IV. ENVIRONMENTAL IMPACT ANALYSIS
C. AIR QUALITY

INTRODUCTION

The information and analysis in this section is based on the following report prepared for the proposed project, which is included in Appendix D of this Draft EIR:

- Illingworth & Rodkin, Upper Road Residential Land Division Construction Health Risk Assessment, Ross, California, April 9, 2013.

METHODOLOGY

The potential air quality impacts are discussed below, in the Initial Study (Appendix A), and in the Air Quality Assessment (Appendix D) by qualitatively and quantitatively assessing the air pollutant emissions resulting from the construction of the proposed project. Construction related emissions would include construction equipment exhaust and fugitive dust associated with grading activities. For operational impacts, the project size screening threshold as contained in the 2010 Bay Area Air Quality Management District's (BAAQMD) CEQA Guidelines was identified at 325 dwelling units. Since the project proposes three units, emissions would be below the BAAQMD significance thresholds for operational emissions. Therefore, operational impacts would be ***less than significant*** and were not evaluated.

In addition, the project's consistency with all applicable State, regional, and local rules and regulations was assessed using the State CEQA Guidelines, the *BAAQMD CEQA Guidelines,* and the Town of Ross General Plan as guidance.

ENVIRONMENTAL SETTING

Project Location

The project site is located in the western area of the Town of Ross and is comprised of an approximately 36-acre parcel of sloped, hillside land on the southeastern section of Bald Hill, which is located on the northern slope of Mount Tamalpais. The site is adjacent to Marin Municipal Water District lands and Natalie Coffin Greene Park (a Town facility) on the west and southerly sides. The subject site is currently occupied with two non-habitable dilapidated small cabins, a greenhouse, deck, and wooden water tanks. The Town of Ross is located in the jurisdiction of the BAAQMD, which regulates stationary sources of air pollution in the nine counties that surround San Francisco Bay: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma counties. The air quality within the regional air basin is influenced by a wide range of emissions sources, such as dense population centers, heavy vehicular traffic, and industry.

Climate and Topography

The project site is located in the eastern portion of Marin County, which is bounded on the west by the Pacific Ocean, on the east by San Pablo Bay, on the south by the Golden Gate, which connects San Francisco Bay to the Pacific Ocean, and on the north by the Petaluma Gap, which is a geographical region in Sonoma County which extends in a band from the Pacific Ocean to San Pablo Bay. Most of Marin's population lives in the eastern part of the county, in small, sheltered valleys. These valleys act like a series of miniature air basins.

Although there are a few mountains above 1,500 feet, most of the terrain is only 800 to 1,000 feet high, which usually is not high enough to block the marine layer. Because of the wedge shape of the county, northeast Marin County is further from the ocean than is the southeastern section. This extra distance from the ocean allows the marine air to be moderated by bayside conditions as it travels to northeastern Marin County. In southern Marin the distance from the ocean is short and elevations are lower, resulting in higher incidence of maritime air in that area.

Wind speeds are highest along the west coast of Marin, averaging about 8 to 10 miles per hour. The complex terrain in central Marin creates sufficient friction to slow the air flow. At Hamilton Air Force Base, in Novato, the annual average wind speeds are only 5 mph. The prevailing wind directions throughout Marin County are generally from the northwest.

In the summer months, areas along the coast are usually subject to onshore movement of cool marine air. In the winter, proximity to the ocean keeps the coastal regions relatively warm, with temperatures varying little throughout the year. Coastal temperatures are usually in the high-50's in the winter and the low-60's in the summer. The warmest months are September and October.

The eastern side of Marin County has warmer weather than the western side because of its distance from the ocean and because the hills that separate eastern Marin from western Marin occasionally block the flow of the marine air. The temperatures of cities next to the Bay are moderated by the cooling effect of the Bay in the summer and the warming effect of the Bay in the winter. For example, San Rafael experiences average maximum summer temperatures in the low-80's and average minimum winter temperatures in the low-40's. Inland towns such as Kentfield experience average maximum temperatures that are two degrees cooler in the winter and two degrees warmer in the summer.[1]

Air pollution potential is highest in eastern Marin County, where most of population is located in semi-sheltered valleys. In the southeast, the influence of marine air keeps pollution levels low. As development moves further north, there is greater potential for air pollution to build up because the valleys are more sheltered from the sea breeze. While Marin County does not have many polluting industries, the air quality on its eastern side - especially along the U.S. 101 corridor - may be affected by emissions from increasing motor vehicle use within and through the county.

[1] *Bay Area Air Quality Management District. 2010. BAAQMD CEQA Air Quality Guidelines. May.*

Ambient air quality standards have been established at both the State and federal level. The Bay Area meets all ambient air quality standards with the exception of ground-level ozone, respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$).

High ozone levels are caused by the cumulative emissions of reactive organic gases (ROG) and nitrogen oxides (NOx). These precursor pollutants react under certain meteorological conditions to form high ozone levels. Controlling the emissions of these precursor pollutants is the focus of the Bay Area's attempts to reduce ozone levels. Highest ozone levels in the Bay Area occur in the eastern and southern inland valleys that are downwind of air pollutant sources. High ozone levels aggravate respiratory and cardiovascular diseases, reduced lung function, and increase coughing and chest discomfort.

