3.15 AIR QUALITY

3.15.1 AFFECTED ENVIRONMENT

The Rio del Oro project site is located in Sacramento County, California, which is under the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD). SMAQMD is the primary local agency with respect to air quality for all of Sacramento County. Sacramento County is within the Sacramento Valley Air Basin (SVAB), which also includes all of Butte, Colusa, Glenn, Shasta, Sutter, Tehama, Yolo, and Yuba Counties, the western portion of Placer County, and the eastern portion of Solano County. Air quality in this area is determined by such natural factors as topography, climate, and meteorology, in addition to the presence of existing air pollution sources and conditions. These factors are discussed below.

TOPOGRAPHY, CLIMATE, AND METEOROLOGY

The SVAB is relatively flat, bordered by mountains to the east, west, and north. Air flows into the SVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento–San Joaquin River Delta, bringing with it pollutants from the heavily populated San Francisco Bay Area. The climate is characterized by hot, dry summers and cool, rainy winters. Periods of dense and persistent low-level fog that are most prevalent between storms are characteristic of SVAB winter weather. From May to October, the region's intense heat and sunlight lead to high ozone concentrations. Summer inversions are strong and frequent, but are less troublesome than those that occur in the fall. Autumn inversions, formed by warm air subsiding in a region of high pressure, have accompanying light winds that do not provide adequate dispersion of air pollutants.

Most precipitation in the area results from air masses that move in from the Pacific Ocean during the winter months. These storms usually move from the west or northwest. More than half the total annual precipitation falls during the winter rainy season (November–February); the average winter temperature is a moderate 49 degrees Fahrenheit (°F). During the summer, daily temperatures range from 50°F to more than 100°F. The inland location and surrounding mountains shelter the area from much of the ocean breezes that keep the coastal regions moderate in temperature.

Regional flow patterns affect air quality patterns by moving pollutants downwind of sources. Localized meteorological conditions, such as moderate winds, disperse pollutants and reduce pollutant concentrations. An inversion layer develops when a layer of warm air traps cooler air close to the ground. Such temperature inversions hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground. During summer mornings and afternoons, these inversions are present over the project site. During summer's longer daylight hours, plentiful sunshine provides the energy needed to fuel photochemical reactions between reactive organic gases (ROGs) and oxides of nitrogen (NO_X), which results in ozone formation.

In the winter, temperature inversions dominate during the night and early morning hours but frequently dissipate by afternoon. The greatest pollution problems during this time of year are from carbon monoxide (CO) and NO_X. High CO concentrations occur on winter days with strong surface inversions and light winds. CO transport is extremely limited.

Local meteorology of the project site is represented by measurements recorded at the Sacramento station. The normal annual precipitation, which occurs primarily from November through March, is approximately 18 inches. January temperatures range from a normal minimum of 38°F to a normal maximum of 53°F. July temperatures range from a normal minimum of 58°F to a normal maximum of 93°F (NOAA 1992). The predominant wind direction and speed is from the south-southwest at 10 mph (ARB 1994).

EXISTING AIR QUALITY—CRITERIA AIR POLLUTANTS

California and National Ambient Air Quality Standards

The California Air Resources Board (ARB) and the U.S. Environmental Protection Agency (EPA) currently focus on the following air pollutants as indicators of ambient air quality: ozone, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, they are commonly referred to as "criteria air pollutants."

EPA has established primary and secondary national ambient air quality standards (NAAQS) for the following criteria air pollutants: ozone, CO, NO_2, SO_2, respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead. The primary standards protect the public health and the secondary standards protect public welfare. In addition to the NAAQS, ARB has established California ambient air quality standards (CAAQS) for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health-effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals. The NAAQS and CAAQS as discussed above are listed in Table 3.15-1.

Ozone

Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and is the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of ROGs and NO_X in the presence of sunlight. ROGs are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that results from the combustion of fuels.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 1991).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 part per million (ppm) for 1–2 hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to symptomatic responses that include such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to the above adverse health effects, evidence also exists relating ozone exposure to an increase in the permeability of respiratory epithelia; such increased permeability leads to an increase in responsiveness of the respiratory system to challenges, and the interference or inhibition of the immune system's ability to defend against infection (Godish 1991).

Table 3.15-1
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards [a]		
		Standards [b, c]	Attainment Status [d]	Primary [c,e]	Secondary [c,f]	Attainment Status [g]
Ozone [h]	1-hour	0.09 ppm (180 µg/m^3)	N	-*	Same as Primary Standard	-
	8-hour	0.07 ppm (137 µg/m^3)	U	0.08 ppm (157 µg/m^3)		N
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	–	U/A
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	–	–	0.053 ppm (100 µg/m^3)	Same as Primary Standard	U/A
	1-hour	0.25 ppm (470 µg/m^3)	A	–		–
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 µg/m^3)	–	U
	24-hour	0.04 ppm (105 µg/m^3)	A	0.14 ppm (365 µg/m^3)	–	
	3-hour	–	–	–	0.5 ppm (1300 µg/m^3)	
	1-hour	0.25 ppm (655 µg/m^3)	A	–	–	–
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3 *	N	-*	Same as Primary Standard	N
	24-hour	50 µg/m^3		150 µg/m^3 [h]		

Table 3.15-1
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards [a]		
		Standards [b, c]	Attainment Status [d]	Primary [c,e]	Secondary [c,f]	Attainment Status [g]
Fine Particulate Matter ($PM_{2.5}$) [i]	Annual Arithmetic Mean	12 µg/m^3*	N	15 µg/m^3	Same as Primary Standard	U (Recommended)
	24-hour	–	–	35 µg/m^3		
Lead [j]	30-day Average	1.5 µg/m^3	U	–	–	–
	Calendar Quarter	–	–	1.5 µg/m^3	Same as Primary Standard	
Sulfates	24-hour	25 µg/m^3	A	**No Federal Standards**		
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	U			
Vinyl Chloride [g]	24-hour	0.01 ppm (26 µg/m^3)	U/A			
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U			

Table 3.15-1
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards [a]		
		Standards [b, c]	Attainment Status [d]	Primary [c,e]	Secondary [c,f]	Attainment Status [g]

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

[*] The 1-hour ozone NAAQS was revoked on June 15, 2005. The annual PM_{10} NAAQS was revoked in 2006.

[a] National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.

[b] California standards for ozone, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d-i] Unclassified (**U**): a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.
Attainment (**A**): a pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.
Nonattainment (**N**): a pollutant is designated nonattainment if there was a least one violation of a state standard for that pollutant in the area.
Nonattainment/Transitional (**NT**): is a subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

[e] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[f] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[g] Nonattainment (**N**): any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

[h] New federal 8-hour ozone was promulgated by EPA on July 18, 1997.

[i] On June 20, 2002, ARB approved staff recommendation to revise the PM_{10} annual average standard to 20 $\mu g/m^3$ and to establish an annual average standard for $PM_{2.5}$ of 12 $\mu g/m^3$. These standards took effect on July 5, 2003. Information regarding these revisions can be found at http://www.arb.ca.gov/research/aaqs/std-rs.htm.
Attainment (A): any area that meets the national primary or secondary ambient air quality standard for the pollutant.
Unclassifiable (U): any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

[j] ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Sources: ARB 2006a, EPA 2006a

In 1997, EPA promulgated a new 8-hour standard in recognition of impacts resulting from daylong exposure. On April 15, 2004, EPA designated areas of the country that exceed the 8-hour standard ozone standard as nonattainment. The designations became effective on June 15, 2004, and incorporate air quality data for the years 2001–2003. These designations have triggered new planning requirements for the 8-hour standard.

Emissions of ozone precursors NO_X and ROG have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. Consequently, peak 1-hour and 8-hour ozone concentrations in the SVAB have declined overall by about 15% since 1988. However, peak ozone values have not declined as rapidly in the SVAB over the last several years as they have in other urban areas. This can be attributed to influx of pollutants into the SVAB from other urbanized areas, making the region both a transport contributor and a receptor of pollutants (ARB 2006b).

Carbon Monoxide

CO is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources. In fact, 77% of the nationwide CO emissions are from mobile sources. The other 23% consist of CO emissions from wood-burning stoves, incinerators, and industrial sources.

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA 2006a).

The highest CO concentrations are generally associated with cold stagnant weather conditions that occur during the winter. In contrast to ozone, which tends to be a regional pollutant, CO problems tend to be localized.

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal-combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (EPA 2005a). The combined emissions of NO and NO_2 are referred to as NO_X, which are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation, during or shortly after exposure. After a period of approximately 4–12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment with such symptoms as chronic bronchitis and decreased lung functions.

Sulfur Dioxide

SO_2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration

rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere by condensation and/or transformation of SO_2 and ROGs (EPA 2006a). $PM_{2.5}$ includes a subgroup of finer particles that have an aerodynamic diameter of 2.5 micrometers or less (ARB 2006b).

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons (PAHs), and other toxic substances adsorbed onto fine particulate matter (the piggybacking effect), or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (EPA 2005a). $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and contain substances that are particularly harmful to human health.

In 1982, ARB adopted 24-hour average and annual average PM_{10} standards. NAAQS for PM_{10} have been in place since 1987. However, California's PM_{10} standards are more health-protective.

In June 2002, ARB adopted recommendations to lower the level of the PM_{10} annual standard from 30 micrograms per cubic meter ($\mu g/m^3$) to 20 $\mu g/m^3$ in addition to establishing a new annual $PM_{2.5}$ standard of 12 $\mu g/m^3$. EPA promulgated new NAAQS for $PM_{2.5}$ in 1997 to complement the national PM_{10} standards. In early 2004, ARB transmitted recommendations for area designations for the national $PM_{2.5}$ standards to EPA. On January 5, 2005, EPA promulgated air quality designations for all areas for the NAAQS for $PM_{2.5}$.

Direct emissions of both PM_{10} and $PM_{2.5}$ increased in the SVAB between 1975 and 2000 and are projected to increase through 2020. These emissions are dominated by areawide sources, primarily because of development. Direct emissions of PM from mobile and stationary sources have remained relatively steady (ARB 2006b).

Lead

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

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (EPA 2006a).

As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (by 95% between 1980 and 1999), and levels of lead in the air decreased by 94% between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13% of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78% decrease in the levels of lead in human blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (as well as the removal of lead from soldered cans) (EPA 2006a).

The decrease in lead emissions and ambient lead concentrations over the past 25 years is California's most dramatic success story with regard to air quality management. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent ARB regulations have virtually eliminated all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB identified lead as a toxic air contaminant.

California and National Area Designations

Criteria air pollutant concentrations are measured at several monitoring stations in the SVAB. The Sacramento–Del Paso Manor station is the closest monitoring station to the project site with recent data for ozone, CO, PM_{10}, and $PM_{2.5}$. In general, the ambient air quality measurements from these monitoring stations are representative of the air quality in the vicinity of the project site. Table 3.15-2 summarizes the air quality data from the most recent 3 years for these two monitoring stations.

Table 3.15-2
Summary of Annual Ambient Air Quality Data (2003–2005)

	2003	2004	2005
Ozone			
Maximum concentration (1-hour/8-hour average, ppm)	0.134/ 0.113	0.110/ 0.089	0.134/ 0.117
Number of days state 1-hour standard exceeded	21	6	14
Number of days national 1-hour/8-hour standard exceeded	2/13	0/3	1/10
Carbon Monoxide			
Maximum concentration (1-hour/8-hour average, ppm)	8.5/4.3	3.6/3.2	4.5/3.5
Number of days state standard exceeded	0	0	0
Number of days national standard exceeded	0	0	0
Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration ($\mu g/m^3$)	73.2	58.2	81.4
Number of days national standard exceeded	0	0	5
Respirable Particulate Matter (PM_{10})			
Maximum concentration ($\mu g/m^3$)	55.0	52.0	77.0
Number of days state standard exceeded (calculated [a])	2	1	5
Number of days national standard exceeded (calculated [a])	0	0	0

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

[a] Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

Sources: ARB 2006a, EPA 2006a

Both ARB and EPA use this type of monitoring data to designate areas according to their attainment status for criteria air pollutants. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment,"

"attainment," and "unclassified." The "unclassified" designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. Attainment designations for the year 2004 with respect to the project site are shown in Table 3.15-1 for each criteria air pollutant.

EXISTING AIR QUALITY—TOXIC AIR CONTAMINANTS

A toxic air contaminant (TAC), or in federal terms a hazardous air pollutant (HAP), is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. This contrasts with the criteria air pollutants for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 3.15-1).

According to the 2006 *California Almanac of Emissions and Air Quality* (ARB 2006b), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, and lubricating oil, and whether an emission control system is present. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, ARB has made preliminary concentration estimates based on a PM exposure method. This method uses the ARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies on chemical speciation to estimate concentrations of diesel PM. In addition to diesel PM, benzene, 1, 3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, *para*-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene are the TACs for which data are available that pose the greatest existing ambient risk in California.

Diesel PM poses the greatest health risk among these 10 TACs mentioned. Based on receptor modeling techniques, ARB estimated its health risk to be 360 excess cancer cases per million people in the SVAB. Since 1990 the health risk associated with diesel PM has been reduced by 52%. Overall, levels of most TACs, except for *para*-dichlorobenzene and formaldehyde, have gone down since 1990 (ARB 2006b).

EXISTING AIR QUALITY—GREENHOUSE GASES AND CLIMATE CHANGE LINKAGES

Constituent gases of the Earth's atmosphere called atmospheric greenhouse gases (GHGs) play a critical role in the Earth's radiation budget by trapping infrared radiation emitted from the Earth's surface, which would have otherwise escaped to space. Prominent GHGs contributing to this process include carbon dioxide (CO_2), methane (CH_4), ozone, water vapor, nitrous oxide (N_2O), and chlorofluorocarbons (CFCs). This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate. Anthropogenic emissions of these GHGs in excess of natural ambient concentrations are responsible for the enhancement of the Greenhouse Effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or climate change. Global warming–inducing emissions of these gases are attributable to human activities associated with industrial/manufacturing, utilities, transportation, residential, and agricultural sectors (CEC 2006a). Transportation is responsible for 41% of the state's GHG emissions, followed by electricity generation (CEC 2006a).Emissions of CO_2 and NO_X are byproducts of fossil fuel combustion. Methane, a highly potent GHG, results from off-gassing associated with agricultural practices and landfills. Sinks of CO_2 include uptake by vegetation and dissolution into the ocean.

Global warming is a global problem, and GHGs are global pollutants, unlike criteria air pollutants and TACs, which are pollutants of regional and local concern. Worldwide, California is the 12th to 16th largest emitter of CO_2, and is responsible for approximately 2% of the world's CO_2 emissions (CEC 2006a, 2006b). In 2004, California produced 492 million gross metric tons of carbon dioxide-equivalent (CEC 2006a).

Various local and statewide initiatives to reduce the state's contribution to GHG emissions have raised awareness that, even though the possible outcomes and feedback mechanisms associated with climate change are not yet fully understood, global warming is already upon us and the potential for environmental, social, and economic disaster over the long term has the potential to be great. Cooperation on a global scale will be required to reduce GHG emissions to a level that will slow the warming trend, and the direct air quality impact of increasing GHG emissions into the global system is incrementally cumulative.

In September 2006, California Governor Arnold Schwarzenegger signed Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions, and is the first of its kind worldwide (ARB 2006b). AB 32 applies to major stationary sources of emissions only, but acknowledges the urgency of this potential threat to the environment.

