3.3 Air Quality

This section describes the existing conditions and potential impacts pertaining to air quality that would result from the proposed project. Mitigation measures are recommended for those impacts that were determined to be significant. The primary sources used in this analysis are listed below.

- The California Almanac of Emissions and Air Quality: 2006 Edition (California Air Resources Board 2006a).
- ARB Databases: Aerometric Data Analysis and Management System (ADAM) (California Air Resources Board 2006b).
- Shasta County General Plan (Shasta County 2004).
- Air Data (U.S. Environmental Protection Agency 2007).

3.3.1 Existing Conditions

This section describes the study area for air quality; existing conditions pertaining to aesthetics in the study area; and federal, state, and local regulations and policies that are applicable to the proposed project.

Environmental Setting

Study Area

The study area for this analysis is the Northern Sacramento Valley Air Basin, which comprises Butte, Colusa, Glenn, Shasta, Sutter, Tehama, and Yuba Counties. The Shasta County Air Quality Management District (SCAQMD) has jurisdiction over air quality issues throughout Shasta County.

Regional Climate and Meteorology

Shasta County encompasses the northernmost portion of the Sacramento Valley and the surrounding mountainous areas, approximately 160 miles northwest of Sacramento. The area has a moderate year-round climate where the average daily temperature remains above freezing. The average annual temperature is approximately 62ºF, and annual precipitation averages about 30 inches.

The Sacramento Valley portion of the air basin forms a bowl, bounded on the west by the Coast Ranges, on the north by the Cascade Range, and on the east by the Sierra Nevada. These mountain ranges reach heights exceeding 6,000 feet above sea level. During summer, the wide, flat expanse of the Sacramento Valley provides an ideal environment for the formation of photochemical smog. Moreover, the prevailing winds in the Sacramento Valley blow from south to north, driven by the marine air traveling through the Carquinez Strait. These winds can transport pollutants from the broader Sacramento area and from the San Francisco Bay Area to the Northern Sacramento Valley Air Basin. The mountain ranges that surround the Northern

Sacramento Valley Air Basin provide a physical barrier to continued movement of the air mass, significantly hindering the dispersal of pollutants.

Criteria Pollutants and Other Pollutants of Concern

The federal and state governments have established ambient air quality standards for the following six criteria pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (particulate matter 10 microns or less in diameter [PM10] and particulate matter 2.5 microns or less in diameter [PM2.5]), and lead. Ozone, NO_2, and particulate matter are generally considered to be "regional" pollutants, as these pollutants or their precursors affect air quality on a regional scale. Pollutants such as CO, SO_2, and lead are considered to be local pollutants that tend to accumulate in the air locally. Particulate matter is considered to be a localized pollutant as well as a regional pollutant. Within the project area, PM10 and ozone are considered pollutants of concern. Toxic air contaminants (TACs) are also pollutants of concern, although no state or federal ambient air quality standards exist for them. Brief descriptions of these pollutants are provided below; a complete summary of state and national ambient air quality standards (CAAQS and NAAQS, respectively) is provided in Table 3.3-1.

Ozone

Ozone is a respiratory irritant that increases susceptibility to respiratory infections. It is also an oxidant that can cause substantial damage to vegetation and other materials. Ozone is a severe eye, nose, and throat irritant. It also attacks synthetic rubber, textiles, plants, and other materials. Ozone can cause extensive damage to plants through leaf discoloration and cell damage.

Ozone is not emitted directly into the air, but is formed by a photochemical reaction in the atmosphere. Ozone precursors—reactive organic gases (ROG) and oxides of nitrogen (NO_X)—react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem. The ozone precursors ROG and NO_X are mainly emitted by mobile sources and by stationary combustion equipment.

Carbon Monoxide

Carbon monoxide is essentially inert to plants and materials but can have significant effects on human health. Carbon monoxide is a public health concern because it combines readily with hemoglobin and reduces the amount of oxygen transported in the bloodstream. Carbon monoxide can cause health problems such as fatigue, headache, confusion, dizziness, and even death.

Motor vehicles are the dominant source of CO emissions in most areas. High CO levels develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles exhibit increased CO emission rates at low air temperatures.

