the presentation of the analysis results, below.

171 *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 517–522.

TABLE 3.1-13
AVERAGE DAILY AND TOTAL ANNUAL MITIGATED OPERATIONAL CRITERIA POLLUTANT EMISSIONS BY YEAR

Year	Average Daily Emissions (Pounds per Day)[a,b]				Annual Emissions (Tons per Year)[b]			
	ROG	NO_X	PM_{10} Total	$PM_{2.5}$ Total	ROG	NO_X	PM_{10} Total	$PM_{2.5}$ Total
2025 [c]	**55**	39	40	9	9	6	6	2
2026 [c]	**164**	**116**	**120**	28	**28**	**18**	**19**	5
2027 [c]	**246**	**174**	**179**	43	**42**	**27**	**28**	7
2028 [d]	**273**	**193**	**199**	47	**47**	**31**	**32**	8
2029 [d]	**273**	**193**	**199**	47	**47**	**31**	**32**	8
2030 [d]	**329**	**194**	**200**	48	**57**	**31**	**32**	8
2031	**329**	**194**	**200**	48	**57**	**31**	**32**	8
2032+ [e]	**395**	**195**	**237**	**56**	**70**	**31**	**37**	9
Threshold	**54**	**54**	**82**	**54**	**10**	**10**	**15**	**10**
Exceeds Threshold?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

NOTES:
NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases

[a] Average daily construction emissions represent total annual emissions divided by 312 work days per year.

[b] Emissions include implementation of Mitigation Measure AQ-2d, Super-Compliant VOC Architectural Coatings during Operations; Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators; Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction; Mitigation Measure AQ-2g, Electric Vehicle Charging; and Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program.

[c] Emissions for 2025–2027 are calculated assuming partial buildout scaling factors as follows: 20% in 2025, 60% in 2026, 90% in 2027, and 100% in 2028.

[d] Emissions for 2028–2030 are the same because the modeling assumes that the same vehicle miles traveled and mobile emissions factors remain constant during these years. This is likely an overestimate because emissions factors would decrease over time with vehicle fleet turnover and technology improvements.

[e] Emissions reported for "2032+" would occur at full buildout in 2032 and each subsequent year of project operations.

SOURCE: Data compiled by Environmental Science Associates in 2020 (refer to Appendix C1).

As explained by BAAQMD in its 2010 report justifying its CEQA significance thresholds, the thresholds for the ozone precursors ROG and NO_X were tied to BAAQMD's offset requirements for ozone precursors. The offset requirements refer to BAAQMD's New Source Review Rule, which requires that certain new projects in the Bay Area secure emission offsets for any increases they might cause in emissions of ozone-precursor organic compounds, NO_X, and $PM_{2.5}$.[172] The offset requirements are based on the Bay Area's nonattainment with the federal ozone standard; therefore, such an approach is appropriate "to prevent further deterioration of ambient air quality and thus has

[172] *Emission offsets* are reductions in emissions in one place that can be used to compensate for increased emissions elsewhere, through an established banking and trading program. Ozone-precursor organic compound and NO_X offsets are required for both major and non-major facilities. $PM_{2.5}$ offsets are required only for emissions increases at *major facilities*, which are defined as facilities that have the potential to emit 100 tons or more per year of a given pollutant. *Non-major facilities* have potential emissions of less than 100 tons per year. Emission offsets may be provided through on-site emissions reductions or the purchase of banked emissions reduction credits. The project is not a source that falls under the New Source Review Rule; this information is provided only to explain the origin of BAAQMD's CEQA thresholds.

TABLE 3.1-14
AVERAGE DAILY AND TOTAL ANNUAL MITIGATED NET NEW CONSTRUCTION AND OPERATIONAL CRITERIA POLLUTANT EMISSIONS BY YEAR

	Average Daily (Pounds per Day)[a,b,c]				Annual (Tons per Year)[a,b,c]			
Year	**ROG**	**NO_X**	**PM_{10} Total**	**$PM_{2.5}$ Total**	**ROG**	**NO_X**	**PM_{10} Total**	**$PM_{2.5}$ Total**
Existing Conditions								
Including Mobile	70	124	66	16	<1	6	<1	<1
Excluding Mobile	12	2	0.2	0.2	2	0.4	<0.1	<0.1
2021	3	37	1	1	1	6	<1	<1
2022	4	50	1	1	1	8	<1	<1
2023	5	**56**	1	1	1	9	<1	<1
2024	5	**67**	1	1	1	10	<1	<1
2025 [d]	**66**	**123**	**41**	10	11	19	6	2
2026 [d]	**182**	**191**	**120**	29	**31**	**30**	19	5
2027 [d]	**261**	**218**	**180**	43	**45**	**34**	**28**	7
2028	**276**	**216**	**200**	47	**48**	**34**	**32**	8
2029	**273**	**256**	**200**	48	**47**	**40**	**32**	8
2030	**322**	**258**	**201**	48	**56**	**41**	**32**	8
2031	**325**	**226**	**200**	48	**56**	**36**	**32**	8
2032+ [e]	**389**	**198**	**237**	**56**	**69**	**31**	**37**	9
Threshold	**54**	**54**	**82**	**54**	**10**	**10**	**15**	**10**
Exceeds Threshold?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No

NOTES:
NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases

a Net new emissions = construction + operation – existing conditions. Existing uses are assumed to operate on-site through 2028. Existing-condition emissions for non-transportation sources were subtracted in 2029–2032.

b Construction emissions presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% of horsepower-hours would be associated with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% of horsepower-hours would be associated with Tier 3 off-road equipment engines) and certain electric equipment pieces.

c Emissions include implementation of Mitigation Measure AQ-2a, Construction Emissions Minimization Plan; Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement; Mitigation Measure AQ-2d, Super-Compliant VOC Architectural Coatings during Operations; Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators; Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction; Mitigation Measure AQ-2g, Electric Vehicle Charging; and Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program.

d Operational emissions for 2025–2027 are calculated assuming partial buildout scaling factors as follows: 20% in 2025, 60% in 2026, 90% in 2027, and 100% in 2028.

e The operational emissions component of those emissions reported for "2032+" would occur at full buildout in 2032 and each subsequent year of project operations. Note that a portion of these emissions include construction in 2032 (see Table 3.1-12), which would cease in 2033 and subsequent years.

SOURCE: Data compiled by Environmental Science Associates in 2020 (refer to Appendix C1).

nexus and proportionality to prevention of a regionally cumulative significant impact (e.g., worsened status of non-attainment)."[173] Such offset levels allow for regional development while keeping the cumulative effects of new sources at a level that would not impede attainment of the

173 Bay Area Air Quality Management District, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, June 2, 2010.

NAAQS. As described in Section 3.1.2, *Regulatory Framework*, compliance with the ambient air quality standards indicates that regional air quality can be considered protective of public health.

As explained above, attainment can be considered protective of public health, thus providing a strong link between a mass emissions threshold and avoidance of negative health effects. For PM_{10} and $PM_{2.5}$, 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."[174] As with ROG and NO_X discussed above, these thresholds likewise provide a connection between a mass emission threshold and avoidance of health effects.

The following analysis is provided to disclose the extent to which unmitigated and mitigated 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 unmitigated project show the following increases at the most affected model grid cells:[175] a maximum increase of 0.014 parts per billion, or 0.021 percent, for the overall maximum daily 8-hour average ozone and 0.20 $\mu g/m^3$, or 1.1 percent, for the maximum 24-hour average $PM_{2.5}$. Similarly, the mitigated project emissions were compared to the base case. The CAMx results for the base case as compared to the base case plus mitigated project show the following increases at the most affected model grid cells: a maximum increase of 0.013 parts per billion, or 0.019 percent, for the overall maximum daily 8-hour average ozone and 0.15 $\mu g/m^3$, or 0.81 percent, for the 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 would be less. These results generally validate the prediction that adding locally generated emissions could result in incremental increases in nearby ground-level concentrations of ozone and $PM_{2.5}$. However, these increases are very small.

Although a strong correlation exists between elevated concentrations and elevated health incidence rates, there is uncertainty when linking health incidence data with very small increases in concentrations. 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. In addition, as discussed below,

[174] Bay Area Air Quality Management District, *Ozone Modeling and Data Analysis During CCOS*, September 2009. Available at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Research%20and%20Modeling/CCOS%20modeling%20report.ashx. Accessed December 2019.

[175] The most-affected model grid cells for $PM_{2.5}$ and ozone concentrations is the one overlapping the project site and the one to the east of the project site, which includes much of downtown San José.

several additional modeling uncertainties and assumptions are embodied in the analysis. The 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 and mitigated project emissions is minimal in light of background incidences. Specifically, for all the health endpoints quantified, the number of estimated incidences is between 0.00002 percent and 0.0012 percent of the background health incidence.[176] The “background health incidence” is an estimate of the average number of people in a given population who would suffer from some adverse health effect 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 percentage of the number of background incidences indicate that these health effects are minimal in a developed, urban environment.

Unmitigated $PM_{2.5}$-related health outcomes attributed to project-related increases in ambient air concentrations include:

- Asthma-related emergency room visits (approximately 1.15 additional per year; study year 2032);
- Asthma-related hospital admissions (approximately 0.10 additional per year; study year 2032);
- All cardiovascular-related hospital admissions, not including myocardial infarctions (approximately 0.29 additional per year; study year 2032);
- All respiratory-related hospital admissions (approximately 0.51 additional per year; study year 2032);
- Mortality (approximately 2.03 additional per year; study year 2032);[177] and
- Non-fatal acute myocardial infarction (approximately 0.23 additional per year for all age groups; study year 2032).

After implementation of mitigation measures, including Mitigation Measure AQ-2a (Construction Emissions Minimization Plan), AQ-2c (Heavy-Duty Truck Model Year Requirement), AQ-2d (Super-Compliant VOC Architectural Coatings during Operations), AQ-2e (Best Available Emissions Controls for Stationary Emergency Generators), AQ-2f (Operational Diesel Truck Emissions Reduction), AQ-2g (Electric Vehicle Charging), and AQ-2h (Enhanced Transportation Demand Management Program), $PM_{2.5}$-related health outcomes attributed to project-related increases in ambient air concentrations include:

- Asthma-related emergency room visits (approximately 0.85 additional per year; study year 2032);
- Asthma-related hospital admissions (less than 0.08 additional per year; study year 2032);

[176] These percentages are based on Project-level incremental health effects divided by background health incidences provided by BenMAP as discussed in the *Approach to Analysis* section above and Appendix C3.
[177] Mortality associated with $PM_{2.5}$ is a result of an individual’s exposure to annual $PM_{2.5}$ concentrations. As such, this analysis uses average annual $PM_{2.5}$ concentrations to estimate incidences of mortality.

- All cardiovascular-related hospital admissions, not including myocardial infarctions (less than 0.22 additional per year; study year 2032);
- All respiratory-related hospital admissions (approximately 0.38 additional per year; study year 2032);
- Mortality (approximately 1.50 additional per year; study year 2032); and
- Non-fatal acute myocardial infarction (less than 0.17 additional per year for all age groups; study year 2032).

These numbers compare to the study year 2032 background incidences for the entire modeled area of approximately 18 million people[178] with asthma-related emergency room visits (112,397 per year), asthma-related hospital admissions (13,102 per year), all cardiovascular-related hospital admissions, not including myocardial infarctions (139,003 per year), all respiratory-related hospital admissions (118,802 per year), mortality (170,920 per year), and nonfatal acute myocardial infarction (38,556 per year for all age groups). For comparison, the San Jose Mineta Airport Master Plan Amendment EIR conducted an HIA similar to the one prepared for the proposed project. That EIR found the maximum $PM_{2.5}$-related health outcomes to be 4.5 additional incidences of mortality, 1.9 additional incidences of asthma-related emergency room visits, and 0.8 additional incidences of all respiratory-related hospital admissions.[179] Refer to Appendix C3 for additional discussion.[180]

Unmitigated ozone-related health outcomes attributed to project-related increases in ambient air concentrations included:

- Respiratory-related hospital admissions (approximately 0.038 additional per year, study year 2032);
- Mortality, all causes (less than 0.07 additional per year, study year 2032); and
- Asthma-related emergency room visits (approximately 0.44 additional per year, study year 2032).

After implementation of mitigation measures, ozone-related health outcomes attributed to project-related increases in ambient air concentrations include:

- Respiratory-related hospital admissions (approximately 0.03 additional per year, study year 2032);

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178 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 2029 and 2032 populations for the modeled domain for usage in the health impact calculations.

179 City of San Jose, *Draft Environmental Impact Report: Amendment to Norman Y. Mineta San Jose International Airport Master Plan*, Chapter 4.3 Air Quality, pp. 92-93, November 2019. Available at https://www.sanjoseca.gov/your-government/department-directory/planning-building-code-enforcement/planning-division/environmental-planning/environmental-review/active-eirs/sjc-airport-master-plan-update. Accessed August 2020.

180 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 2025 is conservatively applied to the Interim Year 2029 Scenario and Year 2030 is conservatively applied to First Operational Year 2032 Scenario emissions modeled in CAMx. The projected incidence rates are assumed conservative because incidence rates are expected to decrease over time with improved air quality.

- Mortality, all causes (approximately 0.05 additional per year, study year 2032); and
- Asthma-related emergency room visits (less than 0.36 additional per year, study year 2032).

These numbers compare to the study year 2032 background incidences for the entire modeled regional area with respiratory-related hospital admissions (49,799 per year), mortality, all causes (73,083 per year), and asthma-related emergency room visits (47,114 per year). For comparison, the San Jose Mineta Airport Master Plan Amendment EIR found the maximum ozone-related health outcomes to be 1.1 additional incidences of mortality, 25.6 additional incidences of asthma-related emergency room visits, and 2.1 additional incidences of all respiratory-related hospital admissions. Refer to Appendix C3 for additional discussion.[181]

Modeling Assumptions

As noted under *Approach to Analysis* above, the health outcomes presented here utilize the highest annual daily average construction and operations emissions for ozone precursors and $PM_{2.5}$, which were combined to develop a conservative emissions inventory. The emissions speciation profiles for the regional existing conditions emission inventory were assumed to be equivalent to the speciation profiles for the project conditions. The model assumes that health effects can occur at any concentration, including small incremental concentrations. It was also assumed that all $PM_{2.5}$ emissions are of equal toxicity, regardless of the source of PM or the constituents of each PM emissions source. These assumptions all result in highly conservative health effect incident rates and are intended to represent the worst-case, upper-bound potential impacts. For example, because the Project is committed to minimizing diesel emission sources, the overwhelming majority of project-related emissions are from less toxic non-combustion sources, such as brake and tire wear and re-entrained road dust. The modeled resultant incremental increase in ambient levels of $PM_{2.5}$ may not be as toxic as the atmospheric PM2.5 levels that serve as the background studies to develop the health impact functions used by BenMAP, like for mortality.[182]

Uncertainty of Results

As many regional-scale HIAs and this project-level analysis demonstrate, performing a quantitative HIA is difficult due to its complexity, but some level of analyses can be performed. Nevertheless, the limits of such analyses should be noted.

The HIA for the project does not link predicted changes in ozone and $PM_{2.5}$ concentrations 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 modeling domain. The model outputs provide seemingly

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[181] 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 2025 is conservatively applied to the Interim Year 2029 Scenario and Year 2030 is conservatively applied to First Operational Year 2032 Scenario emissions modeled in CAMx. The projected incidence rates are assumed conservative because incidence rates are expected to decrease over time with improved air quality.

[182] U.S. Environmental Protection Agency, *BenMAP-Community Edition User's Manual*. Appendix E: Core Particulate Matter Health Impact Functions in U.S. Setup, Section E.1.2 Krewski et al. (2009). Available at: https://www.epa.gov/sites/production/files/2015-04/documents/benmap-ce_user_manual_march_2015.pdf. Accessed August 2020.

precise values. It would be inappropriate, however, to assume that these values give an exact understanding of the project's actual impacts. The uncertainty in such analyses is inherent and unavoidable, given all of the assumptions about meteorology, photochemical reactions, and other air basin characteristics, as described further below.

The modeling performed to estimate a project's contribution to ambient concentrations of pollutants requires assumptions for many variables related to the proposed project and the meteorological and other characteristics of the air basin into which the pollutants are emitted. All simulations of physical processes, whether ambient air concentrations or health effects from air pollution, have an associated level of uncertainty because of 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, resulting from the usage of 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 concentrations of criteria air pollutants 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.

