4.3 AIR QUALITY

4.3.1 Existing Conditions

Climate

Climate in the South Coast Air Basin (SCAB) is determined by its terrain and geographical location. The Basin is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the southwestern border, and high mountains surround the rest of the SCAB. The SCAB lies in the semi-permanent high-pressure zone of the eastern Pacific; the resulting climate is mild and tempered by cool ocean breezes. This climatological pattern is rarely interrupted. However, periods of extremely hot weather, winter storms, or Santa Ana wind conditions do occur.

The annual average temperature varies little throughout the Basin, ranging from the low to middle 60s, measured in degrees Fahrenheit. With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station closest to the site is the Newport Beach Station. The monthly average maximum temperature recorded at this station in the past 71 years ranged from 63.3°F in January to 73.5°F in August, with an annual average maximum of 67.8°F. The monthly average minimum temperature recorded at this station in the past 71 years ranged from 47.0°F in January to 63.4°F in August, with an annual average minimum of 54.8°F. January is typically the coldest month, and August is typically the warmest month in this area of the Basin.

During spring and early summer, pollution produced during any one day is typically blown out of the SCAB through mountain passes or lifted by warm, vertical currents adjacent to mountain slopes. Air contaminants can be transported 60 miles or more from the SCAB by ocean air during the afternoons. From early fall to winter, the transport is less pronounced because of slower average wind speed and the appearance of drainage winds earlier in the day. During stagnant wind conditions, offshore drainage winds may begin by late afternoon. Pollutants remaining in the SCAB are trapped and begin to accumulate during the night and the following morning. A low morning wind speed in pollutant source areas is an important indicator of air stagnation and the potential for buildup of primary air contaminants.

Temperature normally decreases with altitude, and a reversal of this atmospheric state, where temperature increases with altitude, is called an inversion. The height from the earth to the inversion base is known as the mixing height. Persistent low inversions and cool coastal air tend to create morning fog and low stratus clouds. Cloudy days are less likely in the eastern portions of the SCAB and are about 25 percent more likely along the coast. The vertical dispersion of air pollutants in the SCAB is limited by temperature inversions in the atmosphere close to the earth's surface.

Inversions are generally lower in the nighttime, when the ground is cool, than during daylight hours when the sun warms the ground and, in turn, the surface air layer. As this heating process continues, the temperature of the surface air layer approaches the temperature of the inversion base, causing heating along its lower edge. If enough warming takes place, the inversion layer becomes weak and opens up to allow the surface air layers to mix upward. This can be seen in the middle to late afternoon on a hot summer day when the smog appears to clear up suddenly. Winter inversions typically break earlier in the day, preventing excessive contaminant buildup.

The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problem is accumulation of carbon monoxide (CO) and oxides of nitrogen due to extremely low inversions and air stagnation during the night and early morning hours. In the summer, the

longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and oxides of nitrogen to form photochemical smog.

Air Quality Management

Federal Regulations/Standards

Pursuant to the federal Clean Air Act (CAA) of 1970, the EPA established national ambient air quality standards (NAAQS). The NAAQS were established for six major pollutants, termed "criteria" pollutants. Criteria pollutants are defined as those pollutants for which the federal and State governments have established ambient air quality standards (AAQS), or criteria, for outdoor concentrations in order to protect public health.

Data collected at permanent monitoring stations are used by the EPA to classify regions as "attainment" or "non-attainment," depending on whether the regions met the requirements stated in the primary NAAQS. Non-attainment areas are imposed with additional restrictions as required by the EPA.

The EPA has designated the Southern California Association of Governments (SCAG) as the Metropolitan Planning Organization (MPO) responsible for ensuring compliance with the requirements of the CAA for the SCAB.

The EPA established new national air quality standards for ground level ozone (O_3) and fine particulate matter in 1997. On May 14, 1999, the Court of Appeals for the District of Columbia Circuit issued a decision ruling that the CAA, as applied in setting the new public health standards for ozone and particulate matter, was unconstitutional as an improper delegation of legislative authority to the EPA. On February 27, 2001, the U.S. Supreme Court upheld the way the government sets air quality standards under the CAA. The court unanimously rejected industry arguments that the EPA must consider financial cost as well as health benefits in writing standards. The justices also rejected arguments that the EPA took too much lawmaking power from Congress when it set tougher standards for ozone and soot in 1997. Nevertheless, the court threw out the EPA's policy for implementing new ozone rules, saying that the agency ignored a section of the law that restricts its authority to enforce such rules.

In April 2003, the EPA was cleared by the White House Office of Management and Budget (OMB) to implement the eight-hour ground-level ozone standard. The EPA issued the proposed rule implementing the eight-hour ozone standard in April 2003. The EPA completed final eight-hour non-attainment status on April 15, 2004. The EPA revoked the one-hour ozone standard on June 15, 2005.

The EPA issued the final particulate matter ($PM_{2.5}$) implementation rule in fall 2004. The EPA issued final designations for $PM_{2.5}$ attainment status on December 14, 2004. The EPA lowered the 24-hour $PM_{2.5}$ standard from 65 to 35 $\mu g/m^3$ and revoked the annual average PM_{10} standard in December 2006.

State Regulations/Standards

The State of California began to set California ambient air quality standards (CAAQS) in 1969 under the mandate of the Mulford-Carrell Act. The CAAQS are generally more stringent than the NAAQS. In addition to the six criteria pollutants covered by the NAAQS, there are CAAQS for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles.

Originally, there were no attainment deadlines for CAAQS. However, the CCAA of 1988 provided a time frame and a planning structure to promote their attainment. The CCAA required non-attainment areas in the State to prepare attainment plans and proposed to classify each such area on the basis of the submitted plan, as follows: moderate, if CAAQS attainment could not occur before December 31, 1994;

serious, if CAAQS attainment could not occur before December 31, 1997; and severe, if CAAQS attainment could not be conclusively demonstrated at all.

