4.2 AIR QUALITY

This chapter of the Draft EIR evaluates the impacts of the proposed Project on air quality, locally and regionally. Air quality modeling is included in Appendix H.

A. Regulatory Framework

Ambient air quality standards (AAQS) have been adopted at State and federal levels for Criteria Air Pollutants. In addition, both the State and federal government regulate the release of Toxic Air Contaminants (TACs). The Project site is in the San Francisco Bay Area Air Basin (SFBAAB) and is subject to the rules and regulations imposed by the Bay Area Air Quality Management District (BAAQMD), as well as the California AAQS adopted by the California Air Resources Board (CARB) and national AAQS adopted by the U.S. Environmental Protection Agency (EPA). Federal, State, regional and local laws, regulations, plans, or guidelines that are potentially applicable to the proposed Project are summarized below.

1. Ambient Air Quality Standards

The Clean Air Act was passed in 1963 by the U.S. Congress and has been amended several times. The 1970 Clean Air Act amendments strengthened previous legislation and laid the foundation for the regulatory scheme of the 1970s and 1980s. In 1977, Congress again added several provisions, including nonattainment requirements for areas not meeting National AAQS and the Prevention of Significant Deterioration program. The 1990 amendments represent the latest in a series of federal efforts to regulate the protection of air quality in the United States. The CAA allows states to adopt more stringent standards or to include other pollution species. The California Clean Air Act, signed into law in 1988, requires all areas of the State to achieve and maintain the California AAQS by the earliest practical date. The California AAQS tend to be more restrictive than the National AAQS, based on even greater health and welfare concerns.

The National and California AAQS are the levels of air quality considered to provide a margin of safety in the protection of the public health and welfare.

They are designed to protect those "sensitive receptors" most susceptible to further respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

Both California and the federal government have established health-based AAQS for seven air pollutants. As shown in Table 4.2-1, these pollutants include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), coarse inhalable particulate matter (PM_{10}), fine inhalable particulate matter ($PM_{2.5}$), and lead (Pb). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

2. Air Pollutants of Concern

a. Criteria Air Pollutants

The pollutants emitted into the ambient air by stationary and mobile sources are regulated by federal and State law. Air pollutants are categorized as primary and/or secondary pollutants. Primary air pollutants are those that are emitted directly from sources. Carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO_X), sulfur dioxide (SO_2), coarse inhalable particulate matter (PM_{10}), fine inhalable particulate matter ($PM_{2.5}$), and lead (Pb) are primary air pollutants. Of these, CO, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ are "criteria air pollutants," which means that AAQS have been established for them. VOC and NO_2 are Criteria Pollutant precursors that form secondary Criteria Air Pollutants through chemical and photochemical reactions in the atmosphere. Ozone (O_3) and nitrogen dioxide (NO_2) are the principal secondary pollutants.

A description of each of the primary and secondary Criteria Air Pollutants and their known health effects is presented below.

TABLE 4.2-1 **AMBIENT AIR QUALITY STANDARDS FOR CRITERIA POLLUTANTS**

Pollutant	Averaging Time	California Standard	Federal Primary Standard	Major Pollutant Sources
Ozone (O_3)	1 hour	0.09 ppm	*	Motor vehicles, paints, coatings, and solvents.
	8 hours	0.070 ppm	0.075 ppm	
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm	
Nitrogen Dioxide (NO_2)	Annual Average	0.030 ppm	0.053 ppm	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
	1 hour	0.18 ppm	0.100 ppm	
Sulfur Dioxide (SO_2)	Annual Average	*	*1	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	1 hour	0.25 ppm	0.075 ppm[a]	
	24 hours	0.04 ppm	*[a]	
Suspended Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 $\mu g/m^3$	*	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. wind-raised dust and ocean sprays).
	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$	
Suspended Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 $\mu g/m^3$	15 $\mu g/m^3$	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. wind-raised dust and ocean sprays).
	24 hours	*	35 $\mu g/m^3$	

TABLE 4.2-1 **AMBIENT AIR QUALITY STANDARDS FOR CRITERIA POLLUTANTS** (CONTINUED)

Pollutant	Averaging Time	California Standard	Federal Primary Standard	Major Pollutant Sources
Lead (Pb)	Monthly	1.5 $\mu g/m^3$	*	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	*	1.5 $\mu g/m^3$	
	3-Month Average	*	0.15 $\mu g/m^3$	
Sulfates (SO_4)	24 hours	25 $\mu g/m^3$	*	Industrial processes.
Visibility Reducing Particles	8 hours	ExCo =0.23/km visibility of 10≥ miles[a]	No Federal Standard	Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt.
Hydrogen Sulfide	1 hour	0.03 ppm	No Federal Standard	Hydrogen sulfide (H_2S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation.
Vinyl Chloride	24 hour	0.01 ppm	No Federal Standard	Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.

Notes: ppm: parts per million; $\mu g/m^3$: micrograms per cubic meter
* Standard has not been established for this pollutant/duration by this entity.

[a] When relative humidity is less than 70 percent.

Source: California Air Resources Board (CARB), 2010. Ambient Air Quality Standards, http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

- **Carbon Monoxide** (CO) is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. CO is a primary criteria air pollutant. CO concentrations tend to be the highest during winter mornings with little or no wind, when surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines and motor vehicles operating at slow speeds are the primary source of CO in the SFBAAB. Emissions are highest during cold starts, hard acceleration, stop-and-go driving, and when a vehicle is moving at low speeds. New findings indicate that CO emissions per mile are lowest at about 45 mph for the average light-duty motor vehicle and begin to increase again at higher speeds. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces its oxygen-carrying capacity. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as fetuses. Even healthy people exposed to high CO concentrations can experience headaches, dizziness, fatigue, unconsciousness, and even death.[1] The SFBAAB is designated under the California and National AAQS as being in attainment of CO criteria levels.[2]

- **Volatile Organic Compounds** (VOC) are compounds composed primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. Other sources of VOCs include evaporative emissions from paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. Adverse effects on human health are not caused directly by VOCs, but rather by reactions of VOCs to form secondary pollutants such as O_3. There are no AAQS established for VOCs. However, be-

[1] Bay Area Air Quality Management District (BAAQMD), 2011. California Environmental Quality Act Air Quality Guidelines, Appendix C: Sample Air Quality Setting.

[2] California Air Resources Board (CARB), 2011. Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm, accessed on February 16, 2012.

cause they contribute to the formation of O_3, the BAAQMD has established a significance threshold for this pollutant.