A number of assumptions built into the application of concentration-response functions in BenMAP may lead to an overestimation of health effects. For example, estimates of all-cause mortality impacts from $PM_{2.5}$ are based on a single epidemiological study that found an association between $PM_{2.5}$ concentrations and mortality. Similar studies suggest that such an association exists, but uncertainty remains 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 pollutant may confound the other and both air pollutants could contribute to the health effect outcomes evaluated, so the overall impacts may be overstated.

These assumptions and uncertainties do not necessarily mean that the modeled results are invalid or uninformative. Rather, the modeled results should not be misinterpreted as an exact calculation of something as complex as photochemical grid modeling, or as an exact correlation between a given level of emissions and specific health effects. In this case, the modeled health effects may differ from the actual future health effects associated with the project.

In addition, the estimate of health effects presumes that impacts seen at large concentrations can be linearly scaled down to small concentrations, with no consideration of the potential threshold effect[183] below which health effects may not occur. This method of linearly scaling impacts is broadly accepted for use in regulatory evaluations and is considered to be health protective. While conservative to apply linear scaling, it may result in an overestimation of health effect incidences from very small increases in concentrations.

The very small increase in the incidence of health effects as determined from the modeling, relative to the substantially larger number of background health effects incidences, demonstrates that the project would have a very small impact on community-wide health effects. The estimated increases in those incidences of health effects are quite minor compared to the background health incidence values with the largest $PM_{2.5}$ health effect (all-cause mortality), representing only 0.0009 percent of the total of all deaths under mitigated conditions, and the largest effect for ozone (asthma-related emergency room visits by adults), representing 0.0016 percent of all emergency room visits under mitigated conditions.

While the quantitative HIA uses the best available tools and guidance currently available, many compounding uncertainties may affect the reported results such that the modeled health effects may differ from the actual future health effects associated with the proposed project. The calculated health effects for the project are conservatively estimated, within the models' margin of error, and may in fact be zero.

Additional discussion of modeling limitations and uncertainty is provided in Appendix C3.

> **Significance after Mitigation:** Significant and unavoidable. Implementation of Mitigation Measures AQ-2a through AQ-2h would reduce emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ for the proposed project. However, as shown in Table 3.1-14, the net increase in criteria air pollutant emissions would exceed the significance thresholds for ROG, NO_X, PM_{10}, and $PM_{2.5}$, even after mitigation. For these reasons, the residual impact of project emissions during construction and overlapping operations is significant and unavoidable.

Impact AQ-3: The proposed project would expose sensitive receptors to substantial pollutant concentrations. *(Significant and Unavoidable)*

To assess the project's potential to expose sensitive receptors to substantial pollutant concentrations, an HRA was conducted to assess increased cancer risk, non-cancer chronic health effects, and localized annual average $PM_{2.5}$ concentrations from both construction-related and operational sources. In the HRA, localized $PM_{2.5}$ concentrations and non-cancer chronic health

183 U.S. National Library of Medicine, Dose Response, https://toxtutor.nlm.nih.gov/02-002.html. Accessed August 17, 2020.

risks were assessed based on annual average concentrations and exposure; hence, separate evaluations were performed for construction and operations, except where they would overlap.

Cancer risk was assessed based on the probability of contracting cancer over a person's lifetime, evaluated as 30.25 years of exposure, starting as a third-trimester fetus in the womb and ending after 30 years of life.[184] Therefore, the probability of an increased cancer risk was determined by evaluating a sensitive receptor's exposure to both construction-related 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 were compared to the project-related significance thresholds of an increase in cancer risk level greater than 10 in 1 million, a non-cancer chronic HI greater than 1.0, and an annual average $PM_{2.5}$ concentrations greater than 0.3 $\mu g/m^3$ of $PM_{2.5}$, respectively.

BAAQMD established a project-level significance threshold of greater than 10 in 1 million increased lifetime cancer risk. To put the increased risk in context, the "background" cancer risk for the general population in the U.S. is 387,000–401,400 in a million.[185] (Stated another way, the probability of a person in the general population contracting cancer over their lifetime is 38.7 to 40.1 percent, and the BAAQMD project-level significance threshold would be an increase in that probability by over 0.001 percent. See *Incremental Increase in Lifetime Cancer Risk* section above for further perspective.) As discussed in Section 3.1.1, *Environmental Setting*, of this overall cancer risk, CARB has determined that the statewide risk from DPM—the most significant TAC contributor to cancer risk—declined from 750 in 1 million in 1990 to 570 in 1 million in 1995 and to 520 in 1 million by 2012.[186,187] This number is expected to decline further during the 11 years of project construction as the ATCM requiring reductions from construction equipment fleets is fully implemented, and during long-term operation of the project as trucking fleets become cleaner in compliance with existing regulations. For that reason, even if a single project were to cause an increase in cancer risk, a person's lifetime risk may be lower than it is today.

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184 As discussed above, adults are much less susceptible to increased cancer risk, so to include the worst-case scenario, this analysis accounts this "age sensitivity factor" by including results for both adult and children receptors.

185 National Cancer Institute, Cancer Stat Facts: Cancer of Any Site, 2010. Available at https://seer.cancer.gov/statfacts/html/all.html. Accessed March 2020.

186 California Air Resources Board, *California Almanac of Emissions and Air Quality—2009 Edition*, 2009, Table 5-44 and Figure 5-12. Available at https://www.cityofdavis.org/home/showdocument?id=4101. Accessed February 3, 2020.

187 California Air Resources Board, Overview: Diesel Exhaust and Health. Available at https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health. Accessed January 14, 2020. This calculated cancer risk value from ambient air exposure in the Bay Area can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which is approximately 40 percent, or greater than 400,000 in 1 million, according to the American Cancer Society. (American Cancer Society, Lifetime Risk of Developing or Dying from Cancer, last updated January 13, 2020. Available at https://www.cancer.org/cancer/cancer-basics/lifetime-probability-of-developing-or-dying-from-cancer.html. Accessed March 2020.)

As discussed under *Approach to Analysis* above, the HRA considered three separate exposure scenarios to assess worst-case risk at the locations of both new on-site and existing off-site sensitive receptors:

- *Scenario 1:* Exposure of existing off-site sensitive receptors to construction (all phases of development evaluated), operations starting at an interim buildout year of 2028, and full-buildout operations starting at 2032, for a total 30-year exposure.
- *Scenario 2:* Exposure of all new on-site sensitive receptors to construction emissions beginning at building occupancy (i.e., completion of construction of residential structure) plus the exposure from interim operations (if applicable) to full-buildout operations, for a total 30-year exposure.
- *Scenario 3:* Exposure of both existing off-site and new on-site sensitive receptors to full-buildout operations starting at 2032, for a total duration of 30 years.

Impacts on Sensitive Receptors

Sensitive receptors in the HRA include all existing off-site residential receptors within 1,000 feet of the proposed project boundary and all existing schools or childcare centers within approximately 2,500 feet of the proposed project boundary. Refer to Figure 3.1-1, which presents the locations of sensitive receptors include in the HRA.

Future on-site sensitive receptors were considered to be located at any part of the proposed project site that may contain residential uses.[188] The exposure period evaluated for each potential new residence was assumed to begin at the start of occupancy, i.e., when the proposed residential structure's construction was completed. These sensitive receptors would be exposed to the proposed project's new TAC emissions; thus, this analysis is needed to determine how the proposed project might worsen existing conditions and how such worsened conditions could affect the project's future sensitive receptors.

Table 3.1-15, **Table 3.1-16**, and **Table 3.1-17** present the unmitigated results of the HRA for all receptor types under Scenario 1, Scenario 2, and Scenario 3, respectively. These results are explained below and assume Tier 4 Final engines on all off-road equipment (as available), electrification of some construction equipment, and other project features (for construction and operation) described under *Approach to Analysis* above.

Cancer Risk Impacts

Table 3.1-15 shows the incremental increase in lifetime cancer risk for existing off-site receptors for Scenario 1 exposure from unmitigated project construction and operational emissions. As shown, the maximum exposure period for the off-site child resident begins in 2023 and for the off-site adult resident begins in 2021. The incremental increase in the lifetime cancer risk from unmitigated project construction and operational emissions at the maximally exposed off-site child resident MEIR would be 43.8 in 1 million (33.2 from construction and 10.6 from operations), and the maximum incremental increase in lifetime cancer risk at the off-site adult resident MEIR would be 2.4 in 1 million (1.1 from construction and 1.3 from operations). Both

[188] As part of the future on-site sensitive receptor evaluation, residents in the proposed Northern Variant were considered in order to assess potential impacts on residents if the variant is selected for implementation.

TABLE 3.1-15
SCENARIO 1—UNMITIGATED INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/ Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b]
Resident Child—Off-Site Receptor[c]				
Project Construction	2023–2032/2027/2027	**33.2**	0.02	0.12
Project Operational, interim	2025–2032/2025/2025	5.5	0.01	0.19
Project Operational, full[d]	2032–2053/2032/2032	5.1	0.02	0.24
Project Construction + Operations[d]	2023–2053/2027/2027	**43.8**	0.03	**0.31**
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		**Yes**	No	**Yes**
Resident Adult—Off-Site Receptor[e]				
Project Construction	2021–2032/2027/2027	1.1	0.02	0.12
Project Operational, interim	2025–2032/2025/2025	0.3	0.01	0.19
Project Operational, full[d]	2032–2051/2032/2032	1.0	0.02	0.24
Project Construction + Operations[d]	2021–2051/2027/2027	2.4	0.03	**0.31**
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	**Yes**
School—Off-Site Receptor[f]				
Project Construction[g]	2023–2032/2025/2025	0.2	<0.01	0.01
Project Operational, interim	2025–2032/2025/2025	0.8	0.01	0.11
Project Operational, full[d]	NA	0.0	0.0	0.0
Project Construction + Operations[d]	2023–2032/2025/2025	1.0	0.01	0.12
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No

NOTES:
$\mu g/m^3$ = micrograms per cubic meter; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; NA = not applicable; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

a **Bold values** = threshold exceedance.

b Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines).

c The resident child cancer risk MEIR is located south of W. San Fernando St., east of Delmas Ave. The HI and $PM_{2.5}$ MEIR is located along Auzerais Avenue, south of the project site.

d Hazard index values and annual average $PM_{2.5}$ concentrations represent the worst year of exposure, not a summation. Overlapping years of construction and operation have combined impacts. For full buildout operational values, the MEIR is identified based on the maximum exposure to both construction and operational TAC emissions, not just operational TAC emissions. For the MEIR exposed to the maximum operational TAC emissions in isolation without construction, see the Scenario 3 results below.

e The resident adult cancer risk MEIR is located south of W. San Fernando St., east of Delmas Ave. The HI and $PM_{2.5}$ MEIR is located along Auzerais Avenue, south of the project site.

f The school cancer risk and HI MEIR is located at Gardener Elementary School. The $PM_{2.5}$ MEIR is located at Hester School.

g The exposure duration of the school MEIR is less than 30 years. The exposure start date represents the worst-case exposure period.

SOURCES: Data compiled by Environmental Science Associates in 2019 (refer to Appendix C1).

TABLE 3.1-16
SCENARIO 2—UNMITIGATED INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/ Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration (μg/m³)[a,b]
Resident Child—On-Site Receptor[c]				
Project Construction	2029–2032/2029/ 2029	5.2	<0.01	0.02
Project Operational, interim	2029–2032/2029/ 2029	3.7	0.01	0.18
Project Operational, full[g]	2032–2059/2032/2032	4.5	0.01	0.22
Project Construction + Operations[g]	2029–2059/2032/ 2032	**13.4**	0.01	0.22
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		**Yes**	No	No
Resident Adult—On-Site Receptor[d]				
Project Construction	2026–2032/2029/ 2029	0.2	<0.01	0.02
Project Operational, interim	2026–2032/2026/ 2026	0.2	0.01	0.18
Project Operational, full[g]	2032–2056/2032/2032	0.7	0.01	0.22
Project Construction + Operations[g]	2026–2056/2032/ 2032	1.2	0.01	0.22
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No
Childcare—On-Site Receptor[e]				
Project Construction[f]	2027–2032/2028/ 2028	3.4	<0.01	0.01
Project Operational, interim	2027–2032/2027/ 2027	1.9	0.01	0.12
Project Operational, full[g]	2032–2035/2032/2032	0.6	0.01	0.15
Project Construction + Operations[g]	2027–2035/2032/ 2032	5.9	0.01	0.15
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No

TABLE 3.1-16
SCENARIO 2—UNMITIGATED INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/ Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration (μg/m³)[a,b]

NOTES:
μg/m³ = micrograms per cubic meter; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter
[a] **Bold values** = threshold exceedance.
[b] Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines).
[c] The resident child MEIR is located on site at Block E2.
[d] The resident adult MEIR is located on site at Block E2.
[e] The education MEIR is located on site at Block H3.
[f] The exposure duration of the school MEIR is less than 30 years. The exposure start date represents the worst-case exposure period.
[g] Hazard index values and annual average $PM_{2.5}$ concentrations represent the worst year of exposure, not a summation. Overlapping years of construction and operation have combined impacts. For full buildout operational values, the MEIR is identified based on the maximum exposure to both construction and operational TAC emissions, not just operational TAC emissions. For the MEIR exposed to the maximum operational TAC emissions in isolation without construction, see the Scenario 3 results below.
SOURCES: Data compiled by Environmental Science Associates in 2019 (refer to Appendix C1).

TABLE 3.1-17
SCENARIO 3—UNMITIGATED INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/ Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration (μg/m³)[a,b]
Resident Child—Off-Site Receptor[c]				
Project Operational, full buildout	2032–2062/2032/ 2032	**25.0**	0.05	**0.87**
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		**Yes**	No	**Yes**
Resident Child—On-Site Receptor[d]				
Project Operational, full buildout	2032–2062/2032/ 2032	**14.0**	0.04	**0.64**
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		**Yes**	No	**Yes**
Resident Adult—Off-Site Receptor[e]				
Project Operational, full buildout	2032–2062/2032/ 2032	2.6	0.05	**0.87**
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	**Yes**
Resident Adult—On-Site Receptor[f]				
Project Operational, full buildout	2032–2062/2032/ 2032	1.5	0.04	**0.64**
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	**Yes**

TABLE 3.1-17
SCENARIO 3—UNMITIGATED INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/ Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b]
School—Off-Site Receptor[g]				
Project Operational, full buildout[h]	2032–2041/2032/ 2032	2.6	0.02	0.13
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No
Childcare—On-Site Receptor[i]				
Project Operational, full buildout[h]	2032–2038/2032/ 2032	4.9	0.03	**0.43**
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	**Yes**

NOTES:
$\mu g/m^3$ = micrograms per cubic meter; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter
a **Bold values** = threshold exceedance.
b Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines).
c The off-site resident child MEIR is located east of the project site, along N. Montgomery Street north of the SAP center.
d The on-site resident child cancer risk is located in Block D1. The HI and $PM_{2.5}$ MEIR are located on Block C1.
e The off-site resident adult MEIR is located east of the project site, along N. Montgomery Street north of the SAP center.
f The on-site resident adult cancer risk MEIR is located in Block D1. The HI and $PM_{2.5}$ MEIR are located on Block C1.
g The off-site school cancer risk MEIR is located at Gardener Elementary School. The $PM_{2.5}$ and HI MEIR is located at Hester School.
h The exposure duration of the school and childcare MEIR is less than 30 years. The exposure start date represents the worst-case exposure period.
i The childcare cancer MEIR is located in Block H2.

SOURCES: Data compiled by Environmental Science Associates in 2019 (refer to Appendix C1)

the off-site child and adult resident MEIRs are located south of West San Fernando Street, east of Delmas Avenue. The risk at these locations is driven by construction activities occurring on the F blocks. The off-site school MEIR has a maximum incremental increase in lifetime cancer risk of 1.0 in 1 million (0.2 from construction and 0.8 from operations). The off-site school MEIR is located at Gardener Elementary School, and the cancer risk at this location is driven by operational traffic along Interstate 280.