At the time of writing no air districts within California, including SMAQMD, have a recommended emission threshold for determining significance associated with GHGs from development projects.

Other resource areas could be affected as a result of GHGs, including from incremental increases of new GHGs emissions. For example, increased global average temperature increases ocean temperatures and the Pacific Ocean strongly influences the climate within California. If the temperature of the ocean warms, it is anticipated that the winter snow season would be shortened. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state. According to a California Energy Commission report, the snowpack portion of the supply could potentially decline by 70%–90% by the end of the 21st century (CEC 2006c). This phenomenon could lead to significant challenges securing an adequate water supply for a growing population. Further, the increased ocean temperature could result in increased moisture flux into the state; however, since this would likely increasingly come in the form of rain rather than snow in the high elevations, increased precipitation could lead to increased potential for flood events, placing more pressure on California's levee/flood control system. Sea level has risen approximately 7 inches during the last century and, according to the CEC report, it is predicted to rise an additional 22–35 inches by 2100, depending on the future GHG emissions levels (CEC 2006c). If this occurs, resultant effects could include increased coastal flooding, saltwater intrusion (especially a concern in the low-lying Sacramento–San Joaquin Delta, where potable water delivery pumps could be threatened), and disruption of wetlands (CEC 2006c). As the existing climate throughout California changes over time, mass migration of species, or worse, failure of species to migrate in time to adapt to the perturbations in climate, could also result.

Feedback Mechanisms and Uncertainty

Additionally, change in ocean temperature would be expected to lead to changes in ocean current circulation (which incidentally is a function of salinity and temperature; parameters that would also change as sea ice and glaciers melt and air temperature increases). Many complex mechanisms compete within Earth's energy budget to establish the global average temperature.

Direct and Indirect Aerosol Effects

Aerosols, including particulate matter, reflect sunlight back to space. As attainment designations for particulate matter are met, and fewer PM emissions occur, the cooling effect of anthropogenic aerosols would be reduced, and instead, the greenhouse effect would be further enhanced. Similarly, aerosols act as cloud condensation nuclei (CCN) to aid in cloud formation and increase cloud lifetime. Clouds efficiently reflect radiation back to space.

The indirect effect of aerosols on clouds and precipitation efficiency would be reduced, amplifying the greenhouse effect again.

The Cloud Effect

As global temperature rises, the ability of the air to hold moisture increases, and facilitation of cloud formation occurs. If the increase in cloud cover occurs at low or middle altitudes, resulting in clouds with greater liquid water path such as stratus or cumulus clouds, more radiation would be reflected back to space, resulting in a negative feedback, wherein the side effect of global warming acts to balance itself. If cloud formation occurs at higher altitudes in the form of cirrus clouds, these clouds actually allow more light to pass through than they reflect and ultimately, act as GHG themselves. Thus, resulting in a positive feedback wherein the side effect of global warming acts to enhance the process. This feedback mechanism, known as the Cloud Effect, is poorly understood.

Other Feedback Mechanisms

As global temperature continues to rise, methane gas, which is trapped in permafrost, would be released into the atmosphere. Methane is approximately 20 times as efficient a GHG as CO_2. This phenomenon would accelerate and enhance the warming trend. Additionally, as polar and sea ice extent continues to diminish, the Earth's albedo, or reflectivity, would also decrease simultaneously. More incoming solar radiation would be absorbed by the Earth, rather than being reflected back to space, in turn, further enhancing the Greenhouse Effect and associated global warming. These, and other competing feedback mechanisms, are still in the process of being coupled and forecast by the scientific community. It is not known at this time how the ultimate balance between all the variables will be equated to a particular temperature increment. Regardless, there is no longer debate within the scientific community that anthropogenic GHG emissions are linked to a trajectory of unnatural warming of the planet.

EXISTING AIR QUALITY—INDOOR AIR POLLUTION

Indoor air pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems in buildings. Inadequate ventilation can increase indoor pollutant levels by not bringing in enough outdoor air to dilute emissions from indoor sources and by not carrying indoor air pollutants out. High temperature and humidity levels can also increase concentrations of some pollutants (EPA 2005b).

There are many sources of indoor air pollution in any building. Outdoor sources, such as radon, are of concern where new development is proposed. Residential exposure to indoor air pollution from outdoor (underground) sources occurs when vapors are volatilized from groundwater, migrate through soil vapor, and are introduced to indoor air.

Health effects from indoor air pollutants may be experienced soon after exposure or, possibly, years later. Long-term health effects may appear either years after brief exposure has occurred or only after long or repeated periods of exposure. These effects, which include some respiratory diseases, heart disease, and cancer, can be severely debilitating or fatal (EPA 2005b).

EXISTING AIR QUALITY—ODORS

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

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities

of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

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

3.15.2 REGULATORY FRAMEWORK

CRITERIA AIR POLLUTANTS

Federal Plans, Policies, Regulations, and Laws

At the federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required EPA to establish primary and secondary NAAQS (Table 3.15-1). The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA has responsibility for reviewing all state SIPs to determine conformation to the mandates of the CAAA and determine whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) that imposes additional control measures may be prepared for the nonattainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may result in application of sanctions to transportation funding and stationary air pollution sources in the air basin.

In addition, general conformity requirements were adopted by Congress as part of the CAAA and were implemented by EPA regulations in 1993. General conformity requires that all federal actions conform with the SIP as approved or promulgated by EPA. The purpose of the general conformity program is to ensure that actions taken by the federal government do not undermine state or local efforts to achieve and maintain NAAQS. Before a federal action is taken, it must be evaluated for conformity with the SIP. All reasonably foreseeable emissions, both direct and indirect, predicted to result from the action are taken into consideration and must be identified as to location and quantity. If it is found that the action would create emissions above *de minimis* threshold levels specified in EPA regulations, or if the activity is considered regionally significant because its emissions exceed 10% of an area's total emissions, the action cannot proceed unless mitigation measures are specified that would bring the project into conformance.

General conformity applies in both federal nonattainment and maintenance areas. Within these areas, it applies to any federal action not specifically exempted by the CAA or EPA regulations. Emissions from construction activities are also included. General conformity does not apply to projects or actions that are covered by the

transportation conformity rule. If a federal action falls under the general conformity rule, the federal agency responsible for the action is responsible for making the conformity determination. In some instances, a state will make the conformity determination under delegation from a federal agency. Private developers are not responsible for making a conformity determination, but can directly affected by a determination. General conformity with respect to the project will be determined before the record of decision is signed.

There are no federal regulations or policies regarding GHG emissions.

State Plans, Policies, Regulations, and Laws

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish CAAQS (Table 3.15-1). The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

Other ARB responsibilities include overseeing compliance with California and federal laws by local air districts, approving local air quality plans, submitting SIPs to EPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

Assembly Bill 32, the California Climate Solutions Act of 2006

In September 2006, Governor Arnold Schwarzenegger signed Assembly Bill (AB) 32, the California Climate Solutions Act of 2006. AB 32 directs the California Environmental Protection Agency (Cal/EPA) to implement regulations for a cap on stationary sources of GHG emissions. The bill requires that Cal/EPA develop regulations to reduce emissions with an enforcement mechanism to ensure that the reductions are achieved, and to disclose how it arrives at the cap. It also includes conditions to ensure businesses and consumers are not unfairly affected by reductions.

AB 32 requires Cal/EPA to work with state agencies to:

- promulgate and implement a GHG emissions cap for the electric power, industrial, and commercial sectors through regulations in an economically efficient manner;
- institute a schedule of GHG reductions;
- develop an enforcement mechanism for reducing GHGs; and
- establish a program to track and report GHG emission levels.

AB 32 codifies the state's goal by requiring that statewide GHG emissions from stationary sources be reduced to 1990 levels by the year 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop appropriate regulations and establish a mandatory reporting system to track and monitor global warming emissions levels. AB 32 applies to stationary sources of emissions only, and does not mandate any requirements for mobile- or area-source emissions.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

Sacramento Metropolitan Air Quality Management District

SMAQMD attains and maintains air quality conditions in Sacramento County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of SMAQMD includes the preparation of plans for the attainment of ambient air-quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. SMAQMD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the CAA and amendments thereof (CAAA), and the CCAA.

In July 2004, SMAQMD released a revision to the previously adopted guidelines document (SMAQMD 1994). This revised *Guide to Air Quality Assessment* (SMAQMD 2004) is an advisory document that provides lead agencies, consultants, and project applicant(s) with uniform procedures for addressing air quality in environmental documents. The handbook contains the following applicable components:

- criteria and thresholds for determining whether a project may have a significant adverse air quality impact;
- specific procedures and modeling protocols for quantifying and analyzing air quality impacts;
- methods available to mitigate air quality impacts; and
- information for use in air quality assessments and environmental impact reports (EIRs) that will be updated more frequently such as air quality data, regulatory setting, climate, and topography.

As mentioned above, SMAQMD adopts rules and regulations. All projects are subject to SMAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the project may include, but are not limited to, the following:

- **Rule 201: General Permit Requirements.** Any project that includes the use of equipment capable of releasing emissions to the atmosphere may require permit(s) from SMAQMD before equipment operation. The applicant, developer, or operator of a project that includes an emergency generator, boiler, or heater should contact SMAQMD early to determine whether a permit is required, and to begin the permit application process. Portable construction equipment (e.g., generators, compressors, pile drivers, lighting equipment) with an internal combustion engine over 50 horsepower (hp) are required to have a SMAQMD permit or ARB portable equipment registration.
- **Rule 403: Fugitive Dust.** The developer or contractor is required to control dust emissions from earthmoving activities or any other construction activity to prevent airborne dust from leaving the project site.
- **Rule 442: Architectural Coatings.** The developer or contractor is required to use coatings that comply with the volatile organic compound (VOC) content limits specified in the rule.
- **Rule 902: Asbestos.** The developer or contractor is required to notify SMAQMD of any regulated renovation or demolition activity. Rule 902 contains specific requirements for surveying, notification, removal, and disposal of asbestos-containing material.

In addition, effective as of October 10, 2005, if modeled construction-generated emissions for a project are not reduced to SMAQMD's threshold of significance (85 pounds per day [lb/day]) by the application of the standard construction mitigation, then an off-site construction mitigation fee is recommended. The fee must be paid before a grading permit can be issued. This fee is used by SMAQMD to purchase off-site emissions reductions. Such purchases are made through SMAQMD's Heavy Duty Incentive Program, through which select owners of heavy-

duty equipment in Sacramento County can repower or retrofit their old engines with cleaner engines or technologies.

Rancho Cordova General Plan

Goals and policies of the *Rancho Cordova General Plan* relating to air quality that the City has found to be applicable to the proposed project and alternatives under consideration are provided in Appendix F.

Air Quality Plans

SMAQMD, in coordination with the air quality management districts and air pollution control districts of El Dorado, Placer, Solano, Sutter, and Yolo Counties, prepared and submitted the 1991 *Air Quality Attainment Plan* (AQAP) in compliance with the requirements set forth in the CCAA, which specifically addressed the nonattainment status for ozone and, to a lesser extent, CO and PM_{10}. Sacramento County is currently designated as a nonattainment area for both the national and state ozone (1-hour) and PM_{10} (24-hour) standards (ARB 2006a). In addition, the area is also recommended as a serious nonattainment area for the national ozone (8-hour) standard (ARB 2006a).

The CCAA also requires a triennial assessment of the extent of air quality improvements and emission reductions achieved through the use of control measures. As part of the assessment, the AQAP must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections. The requirement of the CCAA for a first triennial progress report and revision of the 1991 AQAP was fulfilled with the preparation and adoption of the 1994 *Ozone Attainment Plan* (OAP). The OAP stresses attainment of ozone standards and focuses on strategies for reducing ROG and NO_X emissions. It promotes active public involvement, enforcement of compliance with SMAQMD rules and regulations, public education in both the public and private sectors, development and promotion of transportation and land use programs designed to reduce vehicle miles traveled (VMT) within the region, and implementation of stationary- and mobile-source control measures. The OAP became part of the SIP in accordance with the requirements of the CAAA and amended the 1991 AQAP. However, at that time the region could not show that the national ozone (1-hour) standard would be met by 1999. In exchange for moving the deadline to 2005, the region accepted a designation of "severe nonattainment" coupled with additional emission requirements on stationary sources. Additional triennial reports that acted as incremental updates were also prepared in 1997, 2000, and 2003 in compliance with the CCAA.

As a nonattainment area, the region is also required to submit rate-of-progress milestone evaluations in accordance with the CAAA. Milestone reports were prepared for 1996, 1999, and 2002. These milestone reports include demonstrations that the requirements for compliance have been met for the Sacramento nonattainment area. The air quality attainment plans and reports present comprehensive strategies to reduce ROG, NO_X, and PM_{10} emissions from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations; enhancement of California Environmental Quality Act (CEQA) participation; implementation of a new and modified indirect-source-review program; adoption of local air quality plans; and stationary-, mobile-, and indirect-source control measures.

In July 1997, EPA promulgated a new 8-hour ozone standard. This change lowered the standard for ambient ozone from 0.12 ppm averaged over 1 hour to 0.08 ppm averaged over 8 hours. In general, the 8-hour standard is more protective of public health and more stringent than the 1-hour standard. The promulgation of this standard prompted new designations and nonattainment classifications in June 2004, resulting in the revocation of the 1-hour standard on June 15, 2005. As stated above, the region has been designated as a nonattainment (serious) area for the national (8-hour) ozone standard with an attainment deadline of June 2013.

Although the region has made significant progress in reducing ozone, a problem has arisen with regard to another requirement set forth in the CAA. The region's transportation plan must conform and thus show that it does not harm the region's chances of attaining the ozone standard. The SIP is tied to a "motor vehicle emissions budget"; transportation planners must ensure that emissions anticipated from plans and improvement programs remain

within this budget. The region is not required to update the SIP before the ozone (8-hour) plans are due in 2006. However, since a conformity lapse began on October 4, 2004, an expedited process to prepare a plan is under way (SMAQMD 2005).

Toxic Air Contaminants

It is important to understand that TACs are not considered criteria air pollutants and thus are not specifically addressed through the setting of ambient air quality standards. Instead, EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology (MACT and BACT) to limit emissions. These in conjunction with additional rules set forth by SMAQMD establish the regulatory framework for TACs (see discussion under "State and Local Toxic Air Contaminant Programs" below).

Federal Hazardous Air Pollutant Program

Title III of the CAA requires EPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP may differ for major sources than for area sources of HAPs. (Major sources are defined as stationary sources with potential to emit more than 10 tons per year [TPY] of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources.) The emissions standards are to be promulgated in two phases. In the first phase (1992–2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAAA required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum emissions of benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1, 3-butadiene. In addition, Section 219 required the use of reformulated gasoline in selected U.S. cities (those with the most severe ozone nonattainment conditions) to further reduce mobile-source emissions.

State and Local Toxic Air Contaminant Programs

The State of California regulates TACs primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [1983]) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 [1987]). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and has adopted EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB adopts an Airborne Toxics Control Measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

ARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators). In

February 2000, ARB adopted a new public-transit bus-fleet rule and emission standards for new urban buses. These new rules and standards provide for:

- more stringent emission standards for some new urban bus engines, beginning with 2002 model year engines;
- zero-emission bus demonstration and purchase requirements applicable to transit agencies; and
- reporting requirements under which transit agencies must demonstrate compliance with the urban-transit bus-fleet rule.

Upcoming milestones include the low-sulfur diesel-fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide.