- **Nitrogen Oxides** (NO_X) are a byproduct of fuel combustion and contribute to the formation of O_3, PM_{10}, and $PM_{2.5}$. The two major components of NO_X are nitric oxide (NO) and nitrogen dioxide (NO_2). The principal component of NO_x produced by combustion is NO, but NO reacts with oxygen to form NO_2, creating the mixture of NO and NO_2 commonly called NO_X. NO_2 acts as an acute irritant and, in equal concentrations, is more injurious than NO. At atmospheric concentrations, however, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase in bronchitis in children (two and three years old) has also been observed at concentrations below 0.3 ppm. NO_2 absorbs blue light; the result is a brownish-red cast to the atmosphere and reduced visibility. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. The SFBAAB is designated as an attainment area for NO_2 under the National AAQS and California AAQS.[3]

- **Sulfur Dioxide** (SO_2) is a colorless, pungent, irritating gas formed by the combustion of sulfurous fossil fuels. It enters the atmosphere as a result of burning high-sulfur-content fuel oils and coal and from chemical processes at chemical plants and refineries. Gasoline and natural gas have very low sulfur content and do not release significant quantities of SO_2. When SO_2 forms sulfates (SO_4) in the atmosphere, together these pollutants are referred to as sulfur oxides (SO_x). Thus, SO_2 is both a primary and secondary criteria air pollutant. At sufficiently high concentrations, SO_2 may irritate the upper respiratory tract. At lower concentrations and when combined with particulates, SO_2 may do greater harm by injur-

[3] California Air Resources Board (CARB), 2011. Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm, accessed on February 16, 2012.

ing lung tissue.[4] The SFBAAB is designated as an attainment area for SO_2 under the California and National AAQS.[5]

- **Suspended Particulate Matter** (PM_{10} and $PM_{2.5}$) consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of fine particulates are now recognized and regulated. Inhalable coarse particles, or PM_{10}, include the particulate matter with an aerodynamic diameter of 10 microns (i.e. 10 millionths of a meter or 0.0004 inch) or less. Inhalable fine particles, or $PM_{2.5}$, have an aerodynamic diameter of 2.5 microns or less (i.e. 2.5 millionths of a meter or 0.0001 inch).

  Some particulate matter, such as pollen, occurs naturally. In the SFBAAB most particulate matter is caused by combustion, factories, construction, grading, demolition, agricultural activities, and motor vehicles. Extended exposure to particulate matter can increase the risk of chronic respiratory disease. PM_{10} is of concern because it bypasses the body's natural filtration system more easily than larger particles, and can lodge deep in the lungs. The EPA and the state of California revised their PM standards several years ago to apply only to these fine particles. $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and contain substances that are particularly harmful to human health. Motor vehicles are currently responsible for about half of particulates in the SFBAAB. Wood burning in fireplaces and stoves is another large source of fine particulates.[6]

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[4] Bay Area Air Quality Management District (BAAQMD), 2011, California Environmental Quality Act Air Quality Guidelines, Appendix C: Sample Air Quality Setting.

[5] California Air Resources Board (CARB), 2011, Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm, accessed on February 16, 2012.

[6] Bay Area Air Quality Management District (BAAQMD), 2011, California Environmental Quality Act Air Quality Guidelines, Appendix C: Sample Air Quality Setting.

Both PM_{10} and $PM_{2.5}$ may adversely affect the human respiratory system, especially in people who are naturally sensitive or susceptible to breathing problems. These health effects include premature death and increased hospital admissions and emergency room visits (primarily the elderly and individuals with cardiopulmonary disease); increased respiratory symptoms and disease (children and individual with asthma); and alterations in lung tissue and structure and in respiratory tract defense mechanisms.[7] Diesel particulate matter (DPM) is classified by CARB as a carcinogen. The SFBAAB is designated as nonattainment under the California AAQS for PM_{10} and nonattainment under both the California and National AAQS for $PM_{2.5}$.[8]

- **Ozone** (O_3) is commonly referred to as "smog" and is a gas that is formed when VOCs and NO_X, both by-products of internal combustion engine exhaust, undergo photochemical reactions in the presence of sunlight. O_3 is a secondary criteria air pollutant. O_3 concentrations are generally highest during the summer months when direct sunlight, light winds, and warm temperatures create favorable conditions to the formation of this pollutant. O_3 poses a health threat to those who already suffer from respiratory diseases as well as to healthy people. O_3 levels usually build up during the day and peak in the afternoon hours. Short-term exposure can irritate the eyes and cause constriction of the airways. Besides causing shortness of breath, it can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Chronic exposure to high ozone levels can permanently damage lung tissue. O_3 can also damage plants and trees and materials such as rubber and fabrics.[9] The SFBAAB is des-

[7] South Coast Air Quality Management District, 2005. *Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning.*

[8] California Air Resources Board (CARB), 2011. Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm, accessed on February 16, 2012.

[9] Bay Area Air Quality Management District (BAAQMD), 2011. California Environmental Quality Act Air Quality Guidelines, Appendix C: Sample Air Quality Setting.

ignated as nonattainment of the 1-hour California AAQS and 8-hour California and National AAQS for O_3.[10]

- **Lead** (Pb) is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

  Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The EPA banned the use of leaded gasoline in highway vehicles in December 1995. As a result of the EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector and levels of lead in the air decreased dramatically.[11] The SFBAAB is designated as in attainment of the California and National AAQS for lead.[12] In addition, compared to the operation of a major industrial facility, the Project would not emit significant amounts of lead, so lead is not a pollutant of major concern for the Project.

[10] California Air Resources Board (CARB), 2011. Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm, accessed on February 16, 2012.

[11] Bay Area Air Quality Management District (BAAQMD), 2011. California Environmental Quality Act Air Quality Guidelines, Appendix C: Sample Air Quality Setting.

[12] California Air Resources Board (CARB), 2011. Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm, accessed on February 16, 2012.

b. Toxic Air Contaminants (TACs)

Public exposure to TACs is a significant environmental health issue in California. In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health. The California Health and Safety Code define a TAC as "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health." A substance that is listed as a hazardous air pollutant pursuant to Section 112(b) of the federal Clean Air Act (42 United States Code §7412[b]) is a toxic air contaminant. Under State law, the California Environmental Protection Agency (Cal/EPA), acting through CARB, is authorized to identify a substance as a TAC if it determines that the substance is an air pollutant that may cause or contribute to an increase in mortality or serious illness, or may pose a present or potential hazard to human health.

California regulates TACs primarily through AB 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics "Hot Spot" Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an "airborne toxics control measure" for sources that emit designated TACs. If there is a safe threshold for a substance (i.e. a point below which there is no toxic effect), the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate toxics best available control technology to minimize emissions. To date, CARB has established formal control measures for 11 TACs, all of which are identified as having no safe threshold.

Air toxics from stationary sources are also regulated in California under the Air Toxics "Hot Spot" Information and Assessment Act of 1987. Under AB 2588, TAC emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High priority facilities are required to perform a health risk assessment (HRA) and, if specific thresholds are exceeded, are required to communicate the results to the public through notices and public meetings.

By the last update to the TAC list in December 1999, CARB had designated 244 compounds as TACs.[13] Additionally, CARB has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines.

In 1998, CARB identified DPM as a TAC. Previously, the individual chemical compounds in diesel exhaust were considered TACs. Almost all diesel exhaust particles are 10 microns or less in diameter. Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lungs.

The BAAQMD's Community Air Risk Evaluation (CARE) program was initiated in 2004 to evaluate and reduce health risks associated with exposures to outdoor TACs in the Bay Area. Based on the annual emissions inventory of TACs for the SFBAAB, DPM was found to account for approximately 80 percent of the cancer risk from airborne toxics. The highest DPM concentrations occur in the urban core areas of eastern San Francisco, western Alameda, and northwestern Santa Clara counties. The major contributor to acute and chronic non-cancer health effects in the SFBAAB is acrolein (C_3H_4O). Major sources of acrolein include on-road mobile sources and aircrafts near freeways and commercial and military airports.[14]

[13] California Air Resources Board (CARB), 1999. Final Staff Report: Update to the Toxic Air Contaminant List.

