

5.3 AIR QUALITY

This Section of the DSSEIR compares the air quality impacts of the 2012 Modified Project to the air quality impacts of the 2011 Approved Project. The analysis in this Section is based on the following:

- *Air Quality Technical Report for the Heritage Fields El Toro, LLC*, ENVIRON, June 2012.

A complete copy of this study is included in Appendix C to this DSSEIR.

5.3.1 Environmental Setting

South Coast Air Basin

The Proposed Project Site lies within the South Coast Air Basin (“SoCAB”), which includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The SoCAB is in a coastal plain with connecting broad valleys and low hills and is bounded by the Pacific Ocean in the southwest quadrant, with high mountains forming the remainder of the perimeter. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. This usually mild weather pattern is interrupted infrequently by periods of extremely hot weather, winter storms, and Santa Ana winds.

Temperature and Precipitation

The annual average temperature varies little throughout the SoCAB, ranging from the low to middle 60s, measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station nearest to the Proposed Project Site is the Tustin Irvine Ranch Station Monitoring Station (ID 049087). The average low is reported at 40.2°F in January while the average high is 85.2°F in August (WRCC 2011).

In contrast to a very steady pattern of temperature, rainfall is seasonally and annually highly variable. Almost all rain falls from November through April. Summer rainfall is normally restricted to widely scattered thundershowers near the coast, with slightly heavier shower activity in the east and over the mountains. Rainfall averages around 12.86 inches per year in the area of the Proposed Project Site, as measured in Irvine (WRCC 2011).

Humidity

Although the SoCAB has a semi-arid climate, the air near the surface is typically moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the SoCAB by offshore winds, the ocean effect is dominant. Periods of heavy fog, especially along the coastline, are frequent; low stratus clouds, often referred to as high fog, are a characteristic climatic feature. Annual average humidity is 70 percent at the coast and 57 percent in the eastern portions of the SoCAB.

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Wind

Wind patterns across the south coastal region are characterized by westerly and southwesterly onshore winds during the day and easterly or northeasterly breezes at night. Wind speed is somewhat greater during the dry summer months than during the rainy winter season.

Between periods of wind, periods of air stagnation may occur, both in the morning and evening hours. Air stagnation is one of the critical determinants of air quality conditions on any given day. During the winter and fall months, surface high-pressure systems over the SoCAB, combined with other meteorological conditions, can result in very strong, downslope Santa Ana winds. These winds normally continue a few days before predominant meteorological conditions are re-established.

The mountain ranges to the east of the SoCAB affect the transport and diffusion of pollutants by inhibiting the eastward transport of pollutants. Air quality in the SoCAB generally ranges from fair to poor and is similar to air quality in most of coastal southern California. The entire region experiences heavy concentrations of air pollutants during prolonged periods of stable atmospheric conditions.

Inversions

In conjunction with the two characteristic wind patterns that affect the rate and orientation of horizontal pollutant transport, there are two similarly distinct types of temperature inversions that control the vertical depth through which pollutants are mixed. These inversions are the marine/subsidence inversion and the radiation inversion. The height of the base of the inversion at any given time is known as the “mixing height.” The combination of winds and inversions are critical determinants in leading to the highly degraded air quality in summer and the generally good air quality in the winter in the vicinity of Proposed Project Site.

Air Pollutants of Concern

Criteria Air Pollutants

The air pollutants emitted into the ambient air by stationary and mobile sources are regulated by federal and state law. Air pollutants are categorized as primary or secondary pollutants. Primary air pollutants are those that are emitted directly from sources. Carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO_x), sulfur dioxide (SO₂), coarse inhalable particulate matter (PM₁₀), fine inhalable particulate matter (PM_{2.5}), and lead (Pb) are primary air pollutants. Of these, CO, SO₂, NO_x, PM₁₀, and PM_{2.5} are “criteria air pollutants,” which means that ambient air quality standards (AAQS) have been established for them. VOC and NO_x are criteria pollutant precursors that form secondary criteria pollutants through chemical and photochemical reactions in the atmosphere. Ozone (O₃) and nitrogen dioxide (NO₂) are the principal secondary pollutants.