At the local level, air pollution control or management districts may adopt and enforce ARB's control measures. Under SMAQMD Rule 201 ("General Permit Requirements"), Rule 202 ("New Source Review"), and Rule 207 ("Federal Operating Permit"), all sources that possess the potential to emit TACs are required to obtain permits from the district. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new-source review standards and air-toxics control measures. SMAQMD limits emissions and public exposure to TACs through a number of programs. SMAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

Sources that require a permit are analyzed by SMAQMD (e.g., health risk assessment) based on their potential to emit toxics. If it is determined that the project will emit toxics in excess of SMAQMD's threshold of significance for TACs (identified below), sources have to implement the BACT for TACs (T-BACT) to reduce emissions. If a source cannot reduce the risk below the threshold of significance even after T-BACT has been implemented, the SMAQMD will deny the permit required by the source. This helps to prevent new problems and reduces emissions from existing older sources by requiring them to apply new technology when retrofitting with respect to TACs.

Odors

In 1991 SMAQMD adopted a nuisance rule that addresses odor exposure. Rule 402 states that no person shall discharge from any source whatsoever such quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons, or to the public, or that endanger the comfort, repose, health, or safety of any such persons, or the public, or that cause to have a natural tendency to cause injury or damage to business or property. The provisions of Rule 402 do not apply to odors emanating from agricultural operations necessary for the growing of crops or raising of fowl or animals.

SMAQMD recommends that odor impacts be addressed in a qualitative manner. Such an analysis shall determine whether the project would result in excessive nuisance odors, as defined under the California Code of Regulations and Section 41700 of the California Health and Safety Code, and thus would constitute a public nuisance related to air quality.

Atmospheric Greenhouse Gases

There are no regional or local policies, regulations, or laws pertaining to GHG emissions.

3.15.3 ENVIRONMENTAL CONSEQUENCES

THRESHOLDS OF SIGNIFICANCE

For the purpose of this analysis, the following thresholds of significance, derived from the State CEQA Guidelines (Appendix G) and advisory CEQA thresholds suggested by SMAQMD, have been used to determine whether implementation of the project or alternatives under consideration would result in significant air quality impacts.

Based on Appendix G of the State CEQA Guidelines, an air quality impact is considered significant if implementation of the proposed project or alternatives under consideration would do any of the following:

- conflict with or obstruct implementation of the applicable air quality 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 air pollutant for which the project region is nonattainment under any applicable national or state ambient air quality standards (including releasing emissions that exceed quantitative thresholds for ozone precursors),
- expose sensitive receptors to substantial pollutant concentrations, or
- create objectionable odors affecting a substantial number or people.

As stated in Appendix G, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. Based on SMAQMD's *Guide to Air Quality Assessment in Sacramento County* (SMAQMD 2004), an air quality impact is considered significant if implementation of the proposed project or alternatives under consideration would do any of the following:

- generate construction-related criteria air pollutant or precursor emissions that exceed the SMAQMD-recommended threshold of 85 lb/day for NO_X, or result in or substantially contribute (at a level equal to or greater than 5%) to emissions concentrations (e.g., 50 $\mu g/m^3$ and 2.5 $\mu g/m^3$ for PM_{10}, respectively) that exceed the NAAQS or CAAQS;
- generate long-term regional criteria air pollutant or precursor emissions that exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, or result in or substantially contribute (at a level equal to or greater than 5%) to emissions concentrations (e.g., 50 $\mu g/m^3$ and 2.5 $\mu g/m^3$ for PM_{10}, respectively) that exceed the NAAQS or CAAQS;
- generate local mobile-source emissions that result in or substantially contribute to CO concentrations that exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm;
- expose sensitive receptors to TAC emissions that exceed 10 in 1 million for the carcinogenic risk (i.e., the risk of contracting cancer) and/or a noncarcinogenic Hazard Index of the Maximally Exposed Individual (MEI) ;
- expose sensitive receptors to excessive nuisance odors, as defined under SMAQMD Rule 402 (see "Odors" under "Regional and Local Plans, Policies, Regulations, and Laws" above); or

- expose construction workers or future residents to hazardous indoor air pollutant emissions that exceed 10^{-4} for the cumulative carcinogenic site risk and/or a noncarcinogenic hazard quotient of 1 based on reasonable maximum exposure for both current and future land use[1] (ENSR International [ENSR] 2004).

Regarding GHG, the SMAQMD has not identified a significance threshold. Further, it appears that no other air district in California has generated a significance threshold pertaining to GHG. The state has identified emissions in the year 1990 as a goal through adoption of AB 32. If this goal is attained, California would generate less GHG than today. It is recognized, though, that there is no simple metric available to determine if a single project would advance toward or away from this goal. Because GHG are global, a project that shifts the location of where someone lives or works, by itself, may or may not contribute new GHG. For example, someone may move from Southern California (and from the South Coast Air Quality Management District) to the project site, and while this would likely increase emissions within the Sacramento Metropolitan Air Quality Management District, it is not conclusive that this would result in generation of more GHG globally. In fact, if a person moves from one location, where they have long commutes and a land use pattern that requires substantial energy use, to a project that promotes shorter and fewer vehicle trips, more walking and less energy use, it could be argued that the new project would result in a potential reduction in generation of global GHG.

A possible metric that could be used to determine if this project would contribute to global GHG would be to determine if, on a per capita basis, this project would generate more GHG than a benchmark level based on a policy, in this case AB 32. Although AB 32 would only directly apply to stationary sources of emissions, mobile- and area-source emissions generated by a project can be addressed on a per capita basis, in order to be consistent with statewide goals to reduce global warming impacts. A project would increase GHG above the 1990 goal if it would result in generation of more than 2 tons of CO_2 per capita annually. This figure is the calculated per-capita CO_2 emissions level generated in California in 1990, discounted because the state's population has grown considerably since 1990 and is projected to continue to grow. The basis for this number is discussed further below.

For this document, a project's contribution to GHG would be considered significant if it would generate a substantial increase in GHG based on whether it exceeded the 2 tons per person metric, the degree to which this metric would be exceeded, and whether the number of persons inhabiting the site would be substantial.

ANALYSIS METHODOLOGY

Short-term construction-generated emissions of criteria air pollutants (e.g., PM_{10}) and ozone precursors (ROG and NO_X) were assessed in accordance with methods recommended by SMAQMD. Where quantification is required, emissions were modeled using the URBEMIS 2002 Version 8.7.0 and EMFAC2002 Version 2.2 computer models (ARB 2002a, 2002b), and other emission factors and recommended methodologies from SMAQMD's *Guide to Air Quality Assessment in Sacramento County* (SMAQMD 2004). The use of these models determined whether short-term construction-generated emissions of criteria air pollutants would exceed applicable thresholds and where mitigation would be required. Modeling was based on project-specific data where available (e.g., estimated duration of construction, amount of land to be disturbed/graded, types of equipment to be used, number of construction employees), and URBEMIS default settings and SMAQMD recommendations where project-specific data were not available. Predicted short-term construction-generated emissions were compared with applicable SMAQMD thresholds for determination of significance.

According to SMAQMD, short-term construction-generated ROG emissions should be modeled; however, SMAQMD has not established a threshold to determine the significance of such emissions. Thus, in accordance with methodologies recommended by SMAQMD, short-term construction-generated ROG emissions are modeled and presented for informational purposes only. SMAQMD bases this approach on the fact that ROG emissions

[1] The upper boundary of the risk range is not a discrete line at 1×10^{-4}, although EPA generally uses 1×10^{-4} in making risk management decisions. A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions (ENSR International 2004).

attributable to construction equipment exhaust are low and those from application of architectural coatings are regulated by Rule 442 (Christensen, pers. comm., 2005).

Long-term (i.e., operational) regional emissions of criteria air pollutants and precursors, including mobile- and area-source emissions, were also quantified using the URBEMIS 2002 Version 8.7.0 computer model. Modeling was based on project-specific data (e.g., size and type of proposed uses), URBEMIS default settings, and trip generation data from the traffic analysis. Long-term stationary-source emissions were qualitatively assessed in accordance with methodologies recommended by SMAQMD. Predicted long-term operational emissions were compared with applicable SMAQMD thresholds for determination of significance.

GHG emissions associated with the project were estimated using CO_2 emissions as a proxy for all GHG emissions. This is consistent with the current reporting protocol of the California Climate Action Registry. CO_2 emissions associated with vehicle miles traveled are the best indicator of GHGs associated with a land development project. However, it is important to note that other GHGs have a higher Global Warming Potential (GWP) than CO_2. For example, 1 pound of methane has an equivalent GWP of 21 pounds of CO_2 (EPA 2002, California Climate Action Registry [2006]). In other words, as a GHG, methane is 21 times as efficient as CO_2. Nonetheless, emissions of other GHGs would be low relative to CO_2, and would be roughly proportional to VMT as well. Annual VMT/person for the year 1990 was estimated based on 1989 census data, and this rate corresponds to an annual rate of 8,703 VMT/person. Based on a fleetwide emission factor for the year 1990, this would result in a statewide annual emission rate of approximately 3.5 tons CO_2/person associated with vehicle miles traveled (ARB 2002c). In addition, population growth must also be considered, in order to obtain the 1990 emissions target. The population of the state is forecast to grow to 43,851,741 people by the year 2020 (California Department of Finance [DOF] 2006). In order to achieve the mass of emissions that occurred in 1990, the emission rate per capita must be further reduced to compensate for increased VMT associated with increased population growth. Thus, the annual rate must be reduced by approximately 33% below the 1990 rate, to approximately 2 Tons CO_2/person, in order to achieve the 1990 baseline promulgated by AB 32.

All other air quality impacts (i.e., local mobile-source emissions, exposure of sensitive receptors to TAC and odorous emissions, and indoor air quality) were assessed in accordance with methodologies recommended by SMAQMD.

IMPACT ANALYSIS

Effects that would occur under each alternative development scenario are identified as follows: PP (Proposed Project), HD (High Density), IM (Impact Minimization), NF (No Federal Action), and NP (No Project). The impacts for each alternative are compared relative to the PP at the end of each impact conclusion (i.e., similar, greater, lesser).

Program Level Impacts and Mitigation Measures

IMPACT 3.15-1	Generation of Temporary, Short-Term Construction Emissions of ROG, NO_X, and PM_{10}. *Construction activities associated with the project would generate temporary, short-term emissions of ROG, NO_X, and PM_{10}. Because of the large size of the project, construction-generated emissions of NO_X, an ozone precursor, would exceed SMAQMD-recommended thresholds and would substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS.*
PP	Construction emissions are described as short term or temporary in duration and have the potential to represent a significant impact with respect to air quality, especially in the case of PM_{10}. Fugitive-dust emissions are associated primarily with site preparation and vary as a function of soil silt content, soil moisture, wind speed, acreage of disturbance, VMT on- and off-site, and other factors. Emissions of the ozone precursors ROG and NO_X are associated primarily

with construction equipment exhaust and the application of architectural coatings.

Under the Proposed Project Alternative, construction activities would temporarily generate emissions of ROG, NO_X, and PM_{10} from grading, excavation, filling, trenching, paving, laying of concrete foundations, application of architectural coatings, heavy-duty equipment exhaust, motor vehicle exhaust from construction employees' commute trips, and material transport (especially on unpaved surfaces) from construction of approximately 11,600 residential units, 239 acres of commercial development, 282 acres of industrial development, and 152 acres of educational development.

SMAQMD has developed screening-level values for the size and type of land use development that would likely result in potentially significant emissions of NO_X during construction (e.g., 28 units of single-family residential). With respect to buildout of the project, there would be approximately 285 times the screening-level value for single-family residences, 118 times the value for development of education-related land uses, and 218 times the value for development of industrial land uses. Thus, because of the large size of the project (approximately 3,800 acres), construction-generated NO_X emissions would exceed the SMAQMD-recommended threshold of 85 lb/day; as NO_X is an ozone precursor, such emissions would substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS. In addition, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County of Sacramento (County), and the other issued by the City of Rancho Cordova (City)—and possibly under one or more future individual Implementation Permits expected to be issued by the City. Such activities would contribute approximately 84 lb/day of NO_X associated with these activities (City of Rancho Cordova 2005).

With respect to PM_{10} emissions, SMAQMD has also developed screening-level values related to the maximum actively disturbed area of the project site. According to these values, if more than 15 acres would be actively disturbed, even with the implementation of the recommended mitigation measures, project construction would likely result in potentially significant emissions. Thus, because of the large size of the project (3,800 acres), construction-generated PM_{10} emissions would result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS. As a result, this temporary, short-term impact would be **significant** and **direct**. **No indirect** impacts would occur.

HD Under the High Density Alternative, approximately the same footprint of land would be disturbed as under the Proposed Project Alternative, but a higher density of dwelling units would be constructed on that same acreage (approximately 4,000 additional units, for a total of 15,488 residential units). The High Density Alternative would likely require mobilization of slightly more construction equipment than the Proposed Project Alternative. Therefore, this impact would be **direct and significant** and would occur at a greater level than under the Proposed Project Alternative. **No indirect** impacts would occur. ***[Greater]***

IM Impacts under the Impact Minimization Alternative would be somewhat less (approximately 500 acres less) than those under the Proposed Project Alternative because this alternative would involve more preservation of wetlands. Approximately 1,000 fewer residential units (for a total of 10,600 residential units) would be constructed. Therefore, this impact would be **direct** and **significant** but would occur at a lesser level than under the Proposed Project Alternative. **No indirect** impacts would occur. ***[Lesser]***

NF Impacts under the No Federal Action Alternative would be less than under the Proposed Project Alternative, and would be similar to those under the Impact Minimization Alternative, as discussed above. This alternative would involve 835 acres for preservation of natural resources. Approximately 835 fewer residential units would be developed (for a total of 10,765 residential units). Therefore, this impact would be **direct** and **significant** but would occur at a lesser level than under the Proposed Project Alternative. **No indirect** impacts would occur. ***[Lesser]***

NP Under the No Project Alternative, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more future individual Implementation Permits expected to be issued by the City. PM_{10} emissions from equipment used during mining operations could exceed SMAQMD standards. However, the *Aerojet Mining Amendment Mitigated Negative Declaration* (City of Rancho Cordova 2004) and the *Grantline West Mitigated Negative Declaration* (City of Rancho Cordova 2005) contain mitigation measures to reduce PM_{10} emissions. As mitigated, indirect impacts from mining activities would not exceed SMAQMD standards for other criteria pollutants.

Because no project-related development would occur under the No Project Alternative, no project-related emissions would result; thus, **no direct or indirect impacts** would occur. ***[Lesser]***

Mitigation Measure 3.15-1: Implement Measures to Control Construction-Generated Air Pollutant Emissions.

PP, HD, IM, NF To reduce short-term construction emissions, the project applicant(s) for all project phases shall implement the measures described below. In addition to the measures identified below, construction operations shall comply with all applicable SMAQMD rules and regulations.

- Phase 1 of all action alternatives for Rio del Oro would result in construction-generated emissions that exceed the SMAQMD threshold of significance, even after implementation of the SMAQMD "standard construction mitigation." Therefore, the project applicant(s) shall pay SMAQMD an off-site mitigation fee for implementation of any of these alternatives for the purpose of reducing impacts to a less-than-significant level. The specific fee amounts shall be calculated when the construction emissions can be more accurately determined. This calculation would occur when an alternative has been selected, the project has been approved, and the Phase 1 improvement plans have been prepared. Calculation of fees associated with future, subsequent project phases shall be conducted before the approval of grading plans. It is estimated, based on information available at this time, that the off-site construction mitigation fees would range from $4,404,845 to $5,461,587 for development Phase 1, depending on which alternative is selected.