[14] Bay Area Air Quality Management District (BAAQMD), 2006. Community Air Risk Evaluation Program, Phase I Findings and Policy Recommendations Related to Toxic Air Contaminants in the San Francisco Bay Area.

3. Air Quality Management Planning

Air quality conditions in the SFBAAB have improved significantly since the BAAQMD was created in 1955.[15] The BAAQMD prepares air quality management plans (AQMPs) to attain ambient air quality standards in the SFBAAB. The BAAQMD prepares Ozone Attainment Plans (OAPs) for the National O_3 standard and Clean Air Plans for the California O_3 standard. The BAAQMD prepares these AQMPs in coordination with the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC). The most recent adopted comprehensive plan is the 2010 Bay Area Clean Air Plan, which was adopted on September 15, 2010, and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools.

The purpose of the 2010 Clean Air Plan is to: 1) update the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement all feasible measures to reduce O_3; 2) consider the impacts of O_3 control measures on PM, TAC, and greenhouse gases (GHGs) in a single, integrated plan; 3) review progress in improving air quality in recent years; and 4) establish emission control measures to be adopted or implemented in the 2009 to 2012 timeframe. The 2010 Clean Air Plan also provides the framework for SFBAAB to achieve attainment of the California AAQS. Areas that meet AAQS are classified attainment areas, while areas that do not meet these standards are classified nonattainment areas. Severity classifications for O_3 range from marginal, moderate, and serious to severe and extreme. The attainment status for the SFBAAB is shown in Table 4.2-2. The SFBAAB is currently designated as a nonattainment area for California and National O_3, California and National $PM_{2.5}$, and California PM_{10} AAQS.

[15] Bay Area Air Quality Management District (BAAQMD), 2011. California Environmental Quality Act Air Quality Guidelines, Appendix C: Sample Air Quality Setting.

TABLE 4.2-2 **ATTAINMENT STATUS OF CRITERIA POLLUTANTS IN THE SAN FRANCISCO AIR BASIN**

Pollutant	State	Federal
Ozone – 1-hour	Nonattainment	Nonattainment
Ozone – 8-hour	Nonattainment (serious)	Classification revoked (2005)
PM_{10}	Nonattainment	Unclassified
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment	Attainment
NO2	Attainment	Attainment
SO2	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	Attainment	Unclassified
All others	Unclassified	Unclassified

Source: California Air Resources Board (CARBP), 2011. Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm, accessed on February 16, 2012.

The Contra Costa Transportation Authority (CCTA) is designated as the Congestion Management Agency for the county. The CCTA is responsible for preparing and adopting a biannual Congestion Management Program (CMP). Regional transportation improvements identified in the CMP for the City of Lafayette in the 2011 CMP include:

- East Bay Municipal Utility District (EBMUD) regional bike trail
- Americans with Disabilities Act (ADA) improvements at the Lafayette BART station
- CCTA bus service to Lafayette BART via Pleasant Hill Road
- School Bus Transit Programs[16]

[16] Contra Costa Transportation Authority, 2011. Contra Costa Congestion Management Program.

4. Local Regulations and Policies

The Open Space and Conservation Chapter of the City's General Plan includes the following policies relevant to air quality and the Plan:

- Policy OS-10.1 Regional Planning: Work with the BAAQMD to implement the Regional Clean Air Plan.
- Policy OS-10.2 Air Quality Standards: Seek to comply with State and federal standards for air quality. Programs under this policy include using BAAQMD's CEQA Guidelines during project CEQA review and evaluating new businesses for air pollutant, TAC, and odor emissions.
- Policy OS-10.3 Vehicle Emissions: Improve air quality by reducing the use of single-occupant automobiles. The Circulation Chapter of the General Plan includes policies and programs designed to reduce single-occupant automobile trips and to encourage public transit.

Other chapters of the General Plan contain policies which would have a beneficial effect on air quality. According to the General Plan, the majority of remaining developable land in Lafayette is located downtown, near public transit and the BART station.

- The Circulation Chapter encourages public transit and calls for extending bicycle and pedestrian paths throughout the community. Bicycle and pedestrian-friendly features are required in new developments downtown.
- The Open Space and Conservation Chapter includes policies to plant additional street trees, reduce energy use, and encourage open space.
- The Land Use and Housing Chapters actively encourage multifamily housing affordable to a range of incomes near to public transit and the BART station.

B. Existing Conditions

1. San Francisco Air Basin

The BAAQMD is the regional air quality agency for the SFBAAB, which comprises all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties; the southern portion of Sonoma County, and the southwestern portion of Solano County. Air quality in this area is determined by such natural factors as topography, meteorology, and climate, in addition to the presence of existing air pollution sources and ambient conditions.[17]

a. Meteorology

The SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The Coast Range splits resulting in a western coast gap, Golden Gate, and an eastern coast gap, Carquinez Strait, which allow air to flow in and out of the SFBAAB and the Central Valley.

The climate is dominated by the strength and location of a semi-permanent, subtropical high-pressure cell. During the summer, the Pacific high pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water from below the surface because of the northwesterly flow produces a band of cold water off the California coast. The cool and moisture-laden air approaching the coast from the Pacific Ocean is further cooled by the presence of the cold water band, resulting in condensation and the presence of fog and stratus clouds along the Northern California coast. In the winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms. Weak inversions coupled with moderate winds result in a low air pollution potential.

[17] Bay Area Air Quality Management District (BAAQMD), 2011. California Environmental Quality Act Air Quality Guidelines, Appendix C: Sample Air Quality Setting.

i. Wind Patterns

During the summer, winds flowing from the northwest are drawn inland through the Golden Gate and over the lower portions of the San Francisco Peninsula. Immediately south of Mount Tamalpais, the northwesterly winds accelerate considerably and come more directly from the west as they stream through the Golden Gate. This channeling of wind through the Golden Gate produces a jet that sweeps eastward and splits off to the northwest toward Richmond and to the southwest toward San Jose when it meets the East Bay hills.

Wind speeds may be strong locally in areas where air is channeled through a narrow opening, such as the Carquinez Strait, the Golden Gate, or the San Bruno gap. For example, the average wind speed at San Francisco International Airport in July is about 17 knots (from 3:00 p.m. to 4:00 p.m.), compared with only 7 knots at San Jose and less than 6 knots at the Farallon Islands.

The air flowing in from the coast to the Central Valley, called the sea breeze, begins developing at or near ground level along the coast in late morning or early afternoon. As the day progresses, the sea breeze layer deepens and increases in velocity while spreading inland. The depth of the sea breeze depends in large part upon the height and strength of the inversion. If the inversion is low and strong, and hence stable, the flow of the sea breeze will be inhibited and stagnant conditions are likely to result.

