3.1 Air Quality

The following discussion summarizes the existing air quality environment and regulatory environment, as well as an analysis of direct and indirect environmental effects of the action. Where feasible, mitigation measures are recommended to reduce the severity of identified effects. A complete air quality study, providing additional methodology and results of the air quality modeling analysis, is provided in the *Kings Beach Commercial Core Revised Air Quality Technical Study* (Appendix C).

3.1.1 Affected Environment

3.1.1.1 Regional Climate and Meteorology

The proposed action is located within the Placer County portion of the Lake Tahoe Air Basin (LTAB). The LTAB consists of Placer and El Dorado Counties in California and Washoe, Carson City, and Douglas Counties in Nevada. Air quality within Placer County is managed by the Placer County Air Pollution Control Board (PCAPCD), and air quality within El Dorado County by the El Dorado County Air Pollution Control District (EDCAPCD). The Washoe County Air Quality Management Division regulates air quality within Washoe County, while the Nevada Bureau of Air Quality Control manages air quality in Carson City and Douglas Counties. TRPA has developed its own set of air quality standards and ordinances and has authority for overseeing and managing overall air quality within the LTAB. The LTAB comprises the surface of Lake Tahoe and the land up to the surrounding rim of mountain ridges, occupying approximately 193 square miles. Its average elevation is 6,200 feet. Deep valleys carved by streams draining into the lake break the precipitous mountain slopes surrounding the lake.

In winter, the meteorology of the LTAB is typified by large amounts of precipitation from Pacific storms that fall mainly as snow, accompanied by below freezing temperatures, winds, cloudiness, and lake and valley fog. Winter days can be cool and brilliantly clear between storms. Thermal inversions are a dominant feature of winter weather within the LTAB. In summer, days are often mild and sunny, with daytime

peaks in the upper 70s and low 80s (degrees Fahrenheit), with southern flows of moisture bringing an occasional thunderstorm.

The principal impact on air quality from these conditions is excess winter concentrations of carbon monoxide (CO) in the more congested and populated areas of the basin. This is seen primarily at South Lake Tahoe from the operation of vehicles, residential wood stoves, and fireplaces. The thermal inversions also trap pollutants near the surface of the land and Lake Tahoe, resulting in higher CO concentrations. Some transport of ozone from the west in summer is also known to occur, but the California Air Resources Board (ARB) has not yet officially recognized this as a transport route.

3.1.1.2 Criteria Pollutants and Local Air Quality of Concern in the Lake Tahoe Region

The federal and state governments have established ambient air quality standards for seven criteria pollutants: ozone, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than or equal to 10 microns in diameter (PM10), particulate matter less than 2.5 microns in diameter (PM2.5), and lead. The State of California (State) has also established standards for hydrogen sulfide, vinyl chloride, and sulfates. National and California ambient air quality standards (NAAQS and CAAQS, respectively) are shown in Table 3.1-1.

Ozone and NO_2 (an ozone precursor) are considered regional pollutants because they affect air quality on a regional scale; oxides of nitrogen ($NO_{X)}$, including NO_2, react photochemically with reactive organic gases (ROG) to form ozone some distance downwind of the source of pollutants. Pollutants such as CO, PM10, and PM2.5 are considered local pollutants because they tend to disperse rapidly with distance from the source. PM2.5 is also a regional pollutant that travels and impacts downwind areas. The health effects of the pollutants of concern in the action area are discussed below.

Table 3.1-1. Ambient Air Quality Standards in California

Pollutant	Average Time	Standard (ppm)		Standard (μg/m^3)		Violation Criteria		Attainment Status of Placer County	
		California	National	California	National	California	National	California	National
Ozone*	1 hour	0.09	–	180	–	If exceeded	–	Attainment	–
	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	–	Unclassified/ attainment
Carbon monoxide	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year	Attainment	Unclassified/ attainment
	1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year	Attainment	Unclassified/ attainment
(Lake Tahoe only)	8 hours	6	–	7,000	–	If equaled or exceeded	–	Attainment	–
Nitrogen dioxide	Annual average	–	0.053	–	100	–	If exceeded on more than 1 day per year	–	Unclassified/ attainment
	1 hour	0.25	–	470	–	If exceeded	–	Attainment	–
Sulfur dioxide	Annual average	–	0.03	–	80	–	If exceeded	–	Attainment
	24 hours	0.04	0.14	105	365	If exceeded	If exceeded on more than 1 day per year	Attainment	Attainment
	1 hour	0.25	–	655	–	If exceeded	–	–	–
Hydrogen sulfide	1 hour	0.03	–	42	–	If equaled or exceeded	–	Unclassified	–
Vinyl chloride	24 hours	0.01	–	26	–	If equaled or exceeded	–	No designation	–
Inhalable particulate matter (PM10)	Annual arithmetic mean	–	–	20	50	If exceeded	If exceeded at each monitor within area	Nonattainment	Unclassified/ attainment
	24 hours	–	–	50	150	If exceeded	If exceeded on more than 1 day per year	Nonattainment	Unclassified/ attainment

Table 3.1-1. Continued

Pollutant	Average Time	Standard (ppm)		Standard (μg/m^3)		Violation Criteria		Attainment Status of Placer County	
		California	National	California	National	California	National	California	National
Inhalable particulate matter (PM2.5)	Annual arithmetic mean	–	–	12	15	If exceeded	If 3-year average from single or multiple community-oriented monitors is exceeded	Attainment	No designation
	24 hours	–	–	–	65	–	If 3-year average of 98P^{thP} percentile at each population-oriented monitor within an area is exceeded	–	No designation
Sulfate particles	24 hours	–	–	25	–	If equaled or exceeded	–	Attainment	–
Lead particles	Calendar quarter	–	–	–	1.5	–	If exceeded no more than 1 day per year	–	No designation
	30-day average	–	–	1.5	–	If equaled or exceeded	–	Attainment	–

Notes: All standards are based on measurements at 25ºC and 1 atmosphere pressure.
National standards shown are the primary (health effects) standards.
– = 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 will revoke the 1-hour standard on June 15, 2005. However, the California 1-hour ozone standard will remain in effect. California's 8-hour standard of 0.07 ppm was approved in June 2005.

Source: California Air Resources Board 2003.

Ozone

Ozone is a severe eye, nose, and throat irritant that increases susceptibility to respiratory infections. Ozone causes extensive damage to plants through leaf discoloration and cell damage. Ozone also attacks synthetic rubber, textiles, and other materials. Ozone is not emitted directly into the air but formed by a photochemical reaction in the atmosphere. Ozone precursors 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. Mobile sources and stationary combustion equipment emit ozone precursors (ROG and NO_X).

Carbon Monoxide

CO is essentially inert to plants and materials but can have significant effects on human health. CO combines readily with hemoglobin and thereby reduces the amount of oxygen transported in the bloodstream. Effects on humans range from slight headaches to nausea to 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, which can cause CO “hotspots” typical of the South Lake Tahoe area. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

Inhalable Particulate Matter

Federal and state ambient air quality standards for particulate matter apply to two classes of particulates: PM2.5 and PM10. 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. In the LTAB, there are additional concerns regarding particulate matter because particles are deposited into Lake Tahoe and reduce lake clarity.

Sulfur Oxides

Sulfur oxide gases are a family of colorless, pungent gases (including SO_2) formed primarily by combustion of sulfur-containing fossil fuels (mainly coal and oil), metal smelting, and other industrial processes. Sulfur oxides can react to form sulfates, which significantly reduce visibility and are regional pollutants that travel to the LTAB from upwind sources. The major health concerns associated with exposure to high concentrations of sulfur oxides include effects on breathing, respiratory illness, alterations in pulmonary defenses, and aggravation of existing cardiovascular disease. Emissions of sulfur oxides can also damage tree foliage and agricultural crops. Together, sulfur oxides and nitrogen oxides are the major precursors to acid rain, which is associated with the acidification of lakes and streams and the accelerated corrosion of buildings and monuments.