The incremental increase in the lifetime cancer risk for the off-site child resident MEIR that would be attributable to combined construction and operational activities would exceed BAAQMD’s threshold of 10 in 1 million, requiring mitigation. The maximum incremental increase in the lifetime chance of contracting cancer would increase only 0.011 percent as a result of project-related emissions (incremental increase in lifetime cancer risk of 43.8 in 1 million divided by background risk of approximately 400,000 in 1 million). However, the increase exceeds the threshold of a 10 in 1 million incremental increase. Therefore, the impact of the proposed project would be **potentially significant** and mitigation would be required.

Table 3.1-16 shows the incremental increase in lifetime cancer risk for new on-site receptors under Scenario 2 for construction plus operations. As shown, the maximum exposure period for the on-site child resident begins in 2029 and for the on-site adult resident begins in 2026. For these exposure start dates, the maximum incremental increase in lifetime cancer risk from unmitigated project construction and operational emissions at the on-site child resident MEIR would be 13.4 in 1 million (5.2 from construction and 8.2 from operations), and the maximum cancer risk at the on-site adult resident MEIR would be 1.2 in 1 million (0.2 from construction and 0.9 from operations). The on-site child and adult resident MEIRs are located in Block E2. The risk in these locations is driven by construction emissions from the buildout of the D and C blocks and by operational traffic along Highway 87.

For the potential on-site childcare center, a worst-case exposure assessment that assumes the center to be a childcare with a maximum occupancy duration of 6 years was used. The maximum exposure period for the on-site childcare begins in 2027. The maximum incremental increase in the lifetime cancer risk from unmitigated project construction and operational emissions would be 5.9 in 1 million (3.4 from construction and 2.5 from operations). The on-site childcare MEIR is located on Block H3. The risk in this location is driven by construction activities occurring on the H blocks.

For the new on-site child resident MEIR, the maximum incremental increase in the lifetime cancer risk of 13.4 in 1 million would increase only 0.003 percent compared to the background lifetime risk as a result of combined project construction and operational activities. However, the cancer risk exceeds BAAQMD's threshold of 10 in 1 million. Consequently, the impact of the proposed project would be **potentially significant** and mitigation would be required.

Table 3.1-17 shows the incremental increase in lifetime cancer risk results for all receptor types under Scenario 3. As shown, the maximum incremental increase in the lifetime cancer risk from unmitigated project full-buildout operational emissions for all receptor types would occur for the off-site child resident MEIR. The maximum increase in cancer risk for the off-site child resident from unmitigated operational emissions would be 25.0 in 1 million, and for the on-site child resident the cancer risk would be 14.0 in 1 million. The off-site child resident MEIR is located east of the project site, along North Montgomery Street, and the cancer risk at this location is driven by operational vehicle traffic along North Montgomery Street. The on-site child resident MEIR is located on Block D1, and the cancer risk at this location is driven by operational traffic along West Santa Clara Street. The off-site school MEIR would have a maximum cancer risk of 2.6 in 1 million, and the on-site childcare MEIR would have a maximum cancer risk of 4.9 in 1 million. The on-site childcare MEIR is located on Block H2, and the cancer risk at this location is driven by operational traffic along Interstate 280. The maximum incremental increases in lifetime cancer risk for both the on- and off-site child residential receptors would exceed the 10 in 1 million threshold. Consequently, the impact of the proposed project would be **potentially significant** and mitigation would be required.

Non-Cancer Health Impacts

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

For exposure under Scenario 1, Scenario 2, and Scenario 3, as shown in Table 3.1-15, Table 3.1-16, and Table 3.1-17, respectively, the maximum non-cancer chronic HI for the project at any receptor was for the off-site resident MEIR, estimated to be 0.05 for full buildout operations in 2032. The off-site resident MEIR is located east of the project site, along North Montgomery Street, and the non-cancer chronic HI at this location is driven by operational vehicle traffic along North Montgomery Street. Because the non-cancer chronic HI would be below the project-level threshold of 1.0, this impact of the proposed project would be **less than significant**.

$PM_{2.5}$ Concentrations

Tables 3.1-15 through 3.1-17 also show the results of the risk assessment for exposure to $PM_{2.5}$ during construction and operations at the maximally impacted receptors.

For Scenario 1, as shown in Table 3.1-15, the maximum annual average $PM_{2.5}$ concentrations for unmitigated project emissions at the off-site MEIR were estimated to be 0.12 $\mu g/m^3$ for construction (year 2027), 0.19 $\mu g/m^3$ for operations (year 2025), and 0.31 $\mu g/m^3$ for the maximum year during combined construction and operations (year 2027). The off-site MEIR is located along North Montgomery Street, east of the project site. The maximum annual average $PM_{2.5}$ concentration at this location is driven by operational vehicle traffic along North Montgomery Street. The maximum annual average $PM_{2.5}$ concentration would exceed BAAQMD's threshold of 0.3 $\mu g/m^3$. Therefore, the impact of the proposed project would be **potentially significant** and mitigation would be required.

For Scenario 2, the maximum annual average $PM_{2.5}$ concentrations occur at the on-site resident located at Block E2, which are 0.02 $\mu g/m^3$ for construction (year 2029), 0.22 $\mu g/m^3$ for operations (year 2032), and 0.22 $\mu g/m^3$ for the maximum of either construction or operations. The maximum annual average $PM_{2.5}$ concentration at this location is driven by operational vehicle traffic along Highway 87 and along West Santa Clara Street. These annual average $PM_{2.5}$ concentrations would not exceed BAAQMD's threshold of 0.3 $\mu g/m^3$. Therefore, this impact of the proposed project would be **less than significant**.

For Scenario 3, the maximum annual average $PM_{2.5}$ concentration occurred at the off-site resident, which was 0.87 $\mu g/m^3$ for full buildout operations. The off-site resident MEIR is located along North Montgomery Street, east of the project site, and the maximum annual average $PM_{2.5}$ concentration at this location is driven by operational vehicle traffic along North Montgomery Street. For the new on-site resident, the maximum annual average $PM_{2.5}$ concentration would be 0.64 $\mu g/m^3$ for full buildout operations. The maximum annual average $PM_{2.5}$ concentrations for unmitigated project emissions at the new on-site MEIR was estimated to be 0.64 $\mu g/m^3$ for full buildout operations. The new on-site child MEIR is located at Block D1, and the maximum annual average $PM_{2.5}$ concentration at this location is driven by operational vehicle traffic along West Santa Clara Street. The values for both the existing off-site and new on-site resident would exceed BAAQMD's threshold of 0.3 $\mu g/m^3$. Consequently, this impact of the proposed project would be **potentially significant** and mitigation would be required.

The following mitigation measures are required as conditions of approval to reduce the impacts of project-related TAC emissions on existing off-site and new on-site sensitive receptors.

Mitigation Measures

Mitigation Measure AQ-2a: Construction Emissions Minimization Plan (refer to Impact AQ-2)

Mitigation Measure AQ-2b: Construction Equipment Maintenance and Tuning (refer to Impact AQ-2)

Mitigation Measure AQ-2c: Heavy-Duty Truck Model Year Requirement (refer to Impact AQ-2)

Mitigation Measure AQ-2e: Best Available Emissions Controls for Stationary Emergency Generators (refer to Impact AQ-2)

Mitigation Measure AQ-2f: Operational Diesel Truck Emissions Reduction (refer to Impact AQ-2)

Mitigation Measure AQ-2g: Electric Vehicle Charging (refer to Impact AQ-2)

Mitigation Measure AQ-2h: Enhanced Transportation Demand Management Program (refer to Impact AQ-2)

Mitigation Measure AQ-3: Exposure to Air Pollution—Toxic Air Contaminants

The project applicant shall incorporate the following health risk reduction measures into the project design to reduce the potential health risk caused by exposure to toxic air contaminants (TACs), as feasible for the project's sources of TACs. These features shall be submitted to the Director of Planning, Building and Code Enforcement, or the Director's designee, for review and approval and shall be included on the project drawings submitted for the construction-related permit(s) or on other documentation submitted to the City:

1. Plant trees and/or vegetation between new on-site and existing off-site sensitive receptors and the project's operational source(s) of TACs, if feasible. In addition, plant trees and/or vegetation between new on-site sensitive receptors and existing background sources of toxic air contaminants, if feasible. Locally native trees that provide suitable trapping of particulate matter are preferred.
2. Construction trucks shall adhere to the modeled haul route as presented in Figure 3.1-2. If an alternative truck haul route is used, the project applicant shall quantitatively demonstrate to the satisfaction of the Director of Planning, Building and Code Enforcement, or the Director's designee, that these haul routes would not result in health risks that exceed the project-level thresholds of significance for either existing off-site or new on-site sensitive receptors.

Mitigation Measure Effectiveness

Effectiveness of Mitigation Measure AQ-3

Mitigation Measure AQ-3, 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. This mitigation measure requires that the project applicant plant vegetative buffers to trap particulate matter and adhere to the modeled construction truck haul route, or to quantitatively demonstrate that any route changes would not result in health risks that exceed the project-level thresholds of significance for any sensitive receptor. Although this measure was not quantified, it would reduce TAC emissions and lessen exposure, thereby reducing the incremental increase in the lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations.

Effectiveness of Mitigation Measures AQ-2a and AQ-2b

Mitigation Measure AQ-2a, Construction Emissions Minimization Plan, and Mitigation Measure AQ-2b, Construction Equipment Maintenance and Tuning, are proposed to reduce exhaust emissions from construction equipment. For the proposed project to comply with Mitigation Measure AQ-2a, the project's construction equipment fleet would be required to meet Tier 4 Final engine standards, or if a specific piece of Tier 4 Final equipment were not available, the next cleanest piece of off-road equipment as provided by the step-down schedule identified in the mitigation measure. This is already modeled as part of the project design, as discussed under *Project Features Analyzed* above.

Mitigation Measure AQ-2a also requires additional electric equipment. This would reduce DPM and $PM_{2.5}$ emissions associated with off-road diesel construction equipment, thereby reducing the incremental increase in lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations.

Mitigation Measure AQ-2b, Construction Equipment Maintenance and Tuning, was not quantified.

Effectiveness of Mitigation Measure AQ-2c

Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement, would be implemented as part of the project to reduce DPM and $PM_{2.5}$ emissions associated with on-road heavy-duty truck travel and idling, thereby reducing the incremental increase in lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations. This measure was quantified using EMFAC2017 emission factors, as described under Impact AQ-2 above.

Effectiveness of Mitigation Measure AQ-2e

Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators, would reduce DPM and $PM_{2.5}$ emissions associated with emergency diesel backup generators, thereby reducing the incremental increase in lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations. The reduction in DPM and $PM_{2.5}$ emissions would be approximately 87 percent.

Effectiveness of Mitigation Measure AQ-2f

Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction, would reduce DPM and $PM_{2.5}$ emissions associated with operational on-road, heavy-duty truck travel and idling, thereby reducing the incremental increase in lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations. This measure would reduce emissions by TRUs by encouraging Tier 4 emissions standards for TRUs and installing electrical hookups to replace TRU operations. In addition, this measure would reduce the 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.

This mitigation measure was not quantified in the HRA because the project applicant has limited control over tenant and vendor delivery vehicles, and because the exact locations of loading docks and sensitive receptors are currently not known.

Effectiveness of Mitigation Measure AQ-2g

Mitigation Measure AQ-2g, Electric Vehicle Charging, would also reduce mobile-source emissions of TOG-related TACs and $PM_{2.5}$ exhaust by encouraging EVs in place of gasoline- and diesel-powered vehicles. Reductions in TOG-related TAC and $PM_{2.5}$ emissions associated with this measure were quantified using the same methods as described above under *Project Features Analyzed*, except the total number of EV chargers was assumed to be 15 percent of the total parking spaces, or 984 total. This measure would not reduce fugitive sources of $PM_{2.5}$, including tire wear, brake wear, and road dust (because these emissions are a function of VMT, not fuel type).

Effectiveness of Mitigation Measure AQ-2h

Implementation of Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program, would reduce vehicle travel and VMT, thereby reducing DPM, $PM_{2.5}$, and TOG emissions from mobile sources. Therefore, Mitigation Measure AQ-2h would reduce the incremental increase in lifetime cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations. This measure would reduce DPM, TOG, and $PM_{2.5}$ emissions by approximately 27 percent at full buildout, resulting in a similar reduction in cancer risk, non-cancer chronic risk, and annual average $PM_{2.5}$ concentrations.

Additional Measures Considered

Additional measures to further reduce exposure to TAC emissions were considered and rejected as infeasible. The additional measures considered and rejected included:

(1) Staging areas shall be located as far from both existing off-site sensitive receptors and new on-site sensitive receptors (once new buildings are occupied and operational) as feasible, to minimize the exposure of these receptors to TAC emissions associated with construction activities.

(2) The project applicant shall locate proposed truck loading docks as far from nearby sensitive receptors as feasible.

(3) Residential developments proposed within 500 feet of freeways shall be built in phases such that the homes nearest the freeway are built last.

(4) The project shall be designed to locate sensitive receptors as far away as feasible from the project’s source(s) of TACs, and operable windows, balconies, and building air intakes shall be located as far away from these sources as feasible.

(5) If near a distribution center, residents shall be located as far away as feasible from loading docks or areas where trucks concentrate to deliver goods.

(6) Sensitive receptors shall be located as far away from truck activity areas, such as loading docks and delivery areas, as feasible.

The six actions listed above were determined to be infeasible for a variety of reasons:

- The proposed project would be located in a high-density urban center near existing non-residential, residential, and mixed uses. This makes it difficult (or impossible) to locate new TAC sources (for both construction and operations) specific distances away from existing off-site sensitive receptors.

- Construction staging areas would be located throughout the site as the project is built out. In addition, staging areas are not the primary source of DPM emissions from construction activity, so Item #1 above would likely have a small effect on construction-related health risks.
- The project site is dense and located in a highly urban area with many surrounding existing off-site sensitive receptors. Thus, it is not feasible to require specific offset distances between sensitive receptors and new loading docks and other TAC sources, per Items #2, #4, #5, and #6 above.

Phasing and buildout would be based on the final project design and market conditions, so requiring residential developments to be built in phases so that the homes nearest the freeway are built last would not meet the proposed project's buildout schedule and other financial and operational considerations, per Item #3 above. Thus, no additional feasible mitigation measures have been identified for achieving further substantial reductions in sensitive receptors' exposure to project-level TAC emissions.

Analysis of Overall Mitigation Measure Effectiveness

Table 3.1-18 shows the mitigated incremental increase in lifetime cancer risk results for existing off-site receptors for Scenario 1 exposure from project construction and operational activities. **Table 3.1-19** presents the mitigated incremental increase in lifetime cancer risk results for new on-site receptors under Scenario 2. **Table 3.1-20** presents the mitigated incremental increase in lifetime cancer risk results for all receptor types from emissions associated with full-buildout operations under Scenario 3. Because the effectiveness of Mitigation Measures AQ-2b, AQ-2f, and AQ-3 on health risks is not known, the mitigated results in Table 3.1-18, Table 3.1-19, and Table 3.1-20 present results that do not quantify reductions associated with these mitigation measures.

Cancer Risk Impacts

With implementation of mitigation measures, the maximum incremental increase in the lifetime cancer risk for existing off-site receptors would occur under Scenario 1. Under this scenario, the incremental increase in the lifetime cancer risk for the off-site child MEIR is reduced to 14.0 in 1 million for construction, 5.6 in 1 million for operations, and 19.6 in 1 million for combined construction and operations, which remains greater than the threshold of significance of 10 in 1 million. This risk occurs for the maximum exposure period beginning in 2024. After implementation of mitigation, the off-site child resident MEIR is located east of the project site, north of Park Avenue, and the cancer risk in this location is driven by construction activities occurring on the F blocks. The off-site adult resident MEIR is located east of the project site, along North Montgomery Street, and the cancer risk at this location is driven by operational vehicle traffic.