In the winter, the SFBAAB frequently experiences stormy conditions with moderate to strong winds, as well as periods of stagnation with very light winds. Winter stagnation episodes are characterized by nighttime drainage flows in coastal valleys. Drainage is a reversal of the usual daytime air-flow patterns; air moves from the Central Valley toward the coast and back down toward the Bay from the smaller valleys within the SFBAAB.

ii. Temperature

Summertime temperatures in the SFBAAB are determined in large part by the effect of differential heating between land and water surfaces. Because land tends to heat up and cool off more quickly than water, a large-scale gradient (differential) in temperature is often created between the coast and the Central Valley, and small-scale local gradients are often produced along the shorelines of the ocean and bays. The temperature gradient near the ocean is also exaggerated, especially in summer, because of the upwelling of cold ocean bottom water along the coast. On summer afternoons the temperatures at the coast can be 35 degrees Fahrenheit (°F) cooler than temperatures 15 to 20 miles inland. At night this contrast usually decreases to less than 10°F.

In the winter, the relationship of minimum and maximum temperatures is reversed. During the daytime the temperature contrast between the coast and inland areas is small, whereas at night the variation in temperature is large.

iii. Precipitation

The SFBAAB is characterized by moderately wet winters and dry summers. Winter rains (November through March) account for about 75 percent of the average annual rainfall. The amount of annual precipitation can vary greatly from one part of the SFBAAB to another even within short distances. In general, total annual rainfall can reach 40 inches in the mountains, but it is often less than 16 inches in sheltered valleys.

During rainy periods, ventilation (rapid horizontal movement of air and injection of cleaner air) and vertical mixing are usually high, and thus pollution levels tend to be low. However, frequent dry periods do occur during the winter where mixing and ventilation are low and pollutant levels build up.

iv. Wind Circulation

Low wind speed contributes to the buildup of air pollution because it allows more pollutants to be emitted into the air mass per unit of time. Light winds occur most frequently during periods of low sun (fall and winter, and early morning) and at night. These are also periods when air pollutant emissions

from some sources are at their peak, namely, commute traffic (early morning) and wood burning appliances (nighttime). The problem can be compounded in valleys, when weak flows carry the pollutants up-valley during the day, and cold air drainage flows move the air mass down-valley at night. Such restricted movement of trapped air provides little opportunity for ventilation and leads to buildup of pollutants to potentially unhealthful levels.

v. Inversions

An inversion is a layer of warmer air over a layer of cooler air. Inversions affect air quality conditions significantly because they influence the mixing depth, i.e. the vertical depth in the atmosphere available for diluting air contaminants near the ground. There are two types of inversions that occur regularly in the SFBAAB. Elevation inversions are more common in the summer and fall, while radiation inversions are more common during the winter. The highest air pollutant concentrations in the SFBAAB generally occur during inversions.

b. Existing Ambient Air Quality

Existing levels of ambient air quality and historical trends and projections in the vicinity of the Project site are best documented by measurements made by the BAAQMD. The air quality monitoring station closest to the Project site is the Concord 2975 Treat Boulevard Monitoring Station. Data from this station are summarized in Table 4.2-3. The data show recurring violations of both the state and federal O_3 standards and federal $PM_{2.5}$ standard. The state PM_{10} standard has been exceeded six days in the last five years, but has not been exceeded since 2008. The federal PM_{10}, CO, SO_2, and NO_2 standards have not been exceeded in the last five years in the Project vicinity.

2. Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardio-respiratory diseases.

TABLE 4.2-3 **AMBIENT AIR QUALITY MONITORING SUMMARY**

	Number of Days Threshold Were Exceeded and Maximum Levels During Such Violations				
Pollutant/Standard	**2006**	**2007**	**2008**	**2009**	**2010**
Ozone (O_3)					
State 1-Hour ≥ 0.09 ppm	8	1	3	2	2
State 8-hour ≥ 0.07 ppm	14	4	8	5	4
Federal 8-Hour > 0.075 ppm	9	1	6	2	1
Max. 1-Hour Conc. (ppm)	0.117	0.105	0.119	0.106	0.103
Max. 8-Hour Conc. (ppm)	0.093	0.081	0.089	0.088	0.087
Carbon Monoxide (CO)					
State 8-Hour > 9.0 ppm	0	0	0	0	0
Federal 8-Hour ≥ 9.0 ppm	0	0	0	0	0
Max. 8-Hour Conc. (ppm)	1.30	1.41	1.13	1.09	0.095
Nitrogen Dioxide (NO_2)					
State 1-Hour ≥ 0.18 (ppm	0	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.047	0.049	0.050	0.40	0.042
Sulfur Dioxide (SO_2)					
State 24-Hour ≥ 0.04 ppm	0	0	0	0	0
Max. 24-Hour Conc. (ppm)	0.006	0.005	0.005	0.003	0.002
Coarse Particulates (PM_{10})					
State 24-Hour > 50 $\mu g/m^3$	3	2	1	0	0
Federal 24-Hour > 150 $\mu g/m^3$	0	0	0	0	0
Max. 24-Hour Conc. ($\mu g/^{m3}$)	83.6	52.4	50.5	32.5	41.3
Fine Particulates ($PM_{2.5}$)					
Federal 24-Hour > 35 $\mu g/m^3$	5	7	3	1	1
Max. 24-Hour Conc. ($\mu g/m^3$)	62.1	46.8	60.3	39.0	36.4

Notes: ppm: parts per million; $\mu g/m^3$: or micrograms per cubic meter
* = insufficient data

Data obtained from the Concord 2975 Treat Boulevard Monitoring Station.
Source: California Air Resources Board (CARB), 2012. Air Pollution Data Monitoring Cards (2006, 2007, 2008, 2009, and 2010), http://www.arb.ca.gov/adam/index.html.

TABLE 4.2-4 **SENSITIVE RECEPTOR LOCATIONS**

Name	Description	Distance (Feet)	Direction
Nearest Residences	Single Family Residential	180	East
Sienna Ranch	Outdoor activities/summer camp for children	130	Adjacent and northwest
Acalanes High School	School	700	Northeast
Springhill Elementary School	School	2,260	North
Diablo Valley Montessori School	Infants to Kindergarten	1,750	West
Happy Days Learning Center	Day care/after school child care	1,120	Northeast

Source: The Planning Center | DC&E, 2012.

Residential areas are also considered sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Other sensitive receptors include retirement facilities, hospitals, and schools. Recreational land uses are considered moderately sensitive to air pollution. Sensitive receptors in the vicinity of the Project site are shown in Table 4.2-4.

Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial, commercial, retail, and office areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public.

C. Standards of Significance

1. CEQA Appendix G Thresholds

According to the CEQA Appendix G thresholds, the proposed Project would have a significant effect on air quality if it would:

a. Conflict with or obstruct implementation of the applicable air quality plan.

b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

c. 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors).

d. Expose sensitive receptors to substantial pollutant concentrations.

e. Create objectionable odors affecting a substantial number of people.