Vinyl Chloride

Vinyl chloride is a sweet-smelling, colorless gas at ambient temperature. Landfills, publicly owned treatment works, and polyvinyl chloride production are the major identified sources of vinyl chloride emissions in California. Polyvinyl chloride can be fabricated into several products such as pipes, pipe fittings, and plastics. In humans, epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer (liver angiosarcoma) and have suggested a relationship between exposure and lung and brain cancers.

Lead

Lead is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. Lead was used several decades ago to increase the octane rating in gasoline, thereby making gasoline-powered automobile engines a major source of airborne lead. Ambient concentrations of lead have dropped dramatically because the use of leaded fuel has been mostly phased out. Short-term exposure to high levels of lead can cause vomiting,

diarrhea, convulsions, coma, or even death, but even small amounts of lead can be harmful, especially to infants, young children, and pregnant women.

Hydrogen Sulfide

Hydrogen sulfide gas is colorless, with a characteristic odor of rotten eggs. Atmospheric hydrogen sulfide is primarily oxidized to SO_2, which is eventually converted into sulfate, then sulfuric acid. When sulfuric acid is transported back to the earth through acid rain, it can damage plant tissue and aquatic ecosystems. Hydrogen sulfide is primarily associated with geothermal activity and oil production activities. It can cause dizziness; irritation to the eyes, mucous membranes, and respiratory tract; nausea; and headaches at low concentrations. Exposure to higher concentrations (above 100 parts per million [ppm]), can cause olfactory fatigue, respiratory paralysis, and death.

Toxic Air Contaminants

Toxic air contaminants (TACs) are pollutants that may result in an increase in mortality or serious illness, or that may pose a present or potential hazard to human health. Health effects of TACs include cancer, birth defects, neurological damage, damage to the body's natural defense system, and diseases that lead to death. In 1998, following a 10-year scientific assessment process, the ARB identified particulate matter from diesel-fueled engines as a TAC. Compared to other air toxics that the ARB has identified and controlled, diesel particulate matter emissions are estimated to be responsible for about 70% of the total ambient air toxics risk (California Air Resources Board 2000).

3.1.1.3 Existing Air Quality Conditions

Typically, the existing air quality conditions in the action area can be characterized by monitoring data collected in the region. However, due to the rural nature and varied topography of the LTAB, monitoring stations to accurately characterize existing air quality conditions are not located in the immediate vicinity of the action area. The nearest monitoring stations in the LTAB include the Tahoe City (Lake Forest) monitoring station, which is located 8 miles to the southwest and monitors for ozone and CO; Echo Summit monitoring station, which is located 30 miles to the south and monitors for

ozone, CO, and PM10; and South Lake Tahoe monitoring station, which is located 20 miles to the south and monitors for ozone, CO, PM10, and PM2.5. Outside of these monitoring stations, the next closest monitoring station is the Truckee monitoring station, which monitors for ozone and PM2.5, and is located 10 miles to the northwest in the Mountain Counties Air Basin.

The Tahoe City air quality site was installed as part of a short-term air quality study led by the ARB. Due to ongoing technical problems that resulted in an inability to collect sound CO data, the CO instruments from this site will not be used for this analysis. The Echo Summit data is not used to assess conditions in the LTAB because local topography and activities in the immediate vicinity of this site have a significant influence on these data, while the Truckee monitoring station is not located within the LTAB.

Table 3.1-2 summarizes air quality data from these monitoring stations from 2003 to 2005. As shown in the table, the monitoring stations in the vicinity of the action area have experienced occasional violations of several ambient air quality standards during the 3-year monitoring period. Placer County's attainment status for each ambient air quality standard is shown in Table 3.1-2. Due to the various problems associated with the Tahoe City and Echo Summit monitoring sites, this analysis relies primarily on data from the South Lake Tahoe site. However, while it is expected that the use of South Lake Tahoe data to evaluate pollutants that can be very localized (such as CO) will include some uncertainty, it is anticipated that the monitoring data presented in Table 3.1-2 gives a "macro level" representation of existing air quality conditions within the LTAB.

3.1.1.4 Sensitive Receptors

Sensitive receptors are locations where human populations—especially children, seniors, and sick persons—are located where there is reasonable expectation of continuous human exposure according to the averaging time for an air quality standard (e.g., 24-hour, 8-hour, 1-hour). These typically include residences, hospitals, and schools. Residences are scattered throughout the vicinity of the action area.

Table 3.1-2. Ambient Air Quality Monitoring Data Measured at the Echo Summit, South Lake Tahoe, Tahoe City, and Truckee Monitoring Stations

Pollutant Standards	Echo Summit[a]			South Lake Tahoe			Tahoe City			Truckee		
	2003	2004	2005	2003	2004	2005	2003	2004	2005	2003	2004	2005
Ozone												
Maximum 1-hour concentration (ppm)	0.082	0.096	0.079	0.075	0.066	–	0.086	0.065	–	0.068	0.086	0.080
Maximum 8-hour concentration (ppm)	0.079	0.082	0.070	0.066	0.058	–	0.070	0.061	–	0.062	0.072	0.068
Number of days standard exceeded[b]												
NAAQS 1-hour (>0.12 ppm)	0	0	0	0	0	–	0	0	–	0	0	0
CAAQS 1-hour (>0.09 ppm)	0	1	0	0	0	–	0	0	–	0	0	0
NAAQS 8-hour (>0.08 ppm)	0	0	0	0	0	–	0	0	–	0	0	0
Carbon Monoxide (CO)												
Maximum 8-hour concentration (ppm)	1.86	4.35	–	1.51	1.18	–	0.81	0.53	–	–	–	–
Maximum 1-hour concentration (ppm)	2.4	6.1	–	2.4	2.2	–	1.4	.9	–	–	–	–
Number of days standard exceeded[b]												
NAAQS 8-hour (U≥U9.0 ppm)	0	0	–	0	0	–	0	0	–	–	–	–
CAAQS 8-hour (U≥U9.0 ppm)	0	0	–	0	0	–	0	0	–	–	–	–
NAAQS 1-hour (U≥U35 ppm)	0	0	–	0	0	–	0	0	–	–	–	–
CAAQS 1-hour (U≥U20 ppm)	0	0	–	0	0	–	0	0	–	–	–	–
Lake Tahoe 8-hour (U≥U6 ppm)[c]	0	0	–	0	0	–	0	0	–	–	–	–
Particulate Matter (PM10)[d]												
National[e] maximum 24-hour concentration ($\mu g/m^3$)	46.0	24.0	–	61.0	47.0	38.0	–	–	–	–	–	–
National[e] second-highest 24-hour concentration ($\mu g/m^3$)	22.0	23.0	–	41.0	45.0	38.0	–	–	–	–	–	–
State[f] maximum 24-hour concentration ($\mu g/m^3$)	36.0	19.0	–	52.0	41.0	33.0	–	–	–	–	–	–
State[f] second-highest 24-hour concentration ($\mu g/m^3$)	18.0	18.0	–	36.0	41.0	32.0	–	–	–	–	–	–
National annual average concentration ($\mu g/m^3$)	7.9	8.3	–	8.8	13.4	17.5	–	–	–	–	–	–
State annual average concentration ($\mu g/m^3$)[g]	6.3	–	–	17	17	15	–	–	–	–	–	–

Table 3.1-2. Continued

Pollutant Standards	Echo Summit[a]			South Lake Tahoe			Tahoe City			Truckee		
	2003	2004	2005	2003	2004	2005	2003	2004	2005	2003	2004	2005
Number of days standard exceeded[a]												
NAAQS 24-hour (>150 μg/m^3)[h]	0.0	–	–	0.o	–	0.0	–	–	–	–	–	–
CAAQS 24-hour (>50 μg/m^3)[h]	0.0	–	–	6.1	–	0.0	–	–	–	–	–	–
Particulate Matter (PM2.5)												
National[e] maximum 24-hour concentration (μg/m^3)	–	–	–	21.0	20.0	–	–	–	–	21.0	34.0	35.0
National[e] second-highest 24-hour concentration (μg/m^3)	–	–	–	19.0	16.0	–	–	–	–	20.0	18.0	20.0
State[f] maximum 24-hour concentration (μg/m^3)	–	–	–	24.0	23.2	–	–	–	–	21.0	34.0	35.0
State[f] second-highest 24-hour concentration (μg/m^3)	–	–	–	23.6	17.5	–	–	–	–	20.0	18.0	20.0
National[e] annual average concentration (μg/m^3)	–	–	–	7.2	–	–	–	–	–	7.2	6.8	6.8
State[e] annual average concentration (μg/m^3)[g]	–	–	–	7.2	–	–	–	–	–	7.2	7.7	–
Number of days standard exceeded[b]												
NAAQS 24-hour (>65 μg/m^3)	–	–	–	0	0	–	–	–	–	0	0	0

Notes:

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

[a] The Echo Summit air monitoring station is not located within the Lake Tahoe Air Basin.