The attainment plans are required to achieve a minimum 5 percent annual reduction in the emissions of non-attainment pollutants unless all feasible measures have been implemented. The State has currently classified the Basin as a non-attainment area for three criteria pollutants; O_3, PM_{10}, and $PM_{2.5}$.

Regional Air Quality Management Plan (AQMP)

The 1976 Lewis Air Quality Management Act established the South Coast Air Quality Management District (SCAQMD) and other air districts throughout the State. The federal CAA Amendments of 1977 required that each state adopt an implementation plan outlining pollution control measures to attain the federal standards in non-attainment areas of the state.

The ARB coordinates and oversees both State and federal air pollution control programs in California. It oversees activities of local air quality management agencies and is responsible for incorporating air quality management plans for local air basins into a State Implementation Plan (SIP) for EPA approval. The ARB maintains air quality monitoring stations throughout the State in conjunction with local air districts. Data collected at these stations are used by the ARB to classify air basins as attainment or non-attainment with respect to each pollutant and to monitor progress in attaining air quality standards. The ARB has divided the State into 15 air basins. Significant authority for air quality control within them has been given to local air districts that regulate stationary source emissions and develop local non-attainment plans.

The SCAQMD and the SCAG are responsible for formulating and implementing the AQMP for the Basin. Every three years the SCAQMD prepares a new AQMP, updating the previous plan and having a 20-year horizon. The SCAQMD adopted the 2003 AQMP in August 2003 and forwarded it to ARB for review and approval. The ARB approved a modified version of the 2003 AQMP and forwarded it to the EPA in October 2003 for review and approval.

The 2003 AQMP updates the attainment demonstration for the federal standards for O_3 and PM_{10}; replaces the 1997 attainment demonstration for the federal CO standard and provides a basis for a maintenance plan for CO for the future; and updates the maintenance plan for the federal nitrogen dioxide (NO_2) standard that the Basin has met since 1992.

This revision to the AQMP also addresses several State and federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. This AQMP is consistent with and builds upon the approaches taken in the 1997 AQMP and the 1999 Amendments to the ozone SIP for the South Coast Air Basin for the attainment of the federal ozone air quality standard. However, this revision points to the urgent need for additional emission reductions (beyond those incorporated in the 1997/1999 Plan) to offset increased emission estimates from mobile sources and meet all federal criteria pollutant standards within the time frames allowed under the federal Clean Air Act.

The SCAQMD has adopted the 2007 AQMP, which it describes as a regional and multi-agency effort (i.e., the SCAQMD Governing Board, ARB, SCAG, and EPA). State and federal planning requirements will include developing control strategies, attainment demonstration, reasonable further progress, and maintenance plans. The 2007 AQMP also incorporates significant new scientific data, primarily in the form of updated emission inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. The SCAQMD has forwarded the 2007 AQMP to the ARB and EPA for their review and approval.

Ambient Air Quality

Regional Air Quality

Both the State of California (State) and the federal government have established health-based ambient air quality standards (AAQS) for seven air pollutants. These pollutants include ozone (O_3), CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), coarse particulate matter with a diameter of 10 microns or less (PM_{10}), fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead. In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

In addition to setting out primary and secondary AAQS, the State of California has established a set of episode criteria for ozone, CO, nitrogen dioxide, sulfur dioxide, and particulate matter. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase from Stage One to Stage Three. Table 4.3-1 lists the health effects of these criteria pollutants and their potential sources. Because the concentration standards were set at a level that protects public health with an adequate margin of safety (EPA), these health effects would not occur unless the standards are exceeded by a large margin. The State AAQS are more stringent than the federal AAQS.

Table 4.3-1
Summary of Health Effects of the Major Criteria Air Pollutants

Pollutant	Sources	Primary Effects
Ozone (O_3)	Atmospheric reaction of organic gases with nitrogen oxides in the presence of sunlight.	Aggravation of respiratory and cardiovascular diseases. Irritation of eyes. Impairment of cardiopulmonary function. Plant leaf injury.
Nitrogen Dioxide (NO_2)	Motor vehicle exhaust. High temperature stationary combustion. Atmospheric reactions.	Aggravation of respiratory illness. Reduced visibility. Reduced plant growth. Formation of acid rain.
Carbon Monoxide (CO)	Byproducts from incomplete combustion of fuels and other carbon containing substances, such as motor exhaust. Natural events, such as decomposition of organic matter.	Reduced tolerance for exercise. Impairment of mental function. Impairment of fetal development. Death at high levels of exposure. Aggravation of some heart diseases (angina).
Suspended Particulate Matter ($PM_{2.5}$ and PM_{10})	Stationary combustion of solid fuels. Construction activities. Industrial processes. Atmospheric chemical reactions.	Reduced lung function. Aggravation of the effects of gaseous pollutants. Aggravation of respiratory and cardiorespiratory diseases. Increased cough and chest discomfort. Soiling. Reduced visibility.

Pollutant	Sources	Primary Effects
Sulfur Dioxide (SO_2)	Combustion of sulfur-containing fossil fuels. Smelting of sulfur-bearing metal ores. Industrial processes.	Aggravation of respiratory diseases (asthma, emphysema). Reduced lung function. Irritation of eyes. Reduced visibility. Plant injury. Deterioration of metals, textiles, leather, finishes, coatings, etc.
Lead (Pb)	Contaminated soil (e.g., from leaded fuels and lead-based paints).	Impairment of blood function and nerve construction. Behavioral and hearing problems in children.
SOURCE: Air Resources Board (2005)		

The California Clean Air Act (CCAA) provides the SCAQMD and other air districts with the authority to manage transportation activities at indirect sources. Indirect sources of pollution are generated when minor sources collectively emit a substantial amount of pollution. Examples of this would be the motor vehicles at an intersection, a mall, and on highways. The SCAQMD also regulates stationary sources of pollution throughout its jurisdictional area. Direct emissions from motor vehicles are regulated by the California Air Resources Board (ARB).

Air Pollution Constituents and Attainment Status

Table 4.3-2 summarizes the attainment status in the SCAB for the major criteria pollutants.