2. BAAQMD Project-Level Thresholds

The BAAQMD adopted CEQA Guidelines in June 2010, which were revised in May 2011.[18,19] The Guidelines include methodology and thresholds for

[18] On March 5, 2012, the Court issued a ruling in *California Building Industry Association v. Bay Area Air Quality Management District* (Superior Court Case No. RG10548693). Pursuant to the ruling, the Court found that the adoption of the BAAQMD's CEQA Guidelines is a "project" requiring CEQA review. No CEQA review was conducted for the CEQA Guidelines prior to their adoption. Therefore, the Court set aside adoption of the BAAQMD CEQA Guidelines for determining the significance of air quality and greenhouse gas emissions. The Court also ordered BAAQMD to take no further action to disseminate those standards before performing CEQA review related to issuing the standards. While adoption of the thresholds was set aside until an environmental evaluation is conducted, the BAAQMD's GHG significance criteria, as outlined in their CEQA Guidelines, are supported by extensive studies and analysis (see http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx). Accordingly, pursuant to its discretion under CEQA Guidelines section 15064 (b) ("lead agencies may

criteria air pollutant impacts and community health risk. The BAAQMD has adopted screening criteria and significance criteria that would be applicable to the proposed Project. If a project exceeds the screening level, it would be required to conduct a full analysis using the BAAQMD's significance criteria:

a. Criteria Air Pollutants

i. Regional Significance Criteria

The BAAQMD's criteria for regional significance for projects that exceed the screening thresholds are shown in Table 4.2-5. Criteria for both the construction and operational phases of the Project are shown.

ii. Local CO Hotspots

Congested intersections have the potential to create elevated concentrations of CO, referred to as CO hotspots. The significance criteria for CO hotspots are based on the California AAQS for CO, which is 9.0 ppm (8-hour average) and 20.0 ppm (1-hour average). However, with the turnover of older vehicles, introduction of cleaner fuels, and implementation of control technology, the SFBAAB is in attainment of the California and National AAQS, and CO concentrations in the SFBAAB have steadily declined. Because CO concentrations have improved, the BAAQMD does not require a CO hotspot analysis if the following criteria are met:

- Project is consistent with an applicable congestion management program established by the County Congestion Management Agency for designated roads or highways, the regional transportation plan, and local congestion management agency plans.

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exercise their discretion on what criteria to use"), and the recent holding in *Citizen for Responsible Equitable Environmental Development v. City of Chula Vista* (2011) 197 Cal.App.4th 327, 335-336, ("[t]he determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data."), the City has decided to apply the BAAQMD CEQA thresholds to the proposed Project.

[19] Bay Area Air Quality Management District (BAAQMD), 2011. California Environmental Quality Act Air Quality Guidelines, Appendix C: Sample Air Quality Setting.

TABLE 4.2-5 **REGIONAL PROJECT-LEVEL CRITERIA AIR POLLUTANT THRESHOLDS**

Pollutant	Construction (lbs/day)	Operational	
		Average Daily (lbs/day)	Maximum Annual (tpy)
Volatile Organic Compounds (VOCs)	54	54	10
Oxides of Nitrogen (NO_x)	54	54	10
Coarse Inhalable Particulate Matter (PM_{10})	82 (exhaust)	82	15
Fine Inhalable Particulate Matter ($PM_{2.5}$)	54 (exhaust)	54	10
PM_{10}/$PM_{2.5}$ Fugitive Dust	BMPs[a]	N/A	N/A

Notes: BMPs = Best Management Practices
N/A = Not Applicable

[a] Construction activities are required to implement the BAAQMD's Best Management Practices (BMPs) for fugitive dust control.

Source: Bay Area Air Quality Management District, 2011, California Environmental Quality Act Air Quality Guidelines.

- The Project would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
- The Project traffic would not increase traffic volumes at affected intersection 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).[20]

[20] Bay Area Air Quality Management District (BAAQMD), 2011 (Revised). California Environmental Quality Act Air Quality Guidelines.

iii. Odors

The BAAQMD's thresholds for odors are qualitative. The BAAQMD does not consider odors generated from use of construction equipment and activities to be objectionable. For operational phase odor impacts, a project that would result in the siting of a new source of odor or exposure of a new receptor to existing or planned odor sources should consider odor impacts. The BAAQMD considers potential odor impacts to be significant if there are five confirmed complaints per year from a facility, averaged over three years. The BAAQMD has established odor screening thresholds for land uses that have the potential to generate substantial odor complaints, including wastewater treatment plants, landfills or transfer stations, composting facilities, confined animal facilities, food manufacturing, and chemical plants.[21]

b. Community Risk and Hazards

The BAAQMD's significance thresholds for local community risk and hazard impacts apply to both the siting of a new source and to the siting of a new receptor. 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. For assessing community risk and hazards, sources within a 1,000-foot radius are considered. Sources are defined as freeways, high volume roadways (with volume of 10,000 vehicles or more per day or 1,000 trucks per day), and permitted sources.[22] Contra Costa County does not have a qualified risk reduction plan.

i. Siting a New Receptor: Project-Level Community Risk

Project-level emissions of TACs or $PM_{2.5}$ from individual sources within 1,000 feet of the Project that exceed any of the thresholds listed below are considered a potentially significant community health risk:

- Non-compliance with a qualified Community Risk Reduction Plan;

[21] Bay Area Air Quality Management District (BAAQMD), 2011 (Revised). California Environmental Quality Act Air Quality Guidelines.

[22] Bay Area Air Quality Management District (BAAQMD), 2011 (Revised). California Environmental Quality Act Air Quality Guidelines.

- An excess cancer risk level of more than 10 in one million, or a non-cancer (i.e. chronic or acute) hazard index greater than 1.0 would be a significant cumulatively considerable contribution;
- An incremental increase of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$) annual average $PM_{2.5}$ from a single source would be a significant cumulatively considerable contribution.[23]

ii. Siting a New Receptor: Cumulative Community Risk

Cumulative sources represent the combined total risk values of each of the individual sources within the 1,000-foot evaluation zone. A project would have a cumulative 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 or location of a receptor, plus the contribution from the Project, exceeds the following:

- Non-compliance with a qualified Community Risk Reduction Plan; or
- An excess cancer risk levels of more than 100 in one million or a chronic non-cancer hazard index (from all local sources) greater than 10.0; or
- 0.8 $\mu g/m^3$ annual average $PM_{2.5}$.[24]

iii. Construction Risk

The Threshold of Significance for construction-related local community risk and hazard impacts is the same as for Project operations. The BAAQMD has adopted screening tables for air toxics evaluation during construction.[25] Construction-related TAC and PM impacts should be addressed on a case-by-case basis, taking into consideration the specific construction-related characteristics of each project and proximity to off-site receptors, as applicable.[26]

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[23] Bay Area Air Quality Management District (BAAQMD), 2011 (Revised). California Environmental Quality Act Air Quality Guidelines.

[24] Bay Area Air Quality Management District (BAAQMD), 2011 (Revised). California Environmental Quality Act Air Quality Guidelines.

[25] Bay Area Air Quality Management District (BAAQMD), 2010. Screening Tables for Air Toxics Evaluations during Construction.

[26] Bay Area Air Quality Management District (BAAQMD), 2011 (Revised). California Environmental Quality Act Air Quality Guidelines.