[b] An exceedance is not necessarily a violation.

[c] A separate 8-hour carbon monoxide standard of 6 ppm has been established for the Lake Tahoe Air Basin.

[d] Measurements usually are collected every 6 days.

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

[f] 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.

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

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

Sources: California Air Resources Board 2004; U.S. Environmental Protection Agency 2005.

3.1.2 Regulatory Setting/ Tahoe Regional Planning Agency Thresholds

The air quality management agencies of direct importance in Placer County include the U.S. Environmental Protection Agency (EPA), ARB, PCAPCD, and TRPA. The EPA establishes NAAQS for which ARB and PCAPCD have primary implementation responsibility.

The ARB and PCAPCD are responsible for ensuring that CAAQS are met. The ARB oversees the activities of the local air districts, but it does not permit stationary sources of air pollutants, which is the responsibility of the local air districts. The ARB has the authority for setting vehicle emissions standards for on-road vehicles and for some off-road vehicles. The ARB also identifies and sets control measures for TACs.

The PCAPCD is responsible for implementing strategies for air quality improvement and recommending mitigation measures for new growth and development. It also adopts and enforces controls on stationary sources of air pollutants through its permit and inspection programs and regulated agricultural burning. Other PCAPCD responsibilities include monitoring air quality, preparation of clean air plans, and responding to citizen air quality complaints. In addition to planning responsibilities, the PCAPCD has permitting authority over stationary sources of pollutants. Authority over mobile sources of pollutants is given to the ARB.

TRPA is responsible for planning within the Lake Tahoe region and oversees development at Lake Tahoe. TRPA has the authority to adopt environmental quality thresholds and to enforce ordinances designed to achieve the thresholds. TRPA's authority is granted directly from Congress; therefore, it has the authority to adopt environmental thresholds, which include air quality thresholds that must be recognized by federal, state, and local agencies. TRPA is required to adopt ordinances or regulations that allow for development while also meeting the threshold standards.

3.1.2.1 Federal Requirements

Federal Clean Air Act

The CAA, enacted in 1963 and amended several times thereafter (including the 1990 amendments), establishes the framework for modern air pollution control. The EPA establishes NAAQS for the following criteria pollutants: CO, NO_2, SO_2, ozone, particulate matter, and lead (Table 3.1-1). The standards are divided into primary and secondary standards. Primary standards are designed to protect human health, including the 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 CAA requires states to submit a state implementation plan (SIP) for areas in nonattainment for NAAQS. The SIP, which is reviewed and approved by the EPA, must demonstrate how the NAAQS will be achieved. Failing to submit a plan or secure approval could lead to denial of federal funding and permits. If the SIP submitted by the state fails to demonstrate achievement of the standards, the EPA must prepare a federal implementation plan.

Transportation Conformity Requirements

The concept of transportation conformity was introduced in the 1977 CAA, which includes a provision to ensure that transportation investments conform to the SIPs for meeting NAAQS. Conformity requirements were made substantially more rigorous in the Clean Air Act Amendments of 1990, and the transportation conformity regulation that details implementation of the new requirements was issued in November 1993. Typically, evaluating whether a project is included in a conforming regional transportation plan (RTP) or transportation improvement plan (TIP) is done to determine transportation conformity for ozone precursors. Because PM10 and CO are localized pollutants, the determination of transportation conformity for these pollutants is assessed by identifying whether the proposed action would generate elevated "hotspot"

concentrations. The determination of conformity for PM10 and PM2.5 is qualitative, and the determination for CO is quantitative.

3.1.2.2 State Requirements

The California Clean Air Act (California CAA) requires local and regional air pollution control districts that are not attaining one or more of the CAAQS for ozone, CO, SO_2, or NO_2 to expeditiously adopt district-level air quality management plans, called clean air plans (CAPs), that are specifically designed to attain these standards. Each CAP must be designed to achieve an annual 5% reduction in districtwide emissions of each nonattainment pollutant or its precursors, and they must be updated every 3 years. The ARB is responsible for developing plans and projects that achieve compliance with the state PM10 standards. Although there are state ambient standards for lead, sulfates, vinyl chloride, and hydrogen sulfide, the California CAA does not require that CAPs be developed for them.

3.1.2.3 Local Requirements

Placer County Air Pollution Control District

The proposed action would be subject to the following PCAPCD rules, which have been adopted by the PCAPCD to reduce emissions throughout Placer County and are required.

- **Rule 202: Visible Emissions.** The purpose of Rule 202 is to establish limits regarding the opacity of emissions.
- **Rule 205: Nuisance.** The purpose of Rule 205 is to limit emissions of any substance that would cause a nuisance to the public.
- **Rule 207: Particulate Matter.** The purpose of Rule 207 is to establish limits regarding the emissions of particulate matter.
- **Rule 228: Fugitive Dust.** The purpose of Rule 228 is to reduce the amount of particulate matter entrained and discharged into the air by requiring actions to

prevent, reduce, or mitigate fugitive dust emissions. This rule also applies to construction activities.

- **Rule 242: Stationary Internal Combustion Engines.** The purpose of Rule 242 is to limit the emission of NO_X and CO from stationary internal combustion engines. This rule would apply to any internal combustion engines rated at more than 50 brake horsepower operating more than 200 hours per year. This rule would apply to construction activities that occur for more than 200 hours per year.
- **Rule 501: General Permit Requirements.** The purpose of Rule 501 is to provide an orderly procedure for the review of new sources of air pollution and the orderly review of the modification and operation of existing sources through the issuance of permits. This rule does not apply to internal combustion engines with a manufacturer's maximum continuous rating of 50 brake horsepower or less or to gas turbine engines with a maximum heat input rate of 3,000,000 British thermal units per hour or less at ISO [International Organization for Standardization] standard day conditions (288 degrees Kelvin, 60% relative humidity, 101.3 kilopascals pressure).
- **Rule 509: Transportation Conformity.** Rule 509 summarizes the requirements for the conformity of transportation plans, programs, and projects developed, funded, or approved under *U.S. Government Code (U.S.C.) Title 23* or the federal Transit Act to state or federal implementation plans.

Tahoe Regional Planning Agency

The TRPA has developed eight air quality standards and indicators with the goal of protecting the air quality in the Lake Tahoe region. They are summarized below.

- **AQ-1: Carbon Monoxide.** CO levels will not meet or exceed the TRPA 8-hour 6.0-ppm standard. The indicator for attainment of this standard is the second-highest CO concentration read at the Stateline, Nevada, station (ppm). This threshold is applicable to the proposed action, and TRPA is in attainment for this threshold.