TABLE 3.1-18
SCENARIO 1—MITIGATED INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/ Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a]	Chronic Hazard Index[a]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a]
Resident Child—Off-Site Receptor[b]				
Project Construction	2024–2032/2027/2027	**14.0**	0.01	0.05
Project Operational, interim	2025–2032/2025/2025	3.3	0.01	0.14
Project Operational, full	2032–2054/2032/2032	2.3	0.01	0.17
Project Construction + Operations[c]	2024–2054/2032/2032	**19.6**	0.02	0.19
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		Yes	No	No
Resident Adult—Off-Site Receptor[d]				
Project Construction	2021–2032/2027/2027	0.6	0.01	0.05
Project Operational, interim	2025–2032/2025/2025	0.4	0.01	0.14
Project Operational, full	2032–2051/2032/2032	1.1	0.01	0.17
Project Construction + Operations[c]	2021–2051/2032/2032	2.1	0.02	0.19
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No
School—Off-Site Receptor[e]				
Project Construction[f]	2023–2030/2025/2025	0.1	<0.01	<0.01
Project Operational, interim	2025–2032/2025/2025	0.4	0.01	0.09
Project Operational, full	NA	0.0	0.0	0.0
Project Construction + Operations[c]	2023–2032/2025/2025	0.5	0.01	0.09
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No

NOTES:
$\mu g/m^3$ = micrograms per cubic meter; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; NA = not applicable; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

a **Bold values** = threshold exceedance.

b Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines), and implementation of Mitigation Measure AQ-2a, Construction Emissions Minimization Plan; Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement; Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators; Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction; Mitigation Measure AQ-2g, Electric Vehicle Charging; and Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program.

c The resident child cancer risk MEIR is located east of the project site, north of Park Avenue. The HI and $PM_{2.5}$ MEIR is located along Auzerais Avenue, south of the project site.

d HI and $PM_{2.5}$ annual concentration represent the worst year of exposure, not a summation. Overlapping years of construction and operation have combined impacts.

e The resident adult cancer risk MEIR is located east of the project site, along N. Montgomery Street north of the SAP center. The HI and $PM_{2.5}$ MEIR is located along Auzerais Avenue, south of the project site.

f The school cancer risk and HI MEIR is located at Gardener Elementary School. The $PM_{2.5}$ MEIR is located at Hester School.

g The exposure duration of the school MEIR is less than 30 years. The exposure start date represents the worst-case exposure period.

SOURCES: Data compiled by Environmental Science Associates in 2019 (refer to Appendix C1).

TABLE 3.1-19
SCENARIO 2—MITIGATED INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/ Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a]	Chronic Hazard Index[a]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a]
Resident Child—On-Site Receptor[b]				
Project Construction	2029–2032/2029/2029	2.5	<0.01	0.01
Project Operational, interim	2029–2032/2029/2029	1.8	0.01	0.09
Project Operational, full	2032–2059/2032/2032	2.2	0.01	0.11
Project Construction + Operations	2029–2059/2032/2032	6.5	0.01	0.11
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No
Resident Adult—On-Site Receptor[c]				
Project Construction	2026–2032/2029/2029	0.1	<0.01	0.01
Project Operational, interim	2026–2032/2026/2026	0.1	0.01	0.09
Project Operational, full	2032–2056/2032/2032	0.3	0.01	0.11
Project Construction + Operations	2026–2056/2032/2032	0.5	0.01	0.11
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No
Childcare—On-Site Receptor[d]				
Project Construction[e]	2027–2032/2028/2028	1.4	<0.01	<0.01
Project Operational, interim	2027–2032/2027/2027	0.9	0.01	0.04
Project Operational, full	2032–2035/2032/2032	0.3	0.01	0.06
Project Construction + Operations[f]	2027–2035/2032/2032	2.6	0.01	0.06
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No

NOTES:
$\mu g/m^3$ = micrograms per cubic meter; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; NA = not applicable; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

a **Bold values** = threshold exceedance.
b Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines), and implementation of Mitigation Measure AQ-2a, Construction Emissions Minimization Plan; Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement; Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators; Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction; Mitigation Measure AQ-2g, Electric Vehicle Charging; and Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program.
c The resident child MEIR is located on-site at Block E2.
d The resident adult MEIR is located on-site at Block E2.
e The education MEIR is located on-site at Block H3.
f The exposure duration of the school MEIR is less than 30 years. The exposure start date represents the worst-case exposure period.
g Hazard impact and $PM_{2.5}$ annual concentration represent the worst year of exposure, not a summation. Overlapping years of construction and operation have combined impacts.

SOURCES: Data compiled by Environmental Science Associates in 2019 (refer to Appendix C1).

TABLE 3.1-20
SCENARIO 3—MITIGATED INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/ Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a]	Chronic Hazard Index[a]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a]
Resident Child—Off-Site Receptor[b]				
Project Operational, full buildout	2032–2062/2032/2032	**17.0**	0.04	**0.74**
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		**Yes**	No	**Yes**
Resident Child—On-Site Receptor[c]				
Project Operational, full buildout	2032–2062/2032/2032	9.7	0.03	0.27
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No
Resident Adult—Off-Site Receptor[d]				
Project Operational, full buildout	2032–2062/2032/2032	1.8	0.04	**0.74**
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	**Yes**
Resident Adult—On-Site Receptor[e]				
Project Operational, full	2032–2062/2032/2032	1.0	0.03	0.27
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No
School—Off-Site Receptor[f]				
Project Operational, full buildout[g]	2032–2039/2032/2032	1.6	0.02	0.11
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No
Childcare – On Site Receptor[h]				
Project Operational, full buildout[g]	2032–2038/2032/2032	3.2	0.02	0.14
Significance Threshold		**10**	**1.0**	**0.3**
Exceeds Threshold (Yes or No)?		No	No	No

NOTES:
$\mu g/m^3$ = micrograms per cubic meter; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

a **Bold values** = threshold exceedance.

b Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines), and implementation of Mitigation Measure AQ-2a, Construction Emissions Minimization Plan; Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement; Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators; Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction; Mitigation Measure AQ-2g, Electric Vehicle Charging; and Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program.

c The off-site resident child MEIR is located east of the project site, along N. Montgomery Street north of the SAP center.

d The on-site resident child cancer risk and HI MEIR is located in Block C1. The $PM_{2.5}$ MEIR is located in Block D1.

e The off-site resident adult MEIR is located east of the project site, along N. Montgomery Street north of the SAP center.

f The on-site resident adult cancer risk and HI MEIR is located in Block C1. The $PM_{2.5}$ MEIR is located in Block D1.

g The off-site school MEIR is located at the Hester School.

h The exposure duration of the school and childcare MEIR is less than 30 years. The exposure start date represents the worst-case exposure period.

i The childcare MEIR is located in Block H2.

SOURCES: Data compiled by Environmental Science Associates in 2019 (refer to Appendix C1)

With implementation of mitigation measures, the maximum incremental increase in the lifetime cancer risk for new on-site receptors would occur under Scenario 2. Under this scenario, the incremental increase in the lifetime cancer risk for the on-site child MEIR is reduced to 2.5 in 1 million for construction, 4.0 in 1 million for operations, and 6.5 in 1 million for combined construction and operations. After implementation of mitigation, the on-site child resident MEIR is located at Block E2, the maximum exposure period begins in 2029, and the cancer risk in this location is driven by operational vehicle traffic along West Santa Clara Street and Highway 87. Because these values are all less than the threshold of significance of 10 in 1 million, the impacts would be less than significant.

For Scenario 3, after implementation of mitigation, the maximum incremental increases in the lifetime cancer risk for the off-site child resident would be 17.0 in 1 million, and for the on-site child resident the cancer risk would be 9.7 in 1 million. The off-site child resident MEIR is located east of the project site, along North Montgomery Street, and the cancer risk at this location is driven by operational vehicle traffic along North Montgomery Street. The on-site child resident MEIR is located at Block C1, and the cancer risk at this location is driven by operational vehicle traffic along North Montgomery Street. The childcare MEIR would have a cancer risk of 3.2 in 1 million. The on-site childcare MEIR is located on Block H2, and the cancer risk at this location is driven by operational vehicle traffic along Interstate 280. Although the value for the on-site child resident is less than the threshold of significance of 10 in 1 million, the value for the off-site child resident is greater than the threshold.

As indicated in Table 3.1-18, the maximum mitigated cancer risk at the off-site child receptor would be 19.6 for combined construction and operations beginning in 2024, which would exceed BAAQMD’s thresholds for significance after implementation of all feasible mitigation. Therefore, the impacts would be **significant and unavoidable**.

Non-Cancer Health Impacts

With implementation of the mitigation measures, exposure under Scenario 1, Scenario 2, and Scenario 3, as shown in Table 3.1-18, Table 3.1-19, and Table 3.1-20, respectively, the maximum non-cancer chronic HI at the MEIR would occur under Scenario 3 for the off-site resident receptor. Under this scenario, the maximum non-cancer chronic HI would be 0.04 for operations under full buildout conditions. The off-site child resident MEIR after implementation of mitigation is located east of the project site, long North Montgomery Street, and the cancer risk at this location is driven by operational vehicle traffic along North Montgomery Street. After implementation of mitigation measures as shown in Table 3.1-20, the maximum non-cancer chronic HI for new on-site receptors would be 0.04 for operations under Scenario 3.

Therefore, with implementation of the mitigation measures, as shown in Table 3.1-20 above, the non-cancer chronic HI would be less than 1 for all receptor types. Because the non-cancer chronic HI would be below the project-level threshold of 1.0 before mitigation is implemented, the impact of the proposed project would be **less than significant**.

$PM_{2.5}$ Concentrations

With the implementation of mitigation measures, the maximum annual average $PM_{2.5}$ concentration would occur under Scenario 3 for existing off-site receptors. Under this scenario, the annual average $PM_{2.5}$ concentration would be 0.74 µg/m^3 for operations (year 2032). After implementation of mitigation, the existing off-site child MEIR is located along North Montgomery Street, east of the project site. The maximum annual average $PM_{2.5}$ concentration at this location is driven by operational vehicle traffic along North Montgomery Street. After implementation of mitigation, the maximum annual average $PM_{2.5}$ concentration for the new on-site MEIR is 0.27 µg/m^3. The new on-site child MEIR is located at Block D1, and the maximum annual average $PM_{2.5}$ concentration at this location is about 50 percent due to operational vehicle traffic along West Santa Clara Street and about 50 percent due to on-site operations of stationary sources such as charbroilers, emergency generators, and cooling towers. There are a number of reasons why the existing off-site MEIR annual average $PM_{2.5}$ concentration is greater than the new on-site annual average $PM_{2.5}$ concentration. For example, the existing off-site MEIR is located adjacent to a major roadway that contains project-related vehicle traffic and the existing off-site MEIR does not have MERV 13 filtration systems installed in their buildings (as the new on-site MEIR does).

The vast majority of the maximum annual average $PM_{2.5}$ concentration at the existing off-site MEIR location is associated with road dust from operational vehicle traffic. Charbroilers, cooling towers, and emergency diesel generators have a very small effect on this concentration. Road dust is a function of total traffic and VMT on local roadways near the location of the existing off-site MEIR, and is independent of the vehicle type and fuel type. As such, the only feasible method for reducing road dust concentrations is to reduce vehicle trips and VMT. Through implementation of Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program, the project applicant would reduce total vehicle trips and VMT by 27 percent and achieve a non-SOV mode split of 65 percent. This performance standard is very aggressive, representing the maximum possible trip reduction for the proposed project, and goes far beyond most TDM plans for CEQA projects in the region.[189] Additional vehicle trip and VMT reductions were determined to be infeasible. It should also be noted that the road dust calculation is based on highly conservative emission rates for $PM_{2.5}$, as recommended by CARB and BAAQMD.[190]

As discussed above under *Significance Criteria*, the 0.3 µg/m^3 annual average $PM_{2.5}$ threshold is based on the lower range of an EPA-proposed SIL, which is the level of $PM_{2.5}$ increment that represents a "significant contribution" to regional non-attainment. Although the SIL was not designed as a threshold for assessing community risk and hazards, it is considered protective of public health at a regional level by helping an area maintain the NAAQS. Further, BAAQMD considers the SIL as a threshold of significance under CEQA for local-scale increments of $PM_{2.5}$.

This EIR also quantifies predicted health impacts associated with the proposed project's regional $PM_{2.5}$ emissions under Impact AQ-2. This is described above as the Health Impacts Assessment. This analysis uses modeling techniques to correlate the project's $PM_{2.5}$ emissions (and other

[189] Fehr & Peers, Downtown West Mixed-Use Plan –Transportation Demand Management (TDM) Plan Assessment, Memorandum to Environmental Science Associates, September 30, 2020.

[190] California Air Resources Board, *Miscellaneous Process Methodology 7.9: Entrained Road Travel, Paved Road Dust*, March 2018. Available at https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2018.pdf. Accessed May 2020.

criteria air pollutant emissions) with health effects that may result from the predicted increased concentrations. This effort was conducted to disclose the potential health consequences of the nature of the project's $PM_{2.5}$ emissions, as directed by the Supreme Court in the *Friant Ranch* case. Refer to Appendix C3 for additional discussion.

With implementation of the mitigation measures, as shown in Table 3.1-20, the annual average $PM_{2.5}$ concentrations would be greater than 0.3 $\mu g/m^3$. Because the annual average $PM_{2.5}$ concentrations would be above the project-level threshold of 0.3 $\mu g/m^3$, the impact of the proposed project would be **significant and unavoidable**.

For Scenario 1, after implementation of mitigation measures as shown in Table 3.1-18, the maximum annual average $PM_{2.5}$ concentrations for at the off-site MEIR was estimated to be 0.05 $\mu g/m^3$ for construction (year 2027), 0.14 $\mu g/m^3$ for interim operations (year 2025 to 2032), 0.17 $\mu g/m^3$ for operations (year 2032), and 0.19 $\mu g/m^3$ for combined construction and operations (year 2027). The off-site MEIR is located along Auzerais Avenue, south of the project site, and the maximum annual average $PM_{2.5}$ concentration at this location is driven by operational vehicle traffic along Interstate 280. These annual average $PM_{2.5}$ concentrations would not exceed BAAQMD's threshold of 0.3 $\mu g/m^3$.

For Scenario 2, after implementation of mitigation measures as shown in Table 3.1-19, the maximum annual average $PM_{2.5}$ concentrations occurred at the on-site resident located on Block E2, which were 0.01 $\mu g/m^3$ for construction (year 2029), 0.11 $\mu g/m^3$ for operations (year 2032), and 0.11 $\mu g/m^3$ for combined construction and operations (year 2032). The maximum annual average $PM_{2.5}$ concentration at this location is driven by operational vehicle traffic along West Santa Clara Street and Highway 87. These annual average $PM_{2.5}$ concentrations would not exceed BAAQMD's threshold of 0.3 $\mu g/m^3$.

Cancer Burden

The cancer risk analysis presented above presents the maximum potential increased *risk* of cancer per million individuals at the maximally exposed receptor location. This risk value is an estimate of the potential for cancer, not the expected rate of cancer in the population. For example, the maximum mitigated cancer risk presented above of 19.6 in 1 million for the off-site child receptor means that the chance of this receptor getting cancer as a result of the project is 0.002 percent.

The cancer burden, in contrast, is the total number of population-wide cancer cases as a result of exposure to TAC emissions from the proposed project. In other words, it means how many people are expected to contract cancer as a result of the project, not just the level of risk. Under the mitigated emissions scenario, the cancer burden is calculated to be 0.16. This should be interpreted to say that amongst the population that could be exposed to project-related TAC emissions continuously for 70 years (a highly conservative assumption, but in line with current OEHHA guidance) that results in an individual incremental increase in cancer risk of 1 in 1 million or more, there would be less than 1 additional case of cancer expected. As stated above, the BAAQMD has not formally adopted a numeric threshold for cancer burden. However, in accordance with OEHHA guidance, a result of less than 0.5 (meaning that lifetime exposure to project emissions are not expected to result in an additional cancer case) is acceptable.

Health Risks for New On-site Receptors

Although not a CEQA issue, the San José 2040 General Plan Policy MS-11.1 states that projects that site new residential receptors must "incorporate effective mitigation into project designs or be located an adequate distance from sources of TACs to avoid significant risks to health and safety." As indicated in Tables 3.1-19 and 3.1-20 and discussed above, the maximum mitigated project-level health risks for all new on-site sensitive receptors (an incremental increase in lifetime cancer risk of 9.7 in 1 million under Scenario 3, a non-cancer chronic HI of 0.03 under Scenario 3, and a maximum annual average $PM_{2.5}$ concentration of 0.27 under Scenario 3) would be less than BAAQMD's thresholds of significance. Consequently, the proposed project complies with General Plan Policy MS-11.1. Refer to Impact AQ-1 for additional discussion of the project's consistency with General Plan Policy MS-11.1.