Particulate matter is another problematic air pollutant of the Bay Area. Particulate matter is assessed and measured in terms of respirable particulate matter or particles that have a diameter of 10 microns or less (PM_{10}) and fine particulate matter where particles have a diameter of 2.5 microns or less ($PM_{2.5}$). Elevated concentrations of PM_{10} and $PM_{2.5}$ are the result of both region-wide (or cumulative) emissions and localized emissions. High particulate matter levels aggravate respiratory and cardiovascular diseases, reduce lung function, increase mortality (e.g., lung cancer), and result in reduced lung function growth in children.

As discussed earlier, BAAQMD is the regional agency tasked with managing air quality in the region. At the State level, the California Air Resources Board (CARB, which is a part of the California Environmental Protection Agency) oversees regional air district activities and regulates air quality at the State level. The BAAQMD's updated CEQA Air Quality Guidelines, dated May 2010, were used in this assessment to evaluate air quality impacts of projects, as discussed further in this section.

Existing Air Quality Conditions

Presently, three categories of air pollutants are regulated by federal, state, and/or regional government agencies; criteria pollutants, toxic air contaminants (TACs), and greenhouse gases. These air pollutants, which are emitted in the San Francisco Bay Area Air Basin (Basin) via "everyday" activities, can pose significant health and environmental risks. A detailed description of each air pollutant category, the existing major sources of these air pollutants in the Basin, and the overall air quality conditions of the Basin are discussed below.

Criteria Air Pollutants

The Federal Clean Air Act (FCAA) of 1970, and subsequent Federal Clean Air Act Amendments (FCAAA) of 1977 and 1990, required the establishment of national ambient air quality standards (NAAQS) for wide-spread pollutants considered harmful to public health and the environment. These pollutants, commonly referred to as criteria pollutants, include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). A description of each criteria pollutant as well as their potential health impacts are presented below.

- **Ozone (O_3)** is a highly reactive and unstable gas that is formed when reactive organic gases (ROGs) and nitrogen oxides (NO_X), both byproducts of internal combustion engine exhaust, undergo slow photochemical reactions in the presence of sunlight. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable to the formation of this pollutant. Short-term exposures (lasting for a few hours) to ozone at levels typically observed in areas of high ozone can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. Elevated ozone levels may lead to increases in school absences, daily hospital admission rates, as well as mortality rates.

- **Carbon Monoxide (CO)** is a colorless, odorless gas produced by the incomplete combustion of carbon-containing fuels, such as gasoline or wood. CO concentrations tend to be the highest during the winter morning, when little to no wind and surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines, motor vehicles operating at slow speeds are the primary source of CO in the Basin. The highest ambient CO concentrations are generally found near congested transportation corridors and intersections.

  Inhaled CO has no direct toxic effect on the lungs, but exerts its effect on tissues by interfering with oxygen transport. Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include patients with diseases involving heart and blood vessels, fetuses, and patients with chronic hypoxemia (oxygen deficiency) as seen in high altitudes. Exposure to low levels of CO can cause fatigue, headaches, nausea, and dizziness, as well as aggravating cardiovascular disease. High concentrations of CO may be lethal with death resulting from asphyxiation.

- **Respirable Particulate Matter (PM_{10}) and Fine Particulate Matter ($PM_{2.5}$)** consist of extremely small, suspended particles or droplets 10 microns and 2.5 microns or smaller in diameter. Some sources of particulate matter, like pollen and windstorms, are naturally occurring. However, in populated areas, most particulate matter is caused by road dust, diesel soot, combustion products, abrasion of tires and brakes, and construction activities. A consistent correlation between elevated ambient fine particulate matter (PM_{10} and $PM_{2.5}$) levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and the world. The elderly, people with pre-existing respiratory or cardiovascular disease and children are more susceptible to the effects of high levels of PM_{10} and $PM_{2.5}$.

- **Nitrogen dioxide (NO_2)** is a nitrogen oxide compound that is produced from the combustion of fossil fuels, such as in internal combustion engines (both gasoline and diesel powered) and power plant facilities. Of the seven types of nitrogen oxide compounds, NO_2 is the most abundant in the atmosphere. Commuters in heavy traffic may be exposed to higher concentrations of NO_2 than those indicated by regional monitors. Short term exposure to NO_2 may lead to an increased resistance to air flow and airway contraction. Larger decreases in lung functions are observed in individuals with asthma or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these sub-groups. Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children (not infants), is associated with long-term exposures to NO_2.

- **Sulfur dioxide (SO_2)** is a colorless, extremely irritating gas or liquid. It enters the atmosphere mainly as a result of burning high sulfur-content fuel oils and coal, as well as from chemical processes occurring at chemical plants and refineries. When SO_2 oxidizes in the atmosphere, it forms sulfates (SO_4). Collectively, these pollutants are referred to as sulfur oxides (SO_X). Acute exposure to SO_2 can cause an increase in resistance to air flow, as well as reduction in breathing capacity leading to severe breathing difficulties in asthmatics. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of SO_2. Very high levels of exposure to SO_2 can cause lung edema (fluid accumulation), lung tissue damage, and sloughing off of cells lining the respiratory tract.

- **Lead (Pb)** occurs in the atmosphere as particulate matter. Present sources of Pb include the manufacturing and recycling of batteries, paint, ink, ceramics, ammunition, and the use of secondary Pb smelters. The combustion of leaded gasoline was the primary source of airborne Pb in the region until the use of leaded gasoline was no longer permitted for on-road motor vehicles. Pb is also present in many soils and can get re-suspended in the air.

