5.3 AIR QUALITY

This section examines the air quality in the project area, includes a summary of applicable air quality regulations, and analyzes potential air quality impacts associated with the proposed project. Air quality impacts were assessed in accordance with methodologies recommended by the California Air Resources Board (CARB) and the Shasta County Air Quality Management District (SCAQMD). Where quantification was required, emissions were modeled using the California Emissions Estimator Model (CalEEMod). Air quality technical data is included in Appendix 15.3, AIR QUALITY/GREENHOUSE GAS EMISSIONS DATA.

5.3.1 ENVIRONMENTAL SETTING

NORTHERN SACRAMENTO VALLEY AIR BASIN

The proposed project is located five miles east of the City of Redding, between the unincorporated communities of Bella Vista and Palo Cedro, which is in Shasta County at the northern end of the Northern Sacramento Valley Air Basin (NSVAB). The NSVAB consists of a total of seven counties: Sutter, Yuba, Colusa, Butte, Glenn, Tehama, and Shasta. The NSVAB is bounded on the north and west by the Coastal Mountain Range and on the east by the southern portion of the Cascade Mountain Range and the northern portion of the Sierra Nevada range. These mountain ranges reach heights in excess of 6,000 feet above mean sea level, with individual peaks rising much higher. The mountains form a substantial physical barrier to locally created pollution as well as that transported northward on prevailing winds from the Sacramento metropolitan area.[1]

The environmental conditions of Shasta County are conducive to potentially adverse air quality conditions. The basin area traps pollutants between two mountain ranges to the east and the west. This problem is exacerbated by a temperature inversion layer that traps air at lower levels below an overlying layer of warmer air. Prevailing winds in the area are from the south and southwest. Sea breezes flow over the San Francisco Bay Area and into the Sacramento Valley, transporting pollutants from the large urban areas. Growth and urbanization in Shasta County have also contributed to an increase in emissions.

AIR POLLUTANTS OF CONCERN

The air pollutants emitted into the ambient air by stationary and mobile sources are regulated by federal and state laws. These regulated air pollutants are known as “criteria air pollutants” and are categorized into primary and secondary pollutants. Primary air pollutants are those that are emitted directly from sources. Carbon monoxide (CO), reactive organic gases (ROG), nitrogen oxide (NO_X), sulfur dioxide (SO_2), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), lead, and fugitive dust are primary air pollutants. Of these, CO, SO_2, PM_{10}, and $PM_{2.5}$ are criteria pollutants. ROG and NO_X are criteria pollutant precursors and go on to form secondary criteria pollutants through chemical and photochemical reactions in the atmosphere. Ozone (O_3) and nitrogen dioxide (NO_2) are the principal secondary pollutants. Sources and health effects commonly associated with criteria pollutants are summarized in Table 5.3-1, CRITERIA AIR POLLUTANTS SUMMARY OF COMMON SOURCES AND EFFECTS.

[1] SVBAPCC (Sacramento Valley Basinwide Air Pollution Control Council). 2015. *Northern Sacramento Valley Planning Area 2015 Triennial Air Quality Attainment Plan*.

Table 5.3-1
CRITERIA AIR POLLUTANTS SUMMARY OF COMMON SOURCES AND EFFECTS

Pollutant	Major Man-Made Sources	Human Health & Welfare Effects
Carbon Monoxide (CO)	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
Nitrogen Dioxide (NO_2)	A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Sources include motor vehicles, electric utilities, and other sources that burn fuel.	Respiratory irritant; aggravates lung and heart problems. Precursor to ozone and acid rain. Contributes to global warming and nutrient overloading which deteriorates water quality. Causes brown discoloration of the atmosphere.
Ozone (O_3)	Formed by a chemical reaction between volatile organic compounds (VOC) and nitrous oxides (NOx) in the presence of sunlight. VOCs are also commonly referred to as reactive organic gases (ROGs). Common sources of these precursor pollutants include motor vehicle exhaust, industrial emissions, gasoline storage and transport, solvents, paints, and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing, and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield. Damages rubber, some textiles, and dyes.
Particulate Matter (PM_{10} & $PM_{2.5}$)	Produced by power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles, and others.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility (haze).
Sulfur Dioxide (SO_2)	A colorless, nonflammable gas formed when fuel containing sulfur is burned; when gasoline is extracted from oil; or when metal is extracted from ore. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships.	Respiratory irritant. Aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid which can damage marble, iron and steel. Damages crops and natural vegetation. Impairs visibility. Precursor to acid rain.

Source: CAPCOA (California Air Pollution Control Officers Association). 2013. Health Effects. [online]: *http://www.capcoa.org/health-effects/*. Accessed on January 14, 2016.

Ambient Air Quality

Criteria Air Pollutant Monitoring Data

Ambient air quality in Shasta County, and thus at the project site, can be inferred from ambient air quality measurements conducted at air quality monitoring stations. Existing levels of ambient air quality and historical trends and projections in the region are documented by measurements made by the SCAQMD, which is the air pollution regulatory agency for the portion of the NSVAB in Shasta County. These measurements are affected by pollutants generated by the urbanized land uses in Shasta County as well as by land uses in the entire NSVAB and beyond.

Ozone, PM_{10}, and $PM_{2.5}$ are the primary pollutants affecting the NSVAB. The nearest air quality monitoring site to the project site that monitors ambient concentrations of ozone and airborne particulates is located on the roof of the Redding Health Department in Redding, approximately 7 miles west of the project site. Table 5.3-2, AMBIENT AIR QUALITY MONITORING DATA, summarizes the published data since 2014 for each year that the monitoring data is provided.

Table 5.3-2
AMBIENT AIR QUALITY MONITORING DATA

Pollutant Standards	2014[1]	2015[1]	2016[1]
Ozone			
Max 1-hour concentration (ppm)	0.090	0.078	0.084
Max 8-hour concentration (ppm) (state/federal)	0.079 / 0.078	0.069 / 0.069	0.074 / 0.074
Number of days above state 1-hour standard	0	0	0
Number of days above state/federal 8-hour standard	5 / 5	0 / 0	5 / 5
Coarse Particulate Matter			
Max 24-hour concentration (µg/m^3) (state/federal)	72.8 /71.7	78.3 / 80.3	27.6 / 28.4
Number of days above state/federal standard	1 / 0	1 / 0	0 / 0
Fine Particulate Matter			
Max 24-hour concentration (µg/m^3) (state/federal)	22.2 / 22.2	64.6 / 64.6	12.6 / 12.6
Number of days above federal standard	0	0 / 1	0 / 0

µg/m^3 = micrograms per cubic meter; ppm = parts per million; * = No data is currently available to determine the value.

Notes:

1. Measurements taken at the Redding Health Department Monitoring Station located at 2630 Hospital Lane, Redding, California 96001.