Table 4.3-2
Attainment Status of Criteria Pollutants in the South Coast Air Basin

Pollutant	State	Federal
Ozone–1 hour	Non-attainment	Standard Revoked June 2005
Ozone–8 hour	Not Established	Severe 17 Non-attainment
PM_{10}	Non-attainment	Serious Non-attainment
$PM_{2.5}$	Non-attainment	Non-attainment
CO	Attainment (except Los Angeles County)	Attainment
NO_2	Attainment	Attainment/Maintenance
SO_2	Attainment	Attainment
Lead	Attainment	Attainment
All others	Attainment/Unclassified	Attainment/Unclassified
SOURCE: Air Resources Board (July 2007)		

The criteria air pollutants and their attainment status in the SCAB based on ARB's Area Designations, Activities, and Maps are described below.

Ozone. Ozone (smog) is formed by photochemical reactions between oxides of nitrogen and reactive organic gases rather than being directly emitted. Ozone is a pungent, colorless gas typical of Southern California smog. Elevated ozone concentrations result in reduced lung function, particularly during vigorous physical activity. This health problem is particularly acute in sensitive receptors such as the sick, the elderly, and young children. Ozone levels peak during summer and early fall. The entire SCAB is designated as a non-attainment area for the State one-hour ozone standard. The EPA has officially designated the status for the SCAB regarding the eight-hour ozone standard as "Severe 17," which means the SCAB has until 2021 to attain the federal eight-hour ozone standard.

Carbon Monoxide. CO is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. The entire SCAB has been designated as an attainment area for the federal CO standards. In addition, Orange County has been designated by the ARB to be an attainment area for State CO standards.

Nitrogen Oxides. Nitrogen dioxide (NO_2), a reddish brown gas, and nitric oxide (NO), a colorless, odorless gas, are formed from fuel combustion under high temperature or pressure. These compounds are referred to as nitrogen oxides, or NO_X. NO_X is a primary component of the photochemical smog reaction. It also contributes to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition (i.e., acid rain). NO_2 decreases lung function and may reduce resistance to infection. The entire SCAB has not exceeded both federal and State standards for nitrogen dioxide in the past five years with published monitoring data. It is designated as an attainment area under both federal and State standards.

Sulfur Dioxide. Sulfur dioxide (SO_2) is a colorless irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight. The entire SCAB is in attainment with both federal and State sulfur dioxide standards.

Lead. Lead is found in old paints and coatings, plumbing, and a variety of other materials. Once in the blood stream, lead can cause damage to the brain, nervous system, and other body systems. Children are highly susceptible to the effects of lead. The entire SCAB is in attainment for the federal and State standards for lead.

Particulate Matter. Particulate matter is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles (all particles less than or equal to 10 micrometers in diameter, or PM_{10}) derive from a variety of sources, including windblown dust and grinding operations. Fuel combustion and resultant exhaust from power plants and diesel buses and trucks are primarily responsible for fine particle (less than 2.5 microns in diameter, or $PM_{2.5}$) levels. Fine particles can also be formed in the atmosphere through chemical reactions. Coarse particles (PM_{10}) can accumulate in the respiratory system and aggravate health problems such as asthma. The EPA's scientific review concluded that fine particles ($PM_{2.5}$), which penetrate deeply into the lungs, are more likely than coarse particles to contribute to the health effects listed in a number of recently published community epidemiological studies at concentrations that extend well below those allowed by the current PM_{10} standards. These health effects include premature death and increased hospital admissions and emergency room visits (primarily the elderly and individuals with cardiopulmonary disease); increased respiratory symptoms and disease (children and individuals with cardiopulmonary disease such as asthma); decreased lung functions (particularly in children and individuals with asthma); and alterations in

lung tissue and structure and in respiratory tract defense mechanisms. The entire SCAB is a non-attainment area for the federal and State PM_{10} and $PM_{2.5}$standards.

Local Air Quality

The SCAQMD, together with the ARB, maintain ambient air quality monitoring stations in the SCAB. The air quality monitoring station closest to the site is the Costa Mesa station, and its air quality trends are representative of the ambient air quality in the project area. The pollutants monitored are CO, ozone, nitrogen dioxide, and sulfur dioxide. The levels of particulate matter monitored at the Mission Viejo Station (the station closest to the project site that monitors these pollutants) are included in these tables for reference.

The ambient air quality data in Table 4.3-3 shows that nitrogen dioxide, sulfur dioxide, and CO levels are below the relevant State and federal standards in the project area. Ozone levels exceed the State one-hour standard and federal eight-hour ozone standard from one to two times a year in 2004 and were below the federal and State standards in 2005 and 2006. The PM_{10} level monitored at the Mission Viejo station exceeded the State annual arithmetic average standards in two of the past three years but has not exceeded the federal standards since 1996. $PM_{2.5}$ levels monitored at the Mission Viejo Monitoring Station were below the federal standard in the past three years.

Table 4.3-3
Ambient Air Quality at the Costa Mesa/Mission Viejo Air Monitoring Stations