Significance after Mitigation: Significant and unavoidable.

Impact AQ-4: Traffic associated with the development of the proposed project would not contribute to carbon monoxide concentrations exceeding the California ambient air quality standards of 9 parts per million averaged over eight hours and 20 parts per million for one hour. *(Less than Significant)*

Regional ambient air quality monitoring data, including those presented in Table 3.1-1, demonstrate that CO concentrations in the city of San José and the SFBAAB 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 CO concentrations from increased traffic has been greatly reduced as a result of improvements in vehicle exhaust controls since the early 1990s and the use of oxygenated fuels.

BAAQMD recommends using screening criteria for determining whether a project would contribute to CO concentrations exceeding the CAAQS of 9 ppm averaged over eight hours and 20 ppm for one hour. If the project meets all of BAAQMD's screening criteria, the project would result in a less-than-significant impact on 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 either:

(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 San José, no nearby roadways or freeways exceed the 44,000 vehicles per hour screening criteria, including U.S. Highway 101 and Interstate 280. Therefore, no nearby roadways would result in elevated CO concentrations at the project site. Further, ambient CO standards have not been exceeded in the Bay Area for more than a decade, largely because of the reformulated fuels in California and vehicle emissions controls, as discussed above. Therefore, development under the proposed project would not be required to estimate localized CO concentrations as it would not contribute to CO concentrations exceeding the CAAQS. The impact would be **less than significant**.

Mitigation: None required.

Impact AQ-5: The proposed project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. ***(Less than Significant with Mitigation)***

Construction

The use of construction equipment at the project site could potentially create objectionable odors to nearby properties or employees/residents located at the project site from an earlier phase. Construction-related odors would be localized and temporary, and the use of low-VOC surface coating materials in accordance with BAAQMD Rules would reduce potentially objectionable odors from painting operations. The project is not expected to generate odors that would adversely affect a substantial number of people. This impact would be **less than significant**.

Operations

Certain commercial land uses on the project site could potentially create objectionable odors. For example, restaurants emit cooking odors while in operation that may be deemed objectionable. This includes odors associated with the project's charbroilers. For restaurants and charbroilers, the proposed project would comply with BAAQMD Rule 6-2 (Commercial Cooking Equipment). This would reduce odors through the installation of catalytic oxidizers, integral grease filtration systems or grease removal systems, baffle filters, and electrostatic precipitators.

In addition, there would be odors from the potential district water reuse facility (wastewater treatment plant and the centralized waste collection terminal[s]). Up to two private district WRFs are proposed to treat site wastewater for reuse to meet demands for non-potable water. The WRFs would be housed within central utility plant(s). The WRF(s) would include a multi-stage treatment system for primary treatment, secondary treatment, tertiary filtration, and disinfection. Membrane bioreactors are proposed as the secondary treatment for the WRF(s). Water that has been tertiary filtered and disinfected would be stored in a non-potable storage tank before being distributed for uses such as toilet flushing, cooling, and irrigation. Treated non-potable water would be distributed via a pressurized distribution network within the private utilidor.

The proposed district WRF(s) would treat wastewater to California Code of Regulations Title 22 disinfected tertiary (unrestricted reuse) recycled-water standards. The treatment plant residuals would be predominantly liquid, with a very low percentage of solids. These solids could be discharged into the City's sanitary sewer system. Alternatively, sanitary solids produced as a byproduct from the district WRFs could be managed on-site through anaerobic digestion, generating biogas that could be used in fuel cells to generate electricity. Should anaerobic digestion be implemented, co-digestion with food waste collected via the automated water collection system would increase the amount of biogas and biosolids production. The digested biosolids would be dewatered and reused beneficially as soil amendment. Alternatively, these solids could be pumped into the City's sanitary sewer network without being thickened or digested. Refer to Section 3.14, *Utilities and Service Systems*, for more detail.

Daily operations of the WRF(s) could result in objectionable odors to nearby sensitive receptors. It should be noted that separation between sources and receptors are difficult or impossible in a dense urban setting, such as the project location. There would be up to two WRFs on the project site, one in each central utility plant on Block B1 in the north and Block F5 in the south (or possibly on the adjacent Block G1). For the northern WRF on Block B1, on-site residents could be located as close as 100 feet south and 100 feet west of the WRF; off-site residents could be located as close as 250 feet northeast, 600 feet southwest, and 350 feet south of the WRF. For the southern WRF on Block F5, on-site residents could be located as close as 250 feet east and 500 feet northeast of the WRF; off-site residents could be located as close as 600 feet east, 350 feet west, and 950 feet south of the WRF. Although these are within BAAQMD's standard screening distances for wastewater treatment plants, the WRF would be enclosed within the central utility plant; would be soundproofed to alleviate potential noise issues; and would include appropriate odor controls (air blowers and odor control units [e.g., carbon filters]) to manage any objectionable odors, as discussed below.

The WRFs would install odor controls to manage any objectionable odors. At the initial stage of treatment, raw wastewater would be screened to remove inorganic solids, which would be collected in a roll-off bin and periodically hauled off site. Screenings would be composed of primarily inorganic wastes that would not be biodegradable and not beneficial for post-processing and resource recovery. As such, screenings would typically be washed, compacted, and hauled off-site at regular intervals for disposal in a permitted landfill. Grit such as sand, gravel, coffee grounds, and eggshells would be removed to prevent them from accumulating in downstream processes such as aeration basins and anaerobic digesters. Similar to screenings, grit does not have a resource recovery value and would be hauled off site. The screenings and grit would be managed to avoid creating nuisance odors; wastewater treatment plant odors are subject to the jurisdiction of BAAQMD. Handling and disposal would require screenings and grit to be washed and drained, and the wash water may be recycled to the front of the treatment train. Once washed and dewatered, the screenings and grit would be stored in refuse containers, satisfying the City's requirements, and would be routinely hauled off site to a permitted landfill. Refuse containers would be odor proof and contained in an area draining to the sanitary sewer in the case of a rain event, leak, or spill. Odor control measures may also include housing primary screenings in a ventilated enclosure at the WRF.

The WRF would also include appropriate controls to manage any objectionable odors from primary treatment and management of primary and secondary solids. The headspace of tanks with the potential to produce odors would be vented. Air blowers and odor control units (e.g., carbon filters) would be incorporated into the wastewater treatment design, along with other appropriate odor controls to satisfy BAAQMD requirements.[191] Further, the waste collection terminal(s) pneumatic exhaust would be filtered and treated before release. These technologies were selected for their low risk of odor break-through, technology maturity, and reliability.[192] In its guidance to

[191] Sherwood Design Engineers, *Water Reuse Basis of Design at Downtown West*, January 20, 2020.
[192] San Francisco Water Power Sewer, Sewer System Improvement Program—Odor Control Fact Sheet, December 2014.

Bay Area agencies regarding air quality improvement methods, BAAQMD identifies carbon adsorption, biofiltration, and ammonia scrubbers as effective methods for reducing odor impacts from wastewater treatment plants.[193]

In addition, through the odor controls described above, and by housing the WRF within the central utility plant structures, the WRF would comply with General Plan Policies MS-12.1 and MS-12.2 (refer to Table 3.1-7).

Future Recordkeeping. The new odor control units proposed as part of the WRF would also be subject to recordkeeping requirements and conditions in BAAQMD's Permit to Operate for the purpose of abating any public nuisance from odors.

Mitigation Measures

Mitigation Measure AQ-5: Hydrogen Sulfide and Odor Management Program for the Potential Water Reuse Facility(s)

Prior to construction of each WRF, the project applicant shall develop a Hydrogen Sulfide and Odor Management program (HSOM Program) at each water reuse facility (WRF) for review and approval by the Director of Planning, Building and Code Enforcement and the Director of Environmental Services, or the Directors' designees. The HSOM Program shall address hydrogen sulfide and odor management using a performance-based approach designed to meet the regulatory ambient air concentrations established in BAAQMD Regulation 9, Rule 2, (i.e., 0.06 ppm averaged over three consecutive minutes or 0.03 ppm averaged over any 60 consecutive minutes) and to limit public complaints. The HSOM Program shall include best management practices and emissions controls as follows:

1. For grit and screenings, refuse containers shall be odor proof and contained within an area draining to the sanitary sewer.
2. Primary screenings shall be housed in a ventilated enclosure at the WRF(s).
3. Carbon absorption, biofiltration, or ammonia scrubbers shall be installed at the WRF(s).
4. Ferrous chloride injection for hydrogen sulfide removal may also be installed and implemented if necessary.

The project applicant shall implement the HSOM Program on an ongoing basis and provide the Directors or the Directors' designees with an annual report to describe implementation of the program and any adjustments needed to improve performance.

The HSOM Program shall address odor complaints that occur over time and shall designate WRF staff to receive and respond to complaints. The name and contact information of the responsible WRF staff shall be posted in a noticeable location on each WRF facility. The performance standard for odors shall be based on a three-tier threshold

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[193] Bay Area Air Quality Management District, *BAAQMD CEQA Air Quality Guidelines*, adopted May 2011, updated May 2012, pages 7-3 to 7-4. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/baaqmd-ceqa-guidelines_final_may-2012.pdf?la=en. Accessed July 2020.

based on 30-day, 90-day, and three year averaging times for complaints. The performance standards that must be met shall be as follows:

1. Three or more violation notices for public nuisance related to odors issued by the BAAQMD within a 30-day period;
2. Odor complaints from ten or more complainants within a 90-day period; or
3. Five or more confirmed odor complaints per year averaged over three years as an indication of a significant odor impact from a facility.

If one or more of these standards are not met, the project applicant shall revise the program and make any necessary improvement to the WRF odor controls to achieve all performance standards in subsequent reporting years.

Additionally, odor-control facilities shall be designed to meet the requirements of Section 302 of BAAQMD Regulation 7 and shall not allow the WRF to discharge any odorous substance that causes the ambient air at or beyond the property line to be odorous and to remain odorous after dilution with four parts of odor-free air.

Mitigation Measure Effectiveness

With proper controls, such as those required by BAAQMD Rule 1-301 (Public Nuisance), Rule 6-2 (Commercial Cooking Equipment), Rule 7 (Odorous Substances), Rule 8-8 (Wastewater Collection and Separation Systems), and Rule 9-2 (Inorganic Gaseous Pollutants: Hydrogen Sulfide), and with implementation of Mitigation Measure AQ-5, odors would not adversely affect a substantial number of people, and the impact would be **less than significant with mitigation**.

Significance after Mitigation: Less than significant.

Cumulative Impacts

This section discusses the cumulative impacts on air quality that could result from the proposed project in conjunction with past, present, and reasonably foreseeable future projects. The following analysis addresses the potential cumulative air quality impacts associated with the proposed project. Impact AQ-1 addresses potential impacts related to consistency with the BAAQMD 2017 Clean Air Plan. Because the 2017 Clean Air Plan focuses on reducing population exposure to air pollutants throughout the region, the assessment in Impact AQ-1 is a cumulative analysis as it assesses consistency with a regionwide air quality plan. Therefore, a separate cumulative assessment of consistency with the 2017 Clean Air Plan is not required.

Impact C-AQ-1: The proposed project, in combination with past, present, and reasonably foreseeable future development in the project area, would result in a cumulatively considerable contribution to significant cumulative regional air quality impacts. *(Significant and Unavoidable)*

Geographic Context

The cumulative geographic context for cumulative air quality impacts related to criteria pollutants is the regional SFBAAB, which is considered a nonattainment area for both federal and state 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 discussed above, 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 non-attainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative air quality conditions.[194]

Construction Criteria Pollutant Emissions

Fugitive dust from all cumulative construction projects would be controlled by Mitigation Measure AQ-2a, Construction Emissions Minimization Plan, and reduced to less-than-significant levels accordingly. This impact determination is based on BAAQMD's 2017 CEQA Guidelines that recommends the implementation of these dust controls for all new projects.

For criteria pollutants, as described under *Approach to Analysis* 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 ROG and NO_X emissions would exceed the project-level thresholds as explained in Impact AQ-2, the proposed project would result in a considerable contribution to cumulative regional air quality NO_X impacts. Mitigation Measure AQ-2a, Construction Emissions Minimization Plan, and Mitigation Measure AQ-2b, Construction Equipment Maintenance and Tuning, have been identified to reduce this impact, although not to less-than-significant levels. Therefore, the project's construction-related emissions of criteria air pollutants would be cumulatively considerable, and this cumulative impact would be **significant and unavoidable.**

Operational Criteria Pollutant Emissions

The region is in nonattainment for ozone and PM, which constitutes a significant cumulative impact. Because the project would have a significant direct impact on air quality with regard to emissions of PM_{10}, $PM_{2.5}$, NO_X, and ROG, its impacts would constitute a cumulatively considerable contribution to a significant cumulative impact with respect to criteria pollutant emissions. As discussed above, implementing Mitigation Measures AQ-2a through AQ-2h would reduce the severity of this impact, but would not reduce the project's contribution to the cumulative impact to a less-than-significant level as shown in the mitigated scenario and uncertainties regarding the implementation of these measures. Therefore, the project's emissions of criteria air pollutants would be cumulatively considerable, and this cumulative impact would be **significant and unavoidable**.

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194 Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2017, p. 2-1. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed January 13, 2020.

Carbon Monoxide

Because the region is in attainment for CO and the project would not contribute to CO concentrations exceeding CAAQS as explained in Impact AQ-4, the proposed project would not result in a considerable contribution to cumulative regional CO impacts.

Odors

There are not currently uncommon or objectionable odors in the project vicinity and no odor-generating projects are reasonably foreseeable in the immediate area. The proposed project could result in objectionable odors from charbroilers and the potential private district water reuse facilities. Odors from the charbroilers would be minimized through compliance with BAAQMD Rule 6-2. With implementation of BAAQMD Rule 8-8 and Mitigation Measure AQ-5, Odor Controls at the Potential Water Reuse Facility, and through the monitoring and enforcement mechanisms of BAAQMD, odors from the water reuse facilities would be minimized.

Because the project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people as explained in Impact AQ-5, the proposed project would not result in a considerable contribution to cumulative odor impacts.

Consistency with the Clean Air Plan

As discussed in Impact AQ-1, with implementation of mitigation measures required to reduce air pollutant emissions, the proposed project would be consistent with the 2017 Clean Air Plan. Thus, the proposed project would not disrupt or hinder implementation of control measures identified in the Clean Air Plan.

Mitigation Measures

Mitigation Measure AQ-2a: Construction Emissions Minimization Plan (refer to Impact AQ-2)

Mitigation Measure AQ-2b: Construction Equipment Maintenance and Tuning (refer to Impact AQ-2)

Mitigation Measure AQ-2c: Heavy-Duty Truck Model Year Requirement (refer to Impact AQ-2)

Mitigation Measure AQ-2d: Super-Compliant VOC Architectural Coatings during Operations (refer to Impact AQ-2)

Mitigation Measure AQ-2e: Best Available Emissions Controls for Stationary Emergency Generators (refer to Impact AQ-2)

Mitigation Measure AQ-2f: Diesel Truck Emissions Reduction (refer to Impact AQ-2)

Mitigation Measure AQ-2g: Electric Vehicle Charging (refer to Impact AQ-2)

Mitigation Measure AQ-2h: Enhanced Transportation Demand Management Program (refer to Impact AQ-2)

Mitigation Measure AQ-5: Hydrogen Sulfide and Odor Management Program for the Potential Water Reuse Facility(s) (refer to Impact AQ-5)

As discussed above, implementing Mitigation Measures AQ-2a through AQ-2h and AQ-5 would reduce the severity of this impact; however, as discussed above, these measures would not reduce the project's contribution to the cumulative regional air quality impact associated with criteria pollutant emissions to a less-than-significant level.

Significance after Mitigation: Significant and unavoidable.

Impact C-AQ-2: The proposed project, in combination with past, present, and reasonably foreseeable future development in the project area, would result in a cumulatively considerable contribution to significant cumulative health risk impacts on sensitive receptors. ***(Significant and Unavoidable)***

As discussed above under *Significance Criteria*, the proposed project would have a cumulatively considerable contribution to health risks if the proposed project plus all background cumulative stationary sources within 1,500 feet and mobile sources within 1,500 feet would expose sensitive receptors to substantial levels of TACs resulting in:

- A cancer risk level greater than 100 in 1 million;
- A non-cancer risk (chronic or acute) HI greater than 10.0; or
- Annual average $PM_{2.5}$ concentration of greater than 0.8 μg/m^3.