- **AQ-2: Ozone.** Ozone levels will not exceed the TRPA 1-hour standard of 0.08 ppm. Attainment is based on the number of 1-hour periods, which equal or exceed the federal, Nevada, or TRPA standard at any of the permanent monitoring sites (unitless), and the number of 1-hour periods that exceed the California standard. This threshold is applicable to the proposed action, and TRPA is in nonattainment for the 1-hour threshold.
- **AQ-3: Particulate Matter.** Particulate matter concentrations will not exceed the California and federal standards for 24-hour concentrations (50 and 150 micrograms per cubic meter [$\mu g/m^3$], respectively) and the annual average (20 and 50 $\mu g/m^3$). Attainment is based on the number of 24-hour periods exceeding the applicable federal or state standards at any permanent monitoring station (unitless) and the annual average PM10 concentration at any monitoring station ($\mu g/m^3$). This threshold is applicable to the proposed action, and TRPA is in attainment for this threshold.
- **AQ-4: Visibility.** TRPA's regional and subregional visibility standards will not be violated. In addition, for regional and subregional visibility, wood smoke concentrations will be reduced 10% below the 1981 levels for regional and subregional visibility. Suspended soil particles will be reduced 30% below the 1981 levels. For regional visibility, visual range is calculated from aerosol data gathered at the D. L. Bliss State Park monitoring site. For subregional visibility, visibility is calculated from aerosol data gathered at the Lake Tahoe Boulevard station. For state visibility standards, visual range is calculated from nephelometer data collected at Bliss State Park and Lake Tahoe Boulevard for periods in which relative humidity is less than 70%. This threshold is applicable to the proposed action, and TRPA is in nonattainment for the regional 90% threshold.
- **AQ-5: Traffic Volume.** There will be a 7% reduction in traffic volume on the U.S. Highway 50 (U.S. 50) corridor from the 1981 values. The standard uses the average traffic volume from 4 p.m. to midnight from November through February. Traffic volumes on U.S. 50, recorded at a site immediately west of the intersection of

Park Avenue in the city of South Lake Tahoe, include a count of both directions during an average day. TRPA selected this indicator because of the timing of the highest CO concentrations, which generally occur during these time periods in this area. This threshold is applicable to the proposed action, and TRPA lacks sufficient data to evaluate whether they are in attainment for this threshold, although it is possible they are in attainment.

- **AQ-6: Wood Smoke.** Annual emissions from wood smoke will be reduced 10% from 1981 levels. There are currently no scientifically sound direct measurements for wood smoke, although indicative aerosol constituents have been used to analyze wood smoke trends. This threshold is not applicable to the proposed action, and TRPA lacks sufficient data to evaluate whether they are in attainment for this threshold, although it is likely they are in nonattainment.
- **AQ-7: Vehicle Miles Traveled.** Vehicle miles traveled (VMT) will be reduced 10% below the 1981 levels. Typically, VMT is calculated directly from a traffic model. However, for the purposes of the 2001 Threshold Evaluation, TRPA utilized the 1995 VMT estimate from the TranPlan traffic model and applied a factor to account for actual increases in traffic volumes from 1995 through 1999. Actual current traffic volumes were closer to the 1995 TranPlan generated traffic volumes than they were to the 2001 forecasted traffic volumes. A factor was then developed comparing the 1995 model-generated traffic volumes to the current actual volumes. This relationship was then applied to the 1995 VMT estimate to account for increase in traffic in that time period and estimate the current year VMT. This threshold is applicable to the proposed action, and TRPA is in nonattainment for the threshold.
- **AQ-8: Atmospheric Deposition.** Dissolved inorganic nitrogen load on Lake Tahoe from atmospheric sources will be reduced by approximately 20% of the 1973–1981 annual average using the annual average concentrations of particulate NO_3 at the Lake Tahoe Boulevard air quality monitoring station and the annual average concentrations of NO_2 at a Stateline, Nevada, monitoring station. TRPA has adopted the following indicator for NO_3: "Annual average concentration of particulate NO_3 at

the Lake Tahoe Boulevard air quality monitoring station (μg/m^3)." The associated interim target is "not greater than 1.27 μg/m^3." This monitoring station was relocated in 1998; therefore, the annual average concentrations from CARB's South Lake Tahoe Sandy Way station are used to determine attainment. This threshold is indirectly applicable to the proposed action, and TRPA lacks sufficient data to evaluate whether they are in attainment for this threshold, although they are in attainment for the interim target.

3.1.3 Environmental Consequences (Including Permanent, Temporary, Direct, Indirect)

This section describes the proposed action's effects on air quality. First, it describes the methods used to determine the proposed action's impacts associated with construction (temporary, short-term) and operation (permanent, long-term). Second, it lists the thresholds used to conclude whether an effect would be adverse. Third, it describes each impact and any mitigation measures that would be implemented.

3.1.3.1 Methodology

Alternative 1

Alternative 1 represents the existing roadway configuration, which would remain unchanged in the future.

Alternatives 2, 3, and 4

Alternatives 2, 3, and 4 represent the build alternatives. The following discussion focuses on the build alternatives, which would not differ substantially with regard to air quality because traffic volumes would not vary between the alternatives.

Construction

Construction emissions of ROG, NO_X, CO, and PM10 were estimated using the Road Construction Emissions Model (Version 5.1). 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 based on 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, which include grubbing/land clearing and grading/excavation.

The amount of pollutants emitted during construction activities varies greatly depending on the level of activity, specific operations taking place, equipment being operated, soil characteristics, and weather conditions. Despite this variability in emissions, experience has shown that several feasible control measures can be reasonably implemented to reduce PM10 emissions from fugitive dust and equipment exhaust emissions during construction.

Operation

Emissions of Criteria Pollutants

Vehicle Emission Rates

Vehicle emission rates were determined using the ARB's EMFAC2002 emission rate program. Free-flow traffic speeds were adjusted to reflect congested speeds using methodology from the *Highway Capacity Manual* (Transportation Research Board 2000), and particulate matter estimates incorporated emissions from brake and tire wear. Guidance provided by TRPA staff indicates that Lake Tahoe's environment and economy result in a local climate and residential/visitor population that is rather different than those parts of the counties that are outside the Lake Tahoe Basin and other areas in California. Specifically, default data included in the EMFAC2002 does not accurately represent the meteorological data, vehicle speed, and actual fleet mix of vehicles present

in the Tahoe area (Quashnick pers. comm.). As a result, the default fleet mix for the Lake Tahoe region was replaced with area-specific data provided by the TRPA. Because emissions of ozone precursors and temperature are directly related, the highest summer peak hour traffic conditions were modeled to estimate worst-case emissions of ozone precursors for the proposed action.

Roadway and Traffic Conditions

Traffic volumes and operating conditions used in the modeling were obtained from the traffic analysis prepared by the project traffic engineers (LSC Transportation Consultants, Inc. 2003; Shaw pers. comm.) Emissions of ozone precursors (ROG and NO_X), CO, and PM10 for existing and future year (2028) project conditions under each alternative were modeled using EMFAC2002. Interim year (2008) emissions of criteria pollutants were not estimated because future year (2028) conditions represent final project buildout conditions. Emissions for peak hour and non-peak hour conditions were estimated to obtain overall daily emissions. For this analysis, the roadway network was assumed to operate at a daily average of LOS A for non-peak hour conditions. In addition, the proposed action is not a traffic-generating project and would not result in differences in traffic volumes throughout the action area between build and no-build conditions.

Carbon Monoxide Impacts at Congested Intersections

CALINE4 Model

Localized increases in CO concentrations from vehicle congestion at intersections affected by development were modeled using the Caltrans CALINE4 line source dispersion model (Benson 1989). CALINE4 is a Gaussian dispersion model specifically designed to evaluate air quality impacts of roadway projects. Each roadway segment analyzed in the model is treated as a sequence of “links.” CALINE4 uses worst-case meteorological data to predict a concentration that would never be exceeded, thus producing a conservative estimate of a project’s potential effects. Because CO emissions and temperature are inversely related, the highest winter peak hour traffic conditions were modeled to estimate the worst-case CO concentrations for the proposed action.

Roadway and Traffic Conditions

Traffic volumes and operating conditions used in the modeling were obtained from the traffic analysis prepared by the project traffic engineers (LSC Transportation Consultants, Inc. 2003; Shaw pers. comm.). Ambient CO concentrations near the roadway for existing, interim year (2008), and future year (2028) project conditions under each alternative were modeled using CALINE4. The intersections of SR 28/SR 267, SR 28/Secline Street, SR 28/Deer Street, SR 28/Bear Street, SR 28/Coon Street, SR 28/Fox Street, and SR 28/Chipmunk Street were modeled to assess CO impacts.

Vehicle Emission Rates

Vehicle emission rates were determined using the ARB's EMFAC2002 emission rate program. Free-flow traffic speeds were adjusted to reflect congested speeds using methodology from the *Highway Capacity Manual* (Transportation Research Board 2000). As indicated above, the TRPA has identified Lake Tahoe as having a local climate and residential/visitor population that is rather different than the parts of the counties that are outside the basin and other areas in California. Therefore, the default fleet mix and meteorological data for the Lake Tahoe region were replaced with area-specific data provided by the TRPA (Quashnick pers. comm.).