Pollutant	Standard	2004	2005	2006
Carbon Monoxide				
Max 1-hr concentration (ppm)		4.9	4.7	3.5
No. days exceeded: State	> 20 ppm/1-hr	0	0	0
Federal	> 35 ppm/1-hr	0	0	0
Max 8-hr concentration (ppm)		4.1	3.2	3.0
No. days exceeded: State	9.0 ppm/8-hr	0	0	0
Federal	9 ppm/8-hr	0	0	0
Ozone				
Max 1-hr concentration (ppm)		0.104	0.085	0.074
No. days exceeded: State	> 0.09 ppm/1-hr	2	0	0
Max 8-hr concentration (ppm)		0.087	0.072	0.062
No. days exceeded: Federal	> 0.08 ppm/8-hr	1	0	0
Particulates (PM_{10})[1]				
Max 24-hr concentration ($\mu g/m^3$)		47	41	57
No. days exceeded: State	> 50 $\mu g/m^3$/24-hr	0	0	1
Federal	> 150 $\mu g/m^3$/24-hr	0	0	0
Annual Arithmetic Average ($\mu g/m^3$)		24	18	21
Exceeded: State	> 20 $\mu g/m^3$ ann. arith. avg.	Yes	No	Yes
Federal	> 50 $\mu g/m^3$ ann. arith. avg.	No	No	No
Particulates ($PM_{2.5}$)[1]				
Max 24-hr concentration ($\mu g/m^3$)		49.4	35.3	46.9
No. days exceeded: Federal	> 65 $\mu g/m^3$/24-hr	0	0	0
Annual Arithmetic Average ($\mu g/m^3$)		12	11	ND
Exceeded: State	> 12 $\mu g/m^3$ ann. arith. avg.	No	No	ND
Federal	> 15 $\mu g/m^3$ ann. arith. avg.	No	No	ND
Nitrogen Dioxide				
Max 1-hr concentration (ppm)		0.097	0.085	0.101
No. days exceeded: State	> 0.25 ppm/1-hr	0	0	0
Annual arithmetic average concentration (ppm)		0.016	0.014	0.015

Pollutant	Standard	2004	2005	2006
Exceeded: Federal	> 0.053 ppm ann. arith. avg.	No	No	No
Sulfur Dioxide				
Max 24-hr concentration (ppm)		0.008	0.008	0.005
No. days exceeded: State	> 0.04 ppm/24-hr	0	0	0
Federal	> 0.14 ppm/24-hr	0	0	0
Annual arithmetic average concentration (ppm)		0.002	0.001	0.001
Exceeded: Federal	> 0.030 ppm ann. arith. avg.	No	No	No

[1]PM_{10} and $PM_{2.5}$ data from the Mission Viejo Station. All other data from the Costa Mesa station.
ppm – parts per million
µg/m3 – micrograms (of pollutant) per cubic meter (of air)
ND – No sufficient data.

SOURCE: EPA and ARB; 2004 to 2006

Global Warming

Global warming is the observed increase in the average temperature of the Earth's atmosphere and oceans in recent decades. The Earth's average near-surface atmospheric temperature rose 0.6 ± 0.2 °Celsius (1.1 ± 0.4 °Fahrenheit) in the 20th century. The prevailing scientific opinion on climate change is that "most of the warming observed over the last 50 years is attributable to human activities". The increased amounts of carbon dioxide (CO_2) and other greenhouse gases (GHGs) are the primary causes of the human-induced component of warming. They are released by the burning of fossil fuels, land clearing and agriculture, etc. and lead to an increase in the greenhouse effect.

GHGs are present in the atmosphere naturally, released by natural sources, or formed from secondary reactions taking place in the atmosphere. They include carbon dioxide, methane, nitrous oxide and ozone. In the last 200 years, mankind has been releasing substantial quantities of GHGs into the atmosphere. These man-made emissions are increasing greenhouse gas concentrations in the atmosphere, enhancing the natural greenhouse effect, which is believed to be causing global warming. While man-made greenhouse gases include carbon dioxide, methane and nitrous oxide, some like the chlorofluorocarbons (CFCs) are completely new to the atmosphere.

Natural sources of carbon dioxide include the respiration (breathing) of animals and plants, and evaporation from the oceans. Together, these natural sources release about 150 billion tons of carbon dioxide each year worldwide, far outweighing the estimated 7 billion tons of man-made emissions per year from fossil fuel burning, waste incineration, deforestation and cement manufacture. Nevertheless, natural removal processes, such as photosynthesis by land and ocean-dwelling plant species, cannot keep pace with this extra input of man-made carbon dioxide, and consequently the gas is building up in the atmosphere.

Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Man-made sources include the mining and burning of fossil fuels, digestive processes in ruminant animals such as cattle, rice paddies and the burying of waste in landfills. Total annual emissions of methane are about 500 million tons, with man-made emissions accounting for the majority. As for carbon dioxide, the major removal process of atmospheric methane –(i.e., chemical breakdown in the atmosphere) cannot keep pace with source emissions, resulting in an increase in methane concentrations in the atmosphere.

In the fall of 2006, Governor Schwarzenegger signed AB 32, the global warming bill, into law. AB 32 codifies the target of reducing GHG emissions to 1990 levels by the year 2020. AB 32 requires that that the State Air Resources Board adopt regulations by January 1, 2008, to require reporting and verification of statewide greenhouse gas emissions and to monitor and enforce compliance with that program. To date, there are no regulations adopted to implement AB 32 and there are no significance thresholds yet established for GHG emissions.

The emission levels in California have been estimated to be 426 million metric tons CO2 equivalent for 1990, 473 million metric tons CO2 equivalent for 2000, 532 million metric tons CO2 equivalent for 2010, and 600 million metric tons CO2 equivalent for 2020. AB 32's goals for emission reductions have been estimated to be approximately 174 million tons CO2 equivalent by 2020 based on the 2007 AQMP. Achieving AB 32's target will require significant development and implementation of energy efficiency technologies and extensive shifting of energy production to renewable sources. In addition to reducing GHGs, such strategies would concurrently reduce emissions of criteria pollutants associated with fossil fuel combustion.

4.3.2 Significance Criteria

The State CEQA Guidelines suggest, from an "air quality" perspective, that a project would normally be judged to produce a significant or potentially significant effect on the environment if the project were to:

- 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 pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standards.
- Expose sensitive receptors to substantial air pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

As indicated in Section 15064(i)(1) of the State CEQA Guidelines, "cumulatively considerable" is defined to mean "that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects."

In order to determine whether or not a proposed project would cause a significant effect on the environment, the impact of the project must be determined by examining the types and levels of emissions generated and its impacts on factors that affect air quality. To accomplish this determination of significance, the SCAQMD has established air pollution thresholds against which a proposed project can be evaluated and assist lead agencies in determining whether or not the proposed project would generate significant air emissions. If the thresholds are exceeded by a proposed project, then it should be considered significant.