  Fetuses, infants, and children are more sensitive than others to the adverse effects of Pb exposure. Exposure to low levels of Pb can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased Pb levels are associated with increased blood pressure. Pb poisoning can cause anemia, lethargy, seizures, and death; although it appears that there are no direct effects of Pb on the respiratory system.

The average daily emissions of criteria pollutants from existing regional and local sources in the project vicinity are listed below in Table IV.C-1.

Table IV.C-1
2010 Estimated Average Daily Regional & Local Emissions

Emissions Source	Emissions in Tons Per Day					
	ROG	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
San Francisco Bay Area Air Basin						
Stationary Sources	107.1	45.2	51.3	47.1	16.6	12.4
Area-Wide Sources	89.1	163.2	17.2	0.6	179.3	53.6
Mobile Sources	165.3	1,393.3	395.7	39	23.6	19.4
Natural (non-anthropogenic) Sources	106.5	49.4	1.6	0.5	5.1	4.3
Total Emissions	465.7	1,645.1	415.8	62.7	220.8	85.9
Marin County						
Stationary Sources	2.4	0.4	0.4	0.0	0.7	0.6
Area-Wide Sources	4.5	13.9	1.0	0.0	9.1	3.8
Mobile Sources	8.7	60.2	18.8	3.7	1.4	1.2
Natural (non-anthropogenic) Sources	7.0	3.9	0.1	0.0	0.4	0.3
Total Emissions	22.6	78.4	21.3	3.7	11.6	5.9

Source: California Air Resources Board, website: http://www.arb.ca.gov/app/emsinv/emseic1_query.php, May 2013.

Stationary (point) sources occur at an identified location and are usually associated with manufacturing and industry. Examples are boilers or combustion equipment that produces electricity or generates heat. Area sources are widely distributed and produce many small emissions. Examples of area sources include residential and commercial water heaters, painting operations, lawn mowers, agricultural fields, landfills, and consumer products such as barbeque lighter fluid and hair spray.

Mobile sources refer to emissions from motor vehicles, including tailpipe and evaporative emissions, and are classified as either on-road or off-road. On-road sources may be legally operated on roadways and highways. Off-road sources include aircraft, ships, trains, racecars, and self-propelled construction equipment. Mobile sources account for the majority of the air pollutant emissions within the Basin. Air pollutants can also be generated by the natural environment (natural non-anthropogenic sources). For example, fine dust particles are pulled off the ground surface and suspended in the air during high winds.

Toxic Air Contaminants (TACs)

Toxic Air Contaminants (TACs) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer or serious illness) and include, but are not limited to, the criteria air pollutants listed above. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a highway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state and federal level. The identification, regulation and monitoring of TACs is relatively new compared to that for criteria air pollutants that have established ambient air quality standards. TACs are regulated or evaluated on the basis of risk to human health rather than comparison to an ambient air quality standard or emission-based threshold. Diesel exhaust is the predominant TAC in urban air and is estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average). Table IV.C-2 describes health effects of the major criteria air pollutants in the Bay Area.

Diesel Particulate Matter

Diesel exhaust, in the form of diesel particulate matter (DPM), is the predominant TAC in urban air with the potential to cause cancer. It is estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average). According to the CARB, diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the State's Proposition 65 or under the federal Hazardous Air Pollutants programs. California has adopted a comprehensive diesel risk reduction program. The U.S. EPA and the CARB have adopted low-sulfur diesel fuel standards in 2006 that reduce diesel particulate matter substantially. The CARB recently adopted new regulations requiring the retrofit and/or replacement of construction equipment, on-highway diesel trucks and diesel buses in order to lower fine particulate matter ($PM_{2.5}$) emissions and reduce statewide cancer risk from diesel exhaust.

Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. For cancer risk assessments, children are the most sensitive receptors, since they are more susceptible to cancer causing TACs. Residential locations are assumed to include infants and small children. The closest sensitive receptors to the project site are single-family residences located north and east of the site boundaries as well as residences along Upper Road that would be adjacent to truck traffic.

The preferred technique for reducing toxic air emissions is source reduction, and as part of a local control strategy in the Bay Area, all applications for new stationary sources are reviewed to ensure compliance with required emission controls and limits. The BAAQMD maintains an inventory of stationary sources of toxic air contaminants that emit TACs above certain threshold quantities in the Bay Area. A summary of health effects of air pollutants is provided in Table IV.C-2.

Table IV.C-2
Health Effects Summary of the Major Criteria Air Pollutants in the Bay Area

Air Pollutant	Adverse Effects
Ozone	eye irritation, respiratory function impairment
Carbon Monoxide	impairment of oxygen transport in the blood stream, aggravation of cardiovascular disease, impairment of central nervous system function, fatigue, headache, confusion, dizziness, fatal in the case of very high concentrations in enclosed places
Nitrogen Dioxide	risk of acute and chronic respiratory illness
Sulfur Dioxide	aggravation of chronic obstruction lung disease, increased risk of acute and chronic respiratory illness
Lead	impairment of blood functions and nerve constriction, behavioral and learning problems in children
Particulate Matter (PM_{10} and $PM_{2.5}$)	may be inhaled and lodge in and irritate the lungs, increased risk of chronic respiratory disease with long exposure, altered lung function in children, and may produce acute illness with sulfur dioxide

Source: Bay Area Air Quality Management District (BAAQMD), CEQA Air Quality Guidelines, Updated May 2010.