A description of each of the primary and secondary criteria air pollutants and their known health effects is presented below. Other pollutants, such as carbon dioxide (CO₂), a natural by-product of animal respiration that is also produced in the combustion process, have been linked to phenomena such as global climate change. These emissions are unregulated and the South Coast Air Quality Management District (“SCAQMD”) has not yet adopted thresholds for them applicable to residential and commercial development projects. Greenhouse gas (“GHG”) emissions that affect global climate change, including

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CO₂, methane (CH₄), nitrous oxide (N₂O), and fluorinated gases, are discussed in Chapter 5.3, *Greenhouse Gas Emissions*, of this DSSEIR.

Carbon Monoxide (CO) is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation (SCAQMD 2005).

Volatile Organic Compounds (VOC) are compounds comprised primarily of atoms of hydrogen and carbon. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. Other sources of VOCs include evaporative emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. Adverse effects on human health are not caused directly by VOCs, but rather by reactions of VOCs to forms of secondary pollutants such as ozone (SCAQMD 2005).

Nitrogen Oxides (NO_x) serve as integral participants in the process of photochemical smog production. The two major forms of NO_x are nitric oxide (NO) and nitrogen dioxide (NO₂). NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO₂ is a reddish-brown irritating gas formed by the combination of NO and oxygen. NO_x acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens (SCAQMD 2005).

NO₂ is a by-product of fuel combustion. The principal form of NO₂ produced by combustion is NO, but NO reacts with oxygen to form NO₂, creating the mixture of NO and NO₂ commonly called NO_x. NO₂ acts as an acute irritant and, in equal concentrations, is more injurious than NO. At atmospheric concentrations, however, NO₂ is only potentially irritating. There is some indication of a relationship between NO₂ and chronic pulmonary fibrosis. Some increase in bronchitis in children (two and three years old) has also been observed at concentrations below 0.3 part per million (ppm). NO₂ absorbs blue light; the result is a brownish-red cast to the atmosphere and reduced visibility. NO₂ also contributes to the formation of PM₁₀, PM_{2.5}, and ozone (SCAQMD 2005).

Sulfur Dioxide (SO₂) is a colorless, pungent, irritating gas formed by the combustion of sulfurous fossil fuels. Fuel combustion is the primary source of SO₂. At sufficiently high concentrations, SO₂ may irritate the upper respiratory tract. At lower concentrations and when combined with particulates, SO₂ may do greater harm by injuring lung tissue. A primary source of SO₂ emissions is high-sulfur-content coal. Gasoline and natural gas have very low sulfur content and hence do not release significant quantities of SO₂ (SCAQMD 2005).

Particulate Matter (PM) consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of fine particulates are now recognized and regulated. Inhalable coarse particles, or PM₁₀, include the particulate matter with an aerodynamic diameter of 10 microns (i.e., 10 one-millionths of a meter or 0.0004 inch) or less. Inhalable fine particles, or PM_{2.5}, have an aerodynamic diameter of 2.5 microns (i.e., 2.5 one-millionths of a meter or 0.0001 inch) or less. Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind action on arid landscapes also contributes substantially to local particulate loading. Both PM₁₀ and PM_{2.5} may adversely affect the human respiratory system, especially in those people who are naturally sensitive or susceptible to breathing problems (SCAQMD 2005).

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Fugitive dust primarily poses two public health and safety concerns. The first concern is that of respiratory problems attributable to the particulates suspended in the air. Diesel particulates are classified by the California Air Resources Board (“CARB”) as a carcinogen. The second concern is that of motor vehicle accidents caused by reduced visibility during severe wind conditions. Fugitive dust may also cause significant property damage during strong windstorms by acting as an abrasive material agent (much like sandblasting activities). Finally, fugitive dust can result in a nuisance factor due to the soiling of proximate structures and vehicles (SCAQMD 2005).

Ozone (O₃), or smog, is one of a number of substances called photochemical oxidants that are formed when VOC and NO_x (both by-products of the internal combustion engine) react with sunlight. O₃ is present in relatively high concentrations in the SoCAB, and the damaging effects of photo chemical smog are generally related to the concentrations of O₃. O₃ poses a health threat to those who already suffer from respiratory diseases as well as to healthy people. Additionally, O₃ has been tied to crop damage, typically in the form of stunted growth and premature death. O₃ can also act as a corrosive, resulting in property damage such as the degradation of rubber products (SCAQMD 2005).