These significance criteria are applicable only to the extent that the proposed project would exacerbate existing air quality conditions. An impact would be significant if the project would exacerbate existing or future air quality conditions.[195] Because the proposed project would result in increased health risks at both new on-site and existing off-site sensitive receptors from both construction and operational activities, as discussed in Impact AQ-3 above, the proposed project would exacerbate future air quality conditions. Consequently, cumulative background plus proposed project health risks are analyzed below and compared to the significance criteria presented above.

Geographic Context

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 and measuring against the BAAQMD-recommended threshold of an incremental increase in lifetime cancer risk of 100 in 1 million. Background risk values were determined using the standard BAAQMD CEQA Guidelines approach, using a conservative 1,500-foot radius for both stationary sources and mobile sources. For mobile sources, cumulative health risk was modeled in AERMOD and impacts were calculated with methods consistent with BAAQMD's online screening tools, as discussed above under *Approach to Analysis*. Stationary-source information was provided by BAAQMD and methods contained within their tools were applied to calculate the impacts at the MEIRs. This method employs the standard modeling procedure recommended by BAAQMD in its CEQA Guidelines.

As discussed under *Cumulative Impacts* at the beginning of Chapter 3, *Environmental Setting, Impacts, and Mitigation*, and again in **Appendix B**, there are three projects that have been identified as cumulative major development projects plus 41 other nearby projects generally located within 0.5 miles of the project site. All but 15 of the listed cumulative projects (the three

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195 *California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369.

major projects plus 12 other projects) are well beyond the 1,000-foot BAAQMD radius guidance from the proposed project site.

Background Sources of Toxic Air Contaminants

TAC and $PM_{2.5}$ sources with a high potential to affect the same sensitive land uses as the proposed project were examined as part of the cumulative analysis as recommended by BAAQMD.[196,197] Near the project site, sources range from highways and high-volume roadways to standby and prime generators and gasoline-dispensing facilities. The following background existing TAC and $PM_{2.5}$ sources were included in the cumulative HRA for this project.

Railyards and Locomotives

The project site is located adjacent to the San José Diridon Station. The station is served by Caltrain, ACE, and Amtrak. Additionally, Union Pacific Railroad freight locomotives occasionally pass through on this rail line. Only the diesel locomotives operating on rail lines emit TACs, which contribute to the background health risks at the project site; therefore, only freight, Amtrak, Caltrain, and ACE locomotives were considered.

The Caltrain modernization project would electrify the corridor from San Francisco to San José and replace 75 percent of Caltrain's diesel service with electric service by 2022–2023. For the cumulative analysis, it was conservatively assumed that 75 percent of locomotives would be electrified and the remaining 25 percent of the locomotives would have Tier 4 diesel engines, as documented in the Peninsula Corridor Electrification Project EIR.[198]

Permitted Stationary Sources

Stationary sources within 1,500 feet of the project site and their associated localized risk values were provided by BAAQMD.[199] Permitted stationary sources include auto body shops, a coffee roaster, backup generators, and gasoline dispensing facilities. The sources are current as of 2018. The cancer risk and $PM_{2.5}$ values provided represent the risk at each stationary source (i.e., localized). To determine the impact of these sources at the MEIR, an equation based on distance, which was acquired from BAAQMD tools, was used to extrapolate the risk.[200]

On-Road Mobile Sources

Vehicles traveling on roadways around the project's development represent a major TAC emissions source in the community. TAC emissions were included for fuel combustion sources, including

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196 Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2017, p. C-16. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed January 13, 2020.

197 Bay Area Air Quality Management District, *Recommended Methods for Screening and Modeling Local Risks and Hazards*, May 2012. Available at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en. Accessed February 5, 2020.

198 ICF, *Peninsula Corridor Electrification Project EIR*, prepared for Peninsula Corridor Joint Powers Board, December 2014. Available at http://www.caltrain.com/Assets/Caltrain+Modernization+Program/FEIR/3.2+Air+Quality.pdf.

199 Flores, Areana, Environmental Planner, Bay Area Air Quality Management District, electronic communication to Sarah Patterson, Environmental Science Associates, January 22, 2020.

200 Bay Area Air Quality Management District, BAAQMD Health Risk Calculator (Beta 4.0), 2020. Available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/tools/baaqmd-health-risk-calculator-beta-4-0-xlsx.xlsx?la=en.

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 modeling include highways (such as Interstate 280 and State Route 87) and surface streets (such as West Santa Clara Street). 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. As discussed under *Approach to Analysis* above, BAAQMD offers analytical tools to assist in evaluating air quality impacts, but these tools were not used to calculate cumulative health risks, because they rely on an older version of the EMFAC model and outdated traffic volumes.[201] Instead, cumulative background on-road mobile-source emissions were calculated using EMFAC2017 (the latest version of the model) and were modeled in AERMOD to determine cumulative cancer risk and $PM_{2.5}$ concentrations at the project MEIR locations.

The methods used to calculate cumulative risk were consistent with the methods contained within the tools. Consistent with BAAQMD CEQA guidelines for cumulative analyses, emissions from roadways with an existing annual average daily traffic volume of 10,000 vehicles or roadways within 1,000 feet of the project site were calculated and subsequently modeled in AERMOD to determine associated TAC concentrations at MEIR locations. These concentrations were then evaluated to determine health risks at each MEIR location. The methods are detailed in Appendix C1.

Local Emissions Sources Not Included in this Analysis

BAAQMD's screening tools do 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. BAAQMD also does not include TAC emissions from these sources in cumulative citywide HRAs for other communities, such as the West Oakland Community Action Plan, 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."[202]

Calculating these TAC emissions and the resulting contribution to cumulative health risks would be speculative, given the uncertainty in the activities generating these TAC emissions, as described by BAAQMD above. As such, these additional local sources of TAC emissions are not included in this analysis.

Construction

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 in San José for new development projects would be speculative at the

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[201] Bay Area Air Quality Management District, Tools and Methodologies, 2012. Available at https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools. Accessed February 5, 2020.

[202] Bay Area Air Quality Management District and West Oakland Environmental Indicators Project, *Final Environmental Impact Report: The West Oakland Community Action Plan*, September 2019, Appendix C, AB 617 Owning Our Air: The West Oakland Community Action Plan Technical Support Document Base Year Emissions Inventory and Air Pollutant Dispersion Modeling. Available at http://www.baaqmd.gov/community-health/community-health-protection-program/west-oakland-community-action-plan. Accessed December 2019.

level of detail needed for a refined HRA. 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 without CEQA documentation of their TAC emissions and associated health risks were not included in the cumulative HRA for the project. The cumulative HRA does include health risks associated with projects that do have CEQA review of project-level health risks (refer to *Other Cumulative Projects* below).

Restaurants and Cooking

Emissions from restaurants that primarily include combustion-related organic TACs from charbroiling and cooking were excluded. Because of the required emissions control devices and the scale of TAC emissions from charbroiling overall, these emissions are typically small and result in minimal health risks compared to major sources of DPM and $PM_{2.5}$.[203] In addition, quantifying TAC emissions from citywide 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 the city. Therefore, TAC emissions from commercial and residential cooking were not included in the cumulative HRA.

Other Cumulative Projects

As discussed under *Cumulative Impacts* at the beginning of Chapter 3, *Environmental Setting, Impacts, and Mitigation*, and again in Appendix B, there are three projects that have been identified as cumulative major development projects. Two of those projects (BART and Caltrain Modernization) would involve construction on the project site or in the immediate vicinity. These projects have been reviewed under CEQA and both are anticipated to have a net reduction in health risk for operational impacts, but also to have some short-term impacts from construction.

Construction of the BART station has the highest potential to contribute to the cumulative health risk in the vicinity. As part of the CEQA review for the BART project, only the construction of the Alum Rock/28th Street Station was evaluated. The reported risk for the Alum Rock/28th Street Station MEIR was conservatively applied to all receptors as a part of this cumulative assessment. The risk from the Caltrain modernization is associated with the construction of the utilities, traction power substation, overhead contact system, signal and grade crossings, communications, and integration/commissioning.

The third major cumulative project is the update to the DSAP, affecting areas outside the project site. This update will modify the DSAP boundaries, will increase height limits and allowable densities, and is likely to result in more commercial and residential development in the vicinity of the site. Replacement parking that is being considered for locations near the project site, such as Lot E, is also likely to be developed in the DSAP area. Specific information regarding potential development is not available, however, and each large development project under the revised plan would require its own evaluation to determine project-specific and cumulative health risks. Similarly, details of the High-Speed Rail alignment/configuration on the site and the final

[203] 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.

outcome of the Diridon Integrated Station Concept planning process are not known at a sufficient level of detail to model their contribution to cumulative health risks. As such, TAC emissions from these cumulative projects were not included in the cumulative HRA for the proposed project.

Also under *Cumulative Impacts* at the beginning of Chapter 3, *Environmental Setting, Impacts, and Mitigation*, is the discussion of 41 nearby projects that either are under planning review, have planning approved, or are under construction. Of those 41 projects, 12 are within 1,000 feet of the project site. Out of those 12 projects, approximately four environmental documents with quantitative health risk analysis details were available. All four were reviewed to identify quantitative emissions for construction and operation of the respective projects; however, not all environmental documents contained emissions for construction and operation.

Impacts on Sensitive Receptors

As discussed in Impact AQ-3, existing off-site sensitive receptors evaluated in the HRA include all existing off-site sensitive receptors within 1,000 feet of the proposed project boundary and all schools within 2,500 feet of the proposed project boundary (there are no childcare centers within 1,000 feet of the proposed project boundary). New on-site sensitive receptors evaluated include all blocks containing residential uses and blocks containing educational centers, assessed as childcare centers as a conservative assumption. Refer to Appendix C1 for a figure presenting the location of sensitive receptors included in the HRA. From Tables 3.1-15 through 3.1-17, it was determined that the maximum risk impacts for residents would occur when exposure starts at the third trimester. For that reason, only the child receptor under mitigated project conditions was evaluated for the residential cumulative scenarios.

Table 3.1-21 shows the cumulative HRA results for unmitigated project TAC emissions; including incremental increase in lifetime cancer risk, non-cancer chronic HI, and maximum annual average $PM_{2.5}$ concentrations; for existing off-site receptors for Scenario 1 exposure from project construction and operational activities. **Table 3.1-22** presents the cumulative HRA results for unmitigated project TAC emissions for new on-site receptors under Scenario 2. **Table 3.1-23** presents the cumulative HRA results for unmitigated project TAC emissions for all receptor types from emissions associated with full-buildout operations under Scenario 3. The MEIR locations and exposure periods shown in these tables are the same ones as shown above for project-level risks presented in Tables 3.1-15, 3.1-16, and 3.1-17, under Impact AQ-3.

Cancer Risk Impacts

Table 3.1-21, Table 3.1-22, and Table 3.1-23 show the incremental increase in lifetime cancer risk results for both the existing off-site and new on-site MEIRs under unmitigated conditions, along with the cumulative background health risks. As shown in Table 3.1-23, the maximum cumulative incremental increase in lifetime cancer risk would occur at the off-site child resident MEIR under Scenario 1. The incremental increase in lifetime cancer risk at this MEIR is 43.8 per 1 million from the project's contribution and 50.3 per 1 million for cumulative background sources, for a total of 94.1 per 1 million, for the exposure period beginning in 2023. As discussed under Impact AQ-3 above, this MEIR is located south of West San Fernando Street, east of Delmas Avenue, and the project-level cancer risk is driven by construction activities occurring on the F blocks. The background cumulative risk is driven by roadways (49 percent) and diesel

TABLE 3.1-21
SCENARIO 1—UNMITIGATED CUMULATIVE INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b]
Resident Child—Off-Site Receptor				
Project Construction + Operations[b]	2023–2053/2027/ 2027	43.8	0.03	0.31
Background, Rail		13.7	0.01	0.04
Background, Stationary Sources		9.3	0.01	0.01
Background, Roadway		24.6	2.75	0.93
Background, BART Silicon Valley Extension[c]		0.1	<0.01	<0.01
Background, Caltrain Modernization		0.3	<0.01	<0.01
Background, Nearby Project Construction[d]		2.3	<0.01	0.01
Project + Background		94.1	2.8	**1.30**
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	**Yes**
School—Off-Site Receptor				
Project Construction + Operations[b,e]	2023–2032/2025/ 2025	1.0	0.01	0.12
Background, Rail		2.0	<0.01	0.01
Background, Stationary Sources		2.9	<0.01	0.01
Background, Roadway		17.8	3.42	0.33
Background, BART Silicon Valley Extension[c]		<0.1	<0.01	<0.01
Background, Caltrain Modernization		<0.1	<0.01	<0.01
Background, Nearby Project Construction[d]		0.2	<0.01	<0.01
Project + Background		23.9	3.43	0.47
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	No

NOTES:
$\mu g/m^3$ = micrograms per cubic meter; BART = Bay Area Rapid Transit; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

[a] **Bold values** = threshold exceedance.

[b] Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines). HI values and annual average PM2.5 concentrations represent the worst year of exposure, not a summation. Overlapping years of construction and operation have combined impacts. For values that represent exposure to full buildout TAC emissions, the MEIR is identified based on the maximum exposure to both construction and operational TAC emissions, not just operational TAC emissions. For the MEIR exposed to the maximum operational TAC emissions in isolation without construction, see the Scenario 3 results below

[c] Risk from construction of the Alum Rock/28th Street Station is assumed to be the same or less than that for Diridon Station. The reported risk for the Alum Rock/28th Street Station MEIR was conservatively applied to all receptors of the project site.

[d] Health risk for nearby project construction was acquired from each project's respective published CEQA documents and their impacts at the MEIR were estimated using the Bay Area Air Quality Management District's Health Risk Calculator with Distance Multiplier.

[e] The exposure duration of the school MEIR is less than 30 years. The exposure start date represents the worst-case exposure period.

SOURCES: Data compiled by Environmental Science Associates in 2019 (refer to Appendix C1).

TABLE 3.1-22
SCENARIO 2—UNMITIGATED CUMULATIVE INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b]
Resident Child—On-Site Receptor[b]				
Project Construction + Operations[c]	2029–2059/2032/2032	13.4	0.01	0.22
Background, Rail		7.0	<0.01	0.01
Background, Stationary Sources		3.0	<0.01	0.01
Background, Roadway		9.4	0.41	0.14
Background, BART Silicon Valley Extension[d]		0.1	<0.01	0.01
Background, Caltrain Modernization		0.2	<0.01	<0.01
Background, Nearby Project Construction[e]		0.6	<0.01	0.02
Project + Background		33.7	0.42	0.41
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	No
Childcare—On-Site Receptor[b]				
Project Construction + Operations[c,f]	2027–2035/2032/2032	5.9	0.01	0.15
Background, Rail		8.2	<0.01	0.02
Background, Stationary Sources		1.4	<0.01	<0.01
Background, Roadway		8.1	0.69	0.23
Background, BART Silicon Valley Extension[d]		<0.1	<0.01	<0.01
Background, Caltrain Modernization		<0.1	<0.01	<0.01
Background, Nearby Project Construction[e]		0.7	<0.01	0.01
Project + Background		24.3	0.70	0.41
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	No

NOTES:
$\mu g/m^3$ = micrograms per cubic meter; BART = Bay Area Rapid Transit; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; NA = not applicable; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; TBD = to be determined

a **Bold values** = threshold exceedance.
b Background calculated including Minimum Efficiency Reporting Value (MERV) reduction.
c Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines). HI values and annual average PM2.5 concentrations represent the worst year of exposure, not a summation. Overlapping years of construction and operation have combined impacts. For values that represent exposure to full buildout TAC emissions, the MEIR is identified based on the maximum exposure to both construction and operational TAC emissions, not just operational TAC emissions. For the MEIR exposed to the maximum operational TAC emissions in isolation without construction, see the Scenario 3 results below.
d Risk from construction of the Alum Rock/28th Street Station is assumed to be the same or less than that for Diridon Station. The reported risk for the Alum Rock/28th Street Station MEIR was conservatively applied to all receptors of the project site.
e Health risk for nearby project construction was acquired from each project's respective published CEQA documents and their impacts at the MEIR were estimated using the Bay Area Air Quality Management District's Health Risk Calculator with Distance Multiplier.
f The exposure duration of the childcare MEIR is less than 30 years.