Inhalable Particulates

Inhalable particulates can damage human health and retard plant growth. Health concerns associated with suspended particulate matter focus on those particles small enough to reach the lungs when inhaled. Particulates also reduce visibility and corrode materials. Particulate

Table 3.3-1. Ambient Air Quality Standards Applicable in California

Pollutant	Symbol	Average Time	Standard (parts per million)		Standard (micrograms per cubic meter)		Violation Criteria	
			California	National	California	National	California	National
Ozone*	O_3	1 hour	0.09	NA	180	NA	If exceeded	NA
		8 hours	0.070	0.08	137	157	If exceeded	If fourth highest 8-hour concentration in a year, averaged over 3 years, is exceeded at each monitor within an area
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year
(Lake Tahoe only)		8 hours	6	NA	7,000	NA	If equaled or exceeded	NA
Nitrogen dioxide	NO_2	Annual average	NA	0.053	NA	100	NA	If exceeded on more than 1 day per year
		1 hour	0.25	NA	470	NA	If exceeded	NA
Sulfur dioxide	SO_2	Annual average	NA	0.03	NA	80	NA	If exceeded
		24 hours	0.04	0.14	105	365	If exceeded	If exceeded on more than 1 day per year
		1 hour	0.25	NA	655	NA	If exceeded	NA
Hydrogen sulfide	H_2S	1 hour	0.03	NA	42	NA	If equaled or exceeded	NA
Vinyl chloride	C_2H_3Cl	24 hours	0.01	NA	26	NA	If equaled or exceeded	NA
Inhalable particulate matter	PM10	Annual arithmetic mean	NA	NA	20	NA	NA	NA
		24 hours	NA	NA	50	150	If exceeded	If exceeded on more than 1 day per year
	PM2.5	Annual arithmetic mean	NA	NA	12	15	NA	If 3-year average from single or multiple community-oriented monitors is exceeded
		24 hours	NA	NA	NA	35	NA	If 3-year average of 98th percentile at each population-oriented monitor within an area is exceeded
Sulfate particles	SO_4	24 hours	NA	NA	25	NA	If equaled or exceeded	NA
Lead particles	Pb	Calendar quarter	NA	NA	NA	1.5	NA	If exceeded no more than 1 day per year
		30-day average	NA	NA	1.5	NA	If equaled or exceeded	NA

Source: California Air Resources Board 2006.

Notes: All standards are based on measurements at 25ºC and 1 atmosphere pressure.
National standards shown are the primary (health effects) standards.
NA = not applicable.

* The U.S. Environmental Protection Agency recently replaced the 1-hour ozone standard with an 8-hour standard of 0.08 part per million. EPA issued a final rule that revoked the 1-hour standard on June 15, 2005. However, the California 1-hour ozone standard will remain in effect.

emissions are generated by a wide variety of sources, including agricultural activities, industrial emissions, dust suspended by vehicle traffic and construction equipment, and secondary aerosols formed by reactions in the atmosphere.

Toxic Air Contaminants

TACs are pollutants that may be expected to result in an increase in mortality or serious illness or that may pose a present or potential hazard to human health. Health effects include cancer, birth defects, neurological damage, damage to the body's natural defense system, and diseases that lead to death. Although ambient air quality standards exist for criteria pollutants, no such standards exist for TACs.

Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, the California Air Resources Board (ARB) has consistently found that there are no levels or thresholds below which exposure is free of risk. Individual TACs vary greatly in the risk they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. For certain TACs, a unit risk factor can be developed to evaluate cancer risk. For acute and chronic health risks, a similar factor called a Hazard Index is used to evaluate risk. In the early 1980s, ARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Toxic Air Contaminant Identification and Control Act (Assembly Bill [AB] 1807) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) supplements the AB 1807 program by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks. The TAC of most concern in relation to the proposed project is diesel exhaust particulate matter, which ARB identified as a TAC in October 2000.

Greenhouse Gases and Climate Change/Global Warming

Global climate change is a problem caused by combined worldwide greenhouse gas emissions (GHGs), and mitigating global climate change will require worldwide solutions. Combined gases in Earth's atmosphere, called atmospheric GHGs, play a critical role in Earth's radiation budget by trapping infrared radiation emitted from Earth's surface that could have otherwise escaped into space. This phenomenon, known as the *greenhouse effect*, keeps Earth's atmosphere near the surface warmer than it would otherwise be and allows for successful habitation by humans and other forms of life. Increases in these gases lead to more absorption of radiation and further warm the lower atmosphere, thereby increasing evaporation rates and temperatures near the surface. Emissions of GHGs in excess of natural ambient concentrations are thought to be responsible for the enhancement of the greenhouse effect and to contribute to what is termed *global warming*, a trend of unnatural warming of Earth's natural climate.

Monitoring Data

Existing air quality conditions in the project area can be characterized in terms of the ambient air quality standards that the federal and state governments have established for various pollutants (Table 3.3-1) and by monitoring data collected in the region. Monitoring data concentrations are typically expressed in terms of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Data from air quality monitoring stations found within Shasta County are summarized in Table 3.3-2. These data are from the last 3 years (2003–2006) for which complete data are available.