Ambient Air Quality

As discussed above, the FCAA requires the United States Environmental Protection Agency (U.S. EPA) to set NAAQS for six common air pollutants, typically referred to as “criteria pollutants.” The FCAA also afforded individual states the option to adopt standards that are more stringent and/or include other pollutants. As such, the CARB also established ambient air quality standards for the state (CAAQS) as outlined in the 1988 California Clean Air Act (CCAA). The national and state ambient air quality standards have been set at levels designed to protect human health, with an adequate margin of safety, including sensitive populations such as children, the elderly, and individuals suffering from respiratory disease.

Air quality in the Basin is monitored by the BAAQMD, which operates a regional network of air pollution monitoring stations to determine if the federal and state standards for criteria air pollutants (NAAQS and CAAQS) are being achieved. Table IV.C-3 identifies the NAAQS and CAAQS for relevant air pollutants, the concentrations registered, and the violations of State and Federal pollutant standards that have occurred at the San Rafael Monitoring Station in 2012.

As shown in Table IV.C-3, the San Rafael monitoring station measurements indicate that the ambient air concentrations have not exceeded the NAAQS or the CAAQS for CO, O_3, and NO_2 from 2012 (most recent data available).

Attainment Status

Ambient air concentrations of criteria pollutants are used by the U.S. EPA and the CARB to assess and classify the air quality of each air basin, county, or a specific developed area. The classification is determined by comparing actual monitoring data with federal and state standards. If a pollutant concentration in an area is lower than the federal and/or state standard, the area is classified as being in "attainment." If the pollutant concentration exceeds the federal and/or state standard, the area is classified as a "non-attainment" area. If there is not enough data available to determine whether the standard is exceeded in an area, the area is designated "unclassified." The attainment status for the Basin is outlined below in Table IV.C-4. As shown in Table IV.C-4, the Basin is considered "non-attainment" for the O_3 (8-hour), and is considered "non-attainment" for the O_3 (1-hour and 8-hour), PM_{10} (24-hour and AAM) and $PM_{2.5}$ (AAM) state standards.

REGULATORY SETTING

Air quality within the Basin is addressed through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, and policy-making aimed at regulating air pollutants of concern as defined under the FCAA and the CCAA. The agencies and legislation responsible for improving the air quality within the Basin are discussed below.

Federal Oversight

The FCAA governs air quality in the United States and is administered by the U.S. EPA. In addition to administering the FCAA, the U.S. EPA is also responsible for setting and enforcing the NAAQS for atmospheric pollutants. As part of its enforcement responsibilities, the U.S. EPA requires each state with non-attainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution. These measures need to incorporate performance standards and market-based programs that can be met within the timeframe identified in the SIP.

Table IV.C-3
Summary of 2012 Ambient Air Quality in the Project Vicinity

Emissions Source	Standard	Year 2012
Carbon Monoxide (CO)		
Maximum 1-hour concentration measured		2.3 ppm
Days exceeding national 1-hour standard	35 ppm	0
Days exceeding State 1-hour standard	20 ppm	0
Maximum 8-hour concentration measured		1.1 ppm
Days exceeding national & State 8-hour standard	9.0 ppm	0
Ozone (O_3)		
Maximum 1-hour concentration measured		76 ppb
Days exceeding State 1-hour standard	0.09 ppm	0
Maximum 8-hour concentration		57 ppb
Days exceeding national 8-hour standard	0.075 ppm	0
Days exceeding State 8-hour standard	0.070 ppm	0
Nitrogen Dioxide (NO_2)[1]		
Maximum 1-hour concentration measured		52 ppb
Days exceeding State 1-hour standard	0.25 ppm[1]	0
Annual Arithmetic Mean (AAM)		11 ppb
Exceedance of national AAM standard?	0.053 ppm	No
Exceedance of State AAM standard?	0.030 ppm	No
Respirable Particulate Matter (PM_{10})[2]		
Maximum 24-hour concentration measured		37
Days exceeding national 24-hour standard	150 µg/m^3	0
Days exceeding State 24-hour standard	50 µg/m^3	0
Annual Arithmetic Mean (AAM)		13.2
Exceedance of State AAM standard?	20 µg/m^3	No
Fine Particulate Matter ($PM_{2.5}$)[3]		
Maximum 24-hour concentration measured		26.5 µg/m^3
Days exceeding national 24-hour standard	35 µg/m^3	0
Annual Arithmetic Mean (AAM)		8 µg/m^3
Exceedance of national AAM standard?	15 µg/m^3	No
Exceedance of State AAM standard?	12 µg/m^3	No

Notes: ppm = parts per million by volume
µg/m^3 = micrograms per cubic meter
Source: BAAQMD, May 2013. http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Quality-Summaries.aspx

Table IV.C-4
Ambient Air Quality Attainment Status for San Francisco Air Basin

Pollutant	State-Level Attainment Status	National-Level Attainment Status
Ozone (1-hour)	Non-attainment	N/A
Ozone (8-hour)	Non-attainment	Non-attainment
Particulates (PM_{10}), (24-hour)	Non-attainment	Unclassified
Particulates (PM_{10}), (AAM)	Non-attainment	N/A
Fine Particulates ($PM_{2.5}$), (24-hour)	N/A	Attainment
Fine Particulates ($PM_{2.5}$), (AAM)	Non-attainment	Attainment
Carbon Monoxide (1-hour)	Attainment	Attainment
Carbon Monoxide (8-hr)	Attainment	Attainment
Nitrogen Dioxide (1-hour)	Attainment	Attainment
Nitrogen Dioxide (AAM)	N/A	Attainment
Sulfur Dioxide (1-hour)	Attainment	Attainment
Sulfur Dioxide (24-hour)	Attainment	N/A
Lead (Pb) (Calendar Quarter)	N/A	Attainment
Lead (Pb) (30 Day Average)	Attainment	N/A

Note: N/A = not applicable
Source: BAAQMD, http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm, accessed May, 2013.