SOURCES: Data compiled by Environmental Science Associates in 2020 (refer to Appendix C1).

TABLE 3.1-23
SCENARIO 3—UNMITIGATED CUMULATIVE INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b]
Resident Child—Off-Site Receptor				
Project Operational, full-buildout[b]	2032–2062/2032/ 2032	25.0	0.05	0.87
Background, Rail		29.5	0.01	0.04
Background, Stationary Sources		4.9	<0.01	0.02
Background, Roadway		11.8	0.71	0.26
Background, BART Silicon Valley Extension[c]		<0.1	<0.01	<0.01
Background, Caltrain Modernization		0.1	<0.01	<0.01
Background, Nearby Project Construction[d]		8.4	0.04	0.09
Project + Background		79.7	0.81	**1.28**
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	**Yes**
Resident Child—On-Site Receptor[e]				
Project Operational, full buildout[b]	2032–2062/2032/ 2032	14.0	0.04	0.64
Background, Rail		17.1	<0.01	0.02
Background, Stationary Sources		2.1	<0.01	0.01
Background, Roadway		10.0	0.24	0.08
Background, BART Silicon Valley Extension[c]		0.1	<0.01	<0.01
Background, Caltrain Modernization		0.5	<0.01	<0.01
Background, Nearby Project Construction[d]		0.3	0.01	0.03
Project + Background		44.1	0.29	0.78
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	No
School—Off-Site Receptor				
Project Operational, full buildout[b,e]	2032–2041/2032/ 2032	2.6	0.02	0.13
Background, Rail		2.0	<0.01	0.01
Background, Stationary Sources		2.9	<0.01	0.01
Background, Roadway		17.8	0.96	0.39
Background, BART Silicon Valley Extension[c]		<0.1	<0.01	<0.01
Background, Caltrain Modernization		<0.1	<0.01	<0.01
Background, Nearby Project Construction[d]		0.2	<0.01	<0.01
Project + Background		25.5	0.98	0.54
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	**No**

TABLE 3.1-23
SCENARIO 3—UNMITIGATED CUMULATIVE INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration ($\mu g/m^3$)[a,b]
Childcare—On-Site Receptor[d]				
Project Operational, full buildout[b,e]	2032–2038/2032/ 2032	4.9	0.03	0.43
Background, Rail		6.6	<0.01	0.02
Background, Stationary Sources		1.4	<0.01	<0.01
Background, Roadway		9.4	0.80	0.29
Background, BART Silicon Valley Extension[c]		<0.1	<0.01	<0.01
Background, Caltrain Modernization		0.1	<0.01	<0.01
Background, Nearby Project Construction[d]		0.7	<0.01	0.01
Project + Background		23.1	0.83	0.75
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	No

NOTES:
$\mu g/m^3$ = micrograms per cubic meter; BART = Bay Area Rapid Transit; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

a **Bold values** = threshold exceedance

b Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines).

c Risk from construction of the Alum Rock/28th Street Station is assumed to be the same or less than that for Diridon Station. The reported risk for the Alum Rock/28th Street Station MEIR was conservatively applied to all receptors of the project site.

d Health risk for nearby project construction was acquired from each project's respective published CEQA documents and their impacts at the MEIR were estimated using the Bay Area Air Quality Management District's Health Risk Calculator with Distance Multiplier.

e Background calculated including Minimum Efficiency Reporting Value (MERV) 13 reduction.

f The exposure duration of the school and childcare MEIR is less than 30 years. The exposure start date represents the worst-case exposure period.

SOURCES: Data compiled by Environmental Science Associates in 2019 (refer to Appendix C1).

locomotives on rail lines (27 percent). The total cumulative cancer risk is less than the cumulative BAAQMD threshold of an increased lifetime cancer risk of 100 in 1 million.

For Scenario 2 as shown in Table 3.1-22, the maximum cumulative incremental increase in lifetime cancer risk would occur at the new on-site child resident MEIR and would be 13.4 per 1 million from the project's contribution and 20.3 per 1 million for cumulative background sources, for a total of 33.7 per 1 million, for the exposure period beginning in 2029. As discussed under Impact AQ-3 above, this MEIR is located at Block E2, and the project-level cancer risk is driven by construction emissions from the buildout of the D and C blocks and by operational traffic along Highway 87. The background cumulative risk is driven by roadways (46 percent) and diesel locomotives on rail lines (34 percent). The total cumulative cancer risk is less than the BAAQMD cumulative threshold of an increased lifetime cancer risk of 100 in 1 million.

For Scenario 3 as shown in Table 3.1-22, the maximum cumulative incremental increase in lifetime cancer risk would occur at the off-site child resident MEIR and would be 25.0 per 1 million from the project's contribution and 54.7 per 1 million for cumulative background sources, for a total of 79.7 per 1 million. As discussed under Impact AQ-3 above, this MEIR is located east of the project site, along North Montgomery Street, and the project-level cancer risk at this location is driven by operational vehicle traffic along North Montgomery Street. The background cumulative risk is driven by diesel locomotives on rail lines (54 percent) and roadways (22 percent). For the on-site child resident MEIR, the cumulative incremental increase in lifetime cancer risk and would be 14.0 per 1 million from the project's contribution and 30.1 per 1 million for cumulative background sources, for a total of 44.1 per 1 million. The on-site child resident MEIR is located on Block D1, and the project-level cancer risk at this location is driven by operational traffic along West Santa Clara Street. The background cumulative risk is driven by diesel locomotives on rail lines (57 percent) and roadways (33 percent). The total cumulative cancer risk for both locations are less than the BAAQMD cumulative threshold of an increased lifetime cancer risk of 100 in 1 million.

Therefore, the project's contribution to the excess lifetime cancer risk to the cumulative impact would be **less than significant**. Nonetheless, modelling results reflecting project mitigation measures are presented below.

Non-cancer Health Impacts

Table 3.1-21, Table 3.1-22, and Table 3.1-23 also show non-cancer chronic health risks for both the existing off-site and new on-site MEIRs for unmitigated conditions, along with the cumulative background health risks. As shown in Table 3.1-21, Table 3.1-22, and Table 3.1-23, the maximum non-cancer chronic HI at would occur under Scenario 1 for the off-site resident MEIR. Under this scenario, the maximum non-cancer chronic HI would be 0.03 from the project's contribution and 2.77 for cumulative background sources for a total of 2.80, and this risk value would occur in 2032. As discussed under Impact AQ-3 above, this MEIR is located east of the project site, along North Montgomery Street, and the project-level non-cancer chronic HI at this location is driven by operational vehicle traffic along North Montgomery Street. The background cumulative risk is driven by roadways (99 percent). Because the maximum non-cancer chronic HI would be below the BAAQMD cumulative HI threshold of 10.0, the proposed project's cumulative impact would be **less than significant**. Nonetheless, modelling results reflecting project mitigation measures are presented below.

$PM_{2.5}$ Concentration

Table 3.1-21, Table 3.1-22, and Table 3.1-23 also show maximum annual average $PM_{2.5}$ concentration for both the existing off-site and new on-site MEIRs for unmitigated conditions, along with the cumulative background health risks. As shown in Table 3.1-21, Table 3.1-22, and Table 3.1-23, the maximum cumulative annual average $PM_{2.5}$ concentration would occur for the existing off-site child resident MEIR under Scenario 1. For this MEIR, as shown in Table 3.1-21, the maximum annual average $PM_{2.5}$ concentration would be 0.31 $\mu g/m^3$ for the project (year 2032 for full-buildout operations) and 0.99 $\mu g/m^3$ for cumulative background sources for a total of 1.30 $\mu g/m^3$. As discussed under Impact AQ-3 above, this MEIR is located along North Montgomery Street, east of the project site, and the project-level annual average $PM_{2.5}$

concentration is driven by operational vehicle traffic along North Montgomery Street. The background cumulative annual average $PM_{2.5}$ concentration is driven by roadways (94 percent). The total cumulative annual average $PM_{2.5}$ concentration is greater than the BAAQMD cumulative threshold of 0.8 $\mu g/m^3$.

For Scenario 2 as shown in Table 3.1-22, the maximum cumulative annual average $PM_{2.5}$ concentrations would occur for the off-site child resident MEIR and would be 0.22 $\mu g/m^3$ for the project and 0.19 $\mu g/m^3$ for cumulative background sources for a total of 0.41 $\mu g/m^3$, for the year 2032. As discussed under Impact AQ-3 above, this MEIR is located on Block E2, and the project-level annual average $PM_{2.5}$ concentration is driven by operational vehicle traffic along West Santa Clara Street and Highway 87. The background cumulative annual average $PM_{2.5}$ concentration is driven by roadways (74 percent). The total cumulative annual average $PM_{2.5}$ concentration is less than the BAAQMD cumulative threshold of 0.8 $\mu g/m^3$.

For Scenario 3 as shown in Table 3.1-22, the maximum cumulative annual average $PM_{2.5}$ concentrations would occur for the off-site child resident MEIR and would be 0.87 $\mu g/m^3$ for the project and 0.41 $\mu g/m^3$ for cumulative background sources for a total of 1.28 $\mu g/m^3$, for the year 2032. As discussed under Impact AQ-3 above, this MEIR is located along North Montgomery Street, east of the project site, and the project-level annual average $PM_{2.5}$ concentration from the project at this location is driven by operational vehicle traffic along North Montgomery Street. The background cumulative annual average $PM_{2.5}$ concentration is driven by roadways (63 percent). The maximum cumulative annual average $PM_{2.5}$ concentration for the new on-site MEIR is 0.64 $\mu g/m^3$ for the project and 0.14 $\mu g/m^3$ for cumulative background sources for a total of 0.78 $\mu g/m^3$, for the year 2032. The new on-site child MEIR is located at Block D1, and the project-level annual average $PM_{2.5}$ concentration at this location is driven by operational traffic along West Santa Clara Street. The background cumulative annual average $PM_{2.5}$ concentration is driven by roadways (57 percent). The total cumulative annual average $PM_{2.5}$ concentration at the off-site MEIR location is greater than the BAAQMD cumulative threshold of 0.8 $\mu g/m^3$.

Because the total cumulative plus project annual average $PM_{2.5}$ concentration at the existing off-site resident MEIR would be above the cumulative threshold of 0.8 $\mu g/m^3$, and because the proposed project would exacerbate the annual average $PM_{2.5}$ concentrations at this MEIR location by adding 0.32 $\mu g/m^3$ under Scenario 1 and 0.87 $\mu g/m^3$ under Scenario 3, the project's contribution would be cumulatively considerable. Therefore, the cumulative impact would be **potentially significant**.

The following mitigation measures are required as conditions of approval to reduce the impacts of project-related and cumulative TAC emissions on existing off-site and new on-site sensitive receptors.

Mitigation Measures

Mitigation Measure AQ-2a: Construction Emissions Minimization Plan (refer to Impact AQ-2)

Mitigation Measure AQ-2b: Construction Equipment Maintenance and Tuning (refer to Impact AQ-2)

Mitigation Measure AQ-2c: Heavy-Duty Truck Model Year Requirement (refer to Impact AQ-2)

Mitigation Measure AQ-2e: Best Available Emissions Controls for Stationary Emergency Generators (refer to Impact AQ-2)

Mitigation Measure AQ-2f: Operational Diesel Truck Emissions Reduction (refer to Impact AQ-2)

Mitigation Measure AQ-2g: Electric Vehicle Charging (refer to Impact AQ-2)

Mitigation Measure AQ-2h: Enhanced Transportation Demand Management Program (refer to Impact AQ-2)

Mitigation Measure AQ-3: Exposure to Air Pollution—Toxic Air Contaminants (refer to Impact AQ-3)

Mitigation Measure Effectiveness

For a discussion of the effectiveness of each individual mitigation measure on the project's TAC emissions and associated health effects, please see Impact AQ-3.

Table 3.1-24 shows the cumulative HRA results for mitigated project TAC emissions; including incremental increase in lifetime cancer risk, non-cancer chronic HI, and maximum annual average $PM_{2.5}$ concentrations; for existing off-site receptors for Scenario 1 exposure from project construction and operational activities. **Table 3.1-25** presents the cumulative HRA results for mitigated project TAC emissions for new on-site receptors under Scenario 2. **Table 3.1-26** presents the cumulative HRA results for mitigated project TAC emissions for all receptor types from emissions associated with full-buildout operations under Scenario 3. The MEIR locations and exposure periods shown in these tables are the same ones as shown above for project-level risks presented in Tables 3.1-18, 3.1-19, and 3.1-20, under Impact AQ-3. Additionally, because the effectiveness of Mitigation Measures AQ-2b, AQ-2f, and AQ-3 on health risks is not known, the mitigated results in Table 3.1-24, Table 3.1-25, and Table 3.1-26 present results that do not quantify reductions associated with these mitigation measures.

Cancer Risk Impacts

Table 3.1-24, Table 3.1-25, and Table 3.1-26 show the incremental increase in lifetime cancer risk results for both the existing off-site and new on-site MEIRs under mitigated conditions, along with the cumulative background health risks. As shown in Table 3.1-23, the maximum cumulative incremental increase in lifetime cancer risk would occur at the off-site child resident MEIR under Scenario 3. The incremental increase in lifetime cancer risk at this MEIR is 17.0 per 1 million from the project's contribution and 54.7 per 1 million for cumulative background sources, for a total of 71.7 per 1 million, for the exposure period beginning in 2032. As discussed under Impact AQ-3 above, this MEIR is located east of the project site, along North Montgomery Street, and the project-level cancer risk is driven by operational vehicle traffic. The background cumulative risk is driven by diesel locomotives on rail lines (54 percent) and roadways (22 percent). For the on-site child resident, the cancer risk would be 9.7 in 1 million from the project's contribution and 24.7 per 1 million for cumulative background sources, for a total of 34.4 per 1 million, for the exposure period beginning in 2032. This MEIR is located at Block C1, and the cancer risk at this location is driven by operational vehicle traffic along North Montgomery

TABLE 3.1-24
SCENARIO 1—MITIGATED CUMULATIVE INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration (µg/m³)[a,b]
Resident Child—Off-Site Receptor				
Project Construction + Operations[b]	2024–2054/2032/ 2032	19.6	0.02	0.19
Background, Rail		23.7	0.01	0.04
Background, Stationary Sources		5.2	0.01	0.01
Background, Roadway		15.7	2.75	0.93
Background, BART Silicon Valley Extension[c]		0.2	<0.01	<0.01
Background, Caltrain Modernization		0.8	<0.01	<0.01
Background, Nearby Project Construction[d]		2.6	<0.01	0.01
Project + Background		67.8	2.79	**1.18**
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	**Yes**
School—Off-Site Receptor				
Project Construction + Operations[b,e]	2023–2032/2025/ 2025	0.5	0.01	0.09
Background, Rail		2.0	<0.01	0.01
Background, Stationary Sources		2.9	<0.01	0.01
Background, Roadway		17.8	3.42	0.33
Background, BART Silicon Valley Extension[c]		<0.1	<0.01	<0.01
Background, Caltrain Modernization		<0.1	<0.01	<0.01
Background, Nearby Project Construction[d]		0.2	<0.01	<0.01
Project + Background		23.4	3.43	0.44
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	No

NOTES:
µg/m³ = micrograms per cubic meter; BART = Bay Area Rapid Transit; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

a **Bold values** = threshold exceedance.

b Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines), and implementation of Mitigation Measure AQ-2a, Construction Emissions Minimization Plan; Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement; Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators; Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction; Mitigation Measure AQ-2g, Electric Vehicle Charging; and Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program. HI values and annual average PM2.5 concentrations represent the worst year of exposure, not a summation. Overlapping years of construction and operation have combined impacts. For values that represent exposure to full buildout TAC emissions, the MEIR is identified based on the maximum exposure to both construction and operational TAC emissions, not just operational TAC emissions. For the MEIR exposed to the maximum operational TAC emissions in isolation without construction, see the Scenario 3 results below

c Risk from construction of the Alum Rock/28th Street Station is assumed to be the same or less than that for Diridon Station. The reported risk for the Alum Rock/28th Street Station MEIR was conservatively applied to all receptors of the project site.

d Health risk for nearby project construction was acquired from each project's respective published CEQA documents and their impacts at the MEIR were estimated using the Bay Area Air Quality Management District's Health Risk Calculator with Distance Multiplier.

e The exposure duration of the school MEIR is less than 30 years. The exposure start date represents the worst-case exposure period.