Attainment Status

If monitored pollutant concentrations meet state or federal standards over a designated period of time, the area is classified as being in attainment for that pollutant. If monitored pollutant concentrations violate the standards, the area is considered a nonattainment area for that pollutant. If data are insufficient to determine whether a pollutant is violating the standard, the area is designated unclassified.

The U.S. Environmental Protection Agency (EPA) has classified Shasta County as an unclassified/attainment area for the 8-hour ozone, CO, PM10, and PM2.5 standards.

ARB has classified Shasta County as a moderate nonattainment area for the 1-hour ozone standard, an unclassified area for the CO and PM2.5 standards, and a nonattainment area for the PM10 standard. Shasta County's attainment status for each of these pollutants relative to the NAAQS and CAAQS is summarized in Table 3.3-3.

Table 3.3-3. Federal and State Attainment Status for Shasta County

Pollutant	Federal	State
1-hour O_3	NA[a]	Moderate nonattainment
8-hour O_3	Unclassified/attainment	NA[b]
CO	Unclassified/attainment	Unclassified
PM10	Unclassified/attainment	Nonattainment
PM2.5	Unclassified/attainment	Unclassified

[a] Previously in nonattainment; no longer subject to the 1-hour standard due to EPA revocation of the 1-hour standard on June 15, 2005.

[b] ARB approved the 8-hour ozone standard on April 28, 2005, and it became effective on May 17, 2006. However, ARB has not yet designated areas for this standard.

Sensitive Receptors

Sensitive receptors are generally defined as people (e.g., children, athletes, elderly, sick populations) or facilities that generally house people (e.g., schools, hospitals, residences) who may experience adverse effects from unhealthful concentrations of air pollutants. Sensitive receptors in the vicinity of the proposed project site include residences on Haines Road west of Burney (approximately 1.5–2 miles east of the southern end of the project area) and residences and camp sites in the Moose Camp area (approximately 3.5 miles southwest of the project area).

Regulatory Setting

This section discusses the federal, state, and local policies and regulations that are relevant to the analysis of air quality in the proposed project area.

Federal Regulations

The federal Clean Air Act, enacted in 1963 and amended several times thereafter (including the 1990 amendments), establishes the framework for modern air pollution control. The Clean Air Act directs EPA to establish ambient air standards for six pollutants: ozone, CO, lead, nitrogen dioxide, particulate matter, and sulfur dioxide. The standards are divided into primary and secondary standards. Primary standards are designed to protect human health, including the

Table 3.3-2. Ambient Air Quality Monitoring Data Measured at the Redding, Anderson, Lassen Volcanic National Park, and Shasta Lake Monitoring Stations

	Redding			Anderson			Lassen Volcanic National Park			Shasta Lake		
Pollutant Standards	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Ozone (O_3)												
Maximum 1-hour concentration (ppm)	0.131	0.102	0.107	0.115	0.105	0.092	0.082	0.092	0.091	–	–	–
Maximum 8-hour concentration (ppm)	0.096	0.089	0.086	0.092	0.084	0.079	0.073	0.078	0.077	–	–	–
Number of days standard exceeded[a]												
NAAQS 1-hour (>0.12 ppm)	1	0	0	0	0	0	0	0	0	–	–	–
CAAQS 1-hour (>0.09 ppm)	2	3	2	3	2	0	0	0	0	–	–	–
NAAQS 8-hour (>0.08 ppm)	2	3	1	2	0	0	0	0	0	–	–	–
Particulate Matter (PM10)[d]												
National[b] maximum 24-hour concentration (µg/m³)	76.0	30.0	54.0	49.0	47.0	53.0	–	–	–	47.0	40.0	43.0
National[b] second-highest 24-hour concentration (µg/m³)	40.0	28.0	46.0	46.0	41.0	49.0	–	–	–	36.0	25.0	39.0
State[c] maximum 24-hour concentration (µg/m³)	74.0	30.0	53.0	49.0	47.0	53.0	–	–	–	49.0	42.0	42.0
State[c] second-highest 24-hour concentration (µg/m³)	39.0	29.0	45.0	46.0	41.0	49.0	–	–	–	36.0	37.0	40.0
National annual average concentration (µg/m³)	16.7	14.9	17.5	23.5	22.3	23.3	–	–	–	14.7	18.6	17.8
State annual average concentration (µg/m³)[e]	16.6	15.0	17.6	23.6	22.3	23.2	–	–	–	–	–	17.9
Number of days standard exceeded[a]												
NAAQS 24-hour (>150 µg/m³)[f]	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	0.0	0.0
CAAQS 24-hour (>50 µg/m³)[f]	5.8	0.0	6.1	0.0	0.0	6.1	–	–	–	–	–	0.0
Particulate Matter (PM2.5)												
National[b] maximum 24-hour concentration (µg/m³)	26.0	20.0	31.0	–	–	–	–	–	–	–	–	–
National[b] second-highest 24-hour concentration (µg/m³)	18.0	19.0	29.0	–	–	–	–	–	–	–	–	–
State[c] maximum 24-hour concentration (µg/m³)	26.0	20.0	31.0	–	–	–	–	–	–	–	–	–
State[c] second-highest 24-hour concentration (µg/m³)	18.0	19.0	29.0	–	–	–	–	–	–	–	–	–
National annual average concentration (µg/m³)[e]	7.2	7.3	8.7	–	–	–	–	–	–	–	–	–
State annual average concentration (µg/m³)[e]	–	7.3	8.7	–	–	–	–	–	–	–	–	–