- The project applicant(s) for all project phases shall pay into SMAQMD's off-site construction mitigation fund to further mitigate construction-generated emissions of NO_X that exceed SMAQMD's daily emission threshold of 85 lb/day. The calculation of daily NO_X emissions is based on the current cost of $14,300 to reduce 1 ton of NO_X. The determination of the final mitigation fee shall be conducted in coordination with SMAQMD before any demolition or ground disturbance occurs for any project phase.

- Calculation of and payment of the fee for development Phase 1 and all subsequent project phases shall also be included in the Mitigation Monitoring and Reporting Program (MMRP) for the project.

- The project applicant(s) for all project phases shall reduce NO_X and visible emissions from heavy-duty diesel equipment by implementing the following measures:

  - A plan shall be developed for approval by the City, in consultation with SMAQMD, demonstrating that the heavy-duty (>50 hp), off-road vehicles to be used in the construction project (including owned, leased, and subcontractor vehicles) will achieve a projectwide fleet-average 20% NO_X reduction and 45% particulate reduction compared to the most recent ARB fleet average at the time of construction. Acceptable options for reducing emissions include the use of late-model engines, low-emission diesel products, alternative fuels, particulate-matter traps, engine retrofit technology, after-treatment products, and/or such other options as become available.

  - A comprehensive inventory of all off-road construction equipment equal to or greater than 50 hp that shall be used for an aggregate of 40 or more hours during any portion of project construction shall be submitted to the City and SMAQMD. The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction operations occur. At least 48 hours before heavy-duty off-road equipment is used, the project applicant(s) shall provide SMAQMD with the anticipated construction timeline, including the start date, and the name and phone number of the project manager and on-site foreman.

  - Emissions from off-road, diesel-powered equipment used on the project site shall not exceed 40% opacity for more than 3 minutes in any 1 hour. Any equipment found to exceed 40% opacity (or Ringlemann 2.0) shall be repaired immediately, and SMAQMD shall be notified of noncompliant equipment within 48 hours of identification. A visual survey of all in-operation equipment shall be made at least weekly. A monthly summary of visual survey results shall be submitted to SMAQMD throughout the duration of the construction project, except that the monthly summary shall not be required for any 30-day period in which no construction operations occur. The monthly summary shall include the quantity and type of vehicles surveyed, as well as the dates of each survey. SMAQMD and/or other officials may conduct periodic site inspections to determine compliance.

  - Emulsified diesel or diesel catalysts shall be used on applicable heavy-duty construction equipment.

  - All of the above measures shall be included in all construction plans and specifications.

  - Payment into SMAQMD's construction mitigation fund to offset construction-generated emissions of NO_X that exceed SMAQMD's daily emission threshold of 85 lb/day shall be made. The calculation of daily NO_X emissions, for determination of offset fee mitigation, shall be conducted in coordination with SMAQMD and shall be based on the construction plan and equipment inventory to be prepared by the project representative.

- As recommended by SMAQMD, the project applicant(s) for all project phases shall reduce fugitive-dust emissions by implementing the following measures:

  - Dust emissions on all disturbed areas, including storage piles that are not being actively used for construction purposes, shall be effectively stabilized using water, a chemical stabilizer or suppressant, or vegetative ground cover (keeping soil moist at all times).

- Dust emissions on all on- and off-site unpaved access roads shall be effectively stabilized using water or a chemical stabilizer or suppressant.
- When materials are transported off-site, such materials shall be covered and effectively wetted to limit visible dust emissions, and at least 2 feet of freeboard space shall be maintained from the top of the container.
- The accumulation of project-generated mud or dirt from adjacent public streets shall be limited or expeditiously removed at least once every 24 hours when operations are occurring. After materials are added to or removed from the surfaces of outdoor storage piles that have the potential for fugitive-dust emissions, such storage piles shall be effectively stabilized using sufficient water or a chemical stabilizer or suppressant.
- On-site vehicle speeds on unpaved roads shall be limited to 15 mph.
- Wheel washers shall be installed for all trucks and equipment exiting unpaved areas, or wheels shall be washed to remove accumulated dirt before such vehicles leave the site.
- Sandbags or other erosion control measures shall be installed to prevent runoff of silt to public roadways from adjacent project areas with a slope greater than 1%.
- Excavation and grading activities, except soil stabilization activities, shall be suspended when winds exceed 20 mph. The extent of areas simultaneously subject to excavation and grading shall be limited to the minimum area feasible.

Timing: Before the approval of all grading plans and throughout project construction for all project phases.

Enforcement: City of Rancho Cordova Public Works and Planning Departments and Sacramento Metropolitan Air Quality Management District.

NP No mitigation measures are required.

Implementation of Mitigation Measure 3.15-1 would reduce construction-generated emissions of NO_X and PM_{10} from on-site heavy-duty equipment exhaust by approximately 20% and 45%, respectively, under the Proposed Project, High Density, Impact Minimization, and No Federal Action Alternatives. It would also reduce emissions of fugitive PM_{10} by 75% under these alternatives. However, daily construction emissions would still exceed SMAQMD's significance threshold for NO_X, resulting in or substantially contributing to emissions concentrations that exceed the NAAQS or CAAQS (e.g., ozone and PM_{10}). As a result, the direct impact of short-term, temporary construction-generated emissions from the project would remain **significant and unavoidable**.

IMPACT 3.15-2

Generation of Long-Term Operational (Regional) Emissions of ROG, NO_X, and PM_{10}. *Operational area- and mobile-source emissions from implementation of the project would exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, and would result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS. In addition, because of the large increase in emissions associated with project buildout and the fact that the project is not within an already approved plan (which means that increased emissions would not already be accounted for in applicable air quality plans), project implementation could conflict with air quality planning efforts.*

PP Operation of the project would result in long-term regional emissions of ROG, NO_X, and PM_{10} associated with area sources, such as natural-gas emissions, landscaping, applications of architectural coatings, and use of consumer products, in addition to operational vehicle-exhaust

emissions. Project buildout would generate approximately 228,557 vehicle trips (1,439,911 VMT) (Fehr & Peers 2005). See Section 3.14, "Traffic and Transportation," for further discussion.

Similar to the screening-level values discussed above for construction, SMAQMD has developed screening-level values for the size and type of land use development that would likely result in potentially significant emissions of NO_X during project operations (e.g., 656 units of single-family residential). Implementation of the Proposed Project Alternative would result in approximately 12 times the screening-level value for single-family residences, six times the value for development of education-related land uses, and 10 times the value for development of industrial land uses. Thus, because of the large size of the project (approximately 3,800 acres) and associated mobile and area sources introduced to the project area, operational emissions would exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, resulting in or substantially contributing to emissions concentrations that exceed the NAAQS or CAAQS. In addition, because of the large increase in emissions associated with project buildout and the fact that the project is not within an already existing approved plan (which means that increased emissions would not be accounted for in applicable air quality plans), implementation of the project could conflict with air quality planning efforts.

Implementation of the Proposed Project Alternative would also result in the operation of stationary sources of emissions such as emergency backup generators, and other stationary sources depending on the specific types of operations that would occur at the proposed commercial land uses. According to SMAQMD, stationary sources of air pollutant emissions that comply with the applicable regulations pertaining to BACT and offset requirements are not considered causes of significant air quality impacts (SMAQMD 2004). In fact, SMAQMD does not require the inclusion of such emissions in CEQA analyses unless the operation of a stationary source results in surplus emissions in excess of BACT and offsets (SMAQMD 2004). The stationary sources proposed as part of this project would not be considered major sources (e.g., power plants). They would be subject to SMAQMD permitting and BACT requirements and are not anticipated to result in any surplus stationary-source emissions (e.g., emissions in excess after BACT and offsets are applied). Also, because electricity-generating facilities for the Sacramento region either are located outside the area or are offset through the use of pollution credits, emissions resulting from energy use are not considered in this assessment in accordance with SMAQMD guidance (SMAQMD 2004).

In summary, operational area- and mobile-source emissions from implementation of the Proposed Project Alternative would exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, resulting in or substantially contributing to emissions concentrations that exceed the NAAQS or CAAQS. In addition, because the project is not within an approved plan area, project implementation could conflict with air quality planning efforts. As a result, this long-term, **direct** impact is considered **significant**. **No indirect** impacts would occur.

HD

Under the High Density Alternative, there would be a larger number of dwelling units (approximately 4,000 additional units, for a total of 15,488) than under the Proposed Project Alternative, on the same number of acres. Increased housing densities tend to generate fewer trips than lower density housing in a cumulative sense; however, the High Density Alternative includes increased commercial and industrial uses, which would generate more trips than the housing component. In addition, higher density residential uses have greater area-source emissions than single-family housing. Thus, operational sources of emissions would be slightly higher because of the larger number of people and vehicles, and increased urban-type land uses.

Thus, this **direct** impact would be **significant** and would occur at a greater level than under the Proposed Project Alternative. **No indirect** impacts would occur. ***[Greater]***

IM Impacts under the Impact Minimization Alternative would be slightly less than those under the Proposed Project Alternative. Because approximately 500 fewer acres of land would be developed, there would be fewer area sources and fewer operational sources of emissions. Thus, this **direct** impact would be **significant** but would occur at a lesser level than under the Proposed Project Alternative. **No indirect** impacts would occur. ***[Lesser]***

NF Impacts under the No Federal Action Alternative would be slightly less than those under the Proposed Project Alternative. Because approximately 800 fewer acres of land would be developed, there would be fewer area sources and fewer operational sources of emissions. Thus, this **direct** impact would be **significant** but would occur at a lesser level than under the Proposed Project Alternative. **No indirect** impacts would occur. ***[Lesser]***

NP Under the No Project Alternative, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more individual Implementation Permits expected to be issued by the City. PM_{10} emissions from equipment used during mining operations could exceed SMAQMD standards. The *Aerojet Mining Amendment Mitigated Negative Declaration* (City of Rancho Cordova 2004) and the *Grantline West Mitigated Negative Declaration* (City of Rancho Cordova 2005) contain mitigation measures to reduce PM_{10} emissions. As mitigated, indirect impacts from mining activities would not exceed SMAQMD standards for other criteria pollutants.

Because no project-related development would occur under the No Project Alternative, no project-related emissions would result; thus, **no significant direct** or **indirect impacts** would occur. ***[Lesser]***

Mitigation Measure 3.15-2: Implement Measures to Control Long-Term Operational (Regional) Emissions of ROG, NO_X, and PM_{10}.

PP, HD, IM, NF The project applicant(s) for all project phases shall submit a copy of the Operational Air Quality Plan developed in consultation with and approved by SMAQMD to the City. The Operational Air Quality Plan shall include measures to reduce operational air quality impacts associated with the project by a minimum of 15%, and these measures shall be included in the Rio del Oro Specific Plan. The project applicant(s) shall implement all measures included in the Operational Air Quality Plan. (The Operational Air Quality Plan is included in Appendix L of this DEIR/DEIS.)

Timing: Before the approval of grading plans and throughout project construction, as appropriate for all project phases.

Enforcement: City of Rancho Cordova Public Works, Building and Safety, and Planning Departments and Sacramento Metropolitan Air Quality Management District.

NP No mitigation measures are required.

Implementation of Mitigation Measure 3.15-2 would lessen long-term regional emissions by a minimum of approximately 15% under the Proposed Project, High Density, Impact Minimization, and No Federal Action Alternatives. Some of the design measures identified to reduce operational emissions, such as mixed-use development and the creation of street and pedestrian connections, are already incorporated into the project; as mentioned previously, they are repeated in Mitigation Measure 3.15-2 to allow a comprehensive listing of both design and operational measures. However, even a reduction of 15% would not reduce ROG and NO_X emissions

to levels below the SMAQMD-recommended significance threshold of 65 lb/day for ROG and NO_X, or PM_{10} emissions (as would be necessary for project implementation not to result in a substantial contribution to an air quality violation). Thus, increases in long-term regional emissions attributable to the project would be considered a significant and unavoidable impact. Implementation of the above-mentioned measures would substantially reduce the level of emissions from this source; however, because of the large size of the proposed development, emissions would still be expected to exceed the applicable thresholds. Thus, this impact would remain **significant and unavoidable**.

IMPACT 3.15-3

Generation of Local Mobile-Source CO Emissions. *Project-generated local mobile-source CO emissions would not result in or substantially contribute to concentrations that exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm.*

PP

The primary mobile-source pollutant of local concern is carbon monoxide. CO concentration is a direct function of vehicle idling time and thus of traffic-flow conditions. CO transport is extremely limited, as CO disperses rapidly with distance from the source under normal meteorological conditions. Under certain meteorological conditions, however, CO concentrations close to a congested roadway or intersection may reach unhealthy levels, affecting local sensitive receptors (residents, schoolchildren, hospital patients, or the elderly). In the past, high CO concentrations have typically been associated with roadways or intersections operating at an unacceptable level of service (LOS) (LOS E or worse). In areas currently experiencing high ambient background CO concentrations, it is recommended that CO concentrations be analyzed for receptors located near signalized roadway intersections that are projected to operate at LOS E or worse (Caltrans 1997).

Under specific-plan buildout conditions, some signalized intersections in the vicinity of the project area are predicted to operate at an unacceptable LOS (LOS E or worse) in addition to those intersections analyzed in Impact 3.15-8 below (Fehr & Peers 2005). Because of stricter vehicle emissions standards in newer cars, new technology, and increased fuel economy, future CO emission factors under buildout conditions would be substantially lower than those used in the analysis of local mobile-source CO emissions for development Phase 1 (see Impact 3.15-9 below), for which modeled concentrations were below recommended thresholds. Thus, even though implementation of the project at buildout would result in more trips than implementation of development Phase 1, project-generated local mobile-source CO emissions would likewise not result in or substantially contribute to concentrations that exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm. This is considered a **less-than-significant, direct** impact. **No indirect** impacts would occur.

HD

More traffic would be generated under the High Density Alternative than under the Proposed Project Alternative, with a higher density of population within the same developed acreage. Approximately 16,000 more trips per day would be generated under the High Density Alternative than under the Proposed Project Alternative. Even if all of these vehicles were to arrive at the worst-case intersection, as analyzed under Impact 3.15-9 below, during p.m. peak-hour traffic conditions, CO concentrations still would not exceed the 1-hour or 8-hour ambient air quality standards (see supporting calculations in Appendix K). Therefore, it is not expected that a substantial increase in CO concentrations would result under this alternative as compared with implementation of the Proposed Project Alternative; however, there would be slightly higher localized ambient CO concentrations generated at affected intersections.

Therefore, **direct** impacts would be **less than significant** but would occur at a slightly greater level than under the Proposed Project Alternative. **No indirect** impacts would occur. ***[Greater]***

IM Impacts under the Impact Minimization Alternative would be slightly less than those under the Proposed Project Alternative because slightly less traffic would be generated under this alternative. However, because nearly the same amount and types of land uses are proposed, it is anticipated that local CO concentrations would be approximately the same as under the Proposed Project Alternative. This would represent a **direct**, **less-than-significant** impact. **No indirect** impacts would occur. ***[Similar]***

NF Impacts under the No Federal Action Alternative would be slightly less than those under the Proposed Project Alternative because slightly less traffic would be generated under this alternative. However, because nearly the same amount and types of land uses are proposed under this alternative, it is anticipated that local CO concentrations would be approximately the same as under the Proposed Project Alternative. This would represent a **direct**, **less-than-significant** impact. **No indirect** impacts would occur. ***[Similar]***

NP Under the No Project Alternative, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more future individual Implementation Permits expected to be issued by the City. The *Aerojet Mining Amendment Mitigated Negative Declaration* (City of Rancho Cordova 2004) and the *Grantline West Mitigated Negative Declaration* (City of Rancho Cordova 2005) did not indicate that CO emissions would exceed ambient air quality standards.