State Oversight

The CARB, a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, the CARB conducts research, sets CAAQS, compiles emission inventories, develops suggested control measures, and prepares the SIP. For example, the CARB establishes emissions standards for motor vehicles sold in California, consumer products (e.g., hair spray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. The CARB also oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level.

Regional Oversight

The BAAQMD is primarily responsible for planning, implementing, and enforcing the federal and State ambient air quality standards in the Bay Area. Air quality plans addressing the California Clean Air Act are developed about every three years. The BAAQMD adopted the 2010 Bay Area Clean Air Plan in September, 2010, which is the latest update to the 1991 Clean Air Plan addressing progress toward attaining the California ozone standard. The plan was prepared to address the more stringent requirements of the California Clean Air Act with respect to ozone, including a comprehensive strategy to reduce emissions from stationary, area, and mobile sources. The plan objective is to indicate how the region would make progress toward attaining the stricter state air quality standards, as mandated by the CCAA. The plan includes the following:

- Updates the recent Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement “all feasible measures” to reduce ozone levels;
- Provides a control strategy to reduce ozone, PM, TACs, and greenhouse gases (GHGs) in a single, integrated plan;
- Reviews progress in improving air quality in recent years; and
- Establishes emission control measures to be adopted or implemented in the 2010-2012 time frame.

The Bay Area currently attains the national annual average and 24-hour standards for PM_{10}, and the national annual average standard for $PM_{2.5}$. The EPA significantly tightened the national 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$ (micro-grams per cubic meter) to 35 $\mu g/m^3$ in 2006. Based on air quality monitoring data for the 2006-2008 period, which showed the Bay Area exceeding the revised standard by a small margin, the EPA designated the Bay Area as non-attainment for the 24-hour national $PM_{2.5}$ standard in December 2009. However, on December 6, 2012, the CARB approved Resolution 12-31 approving the $PM_{2.5}$ Inventory submittal to the SIP for the Bay Area. On December 18, 2012, the EPA Regional Administrator signed a final rule determining that the San Francisco Bay Area nonattainment area has attained and continues to attain the 2006 24-hour $PM_{2.5}$ NAAQS.

The Basin is currently designated as a nonattainment area for state and national ozone standards. The Basin’s nonattainment status is attributed to the region’s development history. Past, present and future development projects contribute to the region’s adverse air quality impacts on a cumulative basis. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, to result in nonattainment of ambient air quality standards. Instead, a project’s individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project’s contribution to the cumulative impact is considerable, then the project’s impact on air quality would be considered significant.

On November 1, 2001, the CARB approved the San Francisco Bay Area 2001 Ozone Attainment Plan for the 1-Hour National Ozone Standard (2001 Plan) as a revision to the State Implementation Plan (SIP). The BAAQMD and its co-lead agencies, the Metropolitan Transportation Commission ABAG adopted the 2001 Plan on October 26, 2001.

The BAAQMD prepared the 2001 Plan because the Bay Area failed to attain the federal ozone standard by its 2000 deadline. As a result, the U.S. EPA disapproved the Bay Area's 1999 Plan and required a new plan with updated volatile organic compounds (VOC) and nitrogen oxides (NOx) emissions inventory, new transportation conformity budgets, and that shows attainment of the federal ozone standard by 2006. The 2001 Plan contains a control strategy with seven new stationary source measures, five new transportation control measures (TCMs), and eleven further-study measures. The 2001 Plan also includes a new attainment assessment based on currently available data for the Bay Area. On November 30, 2001, ARB submitted the 2001 Plan to U.S. EPA for approval as a revision to the California SIP. To support the on-road motor vehicle emission inventory and transportation conformity budgets in the Plan, ARB also transmitted the San Francisco Bay Area-EMFAC2000 model to U.S. EPA for approval for the Bay Area. Air Resources Board Resolution 01-27 documenting Board action on the 2001 Bay Area Plan and related issues. The project would conform with the 2001 Plan and, therefore, the State Implementation Plan (SIP).

At a public hearing on September 15, 2010, the Air District Board of Directors adopted the final Bay Area 2010 Clean Air Plan (CAP), and certified the Final Environmental Impact Report on the CAP. The 2010 CAP serves to update the Bay Area ozone plan in compliance with the requirements of the Chapter 10 of the California Health & Safety Code. In addition, the 2010 CAP provides an integrated, multi-pollutant strategy to improve air quality, protect public health, and protect the climate.

In May 2010, the BAAQMD adopted new CEQA Guidelines with the purpose to assist lead agencies in evaluating air quality impacts of projects and plans proposed in the Basin. The Guidelines provides BAAQMD-recommended procedures for evaluating potential air quality impacts during the environmental review process consistent with CEQA requirements. These revised Guidelines supersede the BAAQMD's previous CEQA guidance.