Pollutant Standards	Redding			Anderson			Lassen Volcanic National Park			Shasta Lake		
	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Number of days standard exceeded[a]												
NAAQS 24-hour (>65 μg/m³)	0	0	0	–	–	–	–	–	–	–	–	–

Source: California Air Resources Board 2007.

Notes: CAAQS = California ambient air quality standards.
NAAQS = national ambient air quality standards.
– = insufficient data available to determine the value.

[a] An exceedance is not necessarily a violation.

[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[c] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, State statistics are based on California approved samplers.

[d] Measurements usually are collected every 6 days.

[e] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[f] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored.

health of sensitive populations such as asthmatics, children, and the elderly, within an adequate margin of safety. Secondary standards are designed to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The primary legislation that governs federal air quality regulations is the Clean Air Act Amendments of 1990. The amendments delegate primary responsibility for clean air to EPA. EPA develops rules and regulations to preserve and improve air quality, as well as delegating specific responsibilities to state and local agencies.

Areas that do not meet the federal ambient air quality standards shown in Table 3.3-1 are called *nonattainment* areas. For these nonattainment areas, the Clean Air Act requires states to develop and adopt State Implementation Plans, which are air quality plans showing how air quality standards will be attained. The State Implementation Plan, which is reviewed and approved by EPA, must demonstrate how the federal standards will be achieved. Failing to submit a plan or secure approval could lead to denial of federal funding and permits for such improvements as highway construction and sewage treatment plants. In cases where the State Implementation Plan is submitted by the state but fails to demonstrate achievement of the standards, EPA is directed to prepare a federal implementation plan.

State Regulations

Responsibility for achieving California's air quality standards, which are more stringent than federal standards, is placed on ARB and local air districts, and is to be achieved through district-level air quality management plans that will be incorporated into the State Implementation Plan. In California, EPA has delegated authority to prepare State Implementation Plans to ARB, which in turn has delegated that authority to individual air districts.

ARB has traditionally established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emissions inventories, collecting air quality and meteorological data, and approving State Implementation Plans.

Responsibilities of air districts include overseeing stationary source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by CEQA.

AB 32, the Global Warming Solutions Act of 2006, was signed and passed into law by Governor Arnold Schwarzenegger on September 27, 2006. It codifies the state's GHG emissions target by requiring that California's global warming emissions be reduced to 1990 levels by 2020. In the short term, it directs ARB to enforce the statewide cap that would begin phasing in 2012.

Local Regulations

SCAQMD has adopted emission thresholds to determine the level of significance of a project's emissions. These thresholds are found in the Air Quality Element of the Shasta County General Plan.

In addition, the proposed project may be subject to the SCAQMD rules presented below. This list of rules may not be all encompassing; additional SCAQMD rules may apply to the project as specific developments are identified. These rules have been adopted by SCAQMD to reduce emissions throughout Shasta County, and compliance with them is required. Failure to comply

with any applicable rule would be a violation of said rule, and is subject to SCAQMD enforcement action.

- **SCAQMD Rule 3:2—Specific Air Contaminants.** This rule establishes limits to the amount of pollutants that may be discharged into the atmosphere.
- **SCAQMD Rule 3:31—Architectural Coatings.** This rule limits the quantity of volatile organic compounds (VOCs) in architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within Shasta County.
- **SCAQMD Rule 3:32—Adhesives and Sealants.** This rule limits the emission of VOCs from adhesives and sealants and associated primers, and from related surface preparation solvents, cleanup solvents, and strippers.