Source: CARB (California Air Resources Board). 2017. *Aerometric Data Analysis and Management System (ADAM) Air Quality Data Statistics*. [online]: http://www.arb.ca.gov/adam/index.html. Accessed on September 5, 2017.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. TACs are considered either carcinogenic or noncarcinogenic based on the nature of the health effects associated with exposure to the pollutant. For regulatory purposes, carcinogenic TACs are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes, such as petroleum refining and chrome-plating operations; commercial operations, such as gasoline stations and dry cleaners; and motor vehicle exhaust. Public exposure to TACs can result from emissions from normal operations, as well as from accidental releases of hazardous materials during upset conditions. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage, or short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches. To date, CARB has designated nearly 200 compounds as TACs. 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 a relatively few compounds.

Most recently, CARB identified diesel particulate matter (DPM) as a toxic air contaminant. DPM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Diesel exhaust is a complex mixture of particles and gases produced when an engine burns diesel fuel. DPM is a concern because it causes lung cancer; many compounds found in diesel exhaust are carcinogenic. DPM includes the particle-phase constituents in diesel exhaust. The chemical composition and particle sizes of DPM vary between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), fuel formulations (high/low sulfur fuel), and the year of the engine.[2] Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and diesel exhaust can cause coughs, headaches, light-headedness, and nausea. DPM poses the greatest health risk among the TACs. Almost all diesel exhaust particle mass is 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 lung.

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 cardiorespiratory diseases. Residential areas are considered to be 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. Children are considered more susceptible to health effects of air pollution due to their immature immune systems and developing organs.[3] As such, schools are also considered sensitive receptors, as children are present for extended durations and engage in regular outdoor activities. The project site is located in an area of large-lot single family homes. The nearest residential land uses would be those surrounding the project site on the western and southern boundaries. No schools, hospitals, or senior care homes exist in the immediate area.

5.3.2 REGULATORY SETTING

FEDERAL AND STATE

Ambient Air Quality Standards

The proposed project has the ability to release gaseous emissions of criteria pollutants and dust into the ambient air; therefore, development activities under the proposed project fall under the ambient air quality standards promulgated at the local, state, and federal levels. The federal Clean Air Act of 1971 and the Clean Air Act Amendments (1977) established the national ambient air quality standards (NAAQS), which are promulgated by the U.S. Environmental Protection Agency (EPA). The State of California has also adopted its own California ambient air quality standards (CAAQS), which are promulgated by CARB. Implementation of the project would occur in the Shasta County portion of the NSVAB, which is under the air quality regulatory jurisdiction of the SCAQMD and is subject to the rules and regulations adopted by the air district to achieve the NAAQS and CAAQS. As shown in Table 5.3-3, AIR QUALITY STANDARDS, these pollutants include O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. 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] EPA (U.S. Environmental Protection Agency). 2002. *Health Assessment Document for Diesel Engine Exhaust.* [online]: http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=29060. Accessed on January 14, 2016.
[3] OEHHA (Office of Environmental Health Hazard Assessment). 2007. *Air Toxicology and Epidemiology: Air Pollution and Children's Health*. [online]: http://oehha.ca.gov/public_info/facts/airkids.html. Accessed on January 14, 2016.

Table 5.3-3
AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards	National Standards
Ozone (O_3)	8 Hour	0.070 ppm (137µg/m^3)	0.070 ppm
	1 Hour	0.09 ppm (180 µg/m^3)	—
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
Nitrogen Dioxide (NO_2)	1 Hour	0.18 ppm (339 µg/m^3)	100 ppb
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	53 ppb (100 µg/m^3)
Sulfur Dioxide (SO_2)	24 Hour	0.04 ppm (105 µg/m^3)	0.14 (for certain areas)
	3 Hour	—	N/A
	1 Hour	0.25 ppm (665 µg/m^3)	75 ppb
Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N/A
	24 Hour	50 µg/m^3	150 µg/m^3
Particulate Matter – Fine ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	12 µg/m^3
	24 Hour	N/A	35 µg/m^3
Sulfates	24 Hour	25 µg/m^3	N/A
Lead	Calendar Quarter	N/A	1.5 µg/m^3
	30 Day Average	1.5 µg/m^3)	N/A
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	N/A
Vinyl Chloride (chloroethene)	24 Hour	0.01 ppm (26 µg/m^3)	N/A
Visibility-Reducing Particles	8 Hour (10:00 to 18:00 PST)	—	N/A

mg/m^3=milligrams per cubic meter; ppm=parts per million; ppb=parts per billion; µg/m^3=micrograms per cubic meter
Source: CARB (California Air Resources Board). 2013. *Ambient Air Quality Standards*. [online]: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed on January 14, 2016.

Air Quality Attainment Plans

In 1994, the air districts in the Northern Sacramento Valley Planning Area (NSVPA), which includes the SCAQMD jurisdiction, prepared an Air Quality Attainment Plan for ozone. This plan was updated in 1997, 2000, 2003, 2006, 2009, 2012, and again in 2015. Like the preceding plans, the 2015 plan focuses on the adoption and implementation of control measures for stationary sources, area-wide sources, indirect sources, and public information and education programs. The 2015 plan also addresses the effect that pollutant transport has on the NSVPA's ability to meet and attain the state standards.

The Air Quality Attainment Plan provides local guidance for air basins to achieve attainment of ambient air quality standards. Areas that meet ambient air quality standards are classified as attainment areas, while areas that do not meet these standards are classified as nonattainment areas. Areas for which there is insufficient data available are designated unclassified. The attainment status for the Shasta County portion of the NSVAB is included in Table 5.3-4, FEDERAL AND STATE AMBIENT AIR QUALITY ATTAINMENT STATUS FOR SHASTA COUNTY. The region is nonattainment for state ozone and PM_{10} standards.

Table 5.3-4
FEDERAL AND STATE AMBIENT AIR QUALITY ATTAINMENT STATUS FOR SHASTA COUNTY

Pollutant	Federal	State
8-Hour Ozone (O_3)	Unclassified/Attainment	Nonattainment
Coarse Particulate Matter (PM_{10})	Unclassified	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Unclassified/Attainment	Attainment
Carbon Monoxide (CO)	Unclassified/Attainment	Unclassified
Nitrogen Dioxide (NO_2)	Unclassified/Attainment	Attainment
Sulfur Dioxide (SO_2)	Unclassified	Attainment

Source: CARB (California Air Resources Board). 2013. State and Federal Area Designation Maps. [online]: http://www.arb.ca.gov/desig/adm/adm.htm. Accessed on January 14, 2016.

Toxic Air Contaminant Regulations

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 Health and Safety Code defines 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 subsection (b) of Section 112 of the federal Clean Air Act (42 United States Code Section 7412[b]) is a TAC. Under state law, the California Environmental Protection Agency, acting through CARB, is authorized to identify a substance as a TAC if it determines the substance is an air pollutant that may cause or contribute to an increase in mortality or to an increase in serious illness, or may pose a present or potential hazard to human health.