Because no project-related development would occur under the No Project Alternative, no project-related emissions would result; thus, **no significant direct or indirect impacts** would occur. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.15-4

Exposure of Sensitive Receptors to Short- and Long-Term Emissions of Toxic Air Contaminants. *Project implementation would result in exposure of receptors to short- and long-term emissions of TACs from on-site mobile and stationary sources.*

PP The exposure of sensitive receptors (e.g., existing and proposed residential units, schools, and parks) to TAC emissions from existing and proposed mobile and stationary sources is discussed below.

Short-Term Emissions from Construction Equipment

Project construction would result in short-term emissions of diesel exhaust from on-site heavy-duty equipment. Emissions of particulate exhaust from diesel-fueled engines (diesel PM) were identified as a TAC by ARB in 1998. Construction of the project would result in the generation of diesel PM emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities. As described above, the dose to which the receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (Salinas, pers. comm., 2004). The use of mobilized equipment would be temporary and there are no sensitive receptors currently located on or adjacent to the project site. However, new residents would be occupying the site concurrently with on-site construction activities. Even with the dispersive properties of

diesel PM (Zhu et al. 2002), short-term construction activities could expose sensitive receptors to levels that exceed applicable standards because of the close proximity between on-site heavy-duty equipment and residents. Therefore, this **direct** impact is considered **potentially significant. No indirect** impact would occur.

Emissions from Stationary Sources

Long-term operation of this alternative would likely include the installation of diesel-fueled emergency backup generators at some of the proposed land uses. This category of stationary source, in addition to any other stationary sources that may emit TACs, would be subject to SMAQMD permitting and T-BACT requirements. Thus, as discussed above, SMAQMD would analyze such sources (e.g., in a health risk assessment) based on their potential to emit TACs. If it is determined that the sources would emit TACs in excess of SMAQMD's applicable threshold of significance, T-BACT would be implemented to reduce emissions. If the implementation of T-BACT would not reduce the risk below the applicable threshold, then SMAQMD would deny the required permit. As a result, operation of any stationary sources would not result in the exposure of sensitive receptors to TACs at levels exceeding SMAQMD's significance threshold. Therefore, this **direct** impact is considered **less than significant. No indirect** impact would occur.

Airport-Related Emissions

In recent years there has been heightened scientific awareness and public debate over potential impacts that may result from the exposure of sensitive receptors to TAC emissions generated by aircraft and ground-support operations at and near airports. Sources of airport-related TAC emissions include aircraft (e.g., air carriers, commuter and cargo aircraft, and general aviation); ground-service equipment; fuel storage and handling; and other sources. TACs released by these sources include but are not limited to VOCs (acetaldehyde, formaldehyde, benzene, and 1, 3-butadiene); chromium; dioxins; polycyclic organic compounds (PAHs); tetrachloroethylene; nickel; and toluene.

Several studies and analyses have been performed in an effort to evaluate the risk posed by airport operations. In 1999 and 2000, public-initiated studies and analyses were released regarding toxic emissions from Chicago's O'Hare International Airport and associated health risks in surrounding residential communities. The overall findings of these analyses were that the cancer risks associated with operations at O'Hare Airport exceed 10 in 1 million over an area of approximately 40 square miles and 1 in 1 million over an area of approximately 1,000 square miles, assuming 70 years of exposure (KM Chng Environmental 1999, Environ 2000). These studies also identified the need for better assessment of the data utilized and recommended that comprehensive air monitoring be conducted around O'Hare Airport so that these data could be used to conduct a more complete and comprehensive analysis.

In response, the Illinois EPA in 2000 monitored TAC emissions in the vicinity of O'Hare Airport as well as other locations in the Chicago area from June to December, focusing on toxic compounds identified in EPA's national strategy and on mobile-source emissions associated with airport operations (Illinois Environmental Protection Agency 2002). The compounds of interest included volatile and semivolatile organics, carbonyls, and trace metals. The purpose of this program was to collect information that would help assess the relative impact of airport-generated emissions and toxic characteristics of large urban areas. One important objective of the monitoring program was to determine whether the emissions associated with O'Hare Airport have a measurable impact on air quality in areas adjacent to the airport. A review and analysis of the accumulated monitoring results found that the levels of toxic compounds (e.g., acetaldehyde and formaldehyde) attributable to airport operations were detected at monitoring sites. However,

the concentrations of such compounds were indistinguishable from (or lower than) typical urban background levels.

Overall, uncertainties in data and methods in the studies and analyses conducted so far, including those discussed above, have admittedly provided a poor foundation for airport-related health studies. More recently, in an effort to improve available data, a multiagency aircraft particle emissions experiment was established with participants from EPA, the National Aeronautics and Space Administration (NASA), the Federal Aviation Administration (FAA), the aviation industry (General Electric and Boeing), and the research community (Massachusetts Institute of Technology). The main focus is to test aircraft engines for TACs. Data from this study are anticipated to be released in 2006; updated emission factors will follow in approximately 2 years. These data, along with further monitoring around airports and validation of modeling results, will allow the compilation of more accurate emissions data into EPA models and identification of the proper characterization methods.

Based on the above discussion, it can be ascertained that the project, because of its proximity to Mather Airport (approximately 1 mile away at the nearest point on the project boundary), has the potential to expose sensitive receptors to TAC emissions to an extent that health risks could result. However, even though Mather Airport is quite modest in size compared to O'Hare International Airport, this issue is not well understood and is the subject of ongoing research, and any conclusions regarding health risks would be speculative. Therefore, a conclusion on the significance of the environmental impact cannot be reasonably reached. Section 15145 of the State CEQA Guidelines provides that if after a thorough investigation a lead agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impacts. This is the case here. **No impact conclusion can be made** based on research of this issue.

Emissions from On-Site Operational Mobile Sources

On-site operational mobile sources of TAC emissions would be associated primarily with the operation of school buses transporting students to and from the proposed high, middle, and elementary schools, as well as diesel-powered delivery trucks associated with proposed on-site commercial activities.

Emissions from school buses can vary depending on various factors, including bus type, age, and maintenance, and the amount of time spent idling. Health impacts from exhaust exposure include eye and respiratory irritation, enhanced respiratory allergic reactions, exacerbation of asthma, increased cancer risk, and degradation of the immune system. Generally, children are more vulnerable than adults to air pollutants because of their higher inhalation rates, narrower airways, and less mature immune systems.

In response to this concern, ARB adopted an ATCM as part of the *Particulate Matter Risk Reduction Plan* specifically to deal with diesel emissions from school buses. This measure became effective July 16, 2003. The school bus–idling ATCM includes the following requirements:

(a) The driver of a school bus or vehicle, transit bus, or heavy-duty vehicle (other than a bus) shall manually turn off the bus or vehicle upon arriving at a school and shall restart no more than 30 seconds before departing. A driver of a school bus or vehicle shall be subject to the same requirement when operating within 100 feet of a school and shall be prohibited from idling more than 5 minutes at each stop beyond schools, such as parking or maintenance facilities, school bus stops, or school activity destinations. A driver of a transit bus or heavy-duty vehicle (other than a bus) shall be prohibited from idling more than 5 minutes at each

stop within 100 feet of a school. Idling necessary for health, safety, or operational concerns shall be exempt from these restrictions.

(b) The motor carrier of the affected bus or vehicle shall ensure that drivers are informed of the idling requirements, track complaints and enforcement actions, and keep track of driver education and tracking activities.

According to ARB, implementation of the above requirements would eliminate unnecessary idling for school buses and other heavy-duty vehicles, thus reducing localized exposure to emissions of TACs and other harmful pollutants at and near schools and protecting children from unhealthy exhaust emissions.

In addition to the school bus–idling ATCM, ARB has adopted an idling-restriction ATCM for large commercial diesel-powered vehicles. In accordance with this measure, which became effective February 1, 2005, affected vehicles are required to limit idling to no longer than 5 minutes under most circumstances. ARB is currently evaluating additional ATCMs intended to further reduce TACs associated with commercial operations, including a similar requirement to limit idling of smaller diesel-powered commercial vehicles. Nonetheless, given that proposed on-site commercial land uses have not yet been identified and given the potential proximity of nearby sensitive receptors, exposure of nearby on-site receptors to mobile-source TACs associated with commercial activities is considered a **potentially significant, direct** impact. **No indirect** impact would occur.

Emissions from Mining Activities

Aggregate mining and reclamation of certain portions of the project site will occur over a period of several years, and will involve the excavation and relocation or removal of portions of the existing deposits of dredge tailings. Mining operations will occur on approximately 180 acres on the eastern portion of the project site. Mining activities are separate actions from the project and will take place under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more future individual Implementation Permits expected to be issued by the City. However, mining operations will involve the use of diesel-fueled heavy-duty equipment on-site, for which particulate exhaust emissions are identified as a TAC. Thus, depending on the location of on-site mining activities in relation to proposed sensitive receptors, on-site mining activities could result in TAC emissions at levels that could result in a potential health hazard for sensitive receptors introduced to the project site before mining activities are completed. Therefore, this is considered a **potentially significant, direct** impact. **No indirect** impact would occur.

Land Use Compatibility

The Rio del Oro project would include proposed residences, schools, and parks. Because of the sensitivity of such uses, assessment of compatibility of surrounding land uses with respect to sources of TAC emissions is required.

ARB recently published the *Air Quality and Land Use Handbook: A Community Health Perspective* (ARB 2005c), which provides new guidance concerning land use compatibility with sources of TAC emissions. The handbook offers recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities. The handbook is advisory and not regulatory, but it offers the recommendations identified below that may be pertinent to the project.

- Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads carrying 100,000 vehicles per day, or rural roads carrying 50,000 vehicles per day.
- Avoid siting new sensitive land uses within 300 feet of a large gasoline station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50-foot separation is recommended for typical gasoline-dispensing facilities.
- Avoid siting new sensitive land uses within 300 feet of any dry-cleaning operation using perchloroethylene (perc). For operations with two or more machines, provide 500 feet. For operations with three or more machines, consult the local air district. Do not site new sensitive land uses in the same building with dry-cleaning operations that use perc.
- Obtain facility-specific information where there are questions about siting a sensitive land use close to an industrial facility, including the amount of pollutant emitted and its toxicity, distance to nearby receptors, and types of emissions controls in place.

The siting of proposed receptors within the project site would be consistent with all of the recommendations listed above, and thus would not result in the exposure of sensitive receptors to TACs that exceed the recommended thresholds.

As a result, the impact associated with the exposure of receptors to short-term TAC emissions would be considered a **less-than-significant, direct** impact. **No indirect** impact would occur. However, long-term exposure of sensitive receptors to TAC emissions from on-site mobile sources, specifically diesel-fueled trucks associated with educational and commercial land use activities, would result in a **potentially significant, direct** impact. **No indirect** impacts would occur.

HD Under the High Density Alternative, there may be a need for slightly more heavy-duty mobile equipment during construction than under the Proposed Project Alternative because of the increased density of structures. However, these emissions still would not exceed SMAQMD standards for TAC emissions. The same number of heavy-duty diesel-fueled vehicles would still be present on-site during operation of the High Density Alternative. This would result in a **direct** and **potentially significant** impact and would occur at nearly the same level as under the Proposed Project. **No indirect** impacts would occur. ***[Similar]***

IM Impacts under the Impact Minimization Alternative would be approximately the same as under the Proposed Project Alternative because a similar number of heavy-duty diesel-fueled vehicles would be present on-site during construction and operation of this alternative. This would represent a **direct**, **potentially significant** impact and would occur at nearly the same level as under the Proposed Project Alternative. **No indirect** impacts would occur. ***[Similar]***

NF Impacts under the No Federal Action Alternative would be approximately the same as under the Proposed Project Alternative because a similar number of heavy-duty diesel-fueled vehicles would be present on-site during construction and operation of this alternative. This would represent a **direct**, **potentially significant** impact and would occur at nearly the same level as under the Proposed Project Alternative. **No indirect** impacts would occur. ***[Similar]***

NP Under the No Project Alternative, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more individual Implementation Permits expected to be issued by the City. See the discussion under "Mining" under Impact 3.15-4 above.

Because the project site would remain in its current state under the No Project Alternative and no sources of TAC emissions would be encountered, **no direct or indirect impacts** would occur. ***[Lesser]***

Mitigation Measure 3.15-4: Develop a Plan to Reduce Emissions and Implement Measures to Control Exposure of Sensitive Receptors to Toxic Air Emissions.

PP, HD, IM, NF The project applicant(s) for all project phases shall develop a plan to reduce the exposure of sensitive receptors to TACs from project construction and operation. The plan shall be submitted to the City for review and approval before the approval of any grading plans.

With respect to project construction, the plan may include such measures as scheduling activities when the residences are the least likely to be occupied, requiring equipment to be shut off when not in use, and prohibiting heavy trucks from idling. Applicable measures shall be included in all project plans and specifications for all project phases.

With respect to project operation for all project phases, the plan may include such measures as the following:

- Before the issuance of any certificates of occupancy or final inspections for on-site sensitive land uses (e.g., residences, schools) in close proximity to mining operations (i.e., within 1,000 feet), the City shall ensure that associated mining activities have concluded.
- Proposed commercial/convenience land uses (e.g., loading docks) that have the potential to emit TACs shall be located as far away as possible from existing and proposed sensitive receptors (i.e., 1,000 feet).
- When determining the exact type of facility that would occupy the proposed commercial/convenience space, the project shall take into consideration the facility's TAC-producing potential.

The following additional guidelines are recommended in ARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (California Air Resources Board 2005a) and are considered to be advisory and not regulatory:

- Sensitive receptors, such as residential units and daycare centers, shall not be located in the same building as dry-cleaning operations that use perchloroethylene. Dry-cleaning operations that use perchloroethylene shall not be located within 300 feet of any sensitive receptor. A setback of 500 feet shall be provided for operations with two or more machines. Large gasoline stations (defined as facilities with a throughput of 3.6 million gallons per year or greater) and sensitive land uses shall not be sited within 300 feet of each other. Small gasoline-dispensing facilities (less than 3.6 million gallons of throughput per year) and sensitive land uses shall not be sited within 50 feet of each other.

Timing: Before the approval of all grading plans and throughout project construction, where applicable for all project phases.

Enforcement: City of Rancho Cordova Planning Department.

NP No mitigation measures are required.

Implementation of Mitigation Measure 3.15-4 would reduce health-related risks associated with continued mining activates under the Proposed Project, High Density, Impact Minimization, and No Federal Action Alternatives to a less-than-significant level. The health risk associated with off-site mobile-source TACs under these alternatives

would be substantially lessened with mitigation implementation, but would not necessarily be reduced to a less-than-significant level. Exposure to mobile-source TAC emissions from on-site mobile sources therefore remains **significant and unavoidable**. This conclusion has been reached because of the uncertainty associated with on-site commercial land use activities and the proximity of sensitive receptors to such uses. Therefore, this conclusion may change as more detailed information regarding proposed on-site commercial uses becomes available.