3.3.2 Impact Analysis

This section describes the analysis relating to impacts on air quality associated with the proposed project. It describes the methods used to determine the project's impacts and the thresholds of significance of those impacts. Measures to mitigate (avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion.

Methodology

In order to evaluate the proposed project's impacts on ambient air quality, emissions were categorized as construction emissions and operational emissions. Construction emissions are associated with heavy-duty equipment, fugitive dust, and emissions from construction vehicles traveling to and from each component site. Operational emissions result mainly from motor vehicles associated with maintenance work. Significance criteria were based on thresholds established by SCAQMD, as discussed below in *Thresholds of Significance*.

Construction-Related Emissions

Construction would occur in phases as outlined in Section 2.7.2, *Construction Sequence*. Accordingly, for the purpose of this analysis, it was assumed that few actions would be undertaken concurrently.

Emissions associated with the construction of project facilities were estimated using the URBEMIS2002 (version 8.7.0) model; emissions associated with construction/widening of access roads were estimated using the Road Construction Emissions Model (Version 5.2). Both models are briefly described below.

URBEMIS2002 (version 8.7.0)

The URBEMIS2002 (version 8.7.0) model was used to estimate emissions associated with construction of the proposed project. URBEMIS2002 is a computer program used to estimate typical emissions (construction, area source, and mobile) associated with land use development projects. URBEMIS2002 estimates emissions based on the type of land use and area source and vehicular emissions typically associated with that land use. This ARB-approved model is widely recommended and used by many California air districts for calculating emissions from a variety of projects.

Road Construction Emissions Model (version 5.2)

Construction emissions of ROG, NO_X, CO, and PM10 were estimated using the Road Construction Emissions Model (Version 5.2). The road construction model is a public-domain spreadsheet model formatted as a series of individual worksheets. The model enables users to estimate emissions using a minimum amount of project-specific information. The model estimates emissions for load hauling (on-road heavy-duty vehicle trips), worker commute trips, construction site fugitive PM10 dust, and off-road construction vehicles. This analysis is based on anticipated construction equipment calculated by the Road Construction Emissions Model, which estimates construction equipment on the basis of project size, duration of construction activities, and level of daily construction activities. Although exhaust emissions are estimated for each activity, fugitive dust estimates are currently limited to the major dust-generating activities—specifically grubbing/land clearing and grading/excavation.

A detailed inventory of construction equipment that will be used for the proposed project has not yet been developed. Because construction plans for the proposed project have not been finalized, estimated construction emissions were based on default equipment inventories calculated by the Road Construction Emissions Model, URBEMIS2002, and professional judgment. Table 3.3-4 summarizes the anticipated construction equipment and construction vehicle activity data used in the estimation of construction emissions. Estimated emissions associated with worker travel to the construction site and construction truck deliveries were based on trip data developed for the transportation analysis. Based on these trip data, it was assumed that worker commute trips would entail a daily total of 9,590 vehicle miles traveled (VMT) (160 trips originating from Redding, 50 miles from the project site, and 106 trips originating from Burney, 15 miles from the project site), and construction truck traffic would entail a daily total of 2,240 VMT (10 trips originating from Redding, 50 miles from the project site, and 116 trips originating from Burney, 15 miles from the project site). Moreover, approximately 1.5% of all traveled roads would be unpaved, resulting in higher fugitive dust emissions than exclusively paved roads. Dust emissions from unpaved roads are based on an emission factor that provides an approximation of the pounds of PM10 generated per VMT on an unpaved road. ARB uses an emission factor of 2.0 pounds PM10/VMT (California Air Resources Board 2004). Because it is expected that the access road will be graveled and watered at least twice daily, the emission factor was reduced by 60% to 0.8 pound PM10/VMT. Finally, the transportation analysis assumes a maximum daily rate of 126 heavy truck trips associated with construction. However, the phase under which this traffic would occur is currently unknown. Consequently, this analysis assumes the maximum level of truck activity in order to account for impacts under a worst-case scenario. The model output for the URBEMIS2002 analysis is provided in Appendix B.