Modeled Receptor Locations

CO concentrations were estimated at locations representing the nearest sensitive receptors in the vicinity of the intersections of SR 28/SR 267, SR 28/Secline Street, SR 28/Deer Street, SR 28/Bear Street, SR 28/Coon Street, SR 28/Fox Street, and SR 28/Chipmunk Street. In addition, receptors were modeled at locations throughout the action area representing the residential land uses situated off SR 28, along the roadways parallel to SR 28. Table 3.1-3 and Figure 3.1-1 indicate the locations of modeled receptors in the action area. Receptors were chosen based on the CO protocol developed for Caltrans (Garza 1997). Receptor heights were set at 1.80 meters (5.9 feet).

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Figure 3.1-1
KIngs Beach Commercial Core Improvement Project
Locations of Carbon Monoxide Modeling Receptors

Table 3.1-3. General Locations of Receptors

Receptor Positions	General Location
1A to 1C	Intersection of SR 28/SR 267
2A to 2D	Intersection of SR 28/Secline Street
3A to 3 D	Intersection of SR 28/Deer Street
4A to 4D	Intersection of SR 28/Bear Street
5A to 5E	Intersection of SR 28/Coon Street
6A to 6E	Intersection of SR 28/Fox Street
7A to 7C	Intersection of SR 28/Chipmunk Street
A1	South of SR 267
B1 to B3	Between SR 267 and Secline Street
C1 to C7	Between Secline Street and Deer Street
D1 to D4	Between Deer Street and Bear Street
E1 to E4	Between Bear Street and Coon Street
F1 to F9	Between Coon Street and Fox Street
G1 to G12	Between Fox Street and Chipmunk Street
H1 to H6	East of Chipmunk Street

Note:
Refer to Figure 3.1-1 for receptor locations.

Meteorological Conditions

Meteorological inputs to the CALINE4 model were determined using methodology recommended in the CO protocol (Garza 1997). The meteorological conditions used represent a calm winter period. The worst-case wind angles option was used to determine a worst-case concentration for each receptor. The meteorological inputs include: 3.28 feet per second (1.0 meter per second) wind speed, ground-level temperature inversion (atmospheric stability class G), wind direction standard deviation equal to 30° Fahrenheit (–1.11° Celsius), ambient temperature of 30°F (–1.11° Celsius), altitude above sea level of 1,914 meters (6,280 feet), and a mixing height of 1,000 meters (3,281 feet).

Background Concentrations and 8-Hour Values

To account for sources of ambient CO not included in the modeling, 1- and 8-hour background concentrations of 1.2 and 0.7 ppm, respectively, were added to the modeled 1-hour and 8-hour values for existing and future years. These values represent the average highest monitored values over the last 2 years that data is available at the closest monitoring station (Tahoe City). Actual 1- and 8-hour background concentrations in future years would likely be lower than those used in the CO modeling analysis because the trend in CO emissions and concentrations is decreasing because of continuing improvements in engine technology and the retirement of older, higher-emitting vehicles. Modeled 8-hour values were calculated from the 1-hour values using a persistence factor of 0.6.

Impact AIR-1: Generation of Construction-Related Emissions of Ozone Precursors (Reactive Organic Gases and Oxides of Nitrogen), Carbon Monoxide, and Particulate Matter in Excess of Placer County Air Pollution Control District Standards

Alternative 1

Under Alternative 1, no construction or associated emissions would occur.

Alternatives 2, 3, and 4

Construction activities for the proposed action would result in short-term effects on ambient air quality in the area. Temporary construction emissions would result from grubbing/land clearing, grading/excavation, drainage/utilities/subgrade, and paving activities and construction worker commuting patterns. Pollutant emissions would vary daily, depending on the level of activity, specific operations, and prevailing weather. It is anticipated that construction activities would begin in 2007 and continue for approximately 24 to 36 months.

The Road Construction Emissions Model (Version 5.1) was used to estimate construction-related ozone precursors (ROG and NO_X), CO, and PM10 emissions from construction activities. It was assumed that construction activities would occur for

8 hours per day over a 12-month period. The total project length was assumed to be 0.9 mile, with a total acreage of 9.0 acres and a maximum of 1 acre disturbed per day.

The results of modeling for construction activities, summarized in Table 3.1-4, indicate that impacts from construction activities would not exceed the PCAPCD thresholds.

Table 3.1-4. Modeled Construction Emission Estimates (pounds/day)

Construction Phase	ROG	NO_X	CO	PM10
Grubbing/land clearing	9	57	44	8
Grading/excavation	9	60	48	8
Drainage/utilities/sub-grade	9	60	51	9
Paving	4	28	17	2
PCAPCD Construction Thresholds	82	82	550	82

Note:
Emissions calculations based on Road Construction Emissions Model (Version 5.1)

Although emissions are below PCAPCD threshold levels, they recommend that projects with construction emissions below the threshold of 82 pounds per day should implement all feasible control measures recommended by the PCAPCD in order to reduce the project's contributions to cumulative air quality impacts and for the project to be consistent with the PCAPCDs air quality attainment plan. Mitigation Measure AIR-1 implements this recommendation. In addition, Mitigation Measures AIR-2 and AIR-3 implement TRPA recommendations and Caltrans requirements, respectively.

Impact AIR-2: Generation of Operation-Related Emissions of Ozone Precursors (Reactive Organic Gases and Oxides of Nitrogen), Carbon Monoxide, and Particulate Matter in Excess of Placer County Air Pollution Control District Standards

Alternative 1

Under Alternative 1, on-road emissions of ROG, NO_X, and CO would decrease in the future as compared to existing conditions (Table 3.1-5). This is because modeling using the ARB's EMFAC2002 emission rate program indicates the increase in vehicle miles

traveled is outweighed by the decrease in emissions resulting from improvements in engine emission control technology. Emissions of PM10 and PM2.5 would increase slightly by 2028 as compared to existing emissions. However, those increases would be less than 1 pound per day and are considered to be negligible.

Alternatives 2, 3, and 4

Long-term air quality impacts are associated with motor vehicles operating on the roadway network, predominantly the SR 28 corridor. The EMFAC2002 model and traffic data provided by LSC Transportation Consultants, Inc. (2003) were used to estimate operation-related emissions of ozone precursors (ROG and NO_X), CO, and PM10. As noted previously, the proposed action is not a traffic-generating project and would not result in any differences in traffic volumes throughout the action area between build and no-build conditions. The results of the vehicle emissions calculations for project operations are summarized in Table 3.1-5. As indicated, emissions for future-year conditions would be well below the PCAPCD's thresholds for all alternatives.

Impact AIR-3: Nonconformance with State Implementation Plan

Alternative 1

Since Alternative 1 represents the no-build condition, a transportation conformity analysis would not be required for this alternative.

Alternatives 2, 3, and 4

The proposed action is included in the 2004 Lake Tahoe Basin RTP (Tahoe Regional Planning Agency and Tahoe Metropolitan Planning Organization 2004) and 2004 Federal TIP (Tahoe Metropolitan Planning Organization 2004) for the Lake Tahoe Region. The U.S. Department of Transportation and the EPA developed guidance for determining conformity of transportation plans, programs, and projects in November 1993 in the Transportation Conformity Rule (*40 Code of Federal Regulations* [*CFR*] *51, 93*). The demonstration of conformity to the SIP is the responsibility of the metropolitan planning organization (in this case, the TRPA), as well as preparation of RTPs and associated conformity analysis.