IMPACT 3.15-5

Possible Exposure of Sensitive Receptors to Odorous Emissions. *Construction and long-term operation of the project could generate odorous emissions, thereby exposing sensitive receptors to such emissions.*

PP, HD, IM, NF

The exposure of sensitive receptors (e.g., existing and proposed residential units, schools, and parks) to odorous emissions from construction and operation of the project is discussed below.

Short-Term Use of Construction Equipment

Project construction activities could result in odorous emissions from diesel exhaust associated with construction equipment. However, because of the temporary nature of these emissions and the highly diffusive properties of diesel exhaust, proposed on-site residents would not likely be affected by diesel exhaust odors associated with project construction. As a result, this **direct** impact would be considered **less than significant**. **No indirect** impacts would occur.

Long-Term Operation

Long-term operation of an approximately 3,800-acre mixed-use development with multiple types of land uses could generate odorous emissions. No common sources of nuisance odors, such as wastewater treatment facilities, waste-disposal facilities, or agricultural operations, are proposed as part of the project.

With regular maintenance and proper design, residential land uses are typically not considered a major source of odors. However, truck deliveries to commercial uses and sewer lift stations could intermittently and temporarily emit diesel odors. Additionally, commercial uses could provide development of convenience uses that may include sources of odorous emissions (e.g., fast-food restaurants) that would be offensive to some individuals. The operation of such sources could expose a substantial number of proposed on-site receptors to objectionable odorous emissions. As a result, this **direct** impact would be considered **potentially significant**. **No indirect** impacts would occur.

NP

Under the No Project Alternative, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more individual Implementation Permits expected to be issued by the City. Project construction activities could result in odorous emissions from diesel exhaust associated with construction equipment. However, there are no existing residents in the adjacent area who would be affected by diesel exhaust odors from project construction. Because mining operations are short-term, no long-term operational impacts would occur.

Because the project site would remain in its current state under the No Project Alternative and no sources of TAC emissions would be encountered, **no direct** or **indirect** impacts would occur. ***[Lesser]***

Mitigation Measure 3.15-5: Implement Measures to Control Exposure of Sensitive Receptors to Odorous Emissions.

PP, HD, IM, NF

The project applicant(s) for all project phases shall implement the following measures:

- Commercial/convenience land uses that have the potential to emit objectionable odors shall be located as far away as feasible from existing and proposed sensitive receptors.
- Delivery areas shall be located as far away as feasible from existing and proposed sensitive receptors.
- The odor-producing potential of land uses shall be considered when the exact type of facility that would occupy commercial/convenience areas is determined.
- Before the approval of building permits, odor control devices shall be identified to mitigate the exposure of receptors to objectionable odors if a potentially odor-producing source is to occupy space in the commercial/convenience area. The identified odor control devices shall be installed before the issuance of certificates of occupancy for the potentially odor-producing use. The odor-producing potential of a source and control devices shall be determined in coordination with SMAQMD and based on the number of complaints associated with existing sources of the same nature.

Timing: Before the approval of building permits and certificates of occupancy for commercial uses for all project phases.

Enforcement: City of Rancho Cordova Building and Safety and Planning Departments.

NP

No mitigation measures are required.

Implementation of Mitigation Measure 3.15-5 would reduce the possible exposure of sensitive receptors to odorous emissions to a **less-than-significant** level.

IMPACT 3.15-6

Possible Exposure to Hazardous Indoor Emissions of Air Pollutants. *Project implementation could result in the exposure of construction workers or future residents to indoor emissions of air pollutants that would pose a threat to human health.*

PP, HD, IM, NF

ENSR presented findings and conclusions from a Baseline Risk Assessment (BRA) of the Inactive Rancho Cordova Test Site (IRCTS) in a report dated December 2004. That report, entitled *Baseline Risk Assessment for the Northern and Southern Groundwater Study Areas*, addressed risks arising from chemicals found in groundwater, soil, and soil vapor. ENSR also evaluated the residential exposure pathway to vapors volatilized from groundwater, migrating through soil vapor, and introduced to indoor air. The ENSR evaluation focused on areas where groundwater was less than 90 feet below the ground surface. The cancer tolerance interval was selected based on EPA's maximum residential exposure thresholds of 10^{-4} to 10^{-6}.

The BRA calculations showed the carcinogenic risk associated with inhalation of volatiles in indoor air to be 1.25×10^{-5}, primarily because of the presence of perchloroethane (PCE) and trichloroethylene (TCE). ENSR concluded this value to be within EPA's target risk range of 1×10^{-6} to 1×10^{-4}. ENSR calculated the noncarcinogenic hazard quotient to be 0.08, which is less than the EPA threshold of 1.

EPA's *Human Health Exposure Manual, Supplemental Guidance: Standard Default Exposure Factors* (EPA 1991) includes the following guidance criteria:

- Where the cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, and the noncarcinogenic hazard quotient is less than 1, action generally is not warranted unless there are adverse environmental impacts.

- The upper boundary of the risk range is not a discrete line at 1×10^{-4}, although EPA generally uses 1×10^{-4} in making risk management decisions. A specific risk estimate around 10^{-4} may be considered acceptable if justified based on site-specific conditions.

The results of ENSR's study indicate that **direct** impacts on human health arising from indoor air quality that would continue to exist once the project is implemented are **less than significant. No indirect** impacts would occur.

NP

Under the No Project Alternative, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more future individual Implementation Permits expected to be issued by the City. These continued mining activities would only take place outdoors; therefore, they would not result in exposure of sensitive receptors to hazardous levels of air pollutants indoors.

Because no project-related development would occur under the No Project Alternative, there would be no potential for exposure of construction workers or future residents to hazardous levels of air pollutants indoors; thus, **no direct** or **indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.15-7

Increase in Long-Term Atmospheric Greenhouse Gas Emissions. *Project implementation could contribute to an increase in atmospheric GHG concentrations. GHGs contribute to a rise in Earth's global average temperature, a phenomenon known as global warming. The project could generate substantial new GHG emissions at a rate that exceeds levels that would be needed to help achieve the objectives of AB 32, the California Climate Solutions Act of 2006.*

PP, HD, IM, NF

Long-term operation of the project would contribute to an increase in atmospheric GHG concentrations. Atmospheric GHGs include, among others, carbon dioxide (CO_2), water vapor, methane, nitrous oxide, and ozone. These gases are of concern because of their potential to enhance Earth's atmospheric greenhouse effect, through selective absorption of radiation. This results in an associated rise in Earth's global average temperature, and a phenomenon known as global warming (Ahrens 2003). In the case of the Proposed Project, High Density, Impact Minimization, and No Federal Action Alternatives, CO_2 is the primary pollutant of concern and arises from emissions associated with vehicle trips (mobile sources) and stationary sources (e.g., power generation, industry).

As discussed previously, beginning in the year 2012, stationary sources of GHG emissions would be regulated under AB 32. Mobile sources of GHG emissions are not regulated, and would be the primary emission source of GHGs associated with the project. Also as discussed above, vehicle miles traveled (VMT) would be the greatest indicator of CO_2 emissions from the project, and CO_2 emissions are the greatest indicator of total GHG emissions. Buildout of the project, under the Proposed Project Alternative, would result in 229,200 total vehicle trips per day (as contained in the traffic report prepared for this project [Fehr & Peers 2006]). This does not include external trips (trips originating from other areas). The project would accommodate 31,671 new residents

(according to Section 3.2, "Population, Employment, and Housing"). Assuming a trip rate of 6.3 miles/trip as contained in the traffic report (Fehr & Peers 2006), the Proposed Project Alternative would generate 16,641 VMT/person annually. This rate would be approximately the same under the High Density, Impact Minimization, and No Federal Action Alternatives, due to the similar types of land uses proposed and associated trips. Assuming an emission factor for future CO_2 emissions from vehicles of approximately 366 grams CO_2/mile (ARB 2002), approximately 6 tons CO_2/person would be generated by the project annually. These emissions would be nearly 3 times the per-capita level that would be needed to achieve 1990 GHG levels, if the goals of AB 32 were extended to all sources of emissions. (See Appendix K for detailed calculations and a list of assumptions). Given that the project would result in GHG generation at 3 times the per-capita level used to determine the potential for significant GHG emissions, and that the project would accommodate more than 30,000 new residents, which is substantial, the increase in GHG is considered significant. The project would, therefore, contribute substantially to global warming impacts. Thus, this **direct** impact is considered **significant**. **No indirect** impacts would result.

Under the High Density Alternative, 10,611 additional residences would be developed on the project site (according to Section 3.2, "Population, Employment, and Housing"), beyond those discussed under the Proposed Project Alternative. The increased number of residences would result in a greater total contribution of GHG emissions. Because the resultant VMT from the High Density Alternative would increase roughly proportionally to the population increase, the per-capita CO_2 emission rate associated with this alternative would be approximately the same as under the Proposed Project Alternative. Similarly, the Impact Minimization and No Federal Action Alternatives would accommodate 2,843 and 2,283 fewer residents, respectively, than the Proposed Project Alternative, and total VMT associated with these alternatives would also decrease proportionately with their associated populations. Thus, the per-capita GHG emission rate for all alternatives would be approximately the same as the rate calculated for the Proposed Project Alternative. This rate is approximately three times the rate needed to achieve 1990 GHG levels. In addition, the number of residents accommodated by each alternative is considered to be substantial. Therefore, this **direct** impact is considered **significant** for all alternatives. **No indirect** impacts would result.

NP Under the No Project Alternative, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more future individual Implementation Permits expected to be issued by the City.

Because no project-related development would occur under the No Project Alternative, there would be no corresponding contribution to GHG concentrations and potential associated warming impacts; thus, **no direct** or **indirect** impacts would occur. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.15-2.

Implementation of Mitigation Measure 3.15-2 would reduce GHG emissions from mobile sources by approximately 15%. However, a reduction in project-generated emissions of approximately 65% would be required to achieve the threshold of 2 tons CO_2/person. Thus, this impact would remain **significant and unavoidable**.

Project (Phase 1) Impacts and Mitigation Measures

IMPACT 3.15-8

Generation of Temporary, Short-Term Construction Emissions of ROG, NO_X, and PM_{10}. *Construction activity associated with development Phase 1 would generate temporary, short-term emissions of ROG, NO_X, and PM_{10}. Because of the large size of the Phase 1 development area, construction-generated emissions of NO_X, an ozone precursor, would exceed the SMAQMD-recommended thresholds and substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS.*

PP

Implementation of development Phase 1 would include construction activity over a 1,100-acre area and would comprise 2,994 residential dwelling units, 139 acres of commercial land uses, 188 acres of industrial land uses, and 82 acres of education-related land uses, in addition to parks and other uses. As discussed in Impact 3.15-1, construction activities would temporarily generate emissions of ROG, NO_X, and PM_{10}.

As discussed above, SMAQMD has not adopted a construction emissions threshold for ROG. However, a construction mass emission threshold of 85 lb/day applies to NO_X (SMAQMD 2004). Short-term construction emissions of ROG and NO_X were estimated using the ARB-approved URBEMIS 2002 Version 8.7 computer program as recommended by SMAQMD. URBEMIS is designed to model construction emissions for land-use development projects and allows for the input of project-specific information. Detailed construction information (e.g., equipment requirements, type, hours of operation, number of employees) was not available at the time this analysis was conducted. As a result, the estimation of construction-generated emissions was based primarily on the default assumptions contained in the model for the size and location of the project. Model parameters were adjusted to reflect the overall construction phasing schedule, as well as equipment assumptions recommended by SMAQMD for site preparation activities. As summarized in Table 3.15-3, the modeled worst-case daily construction-generated emissions of ROG and NO_X would be approximately 627 and 2,071 lb/day, respectively. Refer to Appendix K for model output files and assumptions. In addition, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more individual Implementation Permits expected to be issued by the City. Construction-related NO_X emissions associated with such continued mining activities are projected to be 84 lb/day (City of Rancho Cordova 2005). Construction-generated NO_X emissions would exceed the SMAQMD-recommended threshold of 85 lb/day; as NO_X is an ozone precursor, such emissions would substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS.

With respect to construction-generated PM_{10} emissions, SMAQMD recommends using a modeling program [e.g., the Industrial Source Complex Model (ISC)] if a project is larger than the screening-level value of 15 acres or if the project cannot undertake the required screening-level mitigation measures. Because the Phase 1 development area is substantially larger than the recommended screening value and extensive site grading would occur, construction-generated PM_{10} emissions were modeled as recommended by SMAQMD using the ISC. For Phase 1, detailed construction information was not entirely available at the time of the preparation of this draft environmental impact report/draft environmental impact statement. This is because of the long schedule (approximately 8 years to implement Phase 1), unknown future market demand (which would influence the types and distribution of land uses to be developed), and the large size of the development area (1,100 acres). Thus, reasonably conservative modeling assumptions were made to depict a worst-case daily emissions scenario. Refer to Appendix K for model output contours and assumptions. Based on the dispersion modeling conducted, construction of development Phase 1 would result in a maximum unmitigated fenceline concentration of fugitive dust of approximately 232 $\mu g/m^3$ at the northwest boundary of the site. The generation of such emissions would result in and substantially contribute (at a level equal to or greater than 5%) to

emissions concentrations that exceed the NAAQS and CAAQS for PM_{10}, 50 $\mu g/m^3$ and 2.5 $\mu g/m^3$, respectively.

Table 3.15-3
Summary of Modeled Worst-Case Daily[1] Short-Term Construction-Generated Emissions for Phase 1—Proposed Project Alternative

Source	ROG (lb/day)	NO_X (lb/day)
Site Preparation Phase		
Mobile Equipment Exhaust	99.09	727.71
Employee Trips	0.83	0.85
Maximum lb/day	99.92	728.56
Building Construction Phase		
Mobile Equipment Exhaust	265.82	2,055.01
Architectural Coatings Off-gas[2]	320.30	-
Asphalt Off-gas	2.21	-
Employee Trips	38.67	16.44
Maximum lb/day	627.00	2,071.45
Maximum lb/day for all Phases, Unmitigated	627.00	2,071.45
Maximum lb/day for all Phases, Mitigated[3]	614.15	1,660.45
SMAQMD Significance Threshold	-	85

Notes: lb/day = pounds per day; NO_X = oxides of nitrogen; ROG = reactive organic gases; SMAQMD = Sacramento Metropolitan Air Quality Management District

[1] The worst-case daily emissions from the worst-case year for each pollutant are presented for each construction phase.

[2] Emission factors reflect compliance with SMAQMD Rule 442 ("Architectural Coatings") and the project's use of coatings with low volatile organic compound content.

[3] Implementation of SMAQMD-recommended mitigation measures to control mobile-source emissions would result in a reduction of ROG and NO_X by 5% and 20%, respectively.

See Appendix K for modeling results and detailed assumptions.

Source: Data provided by EDAW in 2005

In summary, construction-generated NO_x emissions would exceed the SMAQMD-recommended threshold of 85 lb/day for NO_X and result in and would substantially contribute (at a level equal to or greater than 5%) to emissions concentrations (e.g., 50 $\mu g/m^3$ and 2.5 $\mu g/m^3$, respectively, for PM_{10}) that exceed the NAAQS or CAAQS. As a result, temporary, short-term construction-generated emissions are considered a **significant**, **direct** impact. **No indirect** impacts would occur.