SOURCES: Data compiled by Environmental Science Associates in 2019 (refer to Appendix C1).

TABLE 3.1-25
SCENARIO 2—MITIGATED CUMULATIVE INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration (μg/m³)[a,b]
Resident Child—On-Site Receptor[b]				
Project Construction + Operations[c]	2029–2059/2032/2032	6.5	0.01	0.11
Background, Rail		7.0	<0.01	0.01
Background, Stationary Sources		3.0	<0.01	0.01
Background, Roadway		9.4	0.41	0.14
Background, BART Silicon Valley Extension[d]		0.1	<0.01	0.01
Background, Caltrain Modernization		0.2	<0.01	<0.01
Background, Nearby Project Construction[e]		0.6	<0.01	0.02
Project + Background		26.8	0.42	0.30
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	No
Childcare—On-Site Receptor[b]				
Project Construction + Operations[c,f]	2027–2035/2032/2032	2.6	0.01	0.06
Background, Rail		8.2	<0.01	0.02
Background, Stationary Sources		1.4	<0.01	0.00
Background, Roadway		8.1	0.69	0.23
Background, BART Silicon Valley Extension[d]		<0.1	<0.01	<0.01
Background, Caltrain Modernization		<0.1	<0.01	<0.01
Background, Nearby Project Construction[e]		0.7	<0.01	0.01
Project + Background		21.0	0.70	0.32
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	No

NOTES:
μg/m³ = micrograms per cubic meter; BART = Bay Area Rapid Transit; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; NA = not applicable; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; TBD = to be determined

a **Bold values** = threshold exceedance.

b Background calculated including Minimum Efficiency Reporting Value (MERV) reduction.

c Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines), and implementation of Mitigation Measure AQ-2a, Construction Emissions Minimization Plan; Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement; Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators; Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction; Mitigation Measure AQ-2g, Electric Vehicle Charging; and Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program. HI values and annual average PM2.5 concentrations represent the worst year of exposure, not a summation. Overlapping years of construction and operation have combined impacts. For values that represent exposure to full buildout TAC emissions, the MEIR is identified based on the maximum exposure to both construction and operational TAC emissions, not just operational TAC emissions. For the MEIR exposed to the maximum operational TAC emissions in isolation without construction, see the Scenario 3 results below.

d Risk from construction of the Alum Rock/28th Street Station is assumed to be the same or less than that for Diridon Station. The reported risk for the Alum Rock/28th Street Station MEIR was conservatively applied to all receptors of the project site.

e Health risk for nearby project construction was acquired from each project's respective published CEQA documents and their impacts at the MEIR were estimated using the Bay Area Air Quality Management District's Health Risk Calculator with Distance Multiplier.

f The exposure duration of the childcare MEIR is less than 30 years.

SOURCES: Data compiled by Environmental Science Associates in 2020 (refer to Appendix C1).

TABLE 3.1-26
SCENARIO 3—MITIGATED CUMULATIVE INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/ Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration (μg/m³)[a,b]
Resident Child—Off-Site Receptor				
Project Operational, full-buildout[b]	2032–2062/2032/2032	**17.0**	0.04	**0.74**
Background, Rail		29.5	0.01	0.04
Background, Stationary Sources		4.9	<0.01	0.02
Background, Roadway		11.8	0.71	0.26
Background, BART Silicon Valley Extension[c]		<0.1	<0.01	<0.01
Background, Caltrain Modernization		0.1	<0.01	<0.01
Background, Nearby Project Construction[d]		8.4	0.04	0.09
Project + Background		71.7	0.8	**1.15**
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	**Yes**
Resident Child—On-Site Receptor[e]				
Project Operational, full buildout[b]	2032–2062/2032/2032	9.7	0.03	0.27
Background, Rail		14.2	<0.01	0.02
Background, Stationary Sources		2.0	<0.01	0.01
Background, Roadway		5.4	0.24	0.12
Background, BART Silicon Valley Extension[c]		<0.1	<0.01	0.02
Background, Caltrain Modernization		<0.1	<0.01	<0.01
Background, Nearby Project Construction[d]		3.1	0.01	<0.01
Project + Background		34.4	0.28	0.44
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	No
School—Off-Site Receptor				
Project Operational, full buildout[b,e]	2032–2039/2032/2032	1.6	0.02	0.11
Background, Rail		0.8	<0.01	0.01
Background, Stationary Sources		3.5	<0.01	0.01
Background, Roadway		3.9	0.96	0.39
Background, BART Silicon Valley Extension[c]		<0.1	<0.01	<0.01
Background, Caltrain Modernization		<0.1	<0.01	<0.01

TABLE 3.1-26
SCENARIO 3—MITIGATED CUMULATIVE INCREMENTAL INCREASE IN LIFETIME CANCER RISK, CHRONIC HAZARD INDEX, AND ANNUAL AVERAGE $PM_{2.5}$ CONCENTRATION

Receptor Type/ Emissions Source	Exposure Period/ HI Max Year/ $PM_{2.5}$ Max Year	Incremental Increase in Lifetime Cancer Risk (in 1 million)[a,b]	Chronic Hazard Index[a,b]	Annual Average $PM_{2.5}$ Concentration (µg/m³)[a,b]
Background, Nearby Project Construction[d]		<0.1	<0.01	<0.01
Project + Background		9.8	0.98	0.52
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	No
Childcare—On-Site Receptor[d]				
Project Operational, full buildout[b,e]	2032–2038/2032/2032	3.2	0.02	0.14
Background, Rail		6.6	<0.01	0.02
Background, Stationary Sources		1.4	<0.01	<0.01
Background, Roadway		9.4	0.80	0.29
Background, BART Silicon Valley Extension[c]		<0.1	<0.01	<0.01
Background, Caltrain Modernization		0.1	<0.01	<0.01
Background, Nearby Project Construction[d]		0.7	<0.01	0.01
Project + Background		21.4	0.82	0.46
Significance Threshold		**100**	**10.0**	**0.8**
Exceeds Threshold (Yes or No)?		No	No	No

NOTES:
µg/m³ = micrograms per cubic meter; BART = Bay Area Rapid Transit; HI = Hazard Index; MEIR = Maximally Exposed Individual Receptor; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

a **Bold values** = threshold exceedance

b Health risk values presented in this table include Tier 4 Final engines on all off-road equipment (as available, with the assumption that 4% of horsepower-hours for all phases of construction would be associated with Tier 4 interim off-road equipment engines, 1% with Tier 3 off-road equipment engines plus Level 4 diesel particulate filters, and 1% with Tier 3 off-road equipment engines), and implementation of Mitigation Measure AQ-2a, Construction Emissions Minimization Plan; Mitigation Measure AQ-2c, Heavy-Duty Truck Model Year Requirement; Mitigation Measure AQ-2e, Best Available Emissions Controls for Stationary Emergency Generators; Mitigation Measure AQ-2f, Operational Diesel Truck Emissions Reduction; and Mitigation Measure AQ-2h, Enhanced Transportation Demand Management Program.

c Risk from construction of the Alum Rock/28th Street Station is assumed to be the same or less than that for Diridon Station. The reported risk for the Alum Rock/28th Street Station MEIR was conservatively applied to all receptors of the project site.

d Health risk for nearby project construction was acquired from each project's respective published CEQA documents and their impacts at the MEIR were estimated using the Bay Area Air Quality Management District's Health Risk Calculator with Distance Multiplier.

e Background calculated including Minimum Efficiency Reporting Value (MERV) reduction.

f The exposure duration of the school and childcare MEIR is less than 30 years. The exposure start date represents the worst-case exposure period.

SOURCES: Data compiled by Environmental Science Associates in 2019 (refer to Appendix C1).

Street. The background cumulative risk is driven by diesel locomotives on rail lines (57 percent) and roadways (22 percent). The total cumulative cancer risk is less than the cumulative BAAQMD threshold of an increased lifetime cancer risk of 100 in 1 million.

For Scenario 1, after implementation of mitigation measures as shown in Table 3.1-25, the maximum cumulative incremental increase in lifetime cancer risk would occur at the off-site child resident MEIR and would be 19.6 per 1 million from the project's contribution and 48.2 per 1 million for cumulative background sources, for a total of 67.8 per 1 million, for the exposure period beginning in 2024. As discussed under Impact AQ-3 above, this MEIR is located east of the project site, north of Park Avenue, and the project-level cancer risk is driven by construction activities occurring on the F blocks. The background cumulative risk is driven by diesel locomotives on rail lines (49 percent) and roadways (33 percent). The total cumulative cancer risk is less than the BAAQMD cumulative threshold of an increased lifetime cancer risk of 100 in 1 million.

For Scenario 2, after implementation of mitigation measures as shown in Table 3.1-25, the maximum cumulative incremental increase in lifetime cancer risk would occur at the new on-site child resident MEIR and would be 6.5 per 1 million from the project's contribution and 20.3 per 1 million for cumulative background sources, for a total of 23.4 per 1 million, for the exposure period beginning in 2029. As discussed under Impact AQ-3 above, this MEIR is located at Block E2, and the project-level cancer risk is driven by operational vehicle traffic along West Santa Clara Street and Highway 87. The background cumulative risk is driven by roadways (49 percent) and diesel locomotives on rail lines (34 percent). The total cumulative cancer risk is less than the BAAQMD cumulative threshold of an increased lifetime cancer risk of 100 in 1 million.

Therefore, the project's contribution to the excess lifetime cancer risk would not be cumulatively considerable, and this cumulative impact would remain less than significant.

Non-cancer Health Impacts

Table 3.1-24, Table 3.1-25, and Table 3.1-26 also show non-cancer chronic health risks for both the existing off-site and new on-site MEIRs under mitigated conditions, along with the cumulative background health risks. As shown in Table 3.1-24, Table 3.1-25, and Table 3.1-26, the maximum non-cancer chronic HI at would occur under Scenario 1 at Gardener Elementary School, for the off-site school MEIR. Under this scenario, the maximum non-cancer chronic HI would be 0.01 from the project's contribution and 3.42 for cumulative background sources for a total of 3.43, and this risk value would occur in 2025. As discussed under Impact AQ-3 above, this MEIR is located east of the project site, along North Montgomery Street, and the project-level non-cancer chronic HI at this location is driven by operational vehicle traffic along North Montgomery Street. The background cumulative risk is driven by roadways (99.7 percent). Because the maximum non-cancer chronic HI would be below the BAAQMD cumulative HI threshold of 10.0, the impact of the proposed project's cumulative impact would remain less than significant.

$PM_{2.5}$ Concentration

Table 3.1-24, Table 3.1-25, and Table 3.1-26 also show maximum annual average $PM_{2.5}$ concentration for both the existing off-site and new on-site MEIRs under mitigated conditions, along with the cumulative background health risks. As shown in Table 3.1-24, Table 3.1-25, and Table 3.1-26, the maximum cumulative annual average $PM_{2.5}$ concentration would occur for the existing off-site child resident MEIR under Scenario 1. For this MEIR, as shown in Table 3.1-24, the maximum annual average $PM_{2.5}$ concentration would be 0.19 $\mu g/m^3$ for the project (year 2025 for construction plus interim-buildout operations) and 0.99 $\mu g/m^3$ for cumulative background sources for a total of 1.18 µg/m^3. As discussed under Impact AQ-3 above, this MEIR is located along Auzerais Avenue, south of the project site, and the project-level annual average $PM_{2.5}$ concentration is driven by operational vehicle traffic along Interstate 280. The background cumulative annual average $PM_{2.5}$ concentration is driven by roadways (94 percent). The total cumulative annual average $PM_{2.5}$ concentration is greater than the BAAQMD cumulative threshold of 0.8 µg/m^3.

For Scenario 2, after implementation of mitigation measures as shown in Table 3.1-25, the maximum cumulative annual average $PM_{2.5}$ concentrations would occur for the on-site child resident MEIR and would be 0.11 µg/m^3 for the project and 0.19 µg/m^3 for cumulative background sources for a total of 0.30 µg/m^3, for the year 2032. As discussed under Impact AQ-3 above, this MEIR is located on Block E2, and the project-level annual average $PM_{2.5}$ concentration is driven by operational vehicle traffic along West Santa Clara Street and Highway 87. The background cumulative annual average $PM_{2.5}$ concentration is driven by roadways (74 percent). The total cumulative annual average $PM_{2.5}$ concentration is less than the BAAQMD cumulative threshold of 0.8 µg/m^3.

For Scenario 3, after implementation of mitigation measures as shown in Table 3.1-25, the maximum cumulative annual average $PM_{2.5}$ concentrations would occur for the off-site child resident MEIR and would be 0.74 µg/m^3 for the project and 0.41 µg/m^3 for cumulative background sources for a total of 1.15 µg/m^3, for the year 2032. As discussed under Impact AQ-3 above, this MEIR is located at Block D1, and the project-level annual average $PM_{2.5}$ concentration is about 50 percent due to operational vehicle traffic along West Santa Clara Street and about 50 percent due to on-site operations of stationary sources such as charbroilers, emergency generators, and cooling towers. The background cumulative annual average $PM_{2.5}$ concentration is driven by roadways (63 percent). After implementation of mitigation, the maximum annual average $PM_{2.5}$ concentration for the new on-site MEIR is 0.27 µg/m^3 for the project and 0.17 µg/m^3 for cumulative background sources for a total of 0.44 µg/m^3, for the year 2032. The new on-site child MEIR is located at Block D1, and the project-level annual average $PM_{2.5}$ concentration at this location is about 50 percent due to operational vehicle traffic along West Santa Clara Street and about 50 percent due to on-site operations of stationary sources such as charbroilers, emergency generators, and cooling towers. The background cumulative annual average $PM_{2.5}$ concentration is driven by roadways (71 percent). The total cumulative annual average $PM_{2.5}$ concentration for the off-site MEIR is greater than the BAAQMD cumulative threshold of 0.8 µg/m^3.

Because the total cumulative plus project annual average $PM_{2.5}$ concentration at the existing off-site resident MEIR would be above the cumulative threshold of 0.8 µg/m^3, and because the proposed project would exacerbate the annual average $PM_{2.5}$ concentrations at this MEIR location by adding 0.19 µg/m^3 under Scenario 1 and 0.74 µg/m^3 under Scenario 3, the project's contribution would be cumulatively considerable. Therefore, the cumulative impact would be **significant and unavoidable**.

Cumulative Health Risks for New On-site Receptors

Although not a CEQA issue, the San José 2040 General Plan Policy MS-11.1 states that projects that site new residential receptors must "incorporate effective mitigation into project designs or be located an adequate distance from sources of TACs to avoid significant risks to health and safety." As indicated in Tables 3.1-25 and 3.1-26 and discussed above, the maximum mitigated total cumulative health risks for all new on-site sensitive receptors (an incremental increase in lifetime cancer risk of 34.4 in 1 million under Scenario 3, a non-cancer chronic HI of 0.82 under Scenario 2, and a maximum annual average $PM_{2.5}$ concentration of 0.46 under Scenario 3) would be less than BAAQMD's cumulative thresholds of significance. Consequently, the proposed project complies with General Plan Policy MS-11.1. Refer to Impact AQ-1 for additional discussion of the project's consistency with General Plan Policy MS-11.1.

Summary of Impacts

As discussed under Impact AQ-3, Mitigation Measures AQ-2a through AQ-2c, AQ-2e through AQ-2h, and AQ-3 would reduce DPM, $PM_{2.5}$, and TOG emissions associated with off-road diesel construction equipment, on-road diesel construction trucks, operational emergency generators, TRU operations, on-road heavy-duty truck travel and idling, and on-road operational vehicle traffic, 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.

The results of these mitigation measures are presented in Tables 3.1-24 through 3.1-26. Even after implementation of mitigation, the maximum annual average $PM_{2.5}$ concentration of 1.19 $\mu g/m^3$ at the off-site MEIR location would exceed the threshold of significance of 0.8 $\mu g/m^3$. Therefore, the impact would be **significant and unavoidable**.

Significance after Mitigation: Significant and unavoidable.