Table 3.1-5. Modeled Motor Vehicle Emissions

			Existing Year (2002) (Pounds Per Day)					Alternatives 1 and 3 (2028) (Pounds Per Day)				
Roadway	From	To	ROG	NO_X	CO	PM10	PM2.5	ROG	NO_X	CO	PM10	PM2.5
SR 28	Beach Street	SR 267	7.9	25.2	146.9	0.6	0.4	0.8	5.1	18.2	0.7	0.5
	SR 267	Secline Street	3.8	12.1	70.3	0.3	0.2	0.4	2.4	8.7	0.3	0.2
	Secline Street	Deer Street	6.4	20.3	118.0	0.5	0.3	0.6	4.4	15.7	0.6	0.5
	Deer Street	Bear Street	5.4	17.2	100.0	0.4	0.3	0.6	3.6	12.8	0.5	0.4
	Bear Street	Coon Street	6.1	19.4	112.8	0.4	0.3	0.7	4.1	14.7	0.6	0.4
	Coon Street	Fox Street	5.6	17.6	102.8	0.4	0.3	0.6	3.7	13.1	0.5	0.4
	Fox Street	Chipmunk Street	6.7	21.2	123.3	0.5	0.3	0.7	4.3	15.5	0.6	0.4
	Chipmunk Street	Beaver Street	3.5	11.1	64.4	0.3	0.2	0.4	2.3	8.1	0.3	0.2
Total:			**45.4**	**143.9**	**838.5**	**3.3**	**2.3**	**4.9**	**30.0**	**106.7**	**4.0**	**3.0**
			Alternative 2 (2028) (Pounds Per Day)					Alternative 4 (2028) (Pounds Per Day)				
			ROG	NO_X	CO	PM10	PM2.5	ROG	NO_X	CO	PM10	PM2.5
SR 28	Beach Street	SR 267	0.7	4.8	17.0	0.6	0.4	0.9	5.2	18.4	0.7	0.5
	SR 267	Secline Street	0.3	2.3	8.1	0.3	0.2	0.4	2.5	8.8	0.3	0.2
	Secline Street	Deer Street	0.5	3.8	13.6	0.5	0.3	0.7	4.2	14.8	0.6	0.4
	Deer Street	Bear Street	0.4	3.3	11.5	0.4	0.3	0.6	3.5	12.5	0.5	0.3
	Bear Street	Coon Street	0.5	3.7	13.0	0.4	0.3	0.7	4.0	14.1	0.5	0.4
	Coon Street	Fox Street	0.5	3.3	11.9	0.4	0.3	0.6	3.6	12.9	0.5	0.4
	Fox Street	Chipmunk Street	0.5	4.0	14.2	0.5	0.3	0.7	4.4	15.4	0.6	0.4
	Chipmunk Street	Beaver Street	0.3	2.1	7.4	0.3	0.2	0.4	2.3	8.1	0.3	0.2
Total:			**3.7**	**27.3**	**96.8**	**3.3**	**2.3**	**4.9**	**29.6**	**104.9**	**3.9**	**2.9**

Any project listed in an RTP must demonstrate conformity with the SIP. That RTP also includes a conformity analysis that demonstrates that the RTP meets federal air quality requirements. TRPA has conducted air quality modeling that shows that emissions associated with the Lake Tahoe Basin 2004 RTP are within the allowable emission budgets for ozone precursors and in conformity with the SIP. Because the proposed action is listed in the RTP and the RTP has been demonstrated to be a conforming plan, the proposed action is a conforming project for ozone precursors.

Impact AIR-4: Generation of Carbon Monoxide Hotspot Emissions in Excess of the Federal or State Standards

Alternative 1

Table 3.1-6 indicates that CO concentrations resulting from Alternative 1 would not exceed the federal or state 1- and 8- hour standards.

Alternatives 2, 3, and 4

Increases of CO concentrations at locations near congested intersections affected by the proposed action were modeled with the CALINE4 dispersion model. The modeling was performed at the intersections of SR 28/SR 267, SR 28/Secline Street, SR 28/Deer Street, SR 28/Bear Street, SR 28/Coon Street, SR 28/Fox Street, and SR 28/Chipmunk Street using the highest winter peak hour traffic data. The conditions modeled were existing 2008 with project and 2028 with project. It should be noted that the existing conditions had the highest modeled concentrations; emissions under future conditions are anticipated to be lower because of continuing improvements in engine technology and the retirement of older, higher-emitting vehicles. Modeled CO concentrations plus background CO levels from the nearest monitoring station are presented in Table 3.1-6. As shown, emissions of CO hotspots are not anticipated to exceed the federal or state 1- and 8-hour standards.

Impact AIR-5: Exposure of Sensitive Receptors to Elevated Levels of Diesel Exhaust and an Increased Health Risk

Alternative 1

Under Alternative 1, no construction or associated emissions would occur.

Alternatives 2, 3, and 4

Construction activities are anticipated to involve the operation of diesel-powered equipment for various activities. In October 2000, the ARB identified diesel exhaust as a TAC. It is anticipated that construction activities would occur over a 12-month period. An assessment of cancer health risks associated with exposure to diesel exhaust is typically for chronic exposure, in which a 70-year exposure period is often assumed. However, while cancer risks can result from exposure periods of less than 70 years, acute exposure periods to diesel exhaust (i.e., exposure periods of 2 to 3 years) are not anticipated to result in increased health risks because health risks are typically seen in exposures periods that are chronic in nature. Construction of the proposed action is not anticipated to result in an elevated cancer risk to exposed persons because construction activities will occur over a 1-year period and will not result in long-term emissions of diesel exhaust at the project site. In addition, implementation of Mitigation Measure AIR-4 would further reduce diesel emissions from construction activities.

Guidance provided by the ARB indicates that elevated health risks from operational exposure to diesel exhaust is associated primarily with facilities that have substantial diesel exhaust emissions, including truck stops, warehouse/distribution centers, large retail or industrial facilities, high-volume transit centers, schools with high volumes of bus traffic, high-volume highways, and high-volume arterials/roadways. The proposed action does not fall under any of these land use types. In addition, project operations are not anticipated to result in increased health risks from exposure to diesel exhaust from vehicles because the proposed action would not increase the number of truck trips or truck traffic throughputs in the vicinity of the action area.

Table 3.1-6. Carbon Monoxide Modeling Concentrations Results

	Existing Conditions (Parts Per Million)		Alternatives 1 and 3 (Parts Per Million)				Alternative 2 (Parts Per Million)				Alternative 4 (Parts Per Million)			
			2008		2028		2008		2028		2008		2028	
Intersection	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.
1A	2.9	1.7	2.3	1.3	1.4	0.8	2.3	1.3	1.5	0.8	2.3	1.3	1.4	0.8
1B	2.5	1.4	2.1	1.2	1.4	0.8	2.1	1.2	1.5	0.8	2.1	1.2	1.4	0.8
1C	2.8	1.6	2.2	1.3	1.4	0.8	2.2	1.3	1.5	0.8	2.2	1.3	1.4	0.8
2A	3.0	1.7	2.4	1.4	1.4	0.8	2.4	1.4	1.4	0.8	2.4	1.4	1.4	0.8
2B	2.9	1.7	2.3	1.3	1.4	0.8	2.3	1.3	1.4	0.8	2.3	1.3	1.4	0.8
2C	2.9	1.7	2.4	1.4	1.4	0.8	2.4	1.4	1.4	0.8	2.4	1.4	1.4	0.8
2D	2.8	1.6	2.3	1.3	1.4	0.8	2.3	1.3	1.4	0.8	2.3	1.3	1.4	0.8
3A	3.1	1.8	2.5	1.4	1.5	0.8	2.5	1.4	1.5	0.8	2.5	1.4	1.5	0.8
3B	2.7	1.6	2.3	1.3	1.4	0.8	2.2	1.3	1.4	0.8	2.3	1.3	1.4	0.8
3C	3.1	1.8	2.6	1.5	1.5	0.8	2.5	1.4	1.5	0.8	2.6	1.5	1.5	0.8
3D	2.5	1.4	2.1	1.2	1.4	0.8	2.0	1.1	1.4	0.8	2.1	1.2	1.4	0.8
4A	2.5	1.4	1.8	1.0	1.3	0.7	1.8	1.0	1.3	0.7	1.8	1.0	1.3	0.7
4B	3.8	2.2	2.5	1.4	1.5	0.8	2.4	1.4	1.5	0.8	2.5	1.4	1.5	0.8
4C	2.8	1.6	2.1	1.2	1.4	0.8	2.0	1.1	1.4	0.8	2.1	1.2	1.4	0.8
4D	3.3	1.9	2.3	1.3	1.4	0.8	2.2	1.3	1.4	0.8	2.3	1.3	1.4	0.8
5A	2.1	1.2	2.1	1.2	1.4	0.8	2.1	1.2	1.4	0.8	2.1	1.2	1.4	0.8
5B	2.1	1.2	2.1	1.2	1.4	0.8	2.2	1.3	1.4	0.8	2.1	1.2	1.4	0.8
5C	2.2	1.3	2.2	1.3	1.4	0.8	2.3	1.3	1.4	0.8	2.2	1.3	1.4	0.8
5D	1.8	1.0	1.8	1.0	1.4	0.8	1.9	1.1	1.3	0.7	1.8	1.0	1.3	0.7
5E	1.9	1.1	1.9	1.1	1.4	0.8	2.0	1.1	1.4	0.8	1.9	1.1	1.4	0.8
6A	2.0	1.1	2.0	1.1	1.4	0.8	2.2	1.3	1.4	0.8	2.0	1.1	1.4	0.8
6B	2.1	1.2	2.1	1.2	1.4	0.8	2.3	1.3	1.4	0.8	2.1	1.2	1.4	0.8
6C	2.3	1.3	2.3	1.3	1.4	0.8	2.5	1.4	1.4	0.8	2.3	1.3	1.4	0.8
6D	1.9	1.1	1.9	1.1	1.4	0.8	2.0	1.1	1.4	0.8	1.9	1.1	1.4	0.8
6E	2.4	1.4	2.4	1.4	1.5	0.8	2.6	1.5	1.5	0.8	2.4	1.4	1.5	0.8
7A	2.1	1.2	2.1	1.2	1.4	0.8	2.2	1.3	1.4	0.8	2.1	1.2	1.4	0.8
7B	2.1	1.2	2.1	1.2	1.4	0.8	2.2	1.3	1.4	0.8	2.1	1.2	1.4	0.8
7C	2.0	1.1	2.0	1.1	1.4	0.8	2.1	1.2	1.4	0.8	2.0	1.1	1.4	0.8