Lead (Pb) concentrations decades ago exceeded the state and federal AAQS by a wide margin, but have not exceeded state or federal air quality standards at any regular monitoring station since 1982 (SCAQMD 2005). However, in 2008 the United States Environmental Protection Agency (USEPA) and CARB adopted more strict lead standards and special monitoring sites immediately downwind of lead sources¹ recorded very localized violations of the new state and federal standards. As a result of these localized violations, the Los Angeles County portion of the SoCAB was designated in 2010 as non-attainment under the California and National AAQS for lead (SCAQMD 2010). The 2011 Approved Project and 2012 Modified Project are not characteristic of industrial-type projects that have the potential to emit lead. Therefore, lead is not a pollutant of concern for the 2011 Approved Project or the 2012 Modified Project.

Toxic Air Contaminants

The public’s exposure to air pollutants classified as toxic air contaminants (TACs) is a significant environmental health issue in California. In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health. The California Health and Safety Code defines a TAC as “an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health.” A substance that is listed as a hazardous air pollutant (“HAP”) pursuant to Section 112(b) of the federal Clean Air Act (42 United States Code §7412[b]) is a toxic air contaminant. Under state law, the California Environmental Protection Agency (“EPA”), acting through CARB, is authorized to identify a substance as a TAC if it determines that the substance is an air pollutant that may cause or contribute to an increase in mortality or to an increase in serious illness, or may pose a present or potential hazard to human health.

California regulates TACs primarily through Assembly Bill (AB) 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics “Hot Spot” Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB

¹ Source-oriented monitors record concentrations of lead at lead-related industrial facilities in the SoCAB, which include Exide Technologies in the City of Commerce, Quemetco, Inc. in the City of Industry, Trojan Battery Company in Santa Fe Springs, and Exide Technologies in Vernon. Monitoring conducted between 2004 through 2007 identified that the Trojan Battery Company and Exide Technologies exceed the federal standards (SCAQMD 2010).

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adopts an “airborne toxics control measure” for sources that emit designated TACs. If there is a safe threshold for a substance (i.e., a point below which there is no toxic effect), the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate toxics best available control technology to minimize emissions. To date, CARB has established formal control measures for 11 TACs, all of which are identified as having no safe threshold.

Air toxics from stationary sources are also regulated in California under the Air Toxics “Hot Spot” Information and Assessment Act of 1987. Under AB 2588, toxic air contaminant emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High priority facilities are required to perform a health risk assessment and, if specific thresholds are exceeded, are required to communicate the results to the public in the form of notices and public meetings.

Since the last update to the TAC list in December 1999, CARB has designated 244 compounds as TACs (CARB 1999). Additionally, CARB has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines.

In 1998, CARB identified particulate emissions from diesel-fueled engines (diesel PM) as a TAC. Previously, the individual chemical compounds in diesel exhaust were considered as TACs. Almost all diesel exhaust particle mass is 10 microns or less in diameter. Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

In 2000, SCAQMD conducted a study on ambient concentrations of TACs and estimated the potential health risks from air toxics. The results showed that the overall risk for excess cancer from a lifetime exposure to ambient levels of air toxics was about 1,400 in a million. The largest contributor to this risk was diesel exhaust, accounting for 71 percent of the air toxics risk. In 2008, the SCAQMD conducted its third update to its study on ambient concentrations of TACs and estimated the potential health risks from air toxics. The results showed that the overall risk for excess cancer from a lifetime exposure to ambient levels of air toxics was about 1,200 in one million. The largest contributor to this risk was diesel exhaust, accounting for approximately 84 percent of the air toxics risk (SCAQMD 2008). In the vicinity of the Proposed Project Site, excess cancer risk ranges from 391 to 652 (SCAQMD 2012).

Regulatory Framework

AAQS have been promulgated at the local, state, and federal levels for criteria pollutants. The Proposed Project Site is in the SoCAB and is subject to the rules and regulations imposed by the SCAQMD, as well as, the California Ambient Air Quality Standards (“CAAQS”) adopted by CARB and federal National Ambient Air Quality Standards (“NAAQS”).