California regulates TACs primarily through Assembly Bill (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 toxic air contaminants. 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 (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 eleven 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 and, if specific thresholds are exceeded, are required to communicate the results to the public in the form of notices and public meetings.

Since the last update to the TAC list in December 1999, CARB has designated 244 compounds as toxic air contaminants.[4] 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.

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

California Diesel Risk Reduction Plan

In September 2000, CARB adopted the Diesel Risk Reduction Plan (DRRP), which recommends many control measures to reduce the risks associated with DPM and achieve a goal of an 85 percent reduction of DPM generated by 2020. The DRRP incorporates measures to reduce emissions from diesel-fueled vehicles and stationary diesel-fueled engines. Ongoing efforts by CARB to reduce diesel-exhaust emissions from these sources include the development of specific statewide regulations, which are designed to further reduce DPM emissions. The goal of each regulation is to make diesel engines as clean as possible by establishing state-of-the-art technology requirements or emission standards to reduce DPM emissions.

Since the initial adoption of the DRRP in September 2000, CARB has adopted numerous rules related to the reduction of DPM from mobile sources, as well as the use of cleaner-burning fuels. Transportation sources addressed by these rules include public transit buses, school buses, on-road heavy-duty trucks, and off-road heavy-duty equipment.

On-Road Heavy-Duty Diesel Vehicles (In Use) Regulation

CARB's On-Road Heavy-Duty Diesel Vehicles (In Use) Regulation requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. Heavier trucks were required to be retrofitted with particulate matter filters beginning January 1, 2012, and older trucks must be replaced starting January 1, 2015. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent. The regulation applies to nearly all privately and federally owned diesel-fueled trucks and buses, as well as to privately and publicly owned school buses with a gross vehicle weight rating greater than 14,000 pounds.

LOCAL

Shasta County Air Pollution Control District

The SCAQMD is designated by law to adopt and enforce regulations to achieve and maintain ambient air quality standards. The SCAQMD, along with other air districts in the NSVAB, has committed to jointly prepare the NSVAB Air Quality Attainment Plan for the purpose of achieving and maintaining healthful air quality throughout the air basin. In addition, the SCAQMD adopts and enforces controls on stationary sources of air pollutants through its permit and inspection programs, and it regulates agricultural burning. Other responsibilities include monitoring air quality, preparing clean air plans, and responding to citizen complaints concerning air quality. All projects in Shasta County are subject to applicable SCAQMD rules and regulations in effect at the time of construction. Descriptions of specific rules applicable to future construction resulting from implementation of the proposed project may include, but are not limited to:

- Architectural coatings and solvents used at the project shall be compliant with SCAQMD Rule 3-31, Architectural Coatings.

- Cutback and emulsified asphalt application shall be conducted in accordance with SCAQMD Rule 3-15, Cutback and Emulsified Asphalt.

- SCAQMD Rule 3-16, Fugitive, Indirect, or Non-Traditional Sources, controls the emission of fugitive dust during earth-moving, construction, demolition, bulk storage, and conditions resulting in wind erosion.

- SCAQMD Rule 3-32, Adhesives and Sealants, limits the emissions of volatile organic compounds (VOCs) from adhesives and sealants and associated primers, and from related surface preparation solvents, cleanup solvents, and strippers.

- SCAQMD Rule 3-33, Wood Products Coating Operations, limits the emissions of volatile organic compounds (VOCs) from coatings and strippers used on wood products and from products used in surface preparation and cleanup.

Shasta County General Plan

The Shasta County *General Plan*, as amended through September 2004, provides the following air quality objectives and policies relative to the proposed project:

- *AQ-1.* To protect and improve the County's air quality in accordance with Federal and State clean air laws in order to: (1) safeguard human health, and (2) minimize crop, plant, and property damage.

- *AQ-1a.* The County shall require builders/developers to limit fireplace installations in new development to low-emitting fireplaces conforming to a maximum emission limit of 7.5 grams per hour of total particulate matter by being equipped with an EPA-certified insert or by being individually certified to meet the above emission standard.

- *AQ-1d.* The County shall require residential development projects and projects categorized as sensitive receptors to be located an adequate distance from existing and potential sources of toxic emissions such as freeways, major arterial, industrial sites, and hazardous material locations.

- *AQ-2c.* Land use decisions, where feasible, should contribute to the improvement of air quality. New projects shall be required to reduce their respective air quality impacts to below levels of significance, or proceed as indicated in Policy AQ-2e.

- *AQ-2d.* Shasta County shall ensure that air quality impacts identified during CEQA review are: (1) consistently and fairly mitigated, and (2) mitigation measures are feasible.

- *AQ-2e.* Shasta County will cooperate with the AQMD in assuring that new projects with stationary sources of emissions of non-attainment pollutants or their precursors that exceed 25 tons per year shall provide appropriate emission offsets. A comparable program which offsets indirect emissions of these pollutants exceeding 25 tons per year from development projects shall also be utilized to mitigate air pollution impacts. An Environmental Impact Report will be required for all projects that have unmitigated emissions of non-attainment pollutants exceeding 25 tons per year.

- *AQ-2f*. Shasta County shall require appropriate Standard Mitigation Measures and Best Available Mitigation Measures on all discretionary land use applications as recommended by the AQMD in order to mitigate both direct and indirect emissions of non-attainment pollutants.

- *AQ-2g.* Significance thresholds as proposed by the AQMD for emissions shall be utilized when appropriate for: (1) Reactive Organic Gases (ROG) and Oxides of Nitrogen (NOx), both of which are precursors of ozone, and (2) inhalable particulate matter (PM10) in determining mitigation of air quality impacts.

- *AQ-4b.* The County's development standards shall require the paving of roads as a part of new development permits to the extent necessary to meet access and air quality objectives. These requirements shall be designed to help mitigate potentially significant adverse air quality impacts created by particulate emissions on both an individual and cumulative basis.

- *AQ-8a.* The County will encourage new development projects to reduce air quality impacts from area sources and energy consumption requirements for heating and cooling.

- *AQ-8b.* The County will encourage use of energy conservation features and low-emission equipment for all new residential and commercial development.

5.3.3 STANDARDS OF SIGNIFICANCE

SIGNIFICANCE CRITERIA

In accordance with State *CEQA Guidelines*, the effects of a project are evaluated to determine whether they would result in a significant adverse impact on the environment. An EIR is required to focus on these effects and offer mitigation measures to reduce or avoid any significant impacts that are identified. The criteria used to determine the significance of impacts may vary depending on the nature of the project. According to Appendix G of the State *CEQA Guidelines*, the proposed project would have a significant impact related to air quality, if it would:

- *Conflict with or obstruct implementation of any applicable air quality plan.* Refer to Impact 5.3-1, below.