HD The same amount of land would be developed under Phase 1 of the High Density Alternative as under Phase 1 of the Proposed Project Alternative, with a higher density of dwelling units constructed on that same acreage. Approximately the same amount of construction equipment would be required during the building phase, resulting in similar emissions from mobile sources. Slightly less application of architectural coatings would be necessary during building construction because of the slight difference in land use acreages compared to the Proposed Project Alternative. As summarized in Table 3.15-4, the modeled worst-case daily construction-generated emissions of ROG and NO_X would be approximately 618 lb/day and 2,071 lb/day,

Table 3.15-4
Summary of Modeled Worst-Case Daily[1] Short-Term Construction-Generated Emissions for Phase 1—High Density Alternative

Source	ROG (lb/day)	NO_X (lb/day)
Site Preparation Phase		
Mobile Equipment Exhaust	99.09	727.71
Employee Trips	0.83	0.85
Maximum lb/day	99.92	728.56
Building Construction Phase		
Mobile Equipment Exhaust	265.36	2,055.01
Architectural Coatings Off-gas[2]	313.31	-
Asphalt Off-gas	2.10	-
Employee Trips	37.66	16.01
Maximum lb/day	618.43	2,071.02
Maximum lb/day for all Phases, Unmitigated	618.43	2,071.02
Maximum lb/day for all Phases, Mitigated[3]	605.17	1,660.02
SMAQMD Significance Threshold	-	85

Notes: lb/day = pounds per day; NO_X = oxides of nitrogen; ROG = reactive organic gases; SMAQMD = Sacramento Metropolitan Air Quality Management District

[1] The worst-case daily emissions from the worst-case year for each pollutant are presented for each construction phase.

[2] Emission factors reflect compliance with SMAQMD Rule 442 ("Architectural Coatings") and the project's use of coatings with low volatile organic compound content.

[3] Implementation of SMAQMD-recommended mitigation measures to control mobile-source emissions would result in a reduction of ROG and NO_X by 5% and 20%, respectively.

See Appendix K for modeling results and detailed assumptions.

Source: Data provided by EDAW in 2005

respectively. In addition, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and individual Implementation Permits expected to be issued by the City. Such operations would contribute an additional 84 lb/day of NO_X, as mentioned under the Proposed Project Alternative. With respect to PM_{10}, based on the dispersion modeling conducted, construction of development Phase 1 would result in a maximum unmitigated fenceline concentration of fugitive dust of approximately 232 $\mu g/m^3$ at the northwest boundary of the site.

Construction-generated NO_X emissions would exceed the SMAQMD-recommended threshold of 85 lb/day for NO_X and would result in and substantially contribute (at a level equal to or greater than 5%) to emissions concentrations (e.g., 50 $\mu g/m^3$ and 2.5 $\mu g/m^3$, respectively, for PM_{10}) that exceed the NAAQS or CAAQS. This would result in a **significant** and **direct** impact, but would occur at nearly the same level as under Phase 1 of the Proposed Project Alternative. **No indirect** impacts would occur. ***[Similar]***

IM Because less land would be developed for urban purposes, impacts under Phase 1 of the Impact Minimization Alternative would be slightly less than those under Phase 1 of the Proposed Project Alternative. Emissions of PM_{10} would be slightly reduced because fugitive-dust emissions associated with disturbed land would be less, and mobile-source emissions would decrease as discussed for impacts of Phase 1 under the High Density Alternative. As summarized in Table

3.15-5, the modeled worst-case daily construction-generated emissions of ROG and NO_X would be approximately 558 lb/day and 1,759 lb/day, respectively. Continued mining activities would

Table 3.15-5
Summary of Modeled Worst-Case Year[1] Short-Term Construction-Generated Emissions for Phase 1—Impact Minimization Alternative

Source	ROG (lb/day)	NO_X (lb/day)
Site Preparation Phase		
Mobile Equipment Exhaust	84.31	619.02
Employee Trips	0.70	0.72
Maximum lb/day	85.01	619.74
Building Construction Phase		
Mobile Equipment Exhaust	226.44	1,743.65
Architectural Coatings Off-gas[2]	293.33	-
Asphalt Off-gas	2.10	-
Employee Trips	35.72	15.19
Maximum lb/day	557.59	1,758.84
Maximum lb/day for all Phases, Unmitigated	557.59	1,758.83
Maximum lb/day for all Phases, Mitigated[3]	546.28	1,410.10
SMAQMD Significance Threshold	-	85

Notes: lb/day = pounds per day; NO_X = oxides of nitrogen; ROG = reactive organic gases; SMAQMD = Sacramento Metropolitan Air Quality Management District

[1] The worst-case daily emissions from the worst-case year for each pollutant are presented for each construction phase.

[2] Emission factors reflect compliance with SMAQMD Rule 442 ("Architectural Coatings") and the project's use of coatings with low volatile organic compound content.

[3] Implementation of SMAQMD-recommended mitigation measures to control mobile-source emissions would result in a reduction of ROG and NO_X by 5% and 20%, respectively.

See Appendix K for modeling results and detailed assumptions.

Source: Data provided by EDAW in 2005

contribute to NO_X emissions, as mentioned previously. With respect to PM_{10}, based on the dispersion modeling conducted, construction of the Phase 1 development area would result in a maximum unmitigated fenceline concentration of fugitive dust of approximately 196 $\mu g/m^3$ at the northwest boundary of the site.

Construction-generated NO_X emissions would exceed the SMAQMD-recommended threshold of 85 lb/day for NO_X and would result in and substantially contribute (at a level equal to or greater than 5%) to emissions concentrations (e.g., 50 $\mu g/m^3$ and 2.5 $\mu g/m^3$, respectively, for PM_{10}) that exceed the NAAQS or CAAQS. Emissions of NO_X would occur at a lower level than under the Proposed Project Alternative and emissions of PM_{10} would be slightly less than under the Proposed Project Alternative. This is considered **direct** and **significant** impact. **No indirect** impacts would occur. ***[Lesser]***

NF Because less land would be developed for urban purposes, impacts under Phase 1 of the No Federal Action Alternative would be slightly less than those under Phase 1 of the Proposed Project Alternative. Emissions would be very similar to those discussed under the Impact Minimization Alternative, but would occur to a slightly lesser extent, since slightly less land would be developed. Continued mining activities would contribute to NO_X emissions, as mentioned previously.

Construction-generated NO_X emissions would exceed the SMAQMD-recommended threshold of 85 lb/day for NO_X and would result in and substantially contribute (at a level equal to or greater than 5%) to emissions concentrations (e.g., 50 $\mu g/m^3$ and 2.5 $\mu g/m^3$, respectively, for PM_{10}) that exceed the NAAQS or CAAQS. Emissions of NO_X would occur at a lower level than under the Proposed Project Alternative and emissions of PM_{10} would be slightly less than under the Proposed Project Alternative. This is considered **direct** and **significant** impact. **No indirect** impacts would occur. ***[Lesser]***

NP Under the No Project Alternative, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more future individual Implementation Permits expected to be issued by the City. PM_{10} emissions from equipment used during mining operations could exceed SMAQMD standards. However, the *Aerojet Mining Amendment Mitigated Negative Declaration* (City of Rancho Cordova 2004) and the *Grantline West Mitigated Negative Declaration* (City of Rancho Cordova 2005) contain mitigation measures to reduce PM_{10} emissions. As mitigated, indirect impacts from mining activities would not exceed SMAQMD standards for other criteria pollutants.

Because the project site would remain in its current state under the No Project Alternative, no project-related emissions would result; thus, **no direct or indirect impacts** would occur. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.15-1.

Implementation of Mitigation Measure 3.15-1 would reduce construction-generated NO_X and PM_{10} emissions from on-site heavy-duty equipment exhaust by approximately 20% and 45%, respectively under Phase 1 of the Proposed Project, High Density, Impact Minimization, and No Federal Action Alternatives. It would also reduce fugitive PM_{10} emissions by 75% under these alternatives. However, implementation of this measure would not mitigate the impact from emissions to a less-than-significant level. Daily construction emissions would still exceed SMAQMD's significance thresholds for NO_X and PM_{10}. As a result, the impact of short-term, temporary construction-generated emissions from the project would remain **significant** and **unavoidable**.

IMPACT 3.15-9

Generation of Long-Term Operational (Regional) Emissions of ROG, NO_X, and PM_{10}. *Operational area- and mobile-source emissions from implementation of the project would exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, and would result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS. In addition, because of the large increase in emissions associated with development Phase 1 and the fact that the project is not within an already approved plan (meaning that increased emissions would not already be accounted for in applicable air quality plans), project implementation could conflict with air quality planning efforts.*

PP Operation of development Phase 1 would result in long-term regional emissions of ROG, NO_X, and PM_{10} associated with area sources, such as natural-gas emissions, landscaping, applications of architectural coatings, and use of consumer products, in addition to operational vehicle-exhaust emissions, as discussed above in Impact 3.15-2. Buildout of development Phase 1 would generate approximately 117,968 vehicle trips (743,199 VMT) (Fehr & Peers 2005). See Section 3.14,

"Traffic and Transportation," for further discussion.

Operational emissions associated with development Phase 1 were modeled using the ARB-approved URBEMIS 2002 version 8.7.0 computer model, as recommended by SMAQMD. Model defaults were adjusted to reflect project-specific data where available; for example, the exact number of vehicle miles traveled, as obtained from the traffic report prepared for this project, was used in calculating mobile-source operational emissions (Fehr & Peers 2005). Modeled operational emissions are presented in Table 3.15-6.

Table 3.15-6
Summary of Modeled Long-Term Operational Emissions for Phase 1— Proposed Project Alternative

Source	ROG (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)
Area Sources			
Natural Gas	8.87	120.22	0.22
Landscaping	6.32	0.81	0.16
Consumer Products	146.48	-	-
Architectural Coatings	18.92	-	-
Total Area-Source Emissions	180.59	121.03	0.38
Operational (Vehicle) Emissions	552.44	556.30	1,114.59
Total Unmitigated Operational Emissions	733.03	676.33	1,114.97
SMAQMD Significance Threshold	65	65	- [a]

Notes: CAAQS = California ambient air quality standards; lb/day = pounds per day; $\mu g/m^3$ = micrograms per cubic meter; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; SMAQMD = Sacramento Metropolitan Air Quality Management District
See Appendix K for modeling assumptions and results.
[a] SMAQMD does not have a mass-emission significance threshold for PM_{10}, but instead uses a concentration-based threshold as defined by the CAAQS of 50 $\mu g/m^3$.
Source: Data provided by EDAW in 2005

Based on the modeling conducted, and as summarized in Table 3.15-6, the operation of development Phase 1 would result in a net increase in unmitigated long-term regional emissions of approximately 733 lb/day of ROG, 677 lb/day of NO_X, and 1,115 lb/day of PM_{10}. Operational area- and mobile-source emissions from implementation of Phase 1 would exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, and would result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS. In addition, because of the large increase in emissions associated with development Phase 1 and the fact that the project is not within an already existing approved plan (meaning that increased emissions would not already be accounted for in applicable air quality plans), implementation of development Phase 1 could conflict with air quality planning efforts. As a result, this long-term **direct** impact is considered **significant**. **No indirect** impacts would occur.

HD The same amount of land would be developed under Phase 1 of the High Density Alternative as under Phase 1 of the Proposed Project Alternative, with a higher density of dwelling units constructed on that same acreage. A larger population would be residing within the same area and contributing to operational emissions than under Phase 1 of the Proposed Project Alternative. Because of the slightly different types of land uses developed under Phase 1 of the High Density Alternative, long-term

operational emissions would be slightly less than those under the Proposed Project Alternative. This is attributable to the change in residential land uses, whereby a larger number of multifamily residences generates more area-source emissions, but fewer mobile-source emissions, than single-family residences. In addition, there would be slightly less commercial and industrial development under this alternative, further reducing associated operational emissions. Based on the modeling conducted, and as summarized in Table 3.15-7, the operation of Phase 1 under this alternative would result in a net increase in unmitigated long-term regional emissions of approximately 711 lb/day of ROG, 650 lb/day of NO_X, and 1,061 lb/day of PM_{10}.

Table 3.15-7
Summary of Modeled Long-Term Operational Emissions for Phase 1— High Density Alternative

Source	ROG (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)
Area Sources			
Natural Gas	8.83	119.75	0.22
Landscaping	6.32	0.81	0.16
Consumer Products	147.16	-	-
Architectural Coatings	22.39	-	-
Total Area-Source Emissions	184.70	120.56	0.38
Operational (Vehicle) Emissions	526.24	529.18	1,060.12
Total Unmitigated Operational Emissions	710.94	649.74	1,060.50
SMAQMD Significance Threshold	65	65	- [a]

Notes: CAAQS = California ambient air quality standards; lb/day = pounds per day; $\mu g/m^3$ = micrograms per cubic meter; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; SMAQMD = Sacramento Metropolitan Air Quality Management District
See Appendix K for modeling assumptions and results.
[a] SMAQMD does not have a mass-emission significance threshold for PM_{10}, but instead uses a concentration-based threshold as defined by the CAAQS of 50 $\mu g/m^3$.
Source: Data provided by EDAW in 2005

The operational emissions from daily uses would occur at a slightly lower level than under Phase 1 of the Proposed Project Alternative. As a result, this is considered a **direct** and **significant** impact. **No indirect** impacts would occur. ***[Lesser]***

IM Impacts under Phase 1 of the Impact Minimization Alternative would be slightly less than those under Phase 1 of the Proposed Project Alternative because of the reduced developed acreage and change in residential land uses. As discussed under the High Density Alternative, a larger number of multifamily residences generates greater area-source emissions, but fewer mobile-source emissions, than single-family residences. In addition, because of the smaller footprint of developed area, slightly fewer commercial and industrial uses would be developed under this alternative, further reducing area and operational emissions associated with urban land-use types. Based on the modeling conducted, and as summarized in Table 3.15-8, the operation of Phase 1 under this alternative would result in a net increase in unmitigated long-term regional emissions of approximately 590 lb/day of ROG, 480 lb/day of NO_X, and 665 lb/day of PM_{10}.

Table 3.15-8
Summary of Modeled Long-Term Operational Emissions for Phase 1—Impact Minimization Alternative

Source	ROG (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)
Area Sources			
Natural Gas	8.18	110.68	0.20
Landscaping	2.63	0.32	0.06
Consumer Products	181.60	-	-
Architectural Coatings	21.00	-	-
Total Area-Source Emissions	213.41	111.00	0.26
Operational (Vehicle) Emissions	376.74	368.80	665.01
Total Unmitigated Operational Emissions	590.15	479.80	665.27
SMAQMD Significance Threshold	65	65	- [a]

Notes: CAAQS = California ambient air quality standards; lb/day = pounds per day; $\mu g/m^3$ = micrograms per cubic meter; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; SMAQMD = Sacramento Metropolitan Air Quality Management District
See Appendix K for modeling assumptions and results.
[a] SMAQMD does not have a mass-emission significance threshold for PM_{10}, but instead uses a concentration-based threshold as defined by the CAAQS of 50 $\mu g/m^3$.
Source: Data provided by EDAW in 2005

Under this alternative, operational emissions would occur at a slightly lower level than under Phase 1 of the Proposed Project Alternative. This is considered a **direct** and **significant** impact. **No indirect** impacts would occur. ***[Lesser]***

NF Impacts under Phase 1 of the No Federal Action Alternative would be slightly less than those under Phase 1 of the Proposed Project Alternative because of the reduced developed acreage and change in residential land uses. As discussed under the Impact Minimization Alternative, because of the smaller footprint of developed area, slightly fewer residential, commercial, and industrial uses would be developed under this alternative, further reducing area and operational emissions associated with urban land-use types. This alternative would preserve an even larger area for resource protection, and would result in emissions slightly less those discussed under the Impact Minimization Alternative.

