4.2—AIR QUALITY

This section of the subsequent environmental impact report (SEIR) documents potential project impacts associated with air quality and air pollutant emissions. Impacts considered in this section include the potential for project air emissions to exceed established thresholds or to cause or contribute to exceedance of state or federal ambient air quality standards. The section also considers human health risks associated with air pollutant emissions resulting from the project and the potential for public nuisance as a result of project odors.

The information in this section is based on a peer review of applicant-prepared studies and publicly available sources. The applicant-prepared studies used are:

- *Air and Greenhouse Gas Emissions Study, Eliot Quarry SMP-23 Reclamation Plan Amendment Project, Alameda County, California* (Compass Land Group 2019) (Appendix C-1, "Air Quality and Greenhouse Gases Report")
- *Public Health Risk Assessment of Site Reclamation, Eliot Quarry SMP-23 Reclamation Plan Amendment* (Compass Land Group 2020) (Appendix C-2, "Public Health Risk Assessment")

These analyses were peer reviewed by County-retained Yorke Engineering, LLC in May of 2019 and June of 2020. The peer review letter reports are on file with the County. The applicant revised the referenced analyses in response to Yorke's comments and provided responses to the peer reviewer comments, which are also on file with the County. Both the *Air and Greenhouse Gas Emissions Study*, dated December 2019, and *Public Health Risk Assessment* (HRA), dated June 2020, adequately addressed the peer reviewer's comments and questions.

4.2.1 Air Quality Conditions at the Time of the LAVQAR EIR

The *Livermore-Amador Valley Quarry Area Reclamation Specific Plan Environmental Impact Report* (LAVQAR EIR), written in 1979, which included an addendum in 1980 (the addendum included response to comments similar to what is included in a Final EIR in today's practice). The EIR, certified in 1981, states that mean maximum temperatures in the Livermore-Amador Valley averaged 99 degrees in July and mean minimums during January averaged 35 degrees. Temperatures over 100 degrees were common during the summer and below freezing temperatures typically occurred every winter.

Average annual precipitation in Pleasanton was seventeen inches at the time of the LAVQAR EIR, which decreased easterly to 14 inches at Livermore. More than 80 percent of annual rainfall normally occurred between November and March, which made more water available for percolation into the Arroyo del Valle (ADV) forebay area during storm events. ·

Similar to existing conditions, the LAVQAR EIR states that the bowl shape of the Valley, together with commonly occurring temperature inversions that prevent normal mixing and dilution of the air, resulted in periodic reaching of critical air pollution levels. The principal types of air pollution in the Valley are photochemical oxidants (caused by reactions between hydrocarbons and oxides of nitrogen in the presence of sunlight) and particulate matter. The number of days per year during which standards were exceeded varied widely, in proportion to adverse or beneficial weather patterns. From 1973 to 1977, the area experienced between 17 and 93 days per year, during which the oxidant level exceeded the National Ambient Air Quality Standard of 0.08 parts per million. This period exceeded the state standard for suspended particulate between 16 to 41 days per year (Alameda County 1980: 40-41).

4.2.2 Environmental Setting

Location and the amount of air pollutants in said locations are the primary factors that influence air quality; however, topography, climate, and meteorological conditions are also influential factors because they determine the movement and dispersal of air pollutants. California is divided into fifteen air basins, each with its own unique regional climate. The project site is located in the southwestern Alameda County sub region of the San Francisco Bay Area Air Basin (SFBAAB).

The SFBAAB includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties, the southern portion of Sonoma County, and the southwest portion of Solano County. The SFBAAB covers approximately 5,540 square miles of complex terrain consisting of coastal mountain ranges, inland valleys, and the San Francisco Bay. The SFBAAB is generally bounded on the west by the Pacific Ocean, on the north by the Coast Ranges, and on the east and south by the Diablo Range.

The climate within the SFBAAB is dominated by a strong, semi-permanent, subtropical high-pressure cell over the northeastern Pacific Ocean. Climate is also affected by the adjacent oceanic heat reservoir's moderating effects. Mild summers and winters, moderate rainfall and humidity, and daytime onshore breezes characterize regional climatic conditions in the San Francisco Bay Area (Bay Area). In summer, when the high-pressure cell is strongest and farthest north, fog forms in the morning and temperatures are mild. In winter, when the high-pressure cell is weakest and farthest south, occasional rainstorms occur.

4.2.2.1 Environmental Factors Affecting Air Quality

Ambient concentrations of air pollutant emissions are determined by the amount of emissions released by pollutant sources and the atmosphere's ability to transport and dilute such emissions. Natural factors affecting transport and dilution include terrain, wind, atmospheric stability, and sunlight. Existing air quality conditions in the project area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutants. The environmental factors that affect ambient air pollutant concentrations are discussed separately below.

Temperature Inversions

Temperature inversion layers, also called thermal inversions, describe areas where the normal decrease in air temperature as altitude increases is reversed and air above the ground is warmer than the air closer to the ground. Inversion layers can be anywhere from under 100 feet to over thousands of feet thick. Thermal inversions limit the vertical dispersion of air pollutants, which can trap pollutants close to the ground. These inversions occur most often when a warmer, less dense air mass flows over a colder, more dense air mass close to the ground. The highest air pollutant concentrations in the Bay Area generally occur during these inversions, of which there are two types: 1) subsidence inversions, a regional phenomenon that is most common in the Bay Area during summer and fall, when descending warmer air from the subtropical high pressure cell centered over the Pacific Ocean caps the cooler marine air layer nearer the surface; and 2) radiation inversions, more localized and typical of winter nights in interior parts of the Bay Area where air in contact with the ground cools more rapidly than the air layer above it (BAAQMD 2019a).

Topography and its Effect on Wind Speeds and Patterns

Low wind speed conditions limit horizontal air dispersion and can result in the buildup of air pollutants. Poor air quality under low wind speed conditions can be especially pronounced in interior valleys, where the topography also contributes to the restriction of air movement and pollutant dispersion.

Solar Radiation and its Impact on Photochemical Pollutants

The higher intensity and longer duration of solar radiation during the Bay Area's summer months provide ultraviolet light and warm temperatures that promote the formation of secondary photochemical pollutants (e.g., ozone). Sunlight intensity and summer temperatures are much higher in many of the Bay Area's inland valleys than near the coast, causing these inland areas to be especially prone to photochemical air pollution. In contrast, photochemical pollutants do not usually reach significant levels anywhere in the Bay Area during the winter, when temperatures are lower and daylight hours are shorter.

As a consequence of all these factors, the parts of the Bay Area having the highest air pollution potential tend to be the inland areas, which experience higher temperatures in the summer and lower temperatures in the winter. Furthermore, the inland areas are sheltered from the higher winds and more frequent fog episodes that affect the coastal areas. Also, air pollutant levels depend on the amount of pollutants emitted locally or from upwind sources, which cause higher ambient levels in inland areas because they are subject to emissions transported by the prevailing winds from populous upwind areas (BAAQMD 2019a).

Local Topography, Meteorology, and Climate

The proposed project is located in the Southwestern Alameda County Subregion, a mostly flat area that encompasses the southeast side of San Francisco Bay from Dublin Canyon to north of Milpitas and is bordered on the east by the East Bay hills and on the west by the bay.

This subregion is indirectly affected by marine air flow. Marine air entering through the Golden Gate is blocked by the East Bay hills, forcing the air to diverge into northerly and southerly paths. The southern flow is directed down the bay, parallel to the hills, where it eventually passes over southwestern Alameda County. These sea breezes are strongest in the afternoon. The further from the ocean the marine air travels, the more the ocean's effect is diminished.

The climate of southwestern Alameda County is also affected by its close proximity to San Francisco Bay (Bay). The Bay cools the air with which it comes in contact during warm weather, while during cold weather the Bay warms the air. The normal northwest wind pattern carries this air onshore. Bay breezes push cool air onshore during the daytime and draw air from the land offshore at night.

Winds are predominantly out of the northwest during the summer months. In the winter, winds are equally likely to be from the east. Easterly-southeasterly surface flow into southern Alameda County passes through three major gaps: Hayward/Dublin Canyon, Niles Canyon, and Mission Pass. Areas north of the gaps experience winds from the southeast, while areas south of the gaps experience winds from the northeast. Wind speeds are moderate in this subregion, with annual average wind speeds close to the Bay at about 7 mph, while further inland they average 6 mph.

Air temperatures are moderated by the subregion's proximity to the Bay and to the sea breeze. Temperatures are slightly cooler in the winter and slightly warmer in the summer than East Bay cities to the north. During the summer months, average maximum temperatures are in the mid-70s. Average maximum winter temperatures are in the high-50s to low-60s. Average minimum temperatures are in the low 40s in winter and mid-50s in the summer.