Table 3.3-4. Anticipated Construction Equipment

Equipment Phase	Equipment Pieces	Number of Equipment Pieces
Access road construction	Dozer	2
	Scraper	2
	Excavator	2
	Grader	3
	Rubber tired loaders	2
	Scraper	2
	Compactor	2
	Trencher	2
	Pavers	2

Equipment Phase	Equipment Pieces	Number of Equipment Pieces
	Paving Equipment	2
Staging Area	Graders	1
	Rollers	1
	Rubber tired loaders	1
Site Prep	Excavators	1
	Graders	1
	Rollers	1
	Rubber tired loaders	4
Foundations	Bore/drill rigs	2
	Cranes	1
	Excavators	1
	Rubber tired loaders	1
	Surfacing equipment	2
	Tractor/loaders/backhoes	1
O/M building construction	Tractor/loaders/backhoes	1
	Concrete/industrial saws	1
	Other equipment	1
	Rough terrain forklifts	1
	Rubber tired dozers	1
Substation/interconnection	Bore/drill rigs	1
	Cranes	1
	Excavators	1
	Rough terrain forklifts	1
	Rubber tired loaders	1
	Tractor/loaders/backhoes	1
	Trenchers	1
Turbine assembly/erection	Cranes	2
	Rough terrain forklifts	4
	Rubber tired loaders	3
	Skid steer loaders	4
	Tractor/loaders/backhoes	4

Operation-Related Emissions

Operation of the proposed project would not generate significant amounts of emissions, as emissions are typically not associated with wind project operations. Operational emissions would be limited to maintenance and operations activities, mobile source vehicular emissions from workers accessing the 4,500-square foot operations and maintenance facility, and area sources from the facility.

Mobile sources are sources of emissions associated with vehicle trips involving employees, deliveries, and maintenance activities. The primary operational emissions associated with the project are ozone precursors, CO, and PM10 emitted as vehicle exhaust. Emissions of ozone precursors, CO, and PM10 were evaluated using the URBEMIS2002 (version 8.7.0) model. Based on the data provided in the transportation analysis, it was assumed that worker commute trips would entail a daily total of 720 vehicles miles traveled (12 trips originating from Redding, 50 miles from the project site, and 8 trips originating from Burney, 15 miles from the project site).

Area sources are sources that can include area-wide, natural, and stationary sources (e.g., dry cleaners and gas stations). In the project area, area sources include emissions from natural gas combustion for heating (e.g., water heater and furnace), landscaping activities, consumer products (e.g., automotive products, cleaners), and periodic paint emissions from facility upkeep. Area emissions associated with project components were estimated using the URBEMIS2002 (version 8.7.0) model.

URBEMIS2002 (Version 8.7.0) Model

Operational emissions of ozone precursors, CO, and PM10 and were modeled using the URBEMIS2002 model. Emission calculations for area sources were based on default URBEMIS2002 calculations based on land use type and size; mobile source emissions were based on the default daily trip generation data calculated by URBEMIS2002. The output of URBEMIS analysis is provided in Appendix B.

Thresholds of Significance

Criteria for determining the significance of impacts related to air quality are based on criteria set forth in Appendix G of the State CEQA Guidelines (14 CCR 15000 et seq.). The proposed project would have a significant impact on air quality if it would result in any of the conditions listed below.

- Conflict with or obstruct implementation of the applicable air quality management plan.
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- 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 that exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

The State CEQA Guidelines (Appendix G, Checklist, Section 3, *Air Quality*) further state that the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make the determinations above. Accordingly, impacts on air quality were assessed on the basis of thresholds established in the Air Quality Element of the Shasta County General Plan. Shasta County has two levels of emission thresholds; these are used to determine the appropriate level of required Best Available Mitigation Measures (Table 3.3-5).

Table 3.3-5. Shasta County Emission Thresholds (Pounds per Day)

Level	ROG	NO_X	PM10
A	25	25	80
B	137	137	137

Source: Shasta County 2004.

While the emission levels shown in Table 3.3-5 are not CEQA air quality thresholds per se, the Level B thresholds are used to determine the level of significance.

If a project's emissions are reduced to a level below the Level B thresholds, the impact is less than significant. If emissions exceed the level B thresholds after the application of emissions offsets, then the project is considered to have a significant air quality impact, and emission offsets are required. SCAQMD has indicated that these offsets are applicable to operational emissions only (Bell pers. comm.).

Impacts and Mitigation Measures

Impact AIR-1: Temporary increase in construction-related emissions (less than significant with mitigation)

Construction of the proposed project would result in the temporary generation of emissions of ROG, NO_X, CO, and PM10 that would result in short-term impacts on ambient air quality in the area. Emissions would originate from mobile and stationary construction equipment exhaust, employee vehicle exhaust, dust from clearing and grading the project site, exposed soil eroded by wind, and ROG from architectural coatings and asphalt paving. Construction-related emissions would vary substantially depending on the number of turbines installed (i.e., 42, 44, or 68); the level of activity; length of the construction period; specific construction operations; types of equipment; number of personnel; wind and precipitation conditions; and soil moisture content.