Table 3.1-6. Continued.

	Existing Conditions (Parts Per Million)		Alternatives 1 and 3 (Parts Per Million)				Alternative 2 (Parts Per Million)				Alternative 4 (Parts Per Million)			
			2008		2028		2008		2028		2008		2028	
Intersection	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.
A1	2.2	1.3	1.9	1.1	1.3	0.7	1.9	1.1	1.4	0.8	1.9	1.1	1.3	0.7
B1	2.0	1.1	1.7	1.0	1.3	0.7	1.7	1.0	1.4	0.8	1.7	1.0	1.3	0.7
B2	1.9	1.1	1.7	1.0	1.2	0.7	1.7	1.0	1.3	0.7	1.7	1.0	1.2	0.7
B3	2.3	1.3	1.9	1.1	1.3	0.7	1.9	1.1	1.3	0.7	1.9	1.1	1.3	0.7
C1	2.9	1.7	2.3	1.3	1.4	0.8	2.3	1.3	1.4	0.8	2.3	1.3	1.4	0.8
C2	2.2	1.3	1.8	1.0	1.3	0.7	1.8	1.0	1.3	0.7	1.8	1.0	1.2	0.7
C3	1.9	1.1	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7
C4	1.9	1.1	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7
C5	3.0	1.7	2.4	1.4	1.4	0.8	2.4	1.4	1.4	0.8	2.4	1.4	1.4	0.8
C6	3.6	2.1	2.8	1.6	1.5	0.8	2.8	1.6	1.5	0.8	2.8	1.6	1.5	0.8
C7	2.2	1.3	1.9	1.1	1.3	0.7	1.9	1.1	1.3	0.7	1.9	1.1	1.2	0.7
D1	2.4	1.4	2.0	1.1	1.4	0.8	2.0	1.1	1.4	0.8	2.0	1.1	1.4	0.8
D2	2.2	1.3	1.9	1.1	1.3	0.7	1.8	1.0	1.3	0.7	1.9	1.1	1.3	0.7
D3	2.4	1.4	2.0	1.1	1.4	0.8	1.9	1.1	1.4	0.8	2.0	1.1	1.3	0.7
D4	1.9	1.1	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7
E1	2.2	1.3	1.7	1.0	1.3	0.7	1.7	1.0	1.3	0.7	1.7	1.0	1.2	0.7
E2	2.0	1.1	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7
E3	2.2	1.3	1.7	1.0	1.3	0.7	1.7	1.0	1.3	0.7	1.7	1.0	1.3	0.7
E4	1.9	1.1	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7
F1	2.4	1.4	2.4	1.4	1.5	0.8	2.7	1.6	1.5	0.8	2.5	1.4	1.5	0.8
F2	1.6	0.9	1.6	0.9	1.2	0.7	1.7	1.0	1.2	0.7	1.6	0.9	1.2	0.7
F3	1.6	0.9	1.6	0.9	1.3	0.7	1.7	1.0	1.2	0.7	1.6	0.9	1.2	0.7
F4	1.5	0.8	1.5	0.8	1.2	0.7	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7
F5	1.5	0.8	1.5	0.8	1.2	0.7	1.6	0.9	1.2	0.7	1.5	0.8	1.2	0.7
F6	2.0	1.1	2.0	1.1	1.4	0.8	2.2	1.3	1.4	0.8	2.0	1.1	1.4	0.8
F7	2.1	1.2	2.1	1.2	1.4	0.8	2.3	1.3	1.4	0.8	2.1	1.2	1.4	0.8
F8	1.7	1.0	1.7	1.0	1.3	0.7	1.8	1.0	1.3	0.7	1.7	1.0	1.3	0.7
F9	1.5	0.8	1.5	0.8	1.2	0.7	1.6	0.9	1.2	0.7	1.5	0.8	1.2	0.7

Table 3.1-6. Continued.

	Existing Conditions (Parts Per Million)		Alternatives 1 and 3 (Parts Per Million)				Alternative 2 (Parts Per Million)				Alternative 4 (Parts Per Million)			
			2008		2028		2008		2028		2008		2028	
Intersection	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.	1 Hr.	8 Hrs.
G1	2.2	1.3	2.2	1.3	1.4	0.8	2.3	1.3	1.4	0.8	2.2	1.3	1.4	0.8
G2	1.8	1.0	1.8	1.0	1.3	0.7	1.9	1.1	1.3	0.7	1.8	1.0	1.3	0.7
G3	1.6	0.9	1.6	0.9	1.2	0.7	1.7	1.0	1.2	0.7	1.6	0.9	1.2	0.7
G4	1.5	0.8	1.5	0.8	1.2	0.7	1.6	0.9	1.2	0.7	1.5	0.8	1.2	0.7
G5	1.6	0.9	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7
G6	2.2	1.3	2.2	1.3	1.4	0.8	2.4	1.4	1.4	0.8	2.2	1.3	1.4	0.8
G7	1.7	1.0	1.7	1.0	1.3	0.7	1.8	1.0	1.3	0.7	1.7	1.0	1.3	0.7
G8	1.5	0.8	1.5	0.8	1.2	0.7	1.6	0.9	1.2	0.7	1.5	0.8	1.2	0.7
G9	1.6	0.9	1.6	0.9	1.2	0.7	1.7	1.0	1.2	0.7	1.6	0.9	1.2	0.7
G10	1.7	1.0	1.7	1.0	1.3	0.7	1.8	1.0	1.3	0.7	1.7	1.0	1.3	0.7
G11	1.7	1.0	1.7	1.0	1.3	0.7	1.8	1.0	1.3	0.7	1.7	1.0	1.3	0.7
G12	1.5	0.8	1.5	0.8	1.2	0.7	1.6	0.9	1.2	0.7	1.5	0.8	1.2	0.7
H1	1.8	1.0	1.8	1.0	1.3	0.7	1.9	1.1	1.3	0.7	1.8	1.0	1.3	0.7
H2	1.8	1.0	1.8	1.0	1.4	0.8	1.9	1.1	1.4	0.8	1.9	1.1	1.4	0.8
H3	1.6	0.9	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7	1.6	0.9	1.2	0.7
H4	1.5	0.8	1.5	0.8	1.2	0.7	1.6	0.9	1.2	0.7	1.5	0.8	1.2	0.7
H5	1.6	0.9	1.6	0.9	1.3	0.7	1.6	0.9	1.3	0.7	1.6	0.9	1.3	0.7
H6	1.5	0.8	1.5	0.8	1.2	0.7	1.6	0.9	1.2	0.7	1.5	0.8	1.2	0.7

Note: Background concentrations of 1.2 and 0.7 parts per million (ppm) were added to the modeling 1- and 8-hour results, respectively. The federal 1- and 8-hour standards are 35 and 9 ppm, respectively. The state 1- and 8-hour standards are 20 and 6 ppm, respectively.