D. Impact Discussion

1. Consistency with Clean Air Planning Efforts

The proposed 315-unit Project is below the BAAQMD screening threshold of 494 units and is not considered a regionally significant project that would warrant Intergovernmental Review by MTC pursuant to the CEQA Guidelines (CEQA Guidelines Section 15206). In addition, the proposed Project would not exceed the level of population or housing foreseen in City or regional planning efforts (see Chapter 4.11, Population and Housing) and, therefore, would not have the potential to substantially affect housing, employment, and population projections within the region, which is the basis of the Clean Air Plan projections. Furthermore, regional emissions generated by the proposed Project would be less than the BAAQMD's emissions thresholds.[27] These thresholds are established to identify projects that have the potential to generate a substantial amount of criteria air pollutants. Because the proposed Project would not exceed these thresholds, the proposed Project would not be considered by the BAAQMD to be a substantial emitter of criteria air pollutants. Therefore, the Project would not conflict with or obstruct implementation of the 2010 Bay Area Clean Air Plan and impacts would be considered *less than significant*.

2. Regional Construction Emissions

Criteria air pollutants generated during construction activities typically include the following sources:

- Exhaust emissions from powered construction equipment;
- Fugitive dust generated by demolition, earthmoving, excavation, and other construction activities;
- Motor vehicle emissions associated with vehicle trips; and
- VOCs from the application of asphalt and architectural coatings.

Air pollutant emissions from construction activities on site would vary daily as construction activity levels change and during different construction phases

[27] The proposed Project would fall under BAAQMD's screening thresholds and therefore would have emissions less than BAAQMD's significance thresholds.

of the proposed Project. The BAAQMD screening thresholds for a mid-rise apartment project are 240 dwelling units. The proposed 315-unit Project would exceed this threshold. In addition, the BAAQMD's screening thresholds are not applicable for projects that have overlap of construction phases (e.g. paving and building construction would occur simultaneously), construction of mixed-use projects, projects that require extensive site preparation, or sites that require extensive material transport (i.e. greater than 10,000 cubic yards of import/export). The proposed Project would necessitate removal of a substantial amount of soil haul (300,000 cubic yards) over the approximately 9-month grading period. In addition, the construction phases of the proposed Project would overlap to allow for occupation of portions of the proposed Project while others are being constructed. Therefore, the screening thresholds are not applicable for the proposed Project.

Construction activities are anticipated to commence in 2013 and be completed in approximately 20 months. Demolition of the 5,000 square feet of existing structures on-site would comply with the requirements of CARB airborne toxic control measures and the BAAQMD's Regulation 11, Rule 2, for asbestos demolition. Pursuant to this regulation, construction contractors are required to follow procedures (e.g. Wetting Method or Exhaust or Collection Method) for safely removing asbestos-containing materials in a manner that prevents or minimize the release of such materials. Please see Appendix H for more details on the BAAQMD's requirements. To determine potential construction-related air quality impacts, criteria air pollutants generated by project-related construction activities are compared to the BAAQMD significance thresholds in Table 4.2-5 for average daily emissions. Average daily emissions are based on the annual construction model run and divided by the total number of construction days. As shown in Table 4.2-6, emissions of NO_X exceed the BAAQMD's average daily thresholds. In addition, fugitive dust emissions (PM_{10} and $PM_{2.5}$) are considered to be significant. Consequently, construction-related criteria air pollutant emissions would result in a *significant* impact.

TABLE 4.2-6 ***AVERAGE DAILY CONSTRUCTION EMISSIONS***

	Average Daily Construction Emissions[a] (lbs/day)			
Pollutant	**ROG**	**NO_x**	**Exhaust PM_{10}**	**Exhaust $PM_{2.5}$**
Average Daily Emissions Over 19.9 Month Construction Period	44	168	7	7
BAAQMD Daily Threshold	54	54	82	54
Exceeds Threshold	No	Yes	No	No

Source: CalEEMod, Version 2011.1.1. Average daily emissions are based on the annual construction model run and divided by the total number of construction days. Air quality modeling is based on the construction schedule and construction equipment use provided by the Project applicant.

3. Regional Operational Emissions

Long-term air pollutant emissions generated by a residential development are typically associated with the burning of fossil fuels in cars and trucks (mobile sources); energy use for cooling, heating, and cooking (energy); and landscape equipment (area sources). The primary source of long-term criteria air pollutant emissions generated by the proposed Project would be emissions produced from Project-generated vehicle trips.

Development of the proposed apartment complex is anticipated to generate a maximum of 2,032 weekday vehicle trips.[28] The BAAQMD has adopted screening criteria for operation-related criteria air pollutant emissions. The screening threshold for a mid-rise apartment included in the BAAQMD's CEQA Guidelines is 494 dwelling units, which is higher than the 315-unit proposed Project. The operational phase criteria air pollutant emissions associated with the proposed Project would not exceed the BAAQMD's screening

[28] TJKM, 2012, *Traffic and Circulation Impact Analysis for the Proposed Terraces of Lafayette Project*.

criteria. Consequently, the proposed Project would not cumulatively contribute to the nonattainment designations of the Air Basin, and regional operational phase air quality impacts would be *less than significant*.

4. Construction Risk and Hazards

The proposed Project would elevate concentrations of TACs and diesel-$PM_{2.5}$ in the vicinity of sensitive land uses during construction activities. Sensitive land uses in the vicinity of the Project include single-family residential land uses east of Pleasant Hill Road; a ranch with outdoor classes and summer camp for children directly northwest of the Project site across Deer Hill Road, a day care center along Stanley Boulevard; and several schools in the area (Acalanes High School, Springhill Elementary School, and Diablo Valley Montessori School). The distances and direction to the sensitive receptors are provided in Table 4.2-4.

A construction risk assessment was conducted for diesel particulate matter (DPM), particulate matter less than 2.5 microns ($PM_{2.5}$), and acrolein (C_3H_4O) generated by the Project pursuant to the BAAQMD's guidance methodology.

The BAAQMD has developed screening thresholds for assessing potential health risks from construction activities. Receptors would have to be located more than 520 feet away to fall below the BAAQMD's screening thresholds. Consequently, a full Health Risk Assessment (HRA) of DPM, $PM_{2.5}$, and acrolein was conducted.

Construction sources evaluated in the HRA include off-road construction equipment (excavators, graders, scrapers, dozer, dump trucks, loaders, rollers, and pavers). In addition, on-road haul trucks, support vehicles (pickups), and workers commuting to the Project site were included in the evaluation.

Using air dispersion models, sensitive receptor concentrations were estimated and excess lifetime cancer risks and acute and chronic non-cancer hazard indexes were calculated based on the mitigated construction scenario, with use of Tier 3 engines for large off-road equipment. These risks were then com-

pared to the significance thresholds identified in the BAAQMD CEQA Guidelines.

Results of the health risk assessment indicate that the incremental cancer risk for sensitive receptors proximate to the site during the construction period, based on the maximum receptor concentration for a 70-year, 24-hour outdoor exposure duration, is 4.0×10^{-6} (roughly 4.0 per million), which is less than the significance threshold of 10 per million. For non-carcinogenic effects, the hazard index identified for each toxicological endpoint totaled less than one. Therefore, acute and chronic non-carcinogenic hazards are within acceptable limits. In addition, $PM_{2.5}$ annual concentrations are below the BAAQMD significance thresholds with Tier 3 construction equipment. The results are summarized in Table 4.2-7.

Without the use of Tier 3 construction equipment during the construction period, the Project could pose a risk to nearby off-site receptors, which would be a *significant* impact.