Local Oversight

Local jurisdictions, such as the Town of Ross, have the authority and responsibility to reduce air pollution through its policies and decision-making authority. Specifically, the Town of Ross is responsible for the assessment and mitigation of air emissions resulting from its land use decisions. The Town of Ross' 2010 General Plan does not include an Air Quality Element, but the Conservation Element has a policy to promote the conservation of all water, soil, wildlife, vegetation, energy, minerals and other natural resources.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

This analysis considers the science informing the BAAQMD thresholds as being supported by substantial evidence. Scientific information supporting the thresholds was documented in BAAQMD's proposed thresholds of significance analysis.[2] The thresholds will not cause any indirect impact in terms of land use development patterns insofar as this project is concerned, because the proposal to construct the project is not influenced by the BAAQMD guidelines. Accordingly, this report uses the thresholds and methodologies from BAAQMD's May 2011 CEQA Air Quality Guidelines to determine whether there would be any project construction health risk impacts.

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[2] *BAAQMD, 2010. California Environmental Quality Act Guidelines Update Proposed Thresholds of Significance. December.*

In accordance with Appendix G of Title 14, Chapter 3 of the California Code of Regulations (CCR's): The 2006 CEQA Guidelines, the proposed project would have a significant environmental impact 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;

f) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment;

g) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

In addition, if emissions of TACs or $PM_{2.5}$ exceed any of the thresholds of significance listed below, the proposed project would result in a significant impact and mitigation would be required.

- An excess cancer risk level of more than 10 in 1 million, or a non-cancer (chronic or acute) hazard index greater than 1.0.
- An incremental increase of more than 0.3 micrograms per cubic meter ($\mu g/m^3$) annual average $PM_{2.5}$.

Air Quality Issues not Further Analyzed

The following section relates to significance thresholds a, e, f and g. The following issues were addressed in the Initial Study (see Appendix A) and Section IV.A of the Draft EIR, and were determined to result in a less-than-significant impact and not warrant further analysis:

- Conflict with or Obstruct Implementation of the Applicable Air Quality Plan, and
- Create Objectionable Odors Affecting a Substantial Number of People.

Based on the Initial Study, operational air quality impacts of the project were determined to not be significant; therefore, such operational impacts are not further analyzed in this Draft SEIR. For operational impacts, the project size threshold was identified at 325 dwelling units. Since the project proposes three units, emissions would be below the BAAQMD significance thresholds for operational emissions.

For greenhouse gas emissions, the BAAQMD considers single family residential projects with more than 56 dwelling units to have a potentially significant impact. Smaller projects, such as this proposed project, are considered to have less-than-significant emissions. Therefore, greenhouse gas emissions were not further analyzed in this Draft SEIR.

Project Impacts and Mitigation Measures

Impact AIR-1: Construction Phase Sensitive Receptor Impacts – Community Risks

The following section relates to significance thresholds b, c, d and bulleted thresholds. Project construction activity would involve demolition of the existing on-site structures and construction of new buildings. Demolition and construction activities would generate dust and diesel exhaust emissions. Most of the dust would be generated during grading activities. If uncontrolled, PM_{10} levels downwind of actively disturbed areas could possibly exceed State ambient air quality standards. In addition, dust fall on adjacent properties could be a nuisance and result in a significant impact. The amount of dust generated would be highly variable and is dependent on the size of the area disturbed at any given time, amount of activity, soil conditions and meteorological conditions. Typical winds during late spring through summer are from the north. Nearby land uses, especially those residences located immediately to the south and southeast could be adversely affected by dust generated during construction activities. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be ***less than significant*** if best management practices are employed to reduce these emissions.

The following analysis addresses impacts from construction TAC emissions caused by the proposed project. The closest existing residences to the project site are residences located to the north and the east of the project boundary (see Figure IV.C-1). A screening health risk assessment of the project construction activities was conducted that evaluated potential health effects at these nearby sensitive receptors from construction emissions of DPM. A dispersion model was used to predict the off-site concentrations resulting from project construction so that lifetime cancer risks could be predicted. Figure IV.C-1 shows the project site and sensitive receptor locations (residences) used in the air quality dispersion modeling analysis where potential health impacts were evaluated.

Construction period diesel exhaust emissions were computed using California Emissions Estimator Model (CalEEMod) version 2011.1.1 for off-road construction equipment and from the EMFAC2011 model for emissions from trucks (e.g., haul trucks and water trucks). The number and types of construction equipment and diesel vehicles, along with the anticipated length of their use, for the grading phase of construction were based on a site-specific activity schedule. This included the estimated number of days the equipment would operate for each phase and the average number of hours per day of operation. Off-road equipment horsepower estimates were based on the defaults used by CalEEMod, unless otherwise provided by the applicant. The model default emission rates for construction equipment were assumed. Construction of the project is anticipated to occur over about an 20-month period. Construction emissions were computed for the following phases:

Grading and Site Preparation

On-site and off-site construction emissions associated with site preparation, grading/excavation and placement of infrastructure were computed using CalEEMod for two scenarios: (1) Proposed project with no off-site hauling of soil and (2) Project construction alternative that would include the off-site hauling of excavated soil material. The results of the latter analysis are included in Section VI (Alternatives to the Proposed Project) of this Draft SEIR. The primary difference for the soil hauling alternative is the use of trucks to haul an estimated 27,000 cubic yards (CY) of soil using “Super Dump” type trucks having a capacity of 12 CY. This would require approximately 98 working days with an average of 54 truck trips. The CalEEMod modeling, performed by Tamura and Associates is included as Appendix A to Appendix D of the Draft SEIR. Only the on-site emissions of 0.03 tons of $PM_{2.5}$ (60 pounds) exhaust were included for the on-site emissions. Off-site emissions were modeled separately using the CARB’s EMFAC2011 mobile source emissions model for heavy-duty trucks traveling at 10 miles per hour.