- *Violate any air quality standard or contribute substantially to an existing or projected air quality violation.* Refer to Impact 5.3-2, below.

- *Expose sensitive receptors to substantial pollutant concentrations.* Refer to Impact 5.2-3, Impact 5.3-4, Impact 5.3-5, and Impact 5.3-6 below.

- *Create objectionable odors affecting a substantial number of people.* Refer to Impact 5.3-7, below.

- *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).* Refer to Impact 5.3-8, below.

SCAQMD thresholds have been used to determine air quality impacts in this analysis. To assist in the evaluation of air quality impacts, the SCAQMD has adopted air quality thresholds for determination of impact significance for projects subject to CEQA review. These thresholds are consistent with New Source Review Rule 2-1 adopted by the SCAQMD Board in 1993 as required by the California Clean Air Act. The thresholds of significance are summarized in Table 5.3-5, SHASTA COUNTY AIR QUALITY MANAGEMENT DISTRICT THRESHOLDS OF SIGNIFICANCE.

Table 5.3-5
SHASTA COUNTY AIR QUALITY MANAGEMENT DISTRICT THRESHOLDS OF SIGNIFICANCE

Threshold	Emissions (pounds per day)		
	NO_X	ROG	PM_{10}
Level A Thresholds	25	25	80
Level B Thresholds	137	137	137

Source: Shasta County Air Quality Management District.

The SCAQMD recommends that projects apply Standard Mitigation Measures (SMM) and appropriate Best Available Mitigation Measures (BAMM) when a project exceeds Level A thresholds and that projects apply SMM, BAMM, and special BAMM when a project exceeds Level B thresholds. Projects that cannot mitigate emissions to levels below the Level B thresholds are considered significant.

Based on these standards, the effects of the proposed project have been categorized as either a "*less than significant"* impact or a "*potentially significant"* impact. Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a "*significant and unavoidable"* impact.

5.3.4 POTENTIAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

Air quality impacts were assessed in accordance with methodologies recommended by CARB and the SCAQMD. Where quantification was required, emissions were modeled using the California Emissions Estimator Model (CalEEMod). CalEEMod is a statewide land use emissions computer model designed to quantify potential criteria pollutant emissions associated with both construction and operations from a variety of land use projects. CalEEMod contains default values for much of the information needed to calculate emissions. However, project specific, user supplied information can also be used when it is available. Vehicle trip generation rates and trip distances for proposed land use were adjusted to reflect project-specific data obtained from the traffic analysis prepared for the proposed project. The CalEEMod model was run to calculate daily emissions during the summer and winter months.

A formal health risk assessment is necessary for projects anticipated to emit state or federal identified toxic air contaminants (TACS)/hazardous air pollutants (HAPs). For typical land use projects that do not propose stationary source of emissions (e.g., smoke stacks), diesel fueled particulates (diesel PM) are the primary TAC of concern. Land uses that generate substantial amounts of diesel PM include warehouses, distribution centers, etc. The proposed project does not propose any major sources of stationary emissions or warehouses, distribution centers, or other uses requiring substantial amounts of diesel traffic. Therefore, a formal health risk assessment was not conducted for this DEIR.

Air quality impacts are analyzed below according to topic. Mitigation measures directly correspond with an identified impact.

IMPACT 5.3-1 *Implementation of the proposed project would not conflict with or obstruct implementation of the 2015Air Quality Attainment Plan.*

Significance: Less Than Significant Impact.

Impact Analysis: Under state law, the California Clean Air Act requires an air quality attainment plan to be prepared for areas designated as nonattainment with regard to state ambient air quality standards. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date. As previously stated, the Shasta County portion of the NSVAB is classified nonattainment for state ozone and PM_{10} standards (refer to Table 5.3-4).

The NSVPA *2015 Air Quality Attainment Plan* is the most recent air quality planning document covering Shasta County.[5] Air quality attainment plans are a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls describing how the state will attain ambient air quality standards.

State law makes CARB the lead agency for all purposes related to the Air Quality Attainment Plan. Local air districts prepare air quality attainment plans and submit them to CARB for review and approval. The NSVPA *2015 Air Quality Attainment Plan* includes forecast ROG and NO_X emissions (ozone precursors) for the entire region through the year 2020. These emissions are not appropriated by county or municipality.

The consistency of the proposed project with the NSVPA *2015 Air Quality Attainment Plan* is determined by its consistency with air pollutant emission projections in the plan. Implementation of the project could increase vehicle miles traveled, and thus ROG and NO_X emissions, which could conflict with air quality planning efforts associated with the NSVPA *2015 Air Quality Attainment Plan*. As previously stated, the plan cites projected O_3 precursor emissions (ROG and NO_X) through the year 2020. For the purposes of this analysis, the emissions resulting from proposed project operations were quantified and compared with the NSVPA *2015 Air Quality Attainment Plan* 2020 ozone precursor emissions projections.

The NSVPA *2015 Air Quality Attainment Plan* includes control strategies necessary to attain the California ozone standard at the earliest practicable date, as well as developed emissions inventories and associated emissions projections for the region showing a downtrend for both ROG and NO_X. The proposed project would result in long-term emissions from area and mobile emission sources. As discussed in Impact Analysis 5.3-3, below, the ozone precursor emissions, ROG and NO_X, would increase as a result of the project. The upward trend in ozone precursor emissions is not reflective of the projected ozone emissions reductions documented in the NSVPA *2015 Air Quality Attainment Plan*, which projects a 16 percent reduction in ROG emissions and a 32 percent reduction in NO_X emissions from area and mobile sources in the NSVPA by the year 2020 (the latest year projected in the NSVPA *2015 Air Quality Attainment Plan*). However, while operation of the project would result in an increase of O_3 precursor emissions, this increase would only total approximately 0.008 tons of ROG and 0.013

[5] SVBAPCC (Sacramento Valley Basinwide Air Pollution Control Council). 2015. *Northern Sacramento Valley Planning Area 2015 Triennial Air Quality Attainment Plan*.

tons of NO_X daily (refer to 15.2, AIR QUALITY/GREENHOUSE GAS EMISSIONS DATA). The addition of these project emissions to the area and mobile source projections documented in the NSVPA *2015 Air Quality Attainment Plan* for year 2020 results in exactly the same statistical percentage reduction in both ROG and NO_X emissions from area and mobile sources in the NSVPA as existing conditions. In other words, the proposed project would represent a 0.00 percent increase in ROG emissions and a 0.00 percent increase in NO_X emissions compared with existing projections in the NSVPA.