5. On-Site Community Risk and Hazards

In addition to construction-related health risks to the neighboring community, on-site health risks and hazards imposed by existing sources (e.g. stationary sources, traffic) on the sensitive receptors of the Project (i.e. residents in the apartment development) were evaluated pursuant to the BAAQMD's guidance methodology. The BAAQMD has developed screening thresholds for assessing potential health risks from stationary and mobile sources. Stationary and mobile sources located within 1,000 feet of the proposed Project would be subject to evaluation using the BAAQMD's screening thresholds. To evaluate nearby sources, the BAAQMD's database of existing stationary sources and the BAAQMD's surface street screening table for Contra Costa County were utilized.

TABLE 4.2-7 **CONSTRUCTION RISK SUMMARY**

Period	Cancer Risk	Chronic Hazard	Acute Hazard-Acrolein	$PM_{2.5}$
Construction (2013 to 2014)	4.0E-06	0.14	0.47	0.23 ug/m^3
BAAQMD Threshold	10E-06	1.0	1.0	0.3 ug/m^3
Exceeds Threshold?	No	No	No	No

Note: Daily construction emissions incorporate mitigation measures, such as the use of Tier 3 construction equipment.
Source: Construction and Operational Health Risk Assessment, 2012.

Two stationary sources were identified within 1,000 feet of the proposed Project: Shell Gasoline Station at 3255 Stanley Boulevard (235 feet northeast of the Project site) and Svensson Automotive located at 3297 Mount Diablo Boulevard (480 feet south of the Project site).

The mobile sources identified within 1,000 feet of the proposed Project are State Highway 24, Pleasant Hill Road, and Deer Hill Road. The screening level cancer risk and $PM_{2.5}$ concentrations for State Highway 24 result in an exceedance of the BAAQMD significance thresholds. Therefore, a site-specific community risk assessment was conducted to better characterize TAC, DPM, and $PM_{2.5}$ emissions from State Highway 24. The BAAQMD screening results are summarized in Table 4.2-8.

Because the BAAQMD screening analysis tools indicated a potential health risk from vehicles traveling along State Highway 24, as shown in Table 4.2-8, a site-specific community health risk assessment was conducted, taking into account meteorological conditions, truck traffic, dispersion modeling, and specific receptor locations. Results of the community health risk assessment for State Highway 24 indicate that the incremental cancer risk for a resident at the Project site, based on a 70-year, 24-hour outdoor exposure duration, is

TABLE 4.2-8 **ON-SITE COMMUNITY RISK SUMMARY BASED ON BAAQMD SCREENING ANALYSIS TOOLS**

Source	Cancer Risk	Chronic Hazard	Acute Hazard	$PM_{2.5}$
State Highway 24	51.4	0.05	0.031	0.48
Pleasant Hill Road	3.56	< 1.0	< 1.0	0.133
Deer Hill Road	2.34	< 1.0	< 1.0	0.085
Svensson Automotive	0	0	0	0
Shell Gasoline Station[a]	3.08	0.004	< 1.0	NSR
BAAQMD Individual Threshold	10E-06	1.0	1.0	0.3 ug/m^3
Exceeds Threshold	Yes	No	No	Yes

[a] Risk values obtained from the BAAQMD; cancer risk and chronic hazard adjusted using distance multiplier for gas dispensing facilities; NSR = No Significant Risk
Source: Construction and Operational Health Risk Assessment, 2012.

9.4×10^{-6} (roughly 9.4 in a million), which is below the BAAQMD threshold of 1.0×10^{-5} (10 in a million). For non-carcinogenic effects from State Highway 24, the hazard index identified for each toxicological endpoint totaled less than one. Therefore, non-carcinogenic hazards are within acceptable limits and emissions of TAC and DPM from State Highway 24 would not significantly impact the health of persons residing at the Project.

However, the results of the risk assessment indicate that the maximum annual average concentration of $PM_{2.5}$ was predicted to be 0.41 $\mu g/m^3$, which slightly exceeds the BAAQMD significance threshold of 0.3 $\mu g/m^3$. Therefore, the results of this risk assessment, with respect to on-site risk during the operational phase of the Project, indicate that the Project impact would be *significant* for $PM_{2.5}$ concentrations.

6. CO Hotspots

The proposed Project would generate a maximum of 2,032 additional weekday trips.[29] The proposed Project would not conflict with the Contra Costa Transportation Authority Congestion Management Program (CMP) because it would not hinder the capital improvements outlined in the CMP or alter regional travel patterns. Furthermore, the proposed Project would not increase traffic volumes at affected intersections by more than 44,000 vehicles per hour or 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited. Trips associated with the proposed Project would not exceed the screening criteria of the BAAQMD, therefore impacts associated CO hotspots would be *less than significant*.

7. Odors

The proposed Project is a 315-unit residential development. Construction and operation of this type of project would not generate substantial odors or be subject to odors that would affect a substantial number of people. Therefore, the impact would be *less than significant*.

E. Cumulative Impacts

This section analyzes potential impacts related to air quality that could occur from a combination of the proposed Project with other past, present, and reasonably foreseeable projects within the Air Basin. Any project that produces a significant project-level regional air quality impact in an area that is in nonattainment adds to the cumulative impact. Due to the extent of the area potentially impacted from cumulative project emissions (the air basin), a project is cumulatively significant when project-related emissions exceed the BAAQMD emissions thresholds shown in Table 4.2-5. As described above, the proposed Project would have no impact or less than significant operational (including AQMP consistency), on-site community risk and hazards, CO

[29] TJKM, 2012, *Traffic and Circulation Impact Analysis for the Proposed Terraces of Lafayette Project*.

hotspot, and odor impacts. Therefore, the proposed Project's operational contribution to cumulative air quality impacts would be *less than significant*.

Construction-related exhaust/off-gas and fugitive dust emissions would exceed the BAAQMD's significance thresholds. In addition, the BAAQMD has adopted cumulative thresholds for community risk and hazards. Cumulative impacts are described in more detail below.

1. Construction

The Air Basin is designated as nonattainment for O_3, $PM_{2.5}$, and PM_{10} (California AAQS only) under the California and National AAQS.[30] Construction of cumulative projects will further degrade the regional and local air quality. Air quality will be temporarily impacted during project-related construction activities. As identified previously, construction activities would result in a temporary increase in criteria air pollutants that exceed the BAAQMD's regional significance thresholds. This would be a *significant* cumulative impact.

2. Off-Site Community Risk and Hazards

Adjacent sensitive land uses could be potentially impacted by construction activities and cumulative emissions of TACs. Criteria pollutants from multiple construction projects would further degrade regional and local air quality. As previously noted, air quality would be temporarily impacted during project-related construction activities. With implementation of Mitigation Measures AQ-1, AQ-2a, AQ-2b, and AQ-3, project-related construction emissions would not exceed the BAAQMD significance thresholds. Therefore, the Project's contribution to cumulative air quality impacts during construction activities would be *less than significant*.

[30] California Air Resources Board (CARB), 2011. Area Designations: Activities and Maps, http://www.arb.ca.gov/desig/adm/adm.htm, accessed on February 16, 2012.