Construction activities were divided into separate phases and analyzed separately. Tables 3.3-6 and 3.3-7 summarize unmitigated and mitigated construction-related emissions, respectively.

Table 3.3-6. Emissions of Unmitigated Criteria Pollutants from Construction Activities (pounds per day)

Level	ROG	NO_X	PM10
Access road construction	22.4	90.1	52.0
Staging area	15.5	122.6	30.9
Site prep	11.5	44.2	24.9
Substation/interconnection	19.7	**142.9**	12.4
Foundations	23.7	**144.1**	29.3
Turbine assembly/erection	20.5	100.6	11.5
O/M building construction	85.2	69.5	30.7
SCAQMD threshold	137	137	137

Note: Each phase includes emissions associated with the maximum (i.e., worst-case) worker commute trips. These emissions are 5.6 pounds per day ROG, 9.9 pounds per day NO_X, and 8.6 pounds per day PM10. Emissions that exceed the SCAQMD threshold are shown in bold type.

Table 3.3-7. Emissions of Mitigated Criteria Pollutants from Construction Activities (Pounds per Day)

Level	ROG	NO_X	PM10
Access road construction	22.4	90.1	52.0
Staging area	15.5	108.6	17.5
Site Prep	11.5	33.6	14.7
Substation/interconnection	19.7	131.2	11.1
Foundations	23.7	110.8	15.6
Turbine assembly/erection	20.5	82.4	9.2
O/M building construction	85.2	59.7	17.7
SCAQMD threshold	137	137	137

Note: Each phase includes emissions associated with the maximum (i.e., worst-case) worker commute trips. These emissions are 5.6 pounds per day ROG, 9.9 pounds per day NO_X, and 8.6 pounds per day PM10. Emissions that exceed the SCAQMD threshold are shown in bold type.

As indicated in Table 3.3-7, implementation of Mitigation Measures AIR-1 and AIR-2 would reduce construction emissions to a less-than-significant level.

Mitigation Measure AIR-1: Implement SCAQMD required standard mitigation measures

The project applicant will require the construction contractor to implement all feasible Standard Mitigation Measures. Such measures include but are not limited to those listed below.

- PM10 Controls.
  - Alternatives to open burning of vegetative material on the project site will be used by the project applicant unless otherwise deemed infeasible by the AQMD. Examples of suitable alternatives are chipping, mulching, and conversion to biomass fuel.
  - The applicant will be responsible for ensuring that all adequate dust control measures are implemented in a timely and effective manner during all phases of project development and construction.
  - All material excavated, stockpiled, or graded should 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 should 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 should be watered periodically or have dust palliatives applied for stabilization of dust emissions.
  - All onsite vehicles should be limited to a speed of 15 miles per hour on unpaved roads.
  - All land clearing, grading, earth moving, and excavation activities on a project will be suspended when winds are expected to exceed 20 miles per hour.

- All inactive portions of the development site should be seeded and watered until suitable grass cover is established.
- The applicant will be responsible for applying (according to manufacturer's specifications) nontoxic soil stabilizers to all inactive construction areas (previously graded areas that remain inactive for 96 hours) in accordance with the Shasta County Grading Ordinance.
- All trucks hauling dirt, sand, soil, or other loose material should be covered or should maintain at least 2 feet of freeboard (i.e., minimum vertical distance between top of the load and top of 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 off site will be either sufficiently watered or securely covered to prevent a public nuisance.
- During initial grading, earth moving, or site preparation, the project will be required to construct a paved (or dust palliative–treated) apron, at least 100 feet in length, onto the project site from the adjacent paved road(s).
- Paved streets adjacent to the development site should be swept or washed at the end of each day to remove excessive accumulations of silt and/or mud that may have accumulated as a result of activities on the development site.
- Adjacent paved streets will be swept (recommend water sweeper with reclaimed water) at the end of each day if substantial volumes of soil materials have been carried onto adjacent public paved roads from the project site.
- Wheel washers will be installed where project vehicles and/or equipment enter and/or exit onto paved streets from unpaved roads. Vehicles and/or equipment will be washed prior to each trip.
- Prior to final occupancy, the applicant will reestablish ground cover on the construction site through seeding and watering in accordance with the Shasta County Grading Ordinance.

- Streets.
  - The project will provide for temporary traffic control as appropriate during all phases of construction to improve traffic flow as deemed appropriate by the Department of Public Works and/or Caltrans.
  - Construction activities will be scheduled to direct traffic flow to off-peak hours as much as practicable.