It is the intent of the NSVPA *2015 Air Quality Attainment Plan* to achieve ozone attainment status, and while O_3 precursor emissions are projected to increase as a result of project development, this increase is minimal to the point of being insubstantial, as such development would represent a 0.00 percent increase in ROG emissions and a 0.00 percent increase in NO_X emissions compared with existing projections. Therefore, the increase of O_3 precursor emissions would have a statistically unsubstantial effect on the emissions projections of the NSVPA *2015 Air Quality Attainment Plan*. Thus, the proposed project would not conflict with or obstruct implementation of the NSVPA *2015 Air Quality Attainment Plan*, and no impact would occur.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No mitigation measures are required. Impacts would be *less than significant* impact.

IMPACT 5.3-2 ***Project implementation could potentially violate an air quality standard or contribute substantially to an existing or projected air quality violation during project construction.***

Significance: Potentially Significant Impact.

Impact Analysis: Subsequent land use activities associated with implementation of the proposed project would introduce additional construction emissions, which would adversely affect regional air quality. Short-term air quality impacts are predicted to occur during grading and construction operations associated with implementation of the proposed project. Temporary air emissions would result from the following activities: 1) Particulate (fugitive dust) emissions from grading and building construction; an 2) Exhaust emissions from the construction equipment and the motor vehicles of the construction crew.

The proposed project would be constructed in phases therefore; construction-generated emissions were quantified using a phase-by-phase analysis. Overall construction activities would include grubbing/clearing of the project site, cut/fill, and compaction of soils, installation of utilities (e.g. underground power, sewer, water, telephone, and storm drainage facilities), construction of proposed buildings, and the paving of approximately 51.71 acres of roadways. Equipment used for construction would vary day-to-day depending on the activity, but would include scrapers/earthmovers, wheeled dozers, water trucks, forklifts, wheeled loaders, and/or motor graders. Construction air emissions associated with the development of each phase was quantified using the CalEEMod land use emissions model. These quantified emission projections were then compared with SCAQMD significance thresholds for each phase. Construction-generated emissions associated with the proposed project could potentially exceed thresholds of significance. Predicted maximum daily construction-generated emissions for the proposed project are summarized in Table 5.3-6, UNMITIGATED CONSTRUCTION-RELATED EMISSIONS.

Table 5.3-6
UNMITIGATED CONSTRUCTION-RELATED EMISSIONS

Construction Activities	Unmitigated Maximum Emissions (pounds per day)[1]				
	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_X)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)	Carbon Monoxide (CO)
Phase I (46 units)	30.52	69.68	20.96	12.50	51.91
Phase II (19 units)	20.69	51.83	20.96	12.50	40.68
Phase III (24 units)	18.20	69.68	20.96	12.50	47.91
Phase IV (20 units)	25.99	51.83	20.96	12.50	42.83
Phase V (43 units)	23.26	69.68	20.96	12.50	47.91
Phase VI (14 units)	34.12	69.68	20.96	12.50	50.38
Level A/B Significant Impact Thresholds	**25/137**	**25/137**	**80/137**	**None**	**None**
Exceed Level A/B Threshold?	Yes/No	Yes/No	No/No	NA	NA

Notes:
1. Emissions calculated using CalEEMod version 2013.2.2.
Refer to Appendix 15.3, AIR QUALITY/GREENHOUSE GAS EMISSIONS DATA, for daily emission model outputs. Construction emissions also account for the construction of roadways for each phase.

Based on the modeling conducted, short-term daily emissions associated with the construction of the proposed project would not exceed the Level B significance threshold; however, the Level A significance threshold would be surpassed for ROG and NO_X emissions. The SCAQMD recommends that projects apply SMM and appropriate BAMM when a project exceeds Level A thresholds. As a result, implementation of **MM 5.3-1** that requires diesel-fueled construction equipment to have CARB certified Tier 3 or better engines to reduce NO_X emissions would be required throughout the duration of project construction activities. Additionally, **MM 5.3-1** also includes various dust control measures to reduce fugitive PM10 and PM2.5, such as regular watering of disturbed areas, providing trackout devices, covering stockpiles, and limiting onsite vehicle speeds. Implementation of **MM 5.3-1** would substantially reduce impacts resulting from construction-generated emissions associated with project construction as shown in Table 5.3-7, MITIGATED CONSTRUCTION-RELATED EMISSIONS. Due to limitations in the modeling software, only the pollutant reductions resulting from the requirement of Tier 3 Certified or better and the fugitive dust measures are quantified.

Table 5.3-7
MITIGATED CONSTRUCTION-RELATED EMISSIONS

Construction Activities	Mitigated Maximum Emissions (pounds per day)[1]				
	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_X)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)	Carbon Monoxide (CO)
Phase I (46 units)	26.46	33.26	19.17	10.93	53.76
Percent Reduction	*13.3%*	*52.2%*	*8.5%*	*12.5%*	*-3.5%*
Phase II (19 units)	16.63	28.40	19.17	10.93	42.53
Percent Reduction	*19.6%*	*45.2%*	*8.5%*	*12.5%*	*-4.5%*
Phase III (24 units)	14.14	29.87	19.17	10.93	42.74
Percent Reduction	*22.3%*	*55.6%*	*8.5%*	*12.5%*	*10.7%*
Phase IV (20 units)	21.92	29.16	19.17	10.93	44.68
Percent Reduction	*15.6%*	*43.7%*	*8.5%*	*12.5%*	*-4.3%*
Phase V (43 units)	19.20	29.87	19.17	10.93	44.68
Percent Reduction	*17.4%*	*55.6%*	*8.5%*	*12.5%*	*3.71*
Phase VI (14 units)	30.06	31.82	19.17	10.93	52.23
Percent Reduction	*11.8%*	*54.3%*	*8.5%*	*12.5%*	*-3.6%*

Notes:
1. Emissions calculated using CalEEMod version 2013.2.2. The reduction/credits for construction emission mitigations are based on mitigation included in the CalEEMod model and as typically required by the SCAQMD through Rule 403. The mitigation includes the following: properly maintain mobile and other construction equipment; replace ground cover in disturbed areas quickly; water exposed surfaces twice daily; cover stock piles with tarps; water all haul roads three times daily; limit speeds on unpaved roads to 15 miles per hour; and use CARB certified engines. Refer to Appendix 15.3, AIR QUALITY/GREENHOUSE GAS EMISSIONS DATA, for daily emission model outputs. Construction emissions also account for the construction of roadways for each phase.

As previously stated, construction-generated emissions associated with the development of the proposed project would not exceed the Level B significance threshold. While the Level A significance threshold would be surpassed for ROG and NO_X emissions, feasible SMM and appropriate BAMM would be implemented per SCAQMD guidance as required by **MM 5.3-1**. Therefore, impacts from construction-generated air pollutants would be *less than significant*.

Offsite Improvements

Several offsite intersection improvements have been identified for the proposed project (refer to **MM 5.16-1** through **MM 5.16-4** in Section 5.16, TRAFFIC AND CIRCULATION). These improvements have been included in the construction emissions modeling conducted for the proposed project noted above in Table 5.3-7. Similar to onsite construction activities associated with the proposed project, implementation of **MM 5.3-1** would be required during construction of improvements associated with **MM 5.16-1** through **MM 5.16-4**. Impacts in this regard would be *less than significant*.