Pollution potential is relatively high in this subregion during the summer and fall. When high pressure dominates, low mixing depths and Bay and ocean wind patterns can concentrate and carry pollutants from other cities to this area, adding to the locally emitted pollutant mix. The polluted air is then pushed

up against the East Bay hills. In the wintertime, the air pollution potential in southwestern Alameda County is moderate. Air pollution sources include light and heavy industry and motor vehicles. Increasing motor vehicle traffic and congestion in the subregion may increase Southwest Alameda County pollution, as well as that of its neighboring subregions (BAAQMD 2019a).

Surface data (wind speed, wind direction, temperature, etc.) were recorded at Livermore airport for the period January 1, 2009 to December 31, 2013. This was the most recent data available from the California Air Resources Board (CARB) at the time of study. The HRA (Appendix C-2) shows winds are predominantly from the northwest with an average annual speed of 5.5 knots. Calm winds occur approximately 31 percent of the time.

4.2.2.2 Pollutants and Health Effects

Air pollution contributes to a wide variety of adverse health effects. The United States Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) for six of the most common air pollutants—carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen dioxide, and sulfur dioxide—known as "criteria" air pollutants. CARB also has adopted California ambient air quality standards (CAAQS) for these same criteria air pollutants. The presence of criteria pollutants in ambient air is generally caused by numerous, diverse, and widespread sources of emissions.

Ambient air quality standards are established to protect the public from adverse health effects of criteria pollutants and to provide protection against visibility impairment and damage to animals, crops, vegetation, or buildings. Health effects that have been associated with each of the criteria pollutants are summarized below.

Ozone

Ground-level ozone is a secondary pollutant that forms through the reaction of pollutants (e.g., oxides of nitrogen and reactive organic gases) in the atmosphere by a photochemical process involving sun energy. Chemicals that are precursors to ozone formation can also be emitted by natural sources, particularly trees and other plants. Ground-level ozone can pose risks to human health, in contrast to the stratospheric ozone layer that protects the earth from harmful wavelengths of solar ultraviolet radiation.

Short-term exposure to ground-level ozone can cause a variety of respiratory health effects, including inflammation of the lining of the lungs, reduced lung function, and respiratory symptoms such as cough, wheezing, chest pain, burning in the chest, and shortness of breath. Ozone exposure can decrease the capacity to perform exercise. Exposure to ozone can also increase susceptibility to respiratory infection. Exposure to ambient concentrations of ozone has been associated with the aggravation of respiratory illnesses such as asthma, emphysema, and bronchitis, leading to increased use of medication, absences from school, doctor and emergency department visits, and hospital admissions. Short-term exposure to ozone is associated with premature mortality. Studies have also found that long-term ozone exposure may contribute to the development of asthma, especially among children with certain genetic susceptibilities and children who frequently exercise outdoors. Long-term exposure to ozone can permanently damage lung tissue (EPA 2013a).

Other health effects of ozone include:

- difficulty to breathe deeply and vigorously,
- shortness of breath and pain when taking a deep breath,
- coughing and sore or scratchy throat,

- inflammation and damage to the airways,
- aggravation of lung diseases such as asthma, emphysema, and chronic bronchitis,
- increased frequency of asthma attacks,
- increased susceptibility of the lungs to infection, and
- continued damage to the lungs even when the symptoms have disappeared (EPA 2012).

Nitrogen Oxides

Nitrogen oxides (NO_X) are a group of gases that form when nitrogen reacts with oxygen during combustion, especially at high temperatures. These compounds (including nitric oxide and nitrogen dioxide), can contribute significantly to air pollution, especially in cities and areas with high motor vehicle traffic.

In the Bay Area, nitrogen dioxide appears as a brown haze. At higher concentrations, nitrogen dioxide can damage sensitive crops, such as beans and tomatoes, and aggravate respiratory problems. The U.S. Environmental Protection Agency, California Air Resources Board, and Air District have all adopted measures to reduce emissions of nitrogen oxides. The Air District places restrictions on pollutant sources such as power plants, boilers, stationary turbines, and stationary engines, and addresses motor vehicle sources by working to change people's driving habits (BAAQMD 2020b).

Sulfur Dioxide

Fossil fuel combustion by electrical utilities and industry is the primary source of sulfur dioxide in the United States. People with asthma are especially susceptible to the effects of sulfur dioxide. Short-term exposures of asthmatic individuals to elevated levels of sulfur dioxide while exercising at a moderate level may result in breathing difficulties, accompanied by symptoms such as wheezing, chest tightness, or shortness of breath. Studies also provide consistent evidence of an association between short-term sulfur dioxide exposures and increased respiratory symptoms in children, especially those with asthma or chronic respiratory symptoms. Short-term exposures to sulfur dioxide have also been associated with respiratory-related emergency department visits and hospital admissions, particularly for children and older adults. (EPA 2013a)

Particulate Matter

Particulate matter (PM) is a generic term for a broad class of chemically and physically diverse substances that exist as discrete particles (liquid droplets or solids) over a wide range of sizes. Particles originate from a variety of man-made stationary and mobile sources, as well as from natural sources like forest fires. The chemical and physical properties of PM vary greatly with time, region, meteorology, and the source of emissions.

For regulatory purposes, EPA distinguishes between categories of particles based on size and has established standards for fine and coarse particles. PM_{10}, in general terms, is an abbreviation for particles with an aerodynamic diameter less than or equal to 10 micrometers (μm), and it represents inhalable particles small enough to penetrate deeply into the lungs (i.e., thoracic particles). PM_{10} is composed of a coarse fraction referred to as $PM_{10-2.5}$ or as thoracic coarse particles (i.e., particles with an aerodynamic diameter less than or equal to 10 μm and greater than 2.5 μm) and a fine fraction referred to as $PM_{2.5}$ or fine particles (i.e., particles with an aerodynamic diameter less than or equal to 2.5 μm). Thoracic coarse particles are emitted largely as a result of mechanical processes and uncontrolled burning. Important sources include resuspended dust (e.g., from cars, wind, etc.), industrial processes, construction and demolition operations, residential burning, and wildfires. Fine particles are formed chiefly by combustion

processes (e.g., from power plants, gas and diesel engines, wood combustion, and many industrial processes) and by atmospheric reactions of gaseous pollutants (EPA 2013a).

Although scientific evidence links harmful human health effects from exposures to both fine particles and thoracic coarse particles, the evidence is much stronger for fine particles than for thoracic coarse particles. Effects associated with exposures to both $PM_{2.5}$ and $PM_{10-2.5}$ include premature mortality, aggravation of respiratory and cardiovascular disease (as indicated by increased hospital and emergency department visits), and changes in sub-clinical indicators of respiratory and cardiac function. Such health effects have been associated with short- and/or long-term exposure to PM. Exposures to $PM_{2.5}$ are also associated with decreased lung function growth, exacerbation of allergic symptoms, and increased respiratory symptoms. Children, older adults, individuals with preexisting heart and lung disease (including asthma), and persons with lower socioeconomic status are among the groups most at risk for effects associated with PM exposures. Information is accumulating and currently provides suggestive evidence for associations between long-term $PM_{2.5}$ exposure and developmental effects, such as low birth weight and infant mortality resulting from respiratory causes (EPA 2013a).

Specifically, the following three types of public health impacts are commonly associated with exposure to trace metals in dust and diesel particulate matter:

- Cancer risk (reported as a probability)
- Acute non-cancer risk (reported as a hazard index [HI])
- Chronic non-cancer risk (reported as an HI) (Compass Land Group 2020)

Lead

Historically, the primary source of lead emissions to the air was combustion of leaded gasoline in motor vehicles (such as cars and trucks), prior to the eradication of leaded gasoline in the United States in the mid-1990s. Since then, the remaining sources of lead air emissions have been industrial sources, including lead smelting operations, battery recycling operations, and piston-engine small aircraft that use leaded aviation gasoline. Lead accumulates in bones, blood, and soft tissues of the body. Exposure to lead can affect development of the central nervous system in young children, resulting in neurodevelopmental effects such as lowered IQ and behavioral problems (EPA 2013a).