While, the final determination of significance thresholds is within the purview of the lead agency pursuant to the State CEQA Guidelines, the SCAQMD *recommends* that the following air pollution thresholds be used by lead agencies in determining whether the construction or operational phase of a proposed project is significant. If the lead agency finds that the proposed project has the potential to exceed any of the air pollution thresholds, the project should be considered significant. These threshold factors are included below.

Construction Phase

The following significance thresholds for air quality have been established by the SCAQMD on a daily basis for construction emissions:

- 75 pounds per day for ROG
- 100 pounds per day for NOx
- 550 pounds per day for CO
- 150 pounds per day of SOx
- 150 pounds per day for PM_{10}
- 55 pounds per day of $PM_{2.5}$

During construction, if any of the identified daily air pollutant thresholds are exceeded by the proposed project, then the project's air quality impacts may be considered significant.

Operational Phase

Specific criteria air pollutants have been identified by the SCAQMD as pollutants of special regional concern. Based upon this categorization, the following emissions significance thresholds have been established by the SCAQMD for project operations:

- 55 pounds per day for ROG
- 55 pounds per day for NOx
- 550 pounds per day for CO
- 150 pounds per day of SOx
- 150 pounds per day for PM_{10}
- 55 pounds per day of $PM_{2.5}$

Projects with daily operation-related emissions that exceed any of the above emission thresholds may be considered significant. The SCAQMD indicates in Chapter 6 of its *Handbook* that it considers a project to be mitigated to a level of insignificance if its primary effects are mitigated below the thresholds provided above.

Localized Emission Standards

In addition to the mass daily threshold values presented above, the SCAQMD has established the following threshold criteria to determine if a project has the potential to contribute to an exceedance of the State Ambient Air Quality Standards.

- California State 1-hour CO standard of 20.0 ppm
- California State 8-hour CO standard of 9.0 ppm
- California State 1-hour NO_2 standard of 0.18 ppm
- SCAQMD 24-hour construction PM_{10} standard of 10.4 $\mu g/m^3$
- SCAQMD 24-hour construction $PM_{2.5}$ standard of 10.4 $\mu g/m^3$
- SCAQMD 24-hour operational PM_{10} standard of 2.5 $\mu g/m^3$
- SCAQMD 24-hour operational $PM_{2.5}$ standard of 2.5 $\mu g/m^3$

The significance of localized emissions impacts depends on whether ambient levels in the vicinity of the project are above or below State standards. If ambient levels are below the standards, a project is considered to have significant impacts if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a State or federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. Again, the SCAQMD indicates in Chapter 6 of their *Handbook* that they consider a project to be mitigated to a level of insignificance if its effects are mitigated below the thresholds provided above.

4.3.3 Standard Conditions

SC 4.3-1 The proposed project shall comply with SCAQMD Rule 403, which sets requirements for dust control associated with grading and construction activities.

SC 4.3-2 The proposed project shall comply with SCAQMD Rules 431.1 and 431.2, which require the use of low sulfur fuel for stationary construction equipment.

SC 4.3-3 The proposed project shall comply with SCAQMD Rule 1108, which sets limitations on ROG content in asphalt.

SC 4.3-4 The proposed project shall comply with SCAQMD Rule 1113, which sets limitations on ROG content in architectural coatings.

SC 4.3-5 The proposed project shall comply with Title 24 energy-efficient design requirements as well as the provide window glazing, wall insulation, and efficient ventilation methods in accordance with the requirements of the Uniform Building Code.

As indicated above, the project will be subject to SCAQMD Rule 403 (Fugitive Dust) during construction. SCAQMD Rule 403 does not require a permit for construction activities, *per se*, but rather, sets forth general and specific requirements for all construction sites (as well as other fugitive dust sources) in the SCAB. The general requirement prohibits a person from causing or allowing emissions of fugitive dust from construction (or other fugitive dust source) such that the presence of such dust remains visible in the atmosphere beyond the property line of the emissions source. SCAQMD Rule 403 also prohibits a construction site from causing an incremental PM_{10} concentration impact at the property line of more than 50 micrograms per cubic meter as determined through PM_{10} high-volume sampling, but the concentration standard and associated PM_{10} sampling do not apply if specific measures identified in the rule are implemented and appropriately documented.

In accordance with Rule 403, the SCAQMD requires that contractors implement Best Available Control Technology (BACT) for construction activities. Rule 403 identifies two sets of specific measures, one for projects less than 50 acres, and another set of conditions for projects that exceed 50 acres.

4.3.4 Potential Impacts

4.3.4.1 Short-Term Construction Impacts

Construction Impacts

Air quality impacts may occur during demolition activities, site preparation, and construction activities necessary to implement the proposed project. Major sources of emissions during construction typically include exhaust emissions generated by heavy equipment and vehicles, fugitive dust generated as a result of soil and material disturbance during demolition and grading activities, and the emissions of reactive organic compounds during site paving and painting of the structures.

As reflected in Chapter 3.0 (Project Description), an extensive construction management plan was developed to include all phases of the proposed construction effort on a day-by-day basis. Equipment emissions are based on the OFFROAD2007 emissions model while vehicle emissions are based in the EMFAC2007 emissions model. In accordance with requirements under SCAQMD Rule 403 for dust suppression, a 55 percent control factor is applied to the demolition activities. A similar control efficiency is used by the URBEMIS2007 model for twice daily watering of graded surfaces.

The project site includes approximately 1.4 acres of land. The URBEMIS model estimates that 25 percent of this area (0.35 acre) is disturbed on a daily basis. This acreage (i.e., 0.35 acre) is then used in the calculation of daily dust emissions, which are assumed to occur during excavation and grading activities. Based on the URBEMIS model, a value of 20 pounds per acre per day is assumed. Also, based on the URBEMIS model, a suppression of 55 percent is assumed for adherence to SCAQMD Rule 403 as required for all projects constructed in the Southland. Truck trips are also included for the removal of debris and delivery of materials. The structures are then constructed over time with various phases of construction overlapping each other. Some of these phases involve work over five days a week while others would extend this to six days a week. The analysis includes both, and in these cases presents those emissions for the five days a week that overlap (though the greenhouse gas analysis considers the sixth day in its total). The URBEMIS model considers dust emissions negligible during the construction of the actual structures, and this analysis follows that approach. Like excavation, the analysis includes the daily delivery of materials to the site.