3. On-Site Community Risk and Hazards

Construction activities of multiple projects could further degrade regional and local air quality. Results of the BAAQMD screening analysis, as shown in Table 4.2-9, indicate that the cumulative cancer risk for a resident of the Project site attributed to all stationary and mobile sources within 1,000 feet of the Project is 60 x 10^{-6} (roughly 60 per million), which is less than the significance threshold of 100 per million for cumulative sources. In addition, the site-specific risk assessment for State Highway 24 indicates that the actual cancer risk for State Highway 24 is much less than the screening value of 51.4 per million. The calculated cancer risk reported in the community risk assessment is 9.4 x 10^{-6}, which reduces the cumulative cancer risk further. For non-carcinogenic effects, the hazard index identified for each toxicological endpoint totaled less than one. Therefore, chronic non-carcinogenic hazards are within acceptable limits. In addition, $PM_{2.5}$ average annual concentrations are below the BAAQMD cumulative significance thresholds. Therefore, the Project's on-site cumulative air quality impacts due to stationary and mobile sources would be *less than significant*.

F. Impacts and Mitigation Measures

Impact AQ-1: Grading and other ground-disturbing activities would produce fugitive dust, which could add to the amount of airborne particulates and contribute to the nonattainment designation of the Air Basin.

Mitigation Measure AQ-1: The Project shall comply with the following BAAQMD Basic Control Measures for reducing construction emissions of PM_{10}:

- Water all active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.

TABLE 4.2-9 **ON-SITE CUMULATIVE COMMUNITY RISK SUMMARY**

	Cancer Risk	Chronic Hazard	$PM_{2.5}$
Total Risk	60	0.05	0.70
BAAQMD Cumulative Threshold	100	10	0.8
Exceeds Threshold	No	No	No

Sources: Construction and Operational Health Risk Assessment, 2012; BAAQMD, 2011.
There is no cumulative threshold for the Acute Hazard Index.

- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 24 inches of freeboard (i.e. the minimum required space between the top of the load and the top of the trailer).
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep streets (with water sweepers using reclaimed water if possible) at the end of each day if visible soil material is carried onto adjacent paved roads.

Significance after Mitigation: Adherence to the BAAQMD Basic Control Measures for reducing construction emissions of PM_{10} and $PM_{2.5}$ would ensure that ground-disturbing activities would not generate a significant amount of fugitive dust. Fugitive dust impacts would be reduced to *less than significant.*

Impact AQ-2: Use of heavy off-road and on-road construction equipment would produce substantial emissions of criteria air pollutants, which would exceed the BAAQMD threshold of significance for NO_X and could contrib-

ute to the O_3 and particulate matter nonattainment designations of the Air Basin. This would be a *significant* impact.

Mitigation Measure AQ-2a: The construction contractor shall implement the following measures to reduce off-road exhaust emissions during grading and construction activities. To assure compliance, the City of Lafayette shall verify that these measures have been implemented during normal construction site inspections:

- Large off-road construction equipment with horsepower (hp) ratings of 50 hp or higher shall meet the United States Environmental Protection Agency-Certified emission standard for Tier 3 off-road equipment. Tier 3 engines between 50 and 750 horsepower are available for 2006 to 2008 model years. A list of construction equipment by type and model year shall be maintained by the construction contractor on-site.
- All construction equipment shall be properly serviced and maintained to the manufacturer's standards to reduce operational emissions.
- Nonessential idling of construction equipment shall be limited to no more than five consecutive minutes.

Mitigation Measure AQ-2b: The construction contractor shall implement one of the following measures to reduce on-road emissions from soil hauling. To assure compliance, the City of Lafayette shall verify that these measures have been implemented during normal construction site inspections.

- The construction contractor shall contract with haulers for soil export that use engines certified to 2007 or newer standards. Prior to construction, the Project engineer shall ensure that grading plans clearly show the requirement for 2007 engines for soil haul trucks; Or
- Off-site disposal of soil shall be limited to no more than 303 truck trips per day (1,520 CY/day).

Significance after Mitigation: Use of more efficient construction equipment as required by Mitigation Measure AQ-2, would reduce criteria air pollutant emissions. As shown in Table 4.2-10, the impact would remain *significant and unavoidable.*

Impact AQ-3: Results of the community risk assessment indicate that the average annual $PM_{2.5}$ concentration for a maximally exposed on-site receptor would exceed the BAAQMD significance threshold of 0.3 $\mu g/m^3$. This would be a *significant* impact.

Mitigation Measure AQ-3: The applicant shall install high efficiency Minimum Efficiency Reporting Value (MERV) filters with a rating of 9 to 12 in the intake of the residential ventilation systems. MERV 9 to 12 filters have a Particle Size Efficiency Rating that results in a 40 percent up to 80 percent reduction of particulates in the 1.0 to 3.0 micron range, which includes $PM_{2.5}$. To ensure long-term maintenance and replacement of the MERV filters in the individual units, the owner/property manager shall maintain and replace the MERV 9 to 12 filters in accordance with the manufacturer's recommendations, which typically is after two to three months. The developer, sales, and/or rental representative also shall provide notification to all affected tenants/residents of the potential health risk from State Highway 24 and shall inform renters of increased risk of exposure to $PM_{2.5}$ from State Highway 24 when the windows are open.

Significance after Mitigation: Use of MERV filters with a rating of 9 to 12 in the ventilation systems of the dwelling units would reduce $PM_{2.5}$ concentrations up to 80 percent. With implementation of this measure, $PM_{2.5}$ impacts would be *less than significant.*

Impact AQ-4: Without the use of Tier 3 construction equipment during the construction period, the Project could pose a risk to nearby off-site receptors, which would be a *significant* impact.

TABLE 4.2-10 **AVERAGE DAILY CONSTRUCTION EMISSIONS – MITIGATED SCENARIO**

	Average Daily Construction Emissions[a] (lbs/day)			
Pollutant	**ROG**	**NO_x**	**Exhaust PM_{10}**	**Exhaust $PM_{2.5}$**
Average Daily Emissions Over 19.9-Month Construction Period	41	133	6	6
BAAQMD Daily Threshold	54	54	82	54
Exceeds Threshold	No	Yes	No	No

Source: CalEEMod, Version 2011.1.1. Includes restrictions on daily haul amount and use of Tier 3 off-road equipment.

Mitigation Measure AQ-4: Implement Mitigation Measure AQ-2a.

Significance after Mitigation: With the use of Tier 3 engines for the off-road construction equipment, the results of the construction risk assessment indicate that annual $PM_{2.5}$ concentrations would be reduced by approximately 60 percent, to a level below BAAQMD thresholds. Therefore, after mitigation this impact would be *less than significant.*

Impact AQ-5: Construction activities associated with the Project would result in a temporary increase in criteria air pollutants that exceed the BAAQMD's regional significance thresholds and, when combined with the construction of cumulative projects, would further degrade the regional and local air quality. This would be a *significant* cumulative impact.

Mitigation Measure AQ-5: Implement Mitigation Measures AQ-1, AQ-2a, AQ-2b, and AQ-3.

Significance after Mitigation: With the implementation of Mitigation Measures AQ-1, AQ-2a, AQ-2b, and AQ-3, project-related construction emissions would continue to exceed the BAAQMD significance thresh-

olds. Therefore, the Project's contribution to cumulative air quality impacts during construction activities would be s*ignificant and unavoidable*.