Carbon Monoxide

Gasoline-fueled vehicles and other on-road and non-road mobile sources are the primary sources of carbon monoxide (CO) in the United States. Exposure to carbon monoxide reduces the capacity of the blood to carry oxygen, thereby decreasing the supply of oxygen to tissues and organs. Reduction in oxygen supply to the heart, in particular, causes critical complications. People with any heart disease already have a reduced capacity for pumping oxygenated blood to the heart, which can cause them to experience myocardial ischemia (reduced oxygen to the heart), often accompanied by chest pain (angina), when exercising or under increased stress. For these people, short-term CO exposure further affects their body's already compromised ability to respond to the increased oxygen demands of exercise or exertion. Therefore, people with angina or heart disease are at the greatest risk from ambient CO. Other potentially at-risk populations include those with chronic obstructive pulmonary disease, anemia, diabetes, and those in prenatal or elderly lifestages (EPA 2013a).

4.2.2.3 Toxic Air Contaminants

Toxic air contaminants (TACs) are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A wide range of sources, from industrial plants to motor vehicles, emit TACs. TAC can be emitted directly and can also be formed in the atmosphere through reactions among different pollutants. This section and the *Air and Greenhouse Gas Emissions Study* (Appendix C-1) focus on direct TAC emissions that would be associated with project reclamation activities, not those formed in the atmosphere.

The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis or genetic damage; or short-term acute effects, such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches. For evaluation purposes, TACs are separated into carcinogens and non-carcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure. Non-carcinogenic substances differ in they are generally assumed to feature a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis. Acute and chronic exposure to non-carcinogens is expressed as an HI, which is the ratio of expected exposure levels to an acceptable reference exposure levels.

TACs are primarily regulated through state and local risk management programs. These programs are designed to eliminate, avoid, or minimize the risk of adverse health effects from exposures to TACs. A chemical becomes a regulated TAC in California based on designation by the Office of Environmental Health Hazard Assessment (OEHHA). As part of its jurisdiction under Air Toxics Hot Spots Program (Health and Safety Code Section 44360(b)(2)), OEHHA derives cancer potencies and reference exposure levels (RELs) for individual air contaminants based on the current scientific knowledge that includes consideration of possible differential effects on the health of infants, children and other sensitive subpopulations, in accordance with the mandate of the Children's Environmental Health Protection Act (Senate Bill 25, Escutia, Chapter 731, Statutes of 1999, Health and Safety Code Sections 39669.5 et seq.).

4.2.2.4 Regional Air Quality and Attainment Status

The determination of whether a region's air quality is healthful or unhealthful is made by comparing contaminant levels in ambient air samples to the CAAQS and NAAQS. Both CARB and USEPA use monitoring station data to designate an area's attainment status with respect to the CAAQS and NAAQS, respectively, for criteria air pollutants. The purpose of these designations is to identify areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The "unclassified" designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. See Table 4.2-1, "Ambient Air Quality Standards."

TABLE 4.2-1
AMBIENT AIR QUALITY STANDARDS

Pollutant	Average Time	California Standards[1]	National Standards[2]	
		Concentration[3]	*Primary*[3,4]	*Secondary*[3,5]
O_3	1 hour	0.09 ppm (180 µg/m³)	—	Same as Primary Standard
	8 hours	0.070 ppm (137 µg/m³)	0.070 ppm (147 µg/m³)	
NO_2	Annual Arithmetic Mean	0.030 ppm (57 µg/m³)	0.053 ppm (100 µg/m³)	Same as Primary Standard
	1 hour	0.18 ppm (339 µg/m³)	0.100 ppm (188 µg/m³)	
CO	8 hours	9.0 ppm (10 mg/m³)	9 ppm (10 mg/m³)	None
	1 hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)	
SO_2	24 hours	0.04 ppm (105 µg/m³)	0.14 ppm (for certain areas)	—
	Annual Arithmetic Mean	—	0.030 ppm (for certain areas)	—
	3 hours	—	—	0.5 ppm (1300 µg/m³)
	1 hour	0.25 ppm (655 µg/m³)	0.075 ppm (196 µg/m³	—
PM_{10}	24 hours	50 µg/m³	150 µg/m³	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m³	—	
$PM_{2.5}$	24 hours	No Separate State Standard	35 µg/m³	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m³	12.0 µg/m³	15.0 µg/m³
Lead[6]	30-day Average	1.5 µg/m³	—	—
	Calendar Quarter	—	1.5 µg/m³	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 µg/m³	
Hydrogen sulfide	1 hour	0.03 ppm	—	—
Vinyl chloride	24 hours	0.01 ppm	—	—
Sulfates	24 hours	25 µg/m³	—	—
Visibility-reducing particles	8 hours (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer because of particles when the relative humidity is less than 70%	—	—

Source: CARB 2016
Notes:
ppm = parts per million by volume.
µg/m³ = micrograms per cubic meter.
mg/m³= milligrams per cubic meter.
1. California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, suspended particulate matter (PM_{10}, $PM_{2.5}$), and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

Pollutant	Average Time	California Standards[1]	National Standards[2]	
		Concentration[3]	*Primary*[3,4]	*Secondary*[3,5]

2. National standards (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For NO_2 and SO_2, the standard is attained when the 3-year average of the 98th and 99th percentile, respectively, of the daily maximum 1-hour average at each monitor within an area does not exceed the standard (effective April 12, 2010). For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 micrograms per cubic meter ($\mu g/m^3$) is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr.
   Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm (parts per million) in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
5. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
6. CARB has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

With respect to the CAAQS, the SFBAAB is currently designated as a nonattainment area for ozone, PM_{10}, and $PM_{2.5}$, and as an attainment or unclassified area for all other pollutants. With respect to the NAAQS, the SFBAAB is designated as a marginal nonattainment area for ozone, as a nonattainment area for $PM_{2.5}$, and as an attainment or unclassified area for all other pollutants.

Criteria Air Pollutant Monitoring Data

Several ambient air quality monitoring stations are located in SFBAAB to monitor progress toward air quality standards attainment of NAAQS and CAAQS. The monitoring station closest to the project area, the Pleasanton (Owens Court) air monitoring station (ID 06-001-0015), is located at approximate GPS coordinates 37.701222, 121.903019 and at I-580 near the Hopyard interchange. Recent air quality monitoring results from the Owens Court station are summarized in the *Air and Greenhouse Gas Emissions Study* (Appendix C-1).Criteria Pollutant Emissions—Alameda County

Mobile sources (on-road and off-road) are the largest contributor to the estimated annual average air pollutant levels of reactive organic gases (ROG), CO, NO_X, and oxides of sulfur (SO_X), accounting for approximately 47, 92, 91, and 53 percent, respectively, of the total inventory for each pollutant. Area-wide sources (e.g., solvent evaporation from equipment cleaning operations), on-site fuel combustion for space and water heating (e.g., boilers), and landscape maintenance equipment such as lawnmowers and leaf blowers), account for approximately 82 percent of Alameda County's PM_{10} emissions and 61 percent of the County's $PM_{2.5}$ emissions.

Although mobile source emissions constitute the majority of the 2011 criteria pollutant inventory both statewide and for Alameda County, emissions from this source category have decreased greatly since the 1970s as a result of more stringent federal and state emission controls on mobile sources and fuels. Examples of vehicle emissions standards include CARB's low-emission vehicle (LEV) standards, CARB's heavy-duty engine standards, and USEPA's corporate average fuel economy (CAFE) standards for passenger car and light duty trucks. Examples of cleaner fuel standards include the elimination of lead from gasoline and lowering of sulfur content in fuels. Criteria pollutant emissions from mobile sources are projected to continue decreasing with vehicle fleet turnover to newer, cleaner models. However, while emissions from gasoline- and diesel-fueled mobile sources are showing a decreasing trend, a

greater reduction in emissions from gasoline-fueled vehicles relative to diesel-fueled vehicles has increased the relative contribution of diesel sources to criteria air pollution from mobile sources. As a result, current regulatory development is focusing on reducing emissions from diesel sources.

4.2.3 Regulatory Setting

Federal, state, and local regulations pertaining to air quality potentially applicable to the project are discussed below.

4.2.3.1 Federal—U.S. Environmental Protection Agency

The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The U.S. EPA is responsible for implementing most aspects of the Clean Air Act, which include NAAQS for major air pollutants, performance standards for new and modified sources, hazardous air pollutant standards, approval of state attainment plans, motor vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions. NAAQS are established for "criteria pollutants" under the Clean Air Act, which are O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead.

NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. NAAQS (other than for O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires EPA to reassess NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed NAAQS must prepare a state implementation plan that demonstrates how those areas will attain the standards within mandated time frames. NAAQS are presented in Table 4.2-1.