Impact AIR-6: Atmospheric Deposition of Phosphorus from Re-Entrained Roadway Fugitive Dust into Lake Tahoe

Alternative 1 (No Build) and Alternatives 2, 3, and 4

The deposition of phosphorus into Lake Tahoe is a concern for the lake ecosystem. A number of factors have been identified as contributors to poor water quality. Among them, it has been demonstrated that concentrations of phosphorus in Lake Tahoe are closely related to its capacity to support algal populations (i.e., as concentrations of phosphorus in the lake increase, algal growth may increase if all other factors remain equal). This is a primary concern for Lake Tahoe because its clarity and visual quality are unique and renowned. Within the region, atmospheric deposition of phosphorus and particulate matter from re-entrained fugitive dust into Lake Tahoe is a concern. Because of heavy winter sanding operations for snow control in the area, the roadway surfaces in the area contain higher levels of sand and gravel than other areas. This can result in higher levels of localized re-entrained fugitive dust as vehicles travel over the roadways and break the sand and gravel into ever smaller dust that is sufficient for aerial transport. This dust can be re-entrained into the air from wind blowing over the roadways and vehicles traveling over the roadways.

It is not anticipated that proposed action would result in an increased contribution to the atmospheric deposition of phosphorus in Lake Tahoe from re-entrained fugitive dust. The physical features associated with the proposed action would reduce the total area of roadway, which would reduce the amount of sand required for snow control in winter. This would in turn reduce the amount of re-entrained fugitive dust in the immediate project vicinity. In addition, the narrowing of the roadways and installation of roundabouts would reduce speeds during peak hours on SR 28, which would reduce the amount of re-entrained roadway dust in the action area because lower amounts of re-entrained roadway dust are associated with lower speeds. Overall, the proposed action would not increase the amount of re-entrained fugitive dust and consequently would not contribute to the atmospheric deposition of phosphorus and particulate matter in Lake Tahoe.

Impact AIR-7: Generation of Significant Levels of Odors

Alternative 1

Under Alternative 1, no construction or associated emissions would occur, so potential odors from construction equipment and volatile organic compounds from construction activities (i.e., paving) would not occur. Operation of the proposed action is not anticipated to generate any objectionable odors that affect a substantial number of people.

Alternatives 2, 3, and 4

Diesel emissions from construction equipment and volatile organic compounds from paving activities may create off-site odors during construction. These odors would be temporary and localized, and they would cease once construction activities have been completed. Operation of the proposed action is not anticipated to generate any objectionable odors that affect a substantial number of people.

3.1.4 Mitigation, Avoidance, Minimization, and Compensation Measures

In accordance with the Chapter 93 Traffic and Air Quality Mitigation Program, the TRPA Code of Ordinances (Tahoe Regional Planning Agency 2004a), traffic (LSC Transportation Consultants, Inc. 2003) and air quality (Appendix C) analyses were conducted for the proposed action. The implementation of Mitigation Measures AIR-1 through AIR-3 would minimize effects associated with Alternatives 2, 3, and 4.

Mitigation Measure AIR-1: Implement All Applicable PCAPCD Best-Available Mitigation Measures

Placer County Department of Public Works (DPW) will implement all feasible and applicable fugitive dust mitigation measures from the PCAPCD's best-available mitigation measures, which are summarized below.

- Placer County DPW will require the construction contractor to submit to the PCAPCD and receive approval of a construction emission/dust control plan prior to groundbreaking. This plan must address the minimum Administrative

Requirements found in section 300 and 400 of District Rule 228, Fugitive Dust (www.placer.ca.gov/airpollution/airpolut.htm).

- Placer County DPW will require the construction contractor to have a preconstruction meeting for grading activities for 20 or more acres to discuss the construction emission/dust control plan with employees and/or contractors and the District is to be invited.
- Placer County DPW will require the construction contractor to suspend all grading operations when fugitive dusts exceed District Rule 228 Fugitive Dust limitations.
- It is to be noted that fugitive dust is not to exceed 40% opacity and not go beyond property boundary at any time. If lime or other drying agents are utilized to dry out wet grading areas, they will be controlled so as to not to exceed District Rule 228 (fugitive dust limitations).
- Construction equipment exhaust emissions will not exceed District Rule 202, visible emission limitations. Operators of vehicles and equipment found to exceed opacity limits are to be immediately notified, and the equipment must be repaired within 72 hours.
- Apply water to control dust as needed to prevent dust impacts off-site. Operational water truck(s), will be on-site, as required, to control fugitive dust. Construction vehicles leaving the site will be cleaned to prevent dust, silt, mud, and dirt from being released or tracked off-site.
- Apply approved chemical soil stabilizers, vegetative mats, or other appropriate best management practices (BMPs) to manufacturers' specifications to all-inactive construction areas (previously graded areas that remain inactive for 96 hours).

- Spread soil binders on unpaved roads and employee/equipment parking areas and wet broom or wash streets if silt is carried over to adjacent public thoroughfares.
- Install wheel washers or wash all trucks and equipment leaving the site.

Mitigation Measure AIR-2: Implement All Applicable TRPA Best Management Practices

Placer County DPW will implement all feasible and applicable BMPs required by TRPA. Guidance is available from TRPA Best Management Practices Retrofit Program, TRPA Erosion Control Team's general information, and BMP Contractors Notes. (Tahoe Regional Planning Agency 2005.) This includes a limitation that all construction-related vehicles will idle for no more than 5 minutes.

Mitigation Measure AIR-3: Implement Caltrans Standard Specification 7-1.01F and Standard Specification 10

Placer County DPW will follow Caltrans Standard Specification 7-1.01F and Standard Specification 10, which address the following of local air pollution control district rules and dust control, respectively.

Mitigation Measure AIR-4: Implement Construction Emissions Control Technology

Placer County DPW will provide a construction work plan to the PCAPCD demonstrating that the heavy-duty (> 50 horsepower) off-road vehicles to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a project wide fleet-average 20 percent NO_X reduction and 45 percent particulate reduction compared to the most recent ARB fleet average at time of construction. Control measures to available to achieve emissions reductions include, but are not limited to use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology (e.g., diesel particulate matter filters and lean-NO_X or diesel oxidation catalysts) after-treatment products, and/or other options as they become available.

3.1.5 Compliance with Tahoe Regional Planning Agency Code

TRPA has designated an air quality significance threshold of 0.08 ppm over 1-hour for ozone, which is slightly more stringent than the CAAQS for ozone of 0.09 ppm for 1 hour. The PCAPCD's thresholds are based on the emissions offset thresholds that apply to new or modified stationary emission sources under PCAPCD Rule 502. Rule 502, in turn, conforms with the "no net increase" policy adopted by the California CAA *(Health & Safety Code § 40919)*, which requires offsets for permitting of new or modified sources having the potential to emit 15 tons or more per year of any nonattainment pollutant or its precursors in a district. Because the PCAPCD's thresholds were implemented to ensure that the CAAQS are met, they are an appropriate proxy in determining if the proposed action is in compliance with TRPA standards. As indicated in Tables 3.1-4 and 3.1-5, construction and operational emissions are expected to be well below threshold values. Consequently, it is determined that the proposed action complies with TRPA code.

Modeled CO concentrations associated with implementation of the alternatives are presented in Table 3.1-6. The modeled CO emissions presented in Table 3.1-6 indicate that emissions of CO hotspots are anticipated to comply with TRPA code.