The structure is painted in the final stages of construction. The major source of emissions associated with the application of paints and surface coatings is from the release of volatile organic compounds (VOCs). These are also a form ROG and are assessed as such. The architect has specified that interior paint is to contain no more than 10 grams per liter and exterior paint is to contain no more than 27 grams per liter of VOC. The area to be painted is based on data included with the URBEMIS model. All interior surfaces are to receive three coats while exterior surfaces would receive one coat. While the application of asphalt also releases VOC emissions, no asphalt is proposed for the project and these surfaces will be of concrete construction.

Based on the emissions estimated for each phase of the project's construction, none of the significance thresholds for any of the pollutants would be exceeded on a daily basis. Table 1 in Appendix D summarizes the daily emissions projected for site construction. As noted above, some phases of construction would occur five days a week whereas others would use six days. The table presents those five days of overlap in calculation of the worst-case days. (Greenhouse gases, discussed later in this analysis, also include these "sixth day" emissions.) As indicated in the emissions calculation presented in Appendix D, all daily emissions are under their respective criteria levels and the impact is less than significant. Equipment and vehicle calculation spreadsheets showing the daily specifics for each phase are also included in Appendix D.

Short-Term Localized Impacts

In addition to the mass daily threshold standards, project construction has the potential to raise localized ambient pollutant concentrations. If these concentrations were to exceed the State ambient air quality standards at receptor locations, a potentially significant impact could occur.

The SCAQMD has developed screening tables for the construction of projects up to five acres in size. These tables are included in *Sample Construction Scenarios for Projects Less than Five Acres in Size* (February 2005) (*Sample Construction Scenarios*). The emissions values included in the screening tables are based on the emissions produced at the site (e.g., air compressors, back hoes, etc.) and do not include mobile source emissions (i.e., trucks and worker vehicles) that are spread over a much larger area. The Aerie residential project site is consists of about 1.4 acres so it fits within the *Sample Construction Scenarios*.

Screening level allowable daily emissions are then calculated from the "mass-rate look-up tables" included in Appendix L of the *Sample Construction Scenarios*. The project borders on Source Receptor Areas (SRA) 18 and 20. In accordance with Appendix L of *Sample Construction Scenarios*, projects of 1.4 acres in size located in either SRA 18 (North Coastal Orange County) or SRA 20 (Central Orange County Coastal) would not create significant localized emissions impacts if CO, NOx, PM_{10}, and $PM_{2.5}$ levels do not exceed 392.2, 185.2, 5.2, and 5.2 pounds per day, respectively. According to Table 1 in Appendix D, peak day CO and NOx levels are projected at 50.90 and 87.02 pounds per day, respectively, including both on-site equipment *and* off-site mobile sources. On-site values are well under the screening table limits and the localized impact of these two pollutants is less than significant.

The highest levels of PM_{10} and $PM_{2.5}$ are produced during the initial demolition phase with the majority of these emissions due to fugitive dust. These activities are estimated to result in 5.94 pounds of PM_{10} and 1.75 pounds of $PM_{2.5}$ per day produced from on-site sources, including both equipment exhaust and fugitive dust. These values include a dust suppression control efficiency of 55 percent as based on requirements of SCAQMD Rule 403. While the value for $PM_{2.5}$, is under the screening threshold and less than significant, the PM_{10} value exceeds it slightly. All other on-site construction phases and activities are projected to remain within the PM_{10} 5.2 pounds-per-day screening threshold and would not result in localized impacts.

The URBEMIS Model indicates that three-times, rather than twice-daily watering, would improve the dust control efficiency to a minimum of 65 percent (rather than 55 percent). As indicated in Section 6.2 of the Construction Management Plan, during grading activities, any exposed soil areas will be watered at least four times per day and stockpiles of crushed cement, debris, dirt or other dusty materials will be covered or watered three times daily. Implementation of these measures, which are identified below, will ensure that potential short-term dust impacts will not occur.

- The project shall comply with the Fugitive Dust Emission and Control Plan approved by the South Coast Air Quality Management District (under Rule 403).

- Dust will be minimized using water as control. Site and debris watering shall be performed a minimum of three times daily during demolition activities. During grading activities, any exposed soil areas shall be watered at least four times per day. Stockpiles of crushed cement, debris, dirt or other dusty materials shall be covered or watered three times daily. In addition, trucks carrying soil and debris shall be wetted or covered prior to leaving the site. On windy days, or when fugitive dust can be observed leaving the site, additional applications of water shall be applied to maintain a minimum 12 percent moisture content as defined by SCAQMD Rule 403. Soil disturbance shall be terminated whenever wind conditions exceed 325 miles per hour.

- All diesel-powered machinery exceeding 100 horsepower shall be equipped with soot traps, unless the contractor demonstrates to the satisfaction of the City Building Official that it is infeasible.

This action would reduce PM_{10} associated with fugitive dust from 5.20 pounds per day to 4.04 pounds per day. When combined with PM_{10} from on-site equipment, daily on-site PM_{10} emissions are reduced to 4.78 pounds per day. This value with the implementation of the measures prescribed in the CMP is under the screening threshold of 5.2 pounds per day. Therefore, the potential PM_{10} impact is less than significant and no mitigation measures are required.

4.3.4.2 Long-Term Operational Impacts

Mobile Source Emissions

The occupation of the site is based on the URBEMIS2007 model. The URBEMIS default value for condominiums is 5.86 vehicle trips per unit. In accordance with the *ITE Trip Generation Manual*, these values can range from 1.83 to 11.79 trips per unit. Based on the size of the proposed units, as a worst-case scenario this analysis uses a trip rate of 11.79 trips per unit per day and the project is estimated to result in 94 average daily trips (ADT). The calculated emissions of the project are compared to thresholds of significance for individual projects using the SCAQMD *Handbook* and Internet web site updates. The *Handbook* recommends assessing emissions of reactive organic compounds (ROC or ROG) as an indicator of ozone.