4.2.3.2 State—California Air Resources Board

The Clean Air Act delegates the regulation of air pollution control and the enforcement of NAAQS to the states. In California, the task of air quality management and regulation has been legislatively granted to the CARB, with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB is responsible for ensuring implementation of the California Clean Air Act (CCAA) and the federal Clean Air Act and regulating emissions from motor vehicles, mobile equipment, and consumer products. CARB also sets health-based air quality standards and control measures for TACs. CARB has established CAAQS, which are generally more restrictive than NAAQS. CAAQS describes adverse condition (i.e. pollution levels must be below these standards before a basin can attain the standard). CAAQS for O_3, CO, SO_2 (1 hour and 24 hours), NO_2, PM_{10}, and $PM_{2.5}$ and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. NAAQS and CAAQS are presented in Table 4.2-1.

Idling of Commercial Heavy Duty Trucks

In January 2005, CARB adopted an Airborne Toxic Control Measure (ATCM) to control emissions from idling trucks. The ATCM, which became effective February 1, 2005, prohibits idling for more than 5 minutes for all diesel-fueled commercial motor vehicles with a gross vehicular weight ratings over 10,000 pounds that are or must be licensed for operation on highways. The ATCM contains several exceptions that allow trucks to idle, including during the following periods:

(1) a bus is idling for

(A) up to 10.0 minutes prior to passenger boarding, or

(B) when passengers are onboard;

(2) idling of the primary diesel engine is necessary to power a heater, air conditioner, or any ancillary equipment during sleeping or resting in a sleeper berth. This provision does not apply when operating within 100 feet of a restricted area;

(3) idling when the vehicle must remain motionless due to traffic conditions, an official traffic control device, or an official traffic control signal over which the driver has no control, or at the direction of a peace officer, or operating a diesel-fueled APS at the direction of a peace officer;

(4) idling when the vehicle is queuing that at all times is beyond 100 feet from any restricted area;

(5) idling of the primary engine or operating a diesel-fueled APS when forced to remain motionless due to immediate adverse weather conditions affecting the safe operation of the vehicle or due to mechanical difficulties over which the driver has no control;

(6) idling to verify that the vehicle is in safe operating condition as required by law and that all equipment is in good working order, either as part of a daily vehicle inspection or as otherwise needed, provided that such engine idling is mandatory for such verification;

(7) idling of the primary engine or operating a diesel-fueled APS is mandatory for testing, servicing, repairing, or diagnostic purposes;

(8) idling when positioning or providing a power source for equipment or operations, other than transporting passengers or propulsion, which involve a power take off or equivalent mechanism and is powered by the primary engine for:

(A) controlling cargo temperature, operating a lift, crane, pump, drill, hoist, mixer (such as a ready mix concrete truck), or other auxiliary equipment;

(B) providing mechanical extension to perform work functions for which the vehicle was designed and where substitute alternate means to idling are not reasonably available; or

(C) collection of solid waste or recyclable material by an entity authorized by contract, license, or permit by a school or local government;

(9) idling of the primary engine or operating a diesel-fueled APS when operating defrosters, heaters, air conditioners, or other equipment solely to prevent a safety or health emergency;

(10) idling of the primary engine or operating a diesel-fueled APS by authorized emergency vehicles while in the course of providing services for which the vehicle is designed;

While the goal of this measure is primarily to reduce public health impacts from diesel emissions, compliance with the regulation also results in energy savings in the form of reduced fuel consumption from unnecessary idling (CARB 2020).

In-Use Off-Road Diesel-Fueled Fleets

On July 26, 2007, CARB adopted the Regulation for In-Use Off-Road Diesel-Fueled Fleets (Off-Road Diesel Regulation) to reduce PM and NO_x emissions from existing off-road heavy-duty diesel vehicles in California. This regulation required that specific fleet average requirements are met for NO_x emissions and for PM emissions. Where average requirements cannot be met, Best Available Control Technology (BACT) requirements apply. All self-propelled off-road diesel vehicles 25 horsepower (hp) or greater

used in California and most two-engine vehicles (except on-road two-engine sweepers) are subject to the Off-Road Diesel Regulation. This includes vehicles that are rented or leased (rental or leased fleets).

The Off-Road Diesel Regulation:

- requires all vehicles be reported to CARB and labeled,
- restricts the adding of older vehicles into fleets starting on January 1, 2014,
- requires fleet owners to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (VDECS) i.e., exhaust retrofits,
- imposes limits on idling and requires a written idling policy, and
- requires a disclosure when selling vehicles.

All fleets must meet emission performance and reporting requirements by January 1, 2028. Annual reporting requirements, including the Responsible Official Affirmation of Reporting form, must be completed by March 1, 2028. Large fleets must report annually from 2012 to 2023, medium fleets from 2016 to 2023, and small fleets from 2018 to 2028. For each annual reporting date, a fleet must report any changes to the fleet, hour meter readings (for low-use vehicles and vehicles used a majority of the time, but not solely, for agricultural operations), and also must submit the Responsible Official Affirmation of Reporting (ROAR) form. Following January 1, 2023, small fleets may no longer add a vehicle with a Tier 2 engine to its fleet. The engine tier must be Tier 3 or higher. Medium and large fleets may not add tier 2 engines as of January 1, 2018. The goal of the In-Use Off-Road Diesel-Fueled Fleets Regulation is to reduce PM and NO_X emissions from in-use (existing) off-road heavy-duty diesel vehicles in California (CARB 2020).

Truck and Bus Regulation

The Truck and Bus regulation affects individuals, private companies, and Federal agencies that own diesel vehicles with a Gross Vehicle Weight Rating (GVWR) greater than 14,000 lbs. that operate in California. The regulation also applies to publicly and privately owned school buses; however, their compliance requirements are different and reporting is not required. The regulation does not apply to state and local government vehicles and public transit buses because they are already subject to other regulations. Vehicles that are exempt from other heavy duty diesel regulations, such as Cargo Handling Equipment, Drayage Truck, and Solid Waste Collection Vehicle regulations, may be subject to the Truck and Bus Regulation. Drayage and solid waste collection trucks with 2007 to 2009 model year engines must meet the requirements of the regulation by January 1, 2023.

Heavier trucks and buses with a GVWR greater than 26,000 pounds must comply with a schedule by engine model year or owners can report to show compliance with more flexible options. All heavier vehicles with 1996 or newer model year engines should have a PM filter (OEM or retrofit). By January 1, 2023, all trucks and buses must have 2010 model year or later engines with few exceptions.

Lighter trucks and buses with a GVWR of 14,001 to 26,000 lbs. have replacement requirements starting January 1, 2015. The Engine Model Year Schedule for Lighter vehicles shown in the table to the right lists the compliance dates by engine model year for existing lighter trucks. Starting January 1, 2015, lighter vehicles with engines that are 20 years or older must be replaced with newer trucks (or engines). Starting January 1, 2020, all remaining vehicles need to be replaced so that they all have 2010 model year engines or equivalent emissions by January 1, 2023 (CARB 2020).

4.2.3.3 State—Assembly Bills 1807 and 617 and Assembly Bill 2588

Assembly Bill 1807 (AB 1807) was enacted in 1983 and established a two-step process of risk identification and risk management to address the potential health effects from air toxic substances and protect the public health of Californians. During the first step (identification), CARE and OEHHA determined if a substance should be formally identified as a TAC in California. In the second step (risk management), CARE reviewed the emission sources of an identified TAC to determine if any regulatory action is necessary to reduce the risk. The analysis included a review of controls already in place, the available technologies and associated costs for reducing emissions, and the associated risk. The AB 1807 program was amended in 1993 as AB 2728, which required CARE to identify the 189 federal hazardous air pollutants as TACs and develop health effects values for newly identified TACs.

The Air Toxics "Hot Spots" Information and Assessment Act, or Assembly Bill 2588 (AB 2588), was enacted in 1987 and requires stationary sources to report the types and quantities of certain substances routinely released into the air. The goals of the Air Toxics "Hot Spots" Act are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels.

Assembly Bill 617 was enacted in 2017 to develop a new community focused program to reduce exposure to air pollution and preserve public health.

4.2.3.4 Local—Alameda County General Plan—East County Area Plan

The *Alameda County General Plan—East County Area Plan* (ECAP) contains air quality goals and policies to address air pollution in the eastern area of the county. ECAP air quality goals applicable to the project include the following:

- **Policy 291:** The County shall strive to meet federal and state air quality standards for local air pollutants of concern. In the event that standards are exceeded, the County shall require appropriate mitigation measures on new development.
- **Policy 294:** The County shall require new development projects to include traffic and air pollutant reduction measures to help attain air quality standards. For non-residential projects, these measures could include Transportation Demand Management programs such as ridesharing and transit promotion; for residential projects, these measures could include site plan features to reduce traffic trip generation such as mixed use development and transit-oriented development.
- **Policy 295:** The County shall require major projects of commercial or industrial nature to include bicycle storage facilities for employees and customers, shower/locker areas, and other facilities identified in the East County Bicycle Plan (described in Program 84) for employees that commute using bicycles.
- **Policy 296:** The County shall review the cumulative impact of proposed projects for their potential effect on air quality conditions.