Under this alternative, operational emissions would occur at a slightly lower level than under Phase 1 of the Proposed Project Alternative. This is considered a **direct** and **significant** impact. **No indirect** impacts would occur. ***[Lesser]***

NP Under the No Project Alternative, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more future individual Implementation Permits expected to be issued by the City. PM_{10} emissions from equipment used during mining operations could exceed SMAQMD standards. The *Aerojet Mining Amendment Mitigated Negative Declaration* (City of Rancho Cordova 2004) and the *Grantline West Mitigated Negative Declaration* (City of Rancho Cordova 2005) contain mitigation measures to reduce PM_{10}

emissions. As mitigated, indirect impacts from mining activities would not exceed SMAQMD standards for other criteria pollutants.

Because the project site would remain in its current state under the No Project Alternative, no project-related emissions would result; thus, **no significant direct** or **indirect impacts** would occur. ***[Lesser]***

Mitigation Measure: Implement Mitigation Measure 3.15-2.

Implementation of Mitigation Measure 3.15-2 would reduce long-term regional emissions by a minimum of approximately 15% under Phase 1 of the Proposed Project, High Density, Impact Minimization, and No Federal Action Alternatives, but would not mitigate the impact from emissions to a less-than-significant level. Some of the design measures recommended to reduce operational emissions, such as mixed-use development and the creation of street and pedestrian connections, are already incorporated into the project. However, even a reduction of 15% would not reduce ROG and NO_X emissions to levels below the SMAQMD-recommended significance threshold of 65 lb/day for ROG and NO_X or PM_{10} emissions (as would be necessary for project implementation not to result in a substantial contribution to an air quality violation). Thus, increases in long-term regional emissions attributable to development Phase 1 would be considered a significant and unavoidable impact. Implementation of the above-mentioned measures would substantially reduce the level of emissions from this source; however, because of the large size of the development, emissions would still be expected to exceed the applicable thresholds. Thus, this impact would remain **significant and unavoidable**.

IMPACT 3.15-10

Generation of Local Mobile-Source CO Emissions. *Project-generated local mobile-source CO emissions would not result in or substantially contribute to concentrations that exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm.*

PP

Under baseline conditions, some signalized intersections in the project vicinity do or are predicted to operate at an unacceptable LOS (LOS E or worse) (Fehr & Peers 2005). Implementation of development Phase 1 would contribute to an unacceptable LOS (LOS E or F) at the intersections displayed in Table 3.15-9 below.

Predicted CO concentrations in the vicinity of these intersections were calculated for baseline conditions, with and without implementation of development Phase 1, using CALINE4 (CL4) in accordance with the methodology recommended by the California Department of Transportation. Predicted CO concentrations for baseline conditions (analysis year 2014) and baseline plus Phase 1 (analysis year 2014) traffic conditions are presented in Table 3.15-9. Predicted CO concentrations are based on projected p.m. peak-hour traffic conditions obtained from the traffic analysis prepared for this project and the existing average ambient CO concentrations obtained from the last 2 years of available data. In reality, future background concentrations of CO are anticipated to be lower than under existing ambient conditions because of improved motor vehicle efficiency and the use of reformulated fuels. SMAQMD-recommended rollback factors, which adjust for this reduction in CO concentrations in future years, are used to account for this; however, the percent reduction used was taken from projected CO concentrations in the year 2010 and extrapolated to year 2014 (SMAQMD 2004). These factors are therefore conservative, and as a result, the predicted CO concentrations presented in Table 3.15-9 are considered "worst-case." In addition, conservative percentage-red times per cycle at each signal were assumed, resulting in associated conservative average cruise speeds for each intersection. These assumptions combined with worst-case meteorological conditions further the "worst-case" analysis scenario.

In comparison to baseline conditions, implementation of development Phase 1 would contribute

to a slight increase in ambient CO concentrations in the vicinity of the studied intersections.

Table 3.15-9
Summary of Modeled CO Concentrations for Baseline and Baseline Plus Phase 1 Development Conditions (Year 2014)—Proposed Project Alternative

Intersection	Time Period	Maximum CO Concentrations (ppm)	
		Baseline Conditions	Baseline Plus Project Conditions
Florin Road/Sunrise Boulevard	1 hour	2.82	3.12
	8 hours	0.83	0.95
Douglas Road/Sunrise Boulevard	1 hour	3.32	3.82
	8 hours	1.49	1.79
Zinfandel Drive/White Rock Road	1 hour	2.82	3.12
	8 hours	1.25	1.49
Sunrise Boulevard/Folsom Boulevard	1 hour	2.72	3.12
	8 hours	1.19	1.37
Sunrise Boulevard/Zinfandel Drive	1 hour	3.22	3.52
	8 hours	1.37	1.55
Hazel Avenue/U.S. 50 eastbound ramps	1 hour	3.12	3.22
	8 hours	1.31	1.43
Hazel Avenue/U.S. 50 westbound ramps	1 hour	3.62	3.72
	8 hours	1.61	1.67
Significance Threshold	**1 hour**	**20.0**	**20.0**
	8 hours	**9.0**	**9.0**

Notes:
CO = carbon monoxide; ppm = parts per million; U.S. 50 = U.S. Highway 50
1-hour and 8-hour CO concentrations were modeled using CL4 Version 1.31, a graphical user interface for the California Line Source Dispersion Model (CALINE4), in accordance with the University of California, Davis, Institute of Transportation Studies' Transportation Project-Level Carbon Monoxide Protocol. Predicted CO concentrations were calculated using p.m. peak-hour traffic conditions based on information obtained from the traffic analysis prepared for this project and based on existing average ambient CO concentrations obtained from the last 2 years of available data. CO concentrations were calculated at 3 and 7 meters from the roadway edge for 1-hour and 8-hour CO concentrations, respectively. Assumptions, methodology, and calculations are presented in Appendix K.
Sources: Caltrans 1996, Garza et al. 1997, data provided by EDAW in 2005

However, predicted CO concentrations would not result in or substantially contribute to CO concentrations that exceed the California 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm. As a result, this is considered a **less-than-significant, direct** impact. **No indirect** impacts would occur.

HD Fewer vehicle trips would be generated under Phase 1 of the High Density Alternative than under Phase 1 of the Proposed Project Alternative because of the changes in developed land uses (see Impact 3.15-8). Under specific-plan buildout conditions more traffic would be generated with the High Density Alternative than with the Proposed Project Alternative; however, for Phase 1, this is not the case because of net decreased trip generation. Therefore, impacts under the High Density Alternative would be slightly less than those under the Proposed Project Alternative. However, because nearly the same amount and types of land uses are proposed, it is anticipated that local CO concentrations would be approximately the same as under Phase 1 of the Proposed Project Alternative. Therefore, **direct** impacts would be **less than significant** and would occur at

the same level as under Phase 1 of the Proposed Project Alternative. **No indirect** impacts would occur. ***[Similar]***

IM Impacts under Phase 1 of the Impact Minimization Alternative would be slightly less than those under Phase 1 of the Proposed Project Alternative because slightly less traffic would be generated under this alternative. However, because nearly the same amount and types of land uses are proposed, it is anticipated that local CO concentrations would be approximately the same as under Phase 1 of the Proposed Project Alternative. This would represent a **direct** and **less-than-significant** impact. **No indirect** impacts would occur. ***[Similar]***

NF Impacts under Phase 1 of the No Federal Action Alternative would be slightly less than those under Phase 1 of the Proposed Project Alternative because slightly less traffic would be generated under this alternative. However, because nearly the same amount and types of land uses are proposed, it is anticipated that local CO concentrations would be approximately the same as under Phase 1 of the Proposed Project Alternative. This would represent a **direct** and **less-than-significant** impact. **No indirect** impacts would occur. ***[Similar]***

NP Under the No Project Alternative, mining activities at the project site, which are not part of the Rio del Oro project, would continue under existing Conditional Use Permits—one originally issued by the County, and the other issued by the City—and possibly under one or more future individual Implementation Permits, expected to be issued by the City. The *Aerojet Mining Amendment Mitigated Negative Declaration* (City of Rancho Cordova 2004) and the *Grantline West Mitigated Negative Declaration* (City of Rancho Cordova 2005) did not indicate that CO emissions would exceed ambient air-quality standards. Because the project site would remain in its current state under the No Project Alternative, no additional traffic would be introduced to the project area; thus, **no direct or indirect impacts** would occur. ***[Lesser]***

Mitigation Measure: No mitigation measures are required.

IMPACT 3.15-11 Exposure of Sensitive Receptors to Short- and Long-Term Emissions of Toxic Air Contaminants. *Implementation of development Phase 1 would result in exposure of receptors to short- and long-term emissions of TACs from on-site mobile and stationary sources.*

Impacts would be the same under Phase 1 as under the program (entire project site) level analysis for all alternatives. Refer to Impact 3.15-4 for further discussion of this impact.

Implementation of Mitigation Measure 3.15-4 would reduce health-related risks associated with continued mining activities to a less-than-significant level. The health risk associated with off-site mobile-source TACs would be substantially lessened, but would not necessarily be reduced to a less-than-significant level. Exposure to mobile-source TAC emissions from on-site mobile sources therefore remains **significant and unavoidable**. This conclusion has been reached because of the uncertainty associated with on-site commercial land use activities and the proximity of sensitive receptors to such uses. Therefore, this conclusion may change as more detailed information regarding proposed on-site commercial uses becomes available.

IMPACT 3.15-12 Possible Exposure of Sensitive Receptors to Odorous Emissions. *Construction and long-term operation of development Phase 1 could generate odorous emissions, thereby exposing sensitive receptors to such emissions.*

Impacts would be the same under Phase 1 as under the program (entire project site) level analysis for all alternatives. Refer to Impact 3.15-5 for further discussion of this impact.

Implementation of Mitigation Measure 3.15-5 would reduce the possible exposure of sensitive receptors to odorous emissions to a **less-than-significant** level.

IMPACT 3.15-13 Possible Exposure to Hazardous Indoor Emissions of Air Pollutants. *Implementation of development Phase 1 could result in the exposure of construction workers or future residents to indoor emissions of air pollutants that would pose a threat to human health.*

Impacts would be the same under Phase 1 as under the program (entire project site) level for all alternatives. Refer to Impact 3.15-6 for further discussion of this impact.

IMPACT 3.15-14 Increase in Long-Term Atmospheric Greenhouse Gas Emissions. *Implementation of development Phase 1 could contribute to an increase in atmospheric GHG concentrations, resulting in an associated rise in Earth's global average temperature, a phenomenon known as global warming. Phase 1 of the project could generate substantial new GHG emissions at a rate that exceeds levels that would be needed to help achieve the objectives of AB 32, the California Climate Solutions Act of 2006.*

Impacts would be the same under Phase 1 as under the program (entire project site) level for all alternatives. Phase 1 of the Proposed Project Alternative would accommodate 8,174 new residents; the number of new residents with other alternatives would range from 7,414 to 10,686 (according to Section 3.2, "Population, Employment, and Housing"). The number of residents accommodated by each alternative is considered to be substantial. Refer to Impact 3.15-7 for further discussion of this impact.

CUMULATIVE IMPACTS

Given that compliance with applicable rules and regulations would be required for the control of stationary-source TAC emissions, both on-site and off-site, the project's contribution to long-term cumulative increases in stationary-source TAC concentrations would be considered minor, as discussed above. Nonetheless, exposure to TAC emissions from mobile sources, specifically diesel exhaust PM, is of growing concern within the SVAB, and major transportation corridors involving the operation of diesel-fueled vehicles are present in the project area (e.g., U.S. Highway 50). For these reasons, cumulative impacts in the SVAB are considered significant. However, background diesel PM concentrations within the project area are not considered to be relatively high, as described under Impact 3.15-4; no major nonpermitted sources of TAC emissions have been proposed. However, sensitive receptors, such as residential dwelling units, proposed for construction under the project could be exposed to diesel PM emissions from on-site construction and mining activies. Therefore, implementation of the Rio del Oro project would be expected to result in a cumulatively considerable incremental contribution to this significant cumulative toxic-related air quality impact. In addition, the cumulative toxic-related air quality effects of the Rio del Oro project, combined with related projects, including TACs from Mather Airport, are considered a cumulatively considerable significant impact.

As described under Impacts 3.15-3 and 3.15-9, implementation of development Phase 1 would result in less-than-significant CO-related air quality impacts from local mobile sources. According to the traffic analysis prepared for this project, at signalized intersections in the vicinity of the project site under Cumulative plus Project Conditions, the LOS would be expected to deteriorate below the current level (Fehr & Peers 2005). Existing plus Phase 1 project-generated 1- and 8-hour CO emissions from peak-hour daily trips were calculated to be significantly less than the California 1-hour or 8-hour ambient air quality standards of 20 ppm or 9 ppm, respectively. CO emissions from mobile sources would be anticipated to decrease further under cumulative conditions with implementation of emissions control technology; thus, 1- and 8-hour CO concentrations for the cumulative (2030) condition would not be anticipated to exceed the significance thresholds of 20 ppm and 9 ppm. Consequently, the

cumulative impact of the project's contribution to traffic volumes on the local roadway network relative to CO concentrations is considered less than significant. However, the cumulative CO air quality effects generated from mobile sources, combined with related projects, are considered a cumulatively considerable significant impact.

The cumulative impact of the project's contribution to long-term criteria pollutants is considered significant; therefore, the cumulative effect from long-term criteria pollutants generated from the Rio del Oro project, combined with related projects, is considered a cumulatively considerable significant impact.

Finally, the project's contribution to long-term atmospheric GHG emissions would be considered significant on a cumulative basis. The project would produce substantial levels of new GHG emissions, based on a per-capita calculation and a substantial number of new residents. Therefore, since the impact would be significant on a project-by-project basis, it would also result in a significant contribution to global warming impacts on an incremental basis. Thus, the project would result in a cumulatively considerable significant impact.

3.15.4 RESIDUAL SIGNIFICANT IMPACTS

Implementation of Mitigation Measures 3.15-1 and 3.15-7 under the Proposed Project, High Density, Impact Minimization, and No Federal Action Alternatives would substantially reduce significant impacts associated with short-term, temporary construction-generated emissions of the pollutants ROG, NO_X, and PM_{10}. However, emissions would exceed thresholds that are set to prevent a violation of or a substantial contribution to a violation of the NAAQS and CAAQS. Therefore, construction of the project could result in emissions that would result in or substantially contribute to emissions concentrations that exceed the NAAQS or CAAQS, and Impacts 3.15-1 and 3.15-7 would remain significant and unavoidable after implementation of mitigation. The project would result in potentially significant long-term regional (operational) air quality impacts for criteria air pollutant and GHG emissions. The significance of exposure of sensitive receptors to TACs cannot be made at this time. In addition, emissions attributable to the project, along with emissions from other reasonably foreseeable future projects in the SVAB as a whole, would continue to contribute to long-term increases in emissions that would exacerbate existing and projected nonattainment conditions. Thus, the project would contribute to a significant and unavoidable cumulative air quality impact under the Proposed Project, High Density, Impact Minimization, and No Federal Action Alternatives after implementation of mitigation. The cumulative air quality effect of the Rio del Oro project, combined with related projects, would remain a cumulatively considerable significant and unavoidable impact.