Emissions are based on a year 2013 occupancy. Both summer and winter scenarios were modeled and the higher of the two values are included in Table 4.3-4. Note that all values are within their respective threshold values and the impact is less than significant. Model runs are included in the Appendix D.

Table 4.3-4
Daily Operational Emissions[1]

Source	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Mobile Sources	0.47	0.64	5.43	0.01	1.19	0.23	673.48[2]
Natural Gas	0.01	0.08	0.03	0.00	0.00	0.00	100.13
Landscape Maintenance	0.12	0.02	1.55	0.00	0.01	0.01	2.81
Consumer Products	0.41	--	--	--	--	--	--
Structural Maintenance	0.01	--	--	--	--	--	--
Operational Total	1.02	0.74	7.01	0.01	1.20	0.24	776.42
Threshold	55	55	550	150	150	55	NT[3]
Exceeds Threshold?	No	No	No	No	No	No	No

[1]All figures in pounds per day.
[2]Averaged from the summer and winter emissions.
[3]NT – No Threshold.

SOURCE: Synectecology (December 2008)

Stationary Source Emissions

In addition to vehicle trips, the proposed land uses would produce emissions from on-site sources. The combustion of natural gas for heating the structures and water would occur. Landscaping would be maintained requiring the use of gardening equipment and their attendant emissions. Additionally, the structures would be maintained and this requires repainting over time resulting in the release of VOC emissions. The resultant emissions are projected by the URBEMIS2007 computer model and included in Table 4.3-4. Similar to mobile source emissions, all stationary source emissions are below their respective threshold values and the impact is less than significant.

Long-Term Localized Impacts

Long-term emissions also have the potential to exceed ambient air quality standards. Because operational emissions are mostly the product vehicle travel, these impacts are typically produced along the roadways. Because CO is produced in greatest quantities from vehicle combustion and does not readily disperse into

the atmosphere; adherence to ambient air quality standards is typically demonstrated through an analysis of localized CO concentrations. Areas of vehicle congestion that have the potential to create "pockets" of CO are called "hot spots." These hot spots typically occur at intersections where vehicle speeds are reduced and idle time is increased.

As noted above, as a worst-case scenario, this analysis uses a trip rate of 11.79 trips per unit per day and the project is estimated to result in 94 average daily trips (ADT). Based on the EMFAC2007 computer model, the peak traffic hour in Orange County includes 7.7 percent of the daily vehicle miles traveled. Assuming that the vehicles associated with the Aerie project follow a similar pattern, approximately seven vehicle trips would occur during the peak hour. This value is too small to add measurably to the CO emissions concentrations at any local intersections.

Impacts to Sensitive Receptors

Criteria Pollutants

In accordance with SCAQMD methodology, any project that does not exceed or can be mitigated to less than the daily threshold values does not add significantly to a cumulative impact. The project is of a size such that it does not result in daily emissions above either the construction or operational threshold values suggested by the SCAQMD and as such, the project does not add significantly to a cumulative impact.

Other Toxics

The project site contains existing structures that would be removed during the first phase of construction. Based on the type and age of structures to be removed, asbestos containing materials (ACM), which could include floor tiles and mastics, gypsum wallboard and joint compound, base cove mastic, carpet glue, thermal system insulation, spray-applied fireproofing ceiling plaster, and roofing mastics, felts and flashing would be removed. Additionally, lead-based paint would be removed.

Demolition and renovation activities that involve ACM are strictly regulated under SCAQMD Rule 1403 (Asbestos Emissions from Demolition/Renovation Activities) adopted on October 8, 1989 and amended April 8, 1994. The purpose of this rule is to specify work practice requirements to limit asbestos emissions from building demolition and renovation activities, including the removal and associated disturbance of ACM. The requirements for demolition and renovation activities include asbestos surveying, notification, ACM removal procedures and time schedules, ACM handling and clean-up procedures, and storage, disposal and landfilling requirements for asbestos-containing waste materials (ACWM). All operators are required to maintain records, including waste shipment records, and are required to use appropriate warning labels, signs, and markings.

Any demolition work involving asbestos-containing material must be identified and potential emissions of asbestos determined. Any building to be demolished or renovation that involves asbestos-containing material would be subject to provisions related to the following tasks:

- Asbestos surveying (inspection, identification, quantification) to be conducted by a qualified environmental laboratory, and
- SCAQMD notification to include project description, removal procedures and time schedules (options provided in Rule), material handling and clean-up, material storage and disposal methods.

All handling and removal of ACM must be performed by a certified California State licensed contractor that has been certified under the California Occupational Safety and Health Administration (Cal OSHA). All workers must undergo 40 hours of hazardous materials handling training and receive 8 hours of refresher training on a yearly basis.

Similarly, lead paint is as a toxic material and its removal is regulated as such. Like asbestos removal, workers are trained and certified in the handling of these materials.

Where necessary, actual asbestos and lead paint removal would be accomplished under a negative pressure environment with high efficiency particulate air (HEPA) filtration, through the use of a glove bag or through adequate wetting. These materials are to be contained in certified leak-proof containers and the general public is not allowed access to the demolition-site.

Mandatory compliance with notification and removal processes identified in the SCAQMD Rules and Regulations would ensure that any potential impacts remain below a level considered significant.

Objectionable Odors

Project construction would involve the use of heavy equipment creating exhaust pollutants from on-site earth movement and from equipment bringing concrete and other building materials to the site. With regards to nuisance odors, any air quality impacts will be confined to the immediate vicinity of the equipment itself. By the time such emissions reach any sensitive receptor sites away from the project site, they will be diluted to well below any level of air quality concern. An occasional "whiff" of diesel exhaust from passing equipment and trucks accessing the site from public roadways may result. Such brief exhaust odors are an adverse, but not significant, air quality impact because they will be short-term in nature and would not affect a significant number of people.