Mitigation Measures:

MM 5.3-1: Prior to issuance of a grading permit, the project applicant shall submit a grading plan for review and approval by the Shasta County Building Department. The following specifications shall be included to reduce short-term air quality impacts attributable to the proposed project:

- During all construction activities, all diesel-fueled construction equipment, including but not limited to rubber-tired dozers, graders, scrapers, excavators, asphalt paving equipment, cranes, and tractors, shall be California Air Resources Board (CARB) Tier 3 Certified or better as set forth in Section 2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 of the Code of Federal Regulations.[6]

- All construction equipment shall be maintained and properly tuned in accordance with manufacturers' specifications. Equipment maintenance records shall be kept onsite and made available upon request by the County of Shasta.

- All material excavated, stockpiled, or graded shall be sufficiently watered to prevent fugitive dust from leaving property boundaries and causing a public nuisance or a violation of an ambient air standard. Watering shall occur at least twice daily with complete site coverage, preferably in the mid-morning and after work is completed each day.

- All areas (including unpaved roads) with vehicle traffic shall be watered periodically or have dust palliatives applied for stabilization of dust emissions.

[6] NOx emissions are primarily associated with use of diesel-powered construction equipment (e.g., graders, excavators, rubber-tired dozers, tractor/loader/backhoes). The Clean Air Act of 1990 directed the EPA to study, and regulate if warranted, the contribution of off-road internal combustion engines to urban air pollution. The first federal standards (Tier 1) for new off-road diesel engines were adopted in 1994 for engines over 50 horsepower and were phased in from 1996 to 2000. In 1996, a Statement of Principles pertaining to off-road diesel engines was signed between the EPA, CARB, and engine makers (including Caterpillar, Cummins, Deere, Detroit Diesel, Deutz, Isuzu, Komatsu, Kubota, Mitsubishi, Navistar, New Holland, Wis-Con, and Yanmar). On August 27, 1998, the EPA signed the final rule reflecting the provisions of the Statement of Principles. The 1998 regulation introduced Tier 1 standards for equipment under 50 horsepower and increasingly more stringent Tier 2 and Tier 3 standards for all equipment with phase-in schedules from 2000 to 2008. As a result, all off-road, diesel-fueled construction equipment manufactured in 2006 or later has been manufactured to Tier 3 standards.

- All onsite vehicles shall be limited to a speed of 15 miles per hour on unpaved roads.

- All land clearing, grading, earth-moving, or excavation activities on the project site shall be suspended when sustained winds are expected to exceed 20 miles per hour.

- All portions of the development site which have been stripped of vegetation by construction activities and left inactive for more than ten days shall be seeded and/or watered until a suitable grass cover is established.

- All trucks hauling dirt, sand, soil, or loose material shall be covered or shall maintain at least 2 feet of freeboard (i.e., minimum vertical distance between top of the load and the trailer) in accordance with the requirements of California Vehicle Code Section 23114. This provision will be enforced by local law enforcement agencies.

- All material transported offsite shall be either sufficiently watered or securely covered to prevent a public nuisance.

- Wheel washers shall be installed where project vehicles and/or equipment enter and/or exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed prior to each trip.

- Prior to final occupancy, the applicant shall re-establish ground cover on the construction site through seeding and watering.

- Off-road construction equipment shall not be left idling for periods longer than 5 minutes when not in use.

Level of Significance After Mitigation: Impacts would be l*ess than significant* impact with mitigation incorporated.

IMPACT 5.3-3	***Project implementation could potentially violate an air quality standard or contribute substantially to an existing or projected air quality violation during project operations.***

Significance: Potentially Significant Impact.

Impact Analysis: Subsequent land use activities associated with implementation of the proposed project would introduce additional mobile and stationary sources of emissions, which would adversely affect regional air quality. The proposed project would result in increased regional emissions of PM_{10} and $PM_{2.5}$, as well as ROG, NO_X, and CO, due to increased use of motor vehicles, natural gas, maintenance equipment, and various consumer products, thereby increasing potential operational air quality impacts. Increases in operational air impacts with the proposed project would generally consist of two sources: stationary and mobile. Predicted maximum daily emissions are summarized in Table 5.3-8, LONG-TERM OPERATIONAL EMISSIONS.

Table 5.3-8
LONG-TERM OPERATIONAL EMISSIONS

Source	Pollutant (pounds/day)[1, 2]				
	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_X)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)	Carbon Monoxide (CO)
Summer Emissions					
Area Source	263.43	5.12	44.04	44.04	327.38
Energy Use	0.16	1.35	0.11	0.11	0.57
Mobile Source	7.46	44.61	11.17	3.21	70.37
Total	**271.05**	**51.08**	**55.32**	**47.36**	**398.32**
Winter Emissions					
Area Source	263.43	5.12	44.04	44.04	327.39
Energy Use	0.16	1.35	0.11	0.11	0.57
Mobile Source	5.81	46.66	11.17	3.22	65.55
Total	**269.40**	**53.13**	**55.32**	**47.37**	**393.51**
Potentially Significant Impact Threshold (Daily Emissions)	**25/137**	**25/137**	**80/137**	**None**	**None**
Exceed Daily Threshold?	Yes/Yes	Yes/No	No/No	NA	NA

Notes:
1. Emissions calculated using CalEEMod version 2016.3.1.
2. Based on a total of 1,774 daily trips as shown in the traffic impact assessment prepared for the project.
Refer to Appendix 15.3, AIR QUALITY/GREENHOUSE GAS EMISSIONS DATA, for daily emission model outputs.

As depicted in Table 5.3-8, emissions associated with operations of the proposed project would exceed Level A and Level B significance thresholds for ROG and Level A for NO_X. Therefore, mitigation would be required. **Mitigation Measure MM 5.3-2** prohibits the installation of wood burning fireplaces (natural gas fireplaces are acceptable). Additionally, **MM 5.3-3** requires energy efficient lighting, energy efficient and automated air conditioning controls, exterior electrical outlets, and street design that maximizes pedestrian access to transit stops. Implementation of **MM 5.3-2** would substantially reduce impacts resulting from long-term operational emissions associated with the project as shown in Table 5.3-9, MITIGATED LONG-TERM EMISSIONS. Due to limitations in the modeling software, only the pollutant reductions resulting from the prohibition of wood-burning hearths are quantified.