4.2.3.5 Local—Bay Area Air Quality Management District

Bay Area Air Quality Management District (BAAQMD) has local air quality jurisdiction over projects in Alameda County. BAAQMD's responsibilities include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by

CEQA. BAAQMD is also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and ensuring that the NAAQS and CAAQS are met.

Under the CCAA, BAAQMD is required to develop an air quality plan for nonattainment criteria pollutants in the air district. The 2001 San Francisco Bay Area Ozone Attainment Plan for the 1- Hour National Ozone Standard was prepared to address ROG and NO_X emissions following the region's nonattainment designation for the 1-hour ozone NAAQS. The Bay Area 2017 Clean Air Plan, adopted by BAAQMD on April 19, 2017, provides an integrated control strategy to reduce ozone, PM, TACs, and greenhouse gas (GHG) emissions in a manner that is consistent with federal and state air quality programs and regulations. The 2017 Clean Air Plan updates the previous Bay Area ozone plan and the 2010 Clean Air Plan, to include strategies to reduce emissions of ozone precursors, particulate matter, and TAC emissions pursuant to air quality planning requirements defined in the California Health & Safety Code. BAAQMD also adopted a redesignation plan for CO in 1994. The redesignation plan includes strategies to ensure the continuing attainment of NAAQS for CO in SFBAAB.

In support of Assembly Bill 617 (AB 617: Community Health Protection Program), BAAQMD established the CARE Program to reduce health risks linked to local air quality. The CARE Program identifies areas with elevated pollution burden and vulnerable populations, develops air quality programs to minimize these burdens, and unites government, businesses, and communities to develop and implement additional actions.

BAAQMD's CEQA Guidelines document provides guidance to assist lead agencies in determining the level of significance of project-related emissions, and contains thresholds of significance for O_3, CO, PM_{10}, $PM_{2.5}$, TACs, and odors. According to BAAQMD's CEQA Guidelines, project emissions that exceed the recommended threshold levels are considered potentially significant and should be mitigated where feasible. Although BAAQMD's CEQA Guidelines are intended to help lead agencies navigate through the CEQA process, BAAQMD indicates that the guidelines for implementation of its significance thresholds are advisory only and should be followed by local governments at their own discretion.

4.2.4 Significance Thresholds and Analysis Methodology

4.2.4.1 Significance Criteria

Based on Appendix G of the CEQA Guidelines, the proposed project would have a significant impact on air quality if it would:

a) conflict with or obstruct implementation of the applicable air quality plan;
b) 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;
c) expose sensitive receptors to substantial pollutant concentrations; or
d) result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The BAAQMD has established significance thresholds to assist lead agencies in determining whether a proposed project may have a significant air quality impact. These thresholds, contained within the district's *California Environmental Quality Act Air Quality Guidelines* (May 2017 Revision) ("BAAQMD CEQA Guidelines") are shown in Table 4.2-2, "BAAQMD Project Level Thresholds of Significance," below.

TABLE 4.2-2
BAAQMD PROJECT LEVEL THRESHOLDS OF SIGNIFICANCE[1]

Pollutant (Criteria Air Pollutants and Precursors (Regional))	Construction-Related (Average Daily Emissions [lb/day])	Operational-Related	
		Average Daily Emissions (lb/day)	Maximum Annual Emissions (tpy)
ROG	54	54	10
NO_X	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
$PM_{10}/PM_{2.5}$ (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average), 20.00 ppm (1-hour average)	
GHGs – Projects other than Stationary Sources	None[2]	Compliance with Qualified GHG Reduction Strategy OR 1,100 MT of CO_2e/yr OR 4.6 MT CO_2e/SP/yr (residents + employees)	
GHGs – Stationary Sources	None[2]	10,000 MT/yr	
Odors	None	5 confirmed complaints per year averaged over three years	

Notes:

1. Project level thresholds of significance adapted from Tables 2-1 and 2-2 of the BAAQMD CEQA Guidelines (BAAQMD 2017).
2. BAAQMD does not have an adopted threshold for construction-related GHG emissions. However, the Lead Agency should quantify and disclose GHG emissions that would occur during construction, and make a determination on the significance of these construction-generated GHG emission impacts in relation to meeting AB 32 GHG reduction goals, as required by the Public Resources Code, Section 21082.2. The Lead Agency is encouraged to incorporate best management practices to reduce GHG emissions during construction, as feasible and applicable. (BAAQMD 2017: 2-6).
3. Definitions: CO = carbon monoxide; CO_2e = carbon dioxide equivalent; GHGs = greenhouse gases; lb/day = pounds per day; MT = metric tons; NO_X = oxides of nitrogen; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppm = parts per million; SP = service population; tpy = tons per year; yr = year; TBD = to be determined.

The issues identified above are considered in the air quality impact analysis presented in Section 4.2.5. Issues related to greenhouse gas are presented in Section 4.5, "Greenhouse Gas."

In addition, the BAAQMD CEQA Guidelines inform the lead and responsible agencies of the extent of airborne emissions from stationary sources and the potential public health impacts associated with such emissions. To assist lead agencies in evaluating air quality impacts at the neighborhood scale, BAAQMD recommends thresholds of significance for local community risks and hazards associated with TACs and $PM_{2.5}$ with respect to siting a new source and/or receptor; as well as for assessing both individual source and cumulative multiple source impacts. Local community risk and hazard impacts are associated with TACs and $PM_{2.5}$ because emissions of these pollutants can have significant health impacts at the local level. If emissions of TACs or $PM_{2.5}$ exceed any of the thresholds of significance listed below, a proposed project would result in a significant impact:

1. Non-compliance with a qualified risk reduction plan; or
2. An excess cancer risk level of more than 10 in one million, or a non-cancer (i.e., chronic or acute) HI greater than 1.0 would be a cumulatively considerable contribution; or

3. An incremental increase of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$) annual average $PM_{2.5}$ would be a cumulatively considerable contribution.

A project would have a cumulatively considerable impact if the aggregate total of all past, present, and foreseeable future sources within a 1,000 foot radius from the fence line of a source plus the contribution from the project, exceeds the following:

1. Non-compliance with a qualified risk reduction plan; or
2. An excess cancer risk levels of more than 100 in one million or a chronic non-cancer HI (from all local sources) greater than 10.0; or
3. 0.8 $\mu g/m^3$ annual average $PM_{2.5}$.

These thresholds for local risks and hazards associated with TACs and $PM_{2.5}$ are intended to apply to both permitted stationary sources and on- and off-road mobile sources, such as sources related to construction, busy roadways, or freight movement. While the project does not introduce a new stationary source, the modeled project health risks involve on- and off-road mobile sources that can be compared to the BAAQMD thresholds for purposes of CEQA analysis. Cumulative impacts are addressed in Chapter 5 of this SEIR.

4.2.4.2 Analysis Methodology

The following sections discuss the methods for evaluating emissions of criteria air pollutants and potential ambient air quality and health impacts associated with project emissions.

This analysis, presented in Section 4.2.5 below, the *Air and Greenhouse Gas Emissions Study* and the HRA (Appendix C) evaluates the potential air quality and health risk impacts for the proposed project and present emissions information related to existing operations at the project site for informational purposes. Project reclamation emissions are compared against significance thresholds adopted by BAAQMD. Emissions from existing operations (i.e., mining and processing activities that are outside the scope of the Project) are presented for evaluation of cumulative impacts only, which are analyzed in Chapter 5, "Cumulative Impacts."

Criteria Pollutant Emissions

The CEQA baseline used for purposes of this analysis is existing conditions; however, no current reclamation activity exists for which baseline emissions would be evaluated or measured. Reclamation activity would occur in the future after mining and processing activities are completed over time in the different locations at the project site, as shown in Table 2-5, "Anticipated Mining and Reclamation Sequence and Schedule."