Residential Building Construction

Building construction of three residential units was modeled using the CalEEMod model. Project specific estimates for equipment usage and duration were input to the model.

The U.S. EPA ISCST3 dispersion model was used to predict concentrations of DPM at existing residences in the vicinity of the project site. The ISCST3 modeling utilized area sources to represent the on-site emissions from project grading and construction areas. Three area sources were used to represent the areas where grading and site preparation would occur and three area sources were used for construction activities, one for each building site. An emission release height of 6 meters was used for all area sources. The elevated source height reflects the height of the equipment exhaust pipes and buoyancy of the exhaust plume. Emissions from truck travel were modeled as a line area source (a series of adjacent line sources along the roadway) extending from the building sites to Upper Road then along Upper Road until the intersection of Upper Road and Glenwood Avenue. DPM concentrations were calculated at nearby sensitive receptors at a breathing height of 1.8 meters (5.9 feet).

Since representative historical meteorological data are not available, the modeling relied upon screening meteorological data provided by the BAAQMD. The screening meteorological data, which are comprised of 54 combinations of wind speed and atmospheric stability that represent meteorological conditions that may exist over a 24-hour period (daytime and nighttime conditions), are based on the meteorological conditions used by the SCREEN3 model. The screening meteorological conditions were used to model worst-hour concentrations. These worst-hour concentrations were then converted to annual concentrations, needed to address cancer, non-cancer chronic health risk impacts and annual $PM_{2.5}$ concentrations, by applying the BAAQMD recommended conversion factor of 0.1 to the 1-hour concentrations.

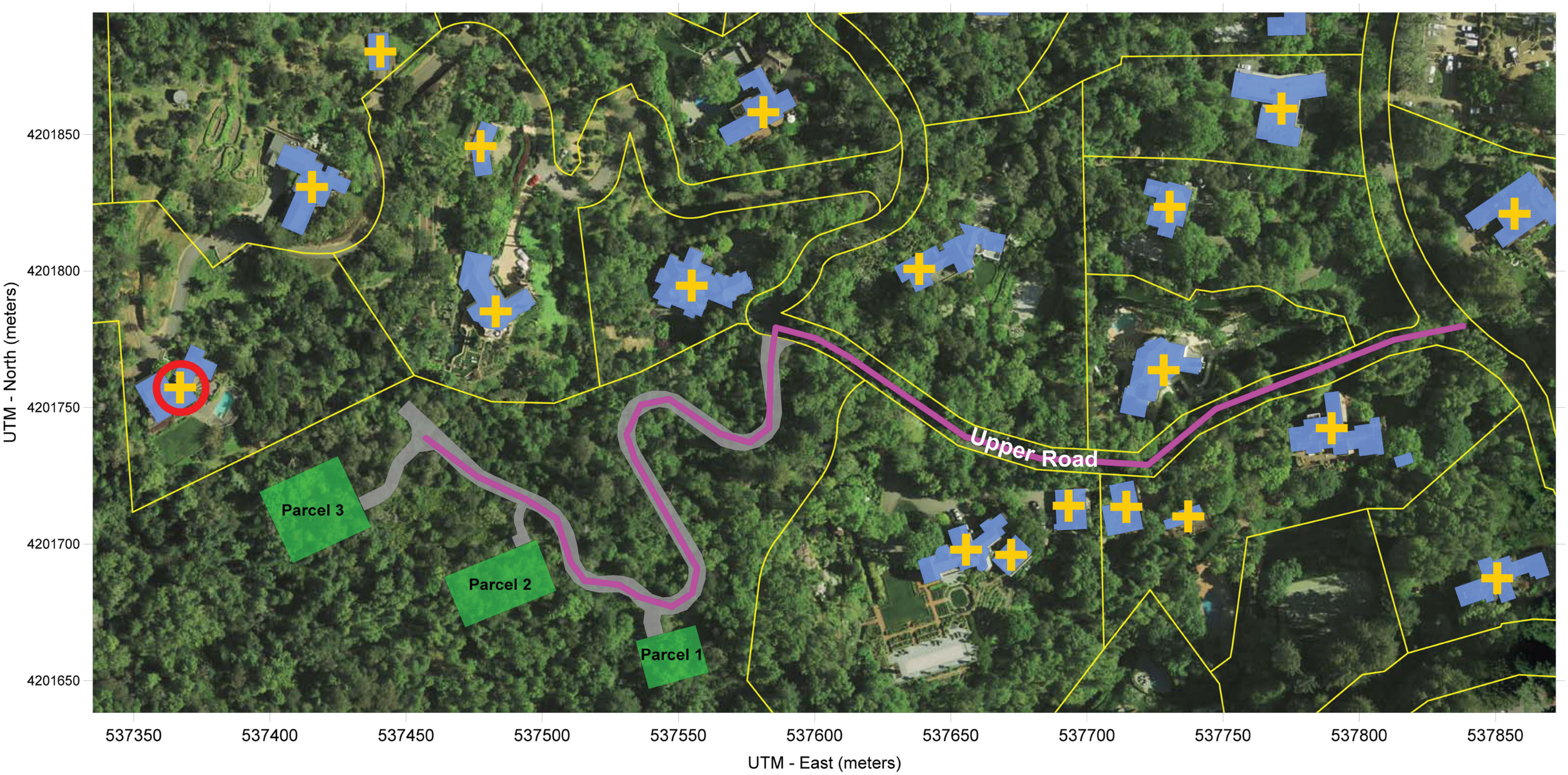

Figure IV.C-1 Project Construction Site, Off-Haul Route, Sensitive Receptor Locations, and Location of Maximum Exposed Individual (MEI)