Table 5.3-9
MITIGATED LONG-TERM EMISSIONS

Source	Pollutant (pounds/day)[1, 2]				
	Reactive Organic Gases (ROG)	Nitrogen Oxide (NO_X)	Coarse Particulate Matter (PM_{10})	Fine Particulate Matter ($PM_{2.5}$)	Carbon Monoxide (CO)
Summer Emissions					
Area Source	9.67	2.64	0.28	0.28	14.85
Energy Use	0.16	1.35	0.11	0.11	0.57
Mobile Source	7.46	44.61	11.17	3.21	70.37
Total	**17.29**	**48.60**	**11.56**	**3.60**	**85.79**
Percent Reduction	*93.62*	*4.86*	*79.10*	*92.40*	*78.46*
Winter Emissions					
Area Source	9.67	2.64	0.28	0.28	14.85
Energy Use	0.16	1.35	0.11	0.11	0.57
Mobile Source	5.81	46.66	11.17	3.22	65.55
Total	*94.19*	*4.67*	*79.10*	*92.38*	*79.42*
Percent Reduction	*93.55*	*12.78*	*76.01*	*91.02*	*74.37*
Exceed Daily Threshold?	No/No	Yes/No	No/No	NA	NA

Notes:
1. Emissions calculated using CalEEMod version 2016.3.1.
2. Mitigation measures include the use of natural gas fireplaces.
Refer to Appendix 15.3, AIR QUALITY/GREENHOUSE GAS EMISSIONS DATA, for daily emission model outputs.

As previously stated, emissions associated with operations of the proposed project would exceed Level A and Level B significance thresholds for ROG, and Level A thresholds for NO_X. The SCAQMD recommends that projects apply SMM and appropriate BAMM when a project exceeds Level A thresholds. The SCAQMD's operations-related SMM and BAMM are described in Appendix 15.3, AIR QUALITY/GREENHOUSE GAS EMISSION DATA. Projects that cannot mitigate emissions to levels below the Level B thresholds are considered significant.

Table 5.3-9, above, shows the reduction in emissions with the inclusion of **MM 5.3-2**. As shown, implementation of **MM 5.3-2** would reduce ROG levels to below the Level B significance threshold. In order to address NO_X emissions, feasible SMM would be implemented per SCAQMD guidance as required by **MM 5.3-3**. Therefore, within implementation of **MM 5.3-2** and **MM 5.3-3**, impacts would be reduced to a *less than significant* level.

Mitigation Measures:

MM 5.3-2: Prior to the issuance of individual building permits, the Shasta County Building Department shall confirm that all construction documents and specifications stipulate that the installation of wood-burning fireplaces is prohibited. Natural gas fireplaces are acceptable.

MM 5.3-3: Prior to the issuance of individual building permits, the Shasta County Building Department shall confirm that all project plans and specifications include all feasible Standard Mitigation Measures and Level A Measures as defined by the SCAQMD including:

- The project shall provide for the use of energy-efficient lighting (includes controls) and process systems such as water heaters, furnaces, and boiler units.
- The project shall utilize energy-efficient and automated controls for air conditioning.
- Residential structures shall include exterior electric outlets in the front and rear.
- Streets shall be designed to maximize pedestrian access to transit stops where feasible.

Level of Significance After Mitigation: Impacts would be *less than significant* impact with mitigation incorporated.

IMPACT 5.3-4	***Project implementation would not expose sensitive receptors to substantial carbon monoxide pollutant concentrations.***

Significance: Less Than Significant Impact.

Impact Analysis: It has long been recognized that CO exceedances are caused by vehicular emissions, primarily when idling at intersections. Concentrations of CO are a direct function of the number of vehicles, length of delay, and traffic flow conditions. Under certain meteorological conditions, CO concentrations close to congested intersections that experience high levels of traffic and elevated background concentrations may reach unhealthy levels, affecting nearby sensitive receptors. Given the high traffic volume potential, areas of high CO concentrations, or "hot spots," are typically associated

with intersections that are projected to operate at unacceptable levels of service during the peak commute hours.[7] However, transport of this criteria pollutant is extremely limited, and CO disperses rapidly with distance from the source under normal meteorological conditions. Furthermore, vehicle emissions standards have become increasingly more stringent in the last 20 years. Currently, the CO standard in California is a maximum of 3.4 grams per mile for passenger cars (requirements for certain vehicles are more stringent). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of control technology on industrial facilities, CO concentrations in the project vicinity have steadily declined.

Accordingly, with the steadily decreasing CO emissions from vehicles, even very busy intersections do not result in exceedances of the CO standard. The analysis prepared for CO attainment in the South Coast Air Quality Management District *1992 Federal Attainment Plan for Carbon Monoxide* (1992 CO Plan) for the South Coast Air Quality Management District's *2003 Air Quality Management Plan* (2003 AQMP) can be used to assist in evaluating the potential for CO exceedances. The CO hot spot analysis was conducted for four busy intersections in Los Angeles County during the peak morning and afternoon time periods. The intersections evaluated included Long Beach Boulevard and Imperial Highway (Lynwood), Wilshire Boulevard and Veteran Avenue (Westwood), Sunset Boulevard and Highland Avenue (Hollywood), and La Cienega Boulevard and Century Boulevard (Inglewood). The busiest intersection evaluated was that at Wilshire Boulevard and Veteran Avenue, which has a traffic volume of approximately 100,000 vehicles per day. The Los Angeles County Metropolitan Transportation Authority evaluated the level of service in the vicinity of the Wilshire Boulevard/Veteran Avenue intersection and found it to be level of service (LOS) E at peak morning traffic and LOS F at peak afternoon traffic. Nonetheless, the analysis concluded that there was no violation of CO standards.[8]

According to the *Tierra Robles Traffic Impact Study* (May 2015), 1,656 vehicle trips would be generated as a result of the proposed project. Therefore, the proposed project would not increase traffic volumes at any intersection to more than 100,000 vehicles per day, the value studied in the 1992 CO Plan. As a result, this impact would be considered *less than significant*.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No mitigation measures are required. Impacts would be *less than significant*.

IMPACT 5.3-5	***Implementation of the proposed project would not expose sensitive receptors to substantial toxic air contaminant concentrations during project construction.***

Significance: Less Than Significant Impact.

Impact Analysis: The proposed project could create a significant hazard to vicinity residents and other sensitive receptors through exposure to substantial pollutant concentrations such as ROG, NO_X and particulate matter and/or other toxic air contaminants during construction activities. Sensitive land uses

[7] Level of service (LOS) is a measure used by traffic engineers to determine the effectiveness of transportation infrastructure. LOS is most commonly used to analyze intersections by categorizing traffic flow with corresponding safe driving conditions. LOS A is considered the most efficient level of service and LOS F the least efficient.
[8] SCAQMD (South Coast Air Quality Management District). 2003. *Final 2003 AQMP Appendix V – Modeling and Attainment Demonstrations*.

are generally defined as locations where people reside or where the presence of air emissions could adversely affect the use of the land. Typical sensitive receptors include residents, schoolchildren, hospital patients, and the elderly. The project site is located within an area of large-lot single family homes. The nearest residential land uses would be those surrounding the project site on the western and southern boundaries. No schools, hospitals, or senior care homes exist in the immediate area.