For proposed project reclamation activities, the air consultant primarily used the California Emissions Estimator Model (CalEEMod) to quantify emissions in the *Air and Greenhouse Gas Emissions Study*. Project reclamation activities are modeled as independent phases in CalEEMod for each of the Lake A, Lake B, and North Areas. The phases were then combined to calculate total project emissions. For CalEEMod modeling purposes, certain end-of-life reclamation activities are assumed to be constructed in year 2049 (ahead of the applicant's anticipated reclamation schedule). This is to ensure proper CalEEMod model functionality, which requires that the project build-out year be set to at least one year after the final year of construction. The final build-out year option in CalEEMod is year 2050; therefore, end-of-life activities are all modeled in construction year 2049 (one year sooner). Since CalEEMod's emissions factors do not extend beyond 2045 and should continue to improve over time, this results in a conservative estimate of

emissions for the reclamation activities that are anticipated to occur between 2050 and 2056. This has no effect on the significance conclusions presented in the analysis.

Using the outputs of the CalEEMod model runs, the highest pollutant-generating years for each pollutant are selected for reporting of emissions and comparison of the project's emissions to BAAQMD's thresholds of significance (see Table 4.2-2).

For evaluation of local CO emissions, the air consultant applied BAAQMD's preliminary screening methodology, which provides a conservative indication of whether the implementation of the proposed project would result in CO emissions that exceed the applicable thresholds of significance described in Table 4.2-2. BAAQMD does not publish a threshold of significance for construction-related CO. Construction activities are not usually a significant source of CO as most construction equipment are diesel-powered and produces much lower CO emissions than gasoline combustion engines. The air consultant also presents data from a nearby air monitoring station to show that the project's CO contribution from reclamation activity would be de-minimis compared to CO concentrations from I-580 (nearby), and the CO concentrations at the I-580 monitoring station are well below the NAAQS and CAAQS.

Existing operations at the project site (that are not part of the project) include mining operations, processing plant operations, and mobile sources. Existing operations emissions estimates are provided in Appendix C-1 for informational purposes and have been evaluated using a 5-year annual averaging period for production between 2013 through 2017. In order to evaluate these sources, the air consultant primarily relied upon CalEEMod for mining-related emissions, EPA AP-42 emission factors and BAAQMD regulation emissions standards for processing plant related emissions, and CARB's 2017 Emission Factor (EMFAC) model for mobile source emissions.

Health Risk

Exposure to equipment exhaust and fugitive dust can lead to various health impacts. Specifically, the following three types of public health impacts are commonly associated with exposure to trace metals in dust and diesel particulate matter:

1. Cancer risk (reported as a probability)
2. Acute non-cancer risk (reported as a HI)
3. Chronic non-cancer risk (reported as a HI)

The preparation of health risk assessments is a multi-step process. The first step is to identify potential contaminants that may contribute to public health risks. The second step is to assess the amount of contaminants that may reach the public (exposure assessment). The third step is to calculate the magnitude of the health risk as a result of exposure to harmful contaminants on the basis of the toxicology of the contaminants.

For evaluation of health risk from exposure to TACs, the air consultant translated the emission rate of individual TACs (presented in Appendix C-2) into a concentration of each TAC. The key step in performing an exposure assessment is the application of an air dispersion model. The dispersion model incorporates the local meteorological data (wind speed, wind direction, local temperature, inversion heights, etc.), stack height, and exhaust flow characteristics into the concentration of individual air contaminant. Dispersion modeling was performed using the AERMOD Modeling System (AERMOD) version 19121. AERMOD is a steady-state plume model that incorporates air dispersion based on

planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. AERMOD, like most dispersion models, uses mathematical formulations to characterize the atmospheric processes that disperse pollutants emitted by a source. Using source emission rates, exhaust parameters, terrain characteristics, and meteorological inputs, AERMOD calculates down-wind pollutant concentrations at specified receptor locations.

To calculate the magnitude of the health risk from these pollutant concentrations, the consultant applied the Hotspots Analysis and Reporting Program Air Dispersion Modeling and Risk Assessment Tool Version 2 (HARP2 risk model) developed by CARB using the OEHHA derived calculation method. Residential cancer risk is based on a 30-year exposure and worker cancer risk is based on a 25-year exposure consistent with BAAQMD and OEHHA guidelines.

HARP 2 can be used by districts, facility operators, and other parties to manage and evaluate emissions inventory data and the potential health impacts associated with these emissions (CARB 2015).

Odor

For consideration of odors, BAAQMD presents screening distances for a variety of land uses that typically generate odors, such as landfills, composting facilities, rendering plants, and asphalt concrete batch plants. Since the proposed project does not propose or fall under any of the land use categories for which screening distances are provided, the air consultant instead obtained compliance history from BAAQMD for the existing Granite Construction Company asphalt concrete plant located on the project site to show whether or not this use (even though it is not part of the project) has resulted in a significant number of odor complaints compared to BAAQMD thresholds of significance that are discussed in Table 4.2-2.

Detailed estimating methods and assumptions are provided in the *Air Quality and Greenhouse Gases Study*'s appendices (see Appendix C-1). Furthermore, the County retained Yorke Engineering, LLC (Yorke) to peer review the *Air and Greenhouse Gas Emissions Study* on May 17, 2019, at which time Yorke commented on the study and noted the need for a public health risk assessment. The air consultant revised the *Air and Greenhouse Gas Emissions Study* and responded to Yorke's comments in December of 2019. The air consultant p also prepared the HRA (Appendix C-2) in March of 2020, to which Yorke also responded with comments in May 2020. The air consultant then responded to Yorke's comments and revised the HRA in June 2020. Yorke confirmed in June 2020 that the air consultant adequately addressed their comments regarding the HRA.

4.2.5 Project Impacts and Mitigation Measures

4.2.5.1 LAVQAR EIR Impact Analysis

Under the LAVQAR EIR, air quality impacts were determined to be less than significant with implementation of mitigation. The 1981 project included the on-site operation of mobile equipment related to the excavation, grading, and transportation of materials on-site; the processing of mined materials; the backfill of slopes, and revegetation activities (Alameda County 1980: 40-41).

The approved project includes the following mitigation of air quality impacts:

- Availability of reclaimed land for higher intensity land uses does not necessary mean that the land would actually be put to such uses. The potential impact on air quality would be eliminated by adherence to environmental policies which do not allow large scale development which would measurably deteriorate air quality. (Alameda County 1980: 41)

Project Revisions

As discussed in Chapter 2, "Project Description," the proposed project involves revisions to approved reclamation activities and does not involve evaluation of permitted mining or processing activities. The activities and equipment used would be similar to the equipment that was evaluated in the LAVQAR EIR, except that the proposed project (which involves reclamation) would not include processing mined materials, which would reduce emissions compared to the 1981 project. In addition, the equipment used today is more efficient and produces fewer emissions than the equipment proposed to be used as part of the 1981 project. Therefore, the proposed project's revisions would not create a new or increased significant impact in this regard.

Changed Circumstances

SMP-23 was originally approved when the property to the north of Lake A was zoned "Agricultural" and within the jurisdiction of the County. Over the years, the property was annexed to the City of Livermore, the zoning was changed to residential, and houses were built adjacent to Lake A. These land uses are changed circumstances that could create a new or increased significant impact as potential receptors are now closer to where reclamation activities will occur.

New Information

The Applicant has submitted the *Air and Greenhouse Gas Emissions Study* (Compass Land Group 2019) that has been peer reviewed by the County. The evaluation focuses on emissions associated with reclamation activities and quantifies emissions associated with ongoing mining for informational purposes. This SEIR quantifies, below and in Section 4.5, estimated criteria air pollutant and greenhouse gas emissions associated with reclamation activities under existing conditions (baseline or environmental setting) and under the proposed SMP-23 reclamation plan amendment, as these potential impacts were not considered in the LAVQAR EIR.

Significance Determination

Based on project revisions and changed circumstances that may create a new or increased significant impacts, the County has amplified and augmented the analysis contained in the 1980 EIR. This evaluation is provided in the following impact analysis.

4.2.5.2 Subsequent Environmental Analysis

Impact 4.2-1: Conflict with or Obstruct Implementation of the Applicable Air Quality Plan

The BAAQMD's 2017 Clean Air Plan (Clean Air Plan) is the applicable air quality plan for the project and the County. Consistency with the air quality plan is determined by whether the project would hinder implementation of control measures identified in the air quality plan or result in growth of population or employment that is not accounted for in local and regional planning.

The project would not result in population growth in the County, as the number of employees for the proposed project would not substantially increase compared to existing conditions and, therefore, would represent an inconsequential growth in County employment and not exceed the employment growth accounted for in the County General Plan and the ECAP.

The Clean Air Plan requires consistency with ATCMs for idling trucks and on- and off-road diesel using vehicles (BAAQMD 2017). Mitigation Measure 4.2-1 below provides for adherence to these ATCMs.