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The maximum-modeled DPM concentration occurred at a residence adjacent to the northern boundary of the construction area. The location of this receptor is identified on Figure IV.C-1. Increased cancer risks were calculated using the maximum modeled annual DPM concentrations and BAAQMD recommended risk assessment methods that include both child exposures (3rd trimester through two years of age) and adult exposures. Infant and child exposures were assumed to occur at residences throughout the entire construction period.

Predicted excess cancer risk, annual $PM_{2.5}$ concentrations, hazard index, and thresholds used to judge the significance of these impacts are reported in Table IV.C-5 below.

Table IV.C-5
Predicted Community Risk Impacts from Construction Activities

Project Scenario	Excess Cancer Risk (per million)	Annual $PM_{2.5}$ Concentration ($\mu g/m^3$)	Hazard Index
Proposed Project	10.1 Child 0.5 Adult	0.12	<0.1
BAAQMD Thresholds	*10.0*	*0.3*	*1.0*

Results of this assessment indicate that the maximum construction residential child cancer risk would be 10.1 in one million and a residential adult cancer risk of 0.5 in one million for the proposed project. The child cancer risks slightly exceed the BAAQMD's threshold used for evaluating cancer risk of 10 excess cancer cases per million. This is considered to be a ***potentially significant*** impact. Note that the predicted cancer risk is based on the assumption that an infant would be present at the location of maximum risk and would be present at that location almost continuously throughout the construction period.

The maximum annual $PM_{2.5}$ concentrations would be 0.12 $\mu g/m^3$, which would be below the BAAQMD significance threshold of 0.3 $\mu g/m^3$ and therefore ***less than significant***. Associated non-cancer hazards would be well below BAAQMD thresholds for DPM, with a chronic hazard index computed at less than 0.1. This hazard index is much lower than the BAAQMD significance threshold of greater than 1.0 and therefore ***less than significant***.

The Bay Area is considered a non-attainment area for ground-level ozone and fine particulate matter ($PM_{2.5}$) under both the Federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for respirable particulates or particulate matter with a diameter of less than 10 micrometers (PM_{10}) under the California Clean Air Act, but not the Federal act. The area has attained both State and Federal ambient air quality standards for carbon monoxide. As part of an effort to attain and maintain ambient air quality standards for ozone and PM_{10}, the BAAQMD has established thresholds of significance for these air pollutants and their precursors. These thresholds are for ozone precursor pollutants (ROG and NOx), PM_{10} and $PM_{2.5}$ and apply to both construction period and operational period impacts. Due to the size of the proposed project, the project would not result in project-specific impacts for any criteria pollutant and would not have a considerable contribution to cumulative criteria pollutant impacts. Impacts would be ***less than significant***.

Mitigation Measure AIR-1:

Approximately 80 to 85 percent of the excess cancer risk attributable to the entire construction project would result from on-site grading. BAAQMD CEQA Air Quality Guidelines recommend mitigation measures to reduce fugitive dust emissions that also include specific measures to reduce exhaust emissions. Implementation of the measure recommended by the BAAQMD and listed below would reduce the air quality impacts associated with demolition and new construction to a less-than-significant impact. The following conditions shall be printed on the first sheet(s) of plans submitted for the building permit:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph. Speed limit signs shall be posted for construction workers.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. A publicly visible sign shall be posted with the telephone number of the Town's building inspector to contact regarding any dust complaints. This person shall respond and require corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

In addition, the project shall include the following measure to reduce diesel exhaust emissions during the grading phase of construction:

1. Any diesel-powered construction equipment greater than 50 horsepower in size (including generators and compressors) operated on the site for more than 2 days shall meet U.S. EPA particulate matter emissions standards for Tier 2 engines or equivalent.

2. Minimize the number of hours that equipment will operate including the use of idling restrictions.

Implementation of the BAAQMD recommended mitigation measures, which are basic measures recommended by their 2010 CEQA Air Quality Guidelines, is considered to reduce exhaust emissions by 5 percent. Implementation of the recommended measures to reduce on-site construction diesel exhaust would further reduce on-site diesel exhaust emissions. The computed maximum excess residential child cancer risk with implementation of Mitigation Measure AIR-1 would be a child excess cancer 7.2 in one million for the proposed project. With implementation of these mitigation measures, the project would have a less-than-significant impact with respect to community risk caused by construction activities.

CUMULATIVE IMPACTS

In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary. As described above, the child cancer risks associated with the project construction phase slightly exceed the BAAQMD's threshold used for evaluating cancer risk of 10 excess cancer cases per million, representing a potentially significant project impact. Implementation of Mitigation Measure AIR-1 would reduce this impact to a less-than-significant level. All other air quality impacts associated with the proposed project would be less than significant. After mitigation, the project would not have an individual significant impact and would not have a cumulatively considerable contribution to ozone or particulate matter levels. Impacts would be ***less than significant***.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

With the implementation of Mitigation Measure AIR-1, air quality impacts related to grading and construction emissions would be ***less than significant***.