Construction activities would involve the use of a variety of gasoline- or diesel-powered equipment that emits exhaust fumes. Residents in the vicinity would potentially be exposed to nuisance dust and heavy equipment emission diesel exhaust during construction. However, the duration of exposure would be short and exhaust from construction equipment dissipates rapidly. According to CARB, concentrations of mobile-source DPM emissions are typically reduced by 70 percent at a distance of approximately 500 feet.[9]

As discussed previously, project construction would not result in an exceedance of SCAQMD standards for particulate matter. Also, **MM 5.3-1** would ensure fugitive dust emissions of PM_{10} and $PM_{2.5}$ control measures are incorporated into the project to reduce the emission of fugitive dust during construction activities at the project site. **MM 5.3-1** additionally reduces the amount of construction-generated exhaust emissions by requiring efficient off-road construction equipment. As shown in Table 5.3-8, **MM 5.3-1** would reduce PM_{10} and $PM_{2.5}$ emissions between 8.5 and 12.5 percent, ROG emissions between 11.8 and 22.3 percent, and NO_X emissions between 43.7 to 55.6 percent.

The temporary duration of construction activities coupled with implementation of **MM 5.3-1** would ensure sensitive receptors within the vicinity of the project site would not be exposed to substantial TAC emissions generated during construction. This impact would be *less than significant*.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: No mitigation measures are required. Impacts would be *less than significant*.

IMPACT 5.3-6	***Project implementation would not expose sensitive receptors to substantial toxic air contaminant concentrations during project operations.***

Significance: Less Than Significant Impact.

Impact Analysis: Project operation would not result in the development of any sources of TACs. In April 2005, CARB released the *Air Quality and Land Use Handbook: A Community Health Perspective*, which offers guidance on siting sensitive land uses in proximity to sources of air toxics. According to this guidance document, CARB does not consider residential neighborhoods to be sources of air toxics.[10]

There is a potential that future residents at the residential development could be exposed to TAC emissions from stationary and/or mobile sources. Per SCAQMD guidance, all TAC sources within 1,000 feet of a proposed sensitive receptor need to be identified and analyzed. There are no sources of TAC within 1,000 feet of the project sites. The closest source of TACs is State Route 299 (SR-299), located over

[9] CARB (California Air Resources Board). 2005. *Air Quality and Land Use Handbook: A Community Health Perspective*.
[10] Ibid.

3,500 feet from the nearest proposed residence. CARB's Air Quality and Land Use Handbook, which offers guidance on developing sensitive land uses in proximity to sources of air toxics, provides guidance concerning the placement of sensitive receptors in the vicinity of freeways and major roadways. The handbook recommends that sensitive land uses be sited no closer than 500 feet from a freeway or major roadway that accommodates more than 100,000 automobile trips daily. This 500-foot buffer area was developed to protect sensitive receptors from exposure to DPM and was based on traffic-related studies that showed a 70 percent drop in particulate matter concentrations at a distance of 500 feet from the roadway. Presumably, acute and chronic risks as well as lifetime cancer risk due to DPM exposure are lowered proportionately. As stated above, the closest proposed residences would be located more than 3,500 feet from SR-299. Therefore, per CARB guidance, SR-299 would not represent a negative impact to the proposed project.

Mitigation Measures: No mitigation measures are required.

Level of Significance: No mitigation measures are required. Impacts would be *less than significant*.

IMPACT 5.3-7	***Project implementation would not create objectionable odors affecting a substantial number of people.***

Significance: Less Than Significant Impact.

Impact Analysis: Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Land uses commonly considered to be potential sources of odorous emissions include wastewater treatment plants, sanitary landfills, composting/green waste facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting/coating operations, rendering plants, and food packaging plants. Implementation of the proposed project would involve individual septic tanks and a community wastewater treatment system. The individual septic tanks would include carbon filters to control odors. The wastewater treatment system would be designed to meet the reuse requirements for discharge of Title 22 (Disinfected Secondary Effluent). Title 22 reuse requires daily testing for coliform and also includes provisions for odor and nuisance control. Furthermore, the project would be required to comply with SCAQMD Rule 3:16 and *California Health & Safety Code* Section 41700, which prohibits the discharge of contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public. Therefore, impacts in this regard would be *less than significant*.

Mitigation Measures: No mitigation measures are required.

Level of Significance: No mitigation measures are required. Impacts would be *less than significant*.

5.3.5 CUMULATIVE SETTING, IMPACTS, AND MITIGATION MEASURES

IMPACT 5.3-8	***Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).***

Significance: Potentially Significant Impact.

Cumulative Setting: The cumulative setting for air quality includes the Shasta County in its entirety and the North Sacramento Valley Air Basin. The Shasta County portion of the NSVAB is designated as a nonattainment area for O_3 and PM_{10} for state standards. The Shasta County portion of the NSVAB is designated as being unclassified and/or attainment for all pollutants under federal standards. Cumulative growth in population, vehicle use, and industrial activity could inhibit efforts to improve regional air quality and attain the ambient air quality standards.

Impact Analysis: Because of the region's nonattainment status for ozone and PM_{10}, if a project generates ozone-precursor pollutants (i.e., ROG and NO_X) or PM_{10} in quantities that would be considered to result in significant air quality impacts under individual project conditions, the project's cumulative impacts would be considered significant as well. As discussed previously, construction-generated emissions associated with the development of the proposed project would not exceed the SCAQMD Level B significance threshold, and while the Level A significance threshold would be surpassed for NO_X emissions, feasible SMM and appropriate BAMM would be implemented per SCAQMD guidance as required by **MM 5.3-1**. As a result, impacts from construction-generated air pollutants would be considered *less than significant*. As also discussed previously, implementation of **MM 5.3-2** would reduce ROG levels to below the Level B significance threshold, and in order to address NO_X emissions, feasible SMM would be implemented per SCAQMD guidance as required by **MM 5.3-3**. However, as long-term mitigated NOx emissions would exceed the SCAQMD's Level A significance threshold, and NO_x

is a precursor pollutant for ozone (Shasta County is a nonattainment area for State ozone standards; refer to Table 5.3-4), the project's long-term operational NOx emissions are cumulatively considerable. Therefore, this impact would be cumulatively *significant*.

Mitigation Measures: Implement **MM 5.3-1**, **MM 5.3-2,** and **MM 5.3-3**.

Level of Significance After Mitigation: As discussed above and shown in Tables 5.3-8 and 5.3-9, the project's construction and operational emissions would be below Level B significance thresholds with implementation of **MM 5.3-1**, **MM 5.3-2,** and **MM 5.3-3**. Despite implementation of these mitigation measures identified for this proposed project, the project's long-term NO_x emissions would be cumulatively considerable, and would result in *significant and unavoidable* cumulative air quality impacts.