The Clean Air Plan contains control measures that identify actions to be taken by the air district, local government agencies, and private enterprises to reduce stationary and mobile sources of criteria pollutants and ozone precursors and TAC emissions in the SFBAAB (BAAQMD 2017). As discussed under Impact 4.2-2 below, the proposed project would result in a cumulatively considerable impact due to daily NO_X emissions in year 2022. Therefore, project emissions would hinder the air district in its goals for reducing significant air pollutants in the air basin in the short-term. However, the daily NO_X exceedances are related to construction activities required for the reclamation of Lake A and the realignment of the Arroyo del Valle. As such, the emissions are only temporary in nature. Furthermore, the annual NO_X emissions in year 2022 would not exceed the annual thresholds. The remainder of the model years are below the applicable thresholds for all criteria pollutants. Furthermore, as outlined in Impact 4.2-2 below, reducing emissions to a less than significant level would require daily operations to be limited to shorter windows compared to typical 8-10 hour days, which would extend the life of reclamation, thereby also potentially increasing emissions of an extended life of the reclamation activities. Therefore, the proposed project's estimated NO_X emissions would constitute a significant and unavoidable impact on consistency of this portion of the Clean Air Plan in the short term.

Level of Significance Before Mitigation: Significant.

Mitigation Measure 4.2-1: Off-road Equipment Plan

The Applicant shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in Lake A reclamation and the Lake B realignment of the Arroyo del Valle would achieve a fleet-average 20 percent NO_X reduction compared to the most recent ARB fleet average for the duration of these reclamation activities. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as such become available.

The Alameda County Community Development Agency would be responsible for ensuring compliance.

Significance After Mitigation: Significant and Unavoidable.

Impact 4.2-2a: 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: NO_X

Project operations associated with reclamation would emit criteria air pollutants, including ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ from construction equipment and from mobile equipment and motor vehicles associated with excavation, grading/fill, and construction of water management facilities at Lakes A and B.

The modeling results from the *Air and Greenhouse Gas Emissions Study*'s (Appendix C-1) indicate that project criteria pollutant emissions are below applicable BAAQMD thresholds of significance for CEQA except for daily emissions of NO_X. Daily emissions of NO_X are exceeded only in model year 2022, when Lake A reclamation activity and the Lake B realignment of the ADV are assumed to occur simultaneously. Even if evaluated separately, the year 2022 Lake A reclamation activities and 2022 Lake B realignment of the Arroyo would exceed the daily NO_X thresholds, but to a lesser degree. However, these daily NO_X exceedances are related to construction activities required for the reclamation of Lake A and the realignment of the Arroyo del Valle. As such, they are only temporary

in nature. In 2022, the annual NO_X emissions would not exceed the annual thresholds. The remainder of the model years are below the applicable thresholds for all criteria pollutants.

Table 4.2-3, "Daily Criteria Air Pollutants and Precursor Emissions Analysis (lb/day) Model Year 2022," presents the daily criteria air pollutants and ozone precursor emissions analysis. Table 4.2-4, "Annual Criteria Air Pollutants and Precursor Emissions Analysis (tons/year) Model Year 2022," presents the annual criteria air pollutants and ozone precursor emissions analysis. A complete summary of project emissions is included in the *Air and Greenhouse Gas Emissions Study*'s (Appendix C-1) Appendix A-1, "Daily and Annual Emissions Summary." Detailed modeling inputs and outputs are included in Appendices A-2 through A-6 of the study.

TABLE 4.2-3
DAILY CRITERIA AIR POLLUTANTS AND PRECURSOR EMISSIONS ANALYSIS (LB/DAY) MODEL YEAR 2022

Emissions Category	ROG	NO_X	PM_{10} (Exhaust)	$PM_{2.5}$ (Exhaust)
Project Emissions	19.62	230.85	8.53	7.90
BAAQMD CEQA Significance Thresholds	54	54	82	54
Exceeds Threshold (Yes/No)?	**No**	**Yes**	**No**	**No**

Source: Compass Land Group 2019
Notes:
1. BAAQMD thresholds from Table 4.2-2, above.
2. Project emissions are reported for model year 2022, which is the highest emitting model year for the reported pollutants. See Appendix A-1 of the study (Appendix C-1 of this SEIR) for detail.
3. The Applicant would be required to implement BAAQMD's best management practices for construction-related fugitive dust emission controls.

TABLE 4.2-4
ANNUAL CRITERIA AIR POLLUTANTS AND PRECURSOR EMISSIONS ANALYSIS (TONS/YEAR) MODEL YEAR 2022[2]

Emissions Category	ROG	NO_X	PM_{10} (Exhaust)	$PM_{2.5}$ (Exhaust)
Project Emissions	0.61	7.60	0.28	0.27
BAAQMD CEQA Significance Thresholds	10	10	15	10
Exceeds Threshold (**Yes/No**)?	**No**	**No**	**No**	**No**

Source: Compass Land Group 2019
Notes:
1. BAAQMD thresholds from Table 4.2-2, above. Operational-related annual thresholds are used since there are no published construction-related annual thresholds.
2. Project emissions are reported for model year 2022, which is the highest emitting model year for the reported pollutants. See Appendix A-1 of the study (Appendix C-1 of this SEIR) for detail.
3. The Applicant would be required to implement BAAQMD's best management practices for construction-related fugitive dust emission controls.

Based on the results presented in Table 4.2-3, above, NO_X emissions are estimated to exceed BAAQMD CEQA significance thresholds by approximately 425 percent in model year 2022. Mitigation Measure 4.2-1 would reduce daily NO_X emissions during Lake A reclamation and the Lake B realignment of the ADV by approximately 20 percent; however, NO_X emissions would remain well above the threshold during this period of time (BAAQMD 2017). Reducing daily emissions to a less than significant level would require daily operations to be limited to shorter windows compared to typical 8-10 hour days, which would extend the life of reclamation, thereby also potentially increasing emissions over an extended life of the project. Therefore, this option is not feasible. In

addition, because of the necessity to mobilize equipment each day, NO_X emissions would be increased over the life of the project should additional daily reductions be implemented. Therefore, the proposed project's estimated NO_X emissions would constitute a significant and unavoidable impact.

Level of Significance Before Mitigation: Significant.

Mitigation Measure*: Implement Mitigation Measure 4.2-1, "Off-road Equipment Plan" (see Impact 4.2-1, above).*

Significance After Mitigation: Significant and Unavoidable.

Impact 4.2-2b: 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: ROG, CO, SO_X, PM_{10}, and $PM_{2.5}$

As stated in Impact 4.2-2a above, proposed project operations associated with reclamation would emit criteria air pollutants, including ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ from construction equipment and from mobile equipment and motor vehicles associated with excavation, grading/fill, and construction of water management facilities at Lakes A and B.

Table 4.2-3 presents the daily criteria air pollutants and ozone precursor emissions analysis. Table 4.2-4 presents the annual criteria air pollutants and ozone precursor emissions analysis. The modeling results from *the Air and Greenhouse Gas Emissions Study's* (Appendix C-1) indicate that project criteria pollutant emissions are below applicable BAAQMD thresholds of significance for CEQA except for daily emissions of NO_X. Therefore, the proposed project's estimated ROG, CO, SO_X, PM_{10}, and $PM_{2.5}$ emissions would constitute a less than significant impact.

Level of Significance: Less than Significant.

Mitigation Measure: None required

Impact 4.2-3: Expose Sensitive Receptors to Substantial Pollutant Concentrations

Health Risk

In the HRA (Appendix C-3), the emission rates discussed in Impact 4.2-3, above, were used as a basis to quantify health risks from public exposure to TACs. The HARP2 risk model developed by CARB and OEHHA was used to calculate the health risks.

The project's incremental maximum cancer risk at nearby homes is estimated to be 0.8 cancers per million. The risk varies from approximately 0.8 to less than 0.1 excess cancers per million depending on the exposure scenario (residential or sensitive receptor) and location. Cancer risk at nearby businesses is estimated to be 0.03 excess cancers per million. These results are presented in terms of a probability (cancers risk per million). These values are all well below the applicable thresholds of significance.

The highest of these risk levels are along Vetta Drive, east of Isabel Avenue and north of Lake A in the vicinity of the future construction of the Lake A to C water conveyance pipeline. Risk at nearby schools and hospitals are estimated to be below 0.04 cancers per million. The highest worker risk occurs southwest of the intersection of Isabel Avenue and East Vineyard Avenue.

The maximum non-cancer risks at nearby homes and businesses are calculated in terms of an HI. Chronic HI was below 0.002 at all locations.