Mitigation Measure AIR-2: Implement additional measures to reduce construction emissions

The project applicant will require construction contractors to implement measures to reduce construction-related emissions. All feasible measures should be implemented including but are not limited to those listed below.

- Limit the area subject to excavation, grading, and other construction activity at any given time.
- Limit the hours of operation of heavy-duty equipment and/or the amount of equipment in use.
- Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run by a portable generator set).
- Require that all diesel engines be shut off when not in use to reduce emissions from idling.
- During the smog season (May through October), lengthen the construction period to minimize the number of vehicles and equipment operating at the same time.
- Off-road trucks should be equipped with on-road engines when possible.
- Minimize obstruction of traffic on adjacent roadways.
- Power construction equipment with diesel engines fueled by alternative diesel fuel blends or ultra low sulfur diesel (ULSD). Only fuels that have been certified by ARB should be used. ARB has verified specific alternative diesel fuel blends for NO_X and PM emission reduction. The applicant should also use ARB-certified alternative fueled (compressed natural gas [CNG], liquid propane gas [LPG], electric motors, or other ARB certified off-road technologies] engines in construction equipment where practicable.
- Use construction equipment that meets the current off-road engine emission standard (as certified by ARB) or that is re-powered with an engine that meets this standard. Tier I, Tier II, and Tier III engines produce significantly less NO_X and PM emissions than uncontrolled engines.

Impact AIR-2: Elevated health risk from exposure of nearby sensitive receptors to construction-related diesel particulate matter (less than significant)

Construction activities are anticipated to entail the operation of diesel-powered equipment for various activities. In October 2000, ARB identified diesel exhaust as a TAC. The assessment of cancer health risks associated with exposure to diesel exhaust is typically associated with chronic exposure, in which a 70-year exposure period is often assumed. Although excess cancer can result from exposure periods of less than 70 years, acute exposure periods (i.e., exposure periods of 2–3 years) to diesel exhaust are not anticipated to result in increased health risk because health risks associated with exposure to diesel exhaust are typically seen in exposures periods that are chronic in nature. Health impacts associated with exposure to diesel exhaust from project construction are not anticipated to be significant because construction activities would occur over a 6- to 12-month period and the nearest sensitive receptors are located more than 1.5 miles from the proposed project area. Consequently, this impact would be less than significant.

Impact AIR-3: Generation of emissions of reactive organic gases and oxides of nitrogen in excess of SCAQMD thresholds (less than significant)

Long-term air quality impacts are associated with the change in permanent use of the project site. Both area and mobile sources must be considered with respect to the proposed project. Area sources include emissions from onsite activities and natural-gas combustion for heating

requirements, as well as emissions from personal product use. Mobile sources are sources of emissions associated with vehicle trips involving employees, deliveries, and maintenance activities. Table 3.3-8 summarizes the results of these calculations.

Table 3.3-8. Emissions of Criteria Pollutants from Project Operations (Pounds per Day)

Full Project Buildout	ROG	NO_x	CO	PM10
Area source emissions				
Natural gas	0.1	0.8	0.7	0.0
Hearth	0.0	0.0	0.0	0.0
Landscaping	0.1	0.0	0.7	0.0
Consumer products	0.0	–	–	–
Architectural coatings	0.1	–	–	–
Mobile source emissions				
Vehicular emissions	0.5	1.0	6.6	7.43
Total	0.7	1.8	8.0	7.43
SCAQMD threshold *	137	137	–	137

* Requiring Best Available Mitigation Measures

As shown in Table 3.3-8, project-related operational emissions are considered less than significant.

Impact AIR-4: Increase in greenhouse gas contaminant emissions (less than significant)

Currently, EPA, ARB, and SCAQMD have not established any thresholds or guidance to evaluate impacts associated with greenhouse gas emissions. This is because GHGs, especially CO_2, do not pose any health risks at ambient concentrations. The impacts associated with GHGs are long-term climatic changes, which are beyond the regulatory purview of the air district. As previously noted, GHG emissions tend to accumulate in the atmosphere because of their relatively long lifespan. Consequently, their impact on the atmosphere is mostly independent of the point of emission; GHG emissions are more appropriately evaluated on a regional, state, or even national scale than on an individual project level.

However, automobiles are a major source of GHG emissions, and the quantity of GHG emissions from automobiles is directly correlated with the amount of VMT. Because GHG emissions are more appropriately evaluated on a regional, state, or even national scale rather than at the project level, and because climate change would not occur directly from project-related emissions, this impact is considered less than significant.