Greenhouse Gases

At the present time, greenhouse gases are not regulated as a criteria pollutant and there are no significance criteria for these emissions. Furthermore, the Final 2007 AQMP does not set CEQA targets that can be used to determine any potential threshold values. Nevertheless, in order to provide decision-makers with as much information as possible, this analysis quantifies, to the extent feasible, potential greenhouse gas emissions associated with the proposed development. As indicated in Table 1 in Appendix D and Table 4.3-4, greenhouse gas emissions for both construction activities and operational activities (i.e., mobile and stationary source emissions) have been calculated to provide decision-makers with information related to greenhouse gases. These impacts are summarized below.

Construction

Construction activities would consume fuel and result in the generation of greenhouse gases. Construction CO_2 emissions are also included in Table 4.3-4, above. In accordance with the projected construction schedule, approximately 4,335,633 pounds (2,168 tons) of CO_2 would be produced over the active construction period.

Site Operations

In the case of site operations, the majority of greenhouse gas emissions, and specifically CO_2, is due to vehicle travel and energy consumption. As indicated in Table 2 in Appendix D, the URBEMIS2007 model projects that on average 776.42 pounds (0.4 ton) of CO_2 would be produced daily or about 283,393 pounds (142 tons) per year. These emissions include mobile sources, the combustion of natural gas for space and water heating, and the use of landscape maintenance equipment.

The generation of electricity also creates GHG emissions. Electricity used in the SCAB comes from within local areas, the State, and other states. There is no way to determine the point of origin for these emissions and as such, these emissions are not quantified by the URBEMIS model, nor are they typically included in CEQA analyses. However, because GHG are of concern at the global level, and the generation of this electricity could add to global CO_2, the CO_2 that is attributable to the generation of electrical power was also quantified.

The SCAQMD *Handbook* includes estimates of electrical usage by land use while the *Source Inventory of Bay Area Greenhouse Gas Emissions* (November 2006) provides CO_2 estimates from the generation of electricity. Based Table A9-11-A of the SCAQMD *Handbook*, each of the eight units would consume about 5,626.50 kilowatts per year. The eight units combined would then use 45,012 kilowatt-hours per year and the generation of this electricity will result in about 14 tons of CO_2 per year. All told, the project then generates about 156 tons of CO_2 per year. Electrical use and its emissions calculations are included in the appendix.

In accordance with the 2007 AQMP, the emission levels in California are estimated to be 473 million metric tons (521.4 million short tons) CO_2 equivalent for 2000 and 532 million metric tons (568.4 short tons) CO_2 equivalent for 2010. At approximately 156 tons per year, the project operations represent less than 0.00003 percent of this State's annual 2010 CO_2 emissions' budget (and would represent an even smaller percentage of the 2013 CO2 budget).

Recognizing that there is a great amount of public concern regarding GHGs, the majority of the information given above is for disclosure purposes as required by CEQA. There is no agreement among air quality experts, or guidance at the State level, regarding the level at which an individual project's incremental GHG effect is cumulatively considerable. Given the emerging level of experience within the air quality industry with GHG analyses, coupled with the fact that the policies implementing the state goal of reducing greenhouse gas emissions in California to 1990 levels by 2020, as set forth by the timetable established in AB 32, California Global Warming Solutions Act of 2006 have not been adequately defined, there is no way to state with reasonable scientific certainty that the project would conflict with these policies.

Notwithstanding the lack of guidance regarding GHGs, the proposed Aerie project has been designed utilizing "green" architecture criteria. As a result, the project will be constructed with both active and passive sustainable design elements that enhance the project design, reduce the amount of energy utilized, and minimize the project footprint on the environment. The active and passive "green" strategies that will be implemented include:

Passive Strategies

- Design to maximize solar orientation to increase the use of daylighting concepts and reduce energy usage.
- Use of high-thermal mass for capturing and retaining heat through solar heat gain apertures.
- Optimum overhangs to minimize harsh summer sun exposures while allowing winter heat gain.
- Natural ventilation systems that capitalize on prevailing ocean breezes and thermal convection dynamics.
- Dual paned glazing systems using "Low-E" glass (both non-mechanical and hybrid systems).
- Gray water retention for property irrigation.
- Use of environmentally friendly and sustainable materials.
- Integration of California drought tolerant landscape materials.

Active Strategies

- Solar domestic hot water and pool heating
- Solar photovoltaic arrays to generate electricity
- Multi-zoned, high velocity hydronic heating and cooling systems.
- Instantaneous hot water boilers with solar domestic hot water assist.

Other Design Elements

- Renewable wood materials and sustainable fly ash concrete construction.
- Reduction of greenhouse gas emissions.
- Reduction of energy use through high efficacy lighting fixtures.
- Cross ventilation systems.
- Lutron Homeworks interactive lighting control systems.

AQMP Consistency

The proposed project represents the removal of 15 dwelling units and the replacement of those units with eight condominiums. The project would neither result in growth-inducing impacts nor cause an exceedance of established population or growth projections. Furthermore, the project is of a size such that would not create either short- or long-term significant quantities of criteria pollutants. Additionally, with the included mitigation to reduce PM_{10} emissions during the demolition phase, the project would not result in significant localized air quality impacts. As such, the project is consistent with the goals of AQMP, does not present a significant impact or conflict with the AQMP.

4.3.5 Mitigation Measures

Implementation of the proposed project will not result in any significant air quality impacts; no mitigation measures are required.

4.3.6 Level of Significance After Mitigation

Implementation of the Standard Conditions identified in Section 4.3.3 that require compliance with SCAQMD and related regulatory requirements and implementation of the CMP measures prescribed to avoid project-related PM_{10} demolition/construction emissions will ensure that potential air quality impacts do not exceed SCAQMD significance thresholds. No mitigation measures are required and no significant unavoidable impacts will occur as a result of project implementation.