The project's incremental annual average $PM_{2.5}$ concentration is 0.26 micrograms per cubic meter ($\mu g/m^3$), which is less than the applicable threshold (Compass Land Group 2020). Therefore, impacts from $PM_{2.5}$ to public health risk would be less than significant.

The results of the health risk analysis are summarized in Table 4.2-5, "Summary of Maximum Long-Term Health Risk at the Project Area," below. For additional detail, refer to Appendix C-3 of this SEIR.

TABLE 4.2-5
SUMMARY OF MAXIMUM LONG-TERM HEALTH RISKS AT THE PROJECT AREA

Risk Metric	Maximum Off-Site Value	Significance Threshold	Significant?
Residential Cancer Risk per Million (30-year exposure)	0.769	10	No
Worker Cancer Risk (25-year exposure)	0.027	10	No
Cancer Risk per Million at Sensitive Receptors (schools, hospitals)	0.039 at Granada High School 0.029 at Stanford Valley Health Center	10	No
Chronic Hazard Index	Residential 0.0019 Worker 0.0012	1.0	No
Acute Hazard Index	Residential 0.065 Worker 0.028	1.0	No
Annual $PM_{2.5}$	0.26 ug/m^3	> 0.3 ug/m^3	No

Source: Compass Land Group 2020

Carbon Monoxide (CO) Hotspots

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuel. The largest source of CO is vehicle engines, and the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Consequently, violations of the CO standard are generally limited to major intersections during peak-hour traffic conditions. Exposure of humans to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, fatigue, impaired central nervous system function, and angina (chest pain) in persons with serious heart disease. Very high concentrations of CO can be fatal. However, high concentrations are not expected as a result of the project.

BAAQMD's preliminary screening methodology indicates that the project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria are met:

1. Project is consistent with an applicable congestion management program established by the County congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.

3. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge, underpass, natural or urban street canyon, below-grade roadway).

Regarding screening criteria number 1, the Alameda County Transportation Commission (ACTC) serves as the congestion management agency for Alameda County, and develops and implements the applicable Congestion Management Program (CMP). ACTC updated the CMP recently in September 2019. ACTC recognizes State Route 84 (between Vallecitos and Isabel Avenues) as a Tier 1 roadway (a highway with more than 30,000 daily traffic volume) and Stanley Boulevard as a Tier 2 roadway (an arterial roadway of County significance) in the CMP. Although the project is located adjacent to roadways that are included in the CMP, the project would not conflict with the CMP because reclamation activities would only occur for short periods of time and would only place very limited traffic on existing roadways. Traffic associated with project reclamation activity would be far less than existing traffic levels associated with mining and processing operations at the site. Based on trip generation estimates found in Appendix A of the *Air and Greenhouse Gas Emissions Study* (Appendix C-1), the project is estimated to generate approximately 834 vehicle trips associated with Lake A reclamation activity, 837 vehicle trips associated with Lake B reclamation activity, and 232 vehicle trips associated with North Area reclamation activity. In total, the project would generate approximately 1,900 trips spread out over six calendar years (based on the estimated schedule provided in Table 2-5), including all worker, vendor, and hauling trips. To put these figures into perspective, as of 2017 Caltrans estimated that State Route 84 (Isabel Ave.) at Vineyard Avenue, which has the highest traffic volume of project-area roadways, would experience 32,100 annual average daily traffic (AADT). The project would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour (screening criteria number 2), or to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (screening criteria number 3). Based on BAAQMD's screening criteria alone, the project's potential CO impacts are less-than-significant.

Furthermore, Caltrans independently evaluated CO impacts for the recently completed State Route 84 Expressway Widening Project in its Initial Study with Negative Declaration/Environmental Assessment with Finding of No Significant Impact (Caltrans 2008). This is relevant because State Route 84 has the highest volume of traffic near the project site and is also closely located to residential receptors. Caltrans performed dispersion modeling to predict CO concentrations near affected roadways following the procedures outlined in the Transportation Project-Level Carbon Monoxide Protocol (Niemeier et al., 1997). The CO concentrations were estimated for baseline conditions in 2005 and cumulative conditions in 2030, with and without the Caltrans project. The highest CO concentration measured at the nearest CARB air monitoring station available (793 Rincon Avenue, Livermore) in 2005 was used in the model as the background CO concentration. Caltrans concluded that with or without the project, localized CO concentrations are predicted to decrease (improve) between 2005 and 2030. This benefit would occur because CARB expects continued future improvements in fuel formulations and vehicle emission controls, and older, higher polluting vehicles would continue to be retired from use as California drivers replace them with newer, more efficient cars. Caltrans noted that future CO concentrations would increase slightly with the Caltrans SR-84 project (between 0 to 0.7 parts per million depending on location for a 1-hour period) in comparison to the No Build modeling results for the morning and afternoon peak periods. This increase was expected, as the SR-84 project added an additional lane of traffic in both directions. However, the modeling results showed that the project would not result in localized CO "hot spots"

at intersections exceeding either NAAQS or CAAQS for CO. Therefore, the project would not cause exceedance of an air quality standard or result in an adverse impact in this regard.

The air consultant's CalEEMod modeling results, summarized in Appendix A of the *Air and Greenhouse Gas Emissions Study* (Appendix C-1), indicate that project CO emissions would peak at approximately 133 lbs. per day and 4.31 tons per year in model year 2022 (during the period of concurrent Lake A and Lake B reclamation activities). These values represent mass emissions estimates and not an emissions concentration, which is the metric used in BAAQMD's operational thresholds. As documented by Caltrans and BAAQMD, CO concentrations in the project area currently meet all NAAQS and CAAQS and the Bay Area Air Basin as a whole is in attainment status (meaning meeting standards) for CO. State standards, which have been adopted as part of BAAQMD's operational thresholds of significance, are more restrictive than the NAAQS at 9 parts per million (ppm) for the maximum 8-hour concentration and 20 ppm for the maximum 1-hour concentration. CO measurements taken at the nearby and new Owens Court air monitoring station since 2018 indicate that CO concentrations are at 0.9 ppm (8-hour average) and 1.2 ppm (1-hour average). Given that these CO concentrations are measured adjacent to I-580, where traffic is heavily congested during the morning and afternoon peak hours, they likely represent much higher concentrations of CO than would be expected at the project site. As of 2017, Caltrans estimated that I-580 at State Route 84 would generate 217,000 AADT. In 2019, BAAQMD estimated that I-580 at the Pleasanton (Owens Ct.) air monitoring station would generate 231,500 AADT based on updated traffic count data from April 1, 2019. These traffic volumes are nearly an order of magnitude higher than traffic along State Route 84 (Isabel Ave) at Vineyard Ave (i.e., 31,200 ADT).

The proposed project's impacts relating to CO are less-than-significant based on BAAQMD CO screening criteria, Pleasanton (Owens Court) air monitoring station data, and Caltrans' CEQA evaluation of the SR-84 Expressway Widening Project.

Level of Significance Before Mitigation: Less than significant.

Mitigation Measures: None required.

Impact 4.2-4: Result in Other Emissions (Such as Those Leading to Odors) Adversely Affecting a Substantial Number of People

Project reclamation activities are not expected to introduce significant sources of odors. The project does not involve odor-generating sources aside from direct exhaust emissions associated with operation of construction equipment that generally dissipate rapidly into the atmosphere as distance increases from the source. Furthermore, BAAQMD has not adopted construction-related thresholds of significance for odors. BAAQMD's operational threshold of significance is five confirmed odor complaints per year averaged over three years.

The BAAQMD CEQA Guidelines provide screening distance criteria for a variety of land uses that have the potential to generate odors, such as landfills, composting facilities, rendering plants, and asphalt batch plants. The project reclamation activity does not involve installation or operation of any of the land use categories that might be expected to generate odors. However, as some paving would occur during reclamation (e.g., for the development of the Lake B pedestrian and bike trail), asphaltic concrete would likely be sourced from the existing Granite Construction Company asphalt concrete plant located on the project site. The air consultant obtained compliance history from BAAQMD for the existing plant to compare it against BAAQMD's operational threshold. For the period 2013 to

August 15, 2019, BAAQMD has recorded five unconfirmed complaints, zero confirmed complaints, and zero pending complaints for the asphalt plant. Zero complaints have been recorded in the most recent three year period.

The project's potential odor impacts are less-than-significant based on the nature of reclamation construction activities, BAAQMD's odor screening criteria, and BAAQMD's record of complaints for the existing asphalt concrete plant.

Level of Significance Before Mitigation: Less than significant.

Mitigation Measures: None required.