Ambient Air Quality Standards

The Clean Air Act (CAA) was passed in 1963 by the US Congress and has been amended several times. The 1970 Clean Air Act amendments strengthened previous legislation and laid the foundation for the regulatory scheme of the 1970s and 1980s. In 1977, Congress again added several provisions, including nonattainment requirements for areas not meeting NAAQS and the Prevention of Significant Deterioration program. The 1990 amendments represent the latest in a series of federal efforts to regulate

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the protection of air quality in the United States. The CAA allows states to adopt more stringent standards or to include other pollution species. The California Clean Air Act (CCAA), signed into law in 1988, requires all areas of the state to achieve and maintain the CAAQS by the earliest practical date. The CAAQS tend to be more restrictive than the NAAQS and are based on even greater health and welfare concerns.

These NAAQS and CAAQS are the levels of air quality considered to provide a margin of safety in the protection of the public health and welfare. They are designed to protect those “sensitive receptors” most susceptible to further respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

Both California and the federal government have established health-based AAQS for seven air pollutants. As shown in Table 5.3-1, these pollutants include O₃, NO₂, CO, SO₂, PM₁₀, PM_{2.5}, and lead (Pb). 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.

*Table 5.3-1
Ambient Air Quality Standards for Criteria Pollutants*

<i>Pollutant</i>	<i>Averaging Time</i>	<i>California Standard</i>	<i>Federal Primary Standard</i>	<i>Major Pollutant Sources</i>
Ozone (O ₃)	1 hour	0.09 ppm	*	Motor vehicles, paints, coatings, and solvents.
	8 hours	0.070 ppm	0.075 ppm	
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm	
Nitrogen Dioxide (NO ₂)	Annual Average	0.030 ppm	0.053 ppm	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
	1 hour	0.18 ppm	0.100 ppm	
Sulfur Dioxide (SO ₂)	1 hour	0.25 ppm	0.075 ppm	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	24 hours	0.04 ppm	*	
Suspended Particulate Matter (PM ₁₀)	Annual Arithmetic Mean	20 µg/m ³	*	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	24 hours	50 µg/m ³	150 µg/m ³	

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*Table 5.3-1
Ambient Air Quality Standards for Criteria Pollutants*

<i>Pollutant</i>	<i>Averaging Time</i>	<i>California Standard</i>	<i>Federal Primary Standard</i>	<i>Major Pollutant Sources</i>
Suspended Particulate Matter (PM _{2.5})	Annual Arithmetic Mean	12 µg/m ³	15.0 µg/m ³	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	24 hours	*	35 µg/m ³	
Lead (Pb)	Monthly	1.5 µg/m ³	*	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	*	1.5 µg/m ³	
	3-Month Average	*	0.15 µg/m ³	
Visibility Reducing Particles	8 hours	ExCo =0.23/km visibility of 10≥ miles ¹	No Federal Standard	Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt.
Sulfates	24 hours	25 µg/m ³	No Federal Standard	Sulfates (SO ₄ ²⁻) are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and / or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to sulfur dioxide (SO ₂) during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO ₂ to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.
Hydrogen Sulfide	1 hour	0.03 ppm	No Federal Standard	Hydrogen sulfide (H ₂ S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation.

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*Table 5.3-1
Ambient Air Quality Standards for Criteria Pollutants*

<i>Pollutant</i>	<i>Averaging Time</i>	<i>California Standard</i>	<i>Federal Primary Standard</i>	<i>Major Pollutant Sources</i>
Vinyl Chloride	24 hour	0.01 ppm	No Federal Standard	Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.

Source: CARB 2010.

ppm: parts per million; $\mu\text{g}/\text{m}^3$: micrograms per cubic meter

ExCo: Extinction Coefficient

¹ When relative humidity is less than 70 percent.

* Standard has not been established for this pollutant/duration by this entity.

Air Quality Management Planning

The SCAQMD and the Southern California Association of Governments (SCAG) are the agencies responsible for preparing the Air Quality Management Plan (AQMP) for the SoCAB. Since 1979, a number of AQMPs have been prepared.

The most recently adopted comprehensive plan is the 2007 AQMP, which was adopted on June 1, 2007, and which incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. The 2007 AQMP proposes attainment demonstration of the federal $\text{PM}_{2.5}$ standards through a more focused control of SO_x , directly emitted $\text{PM}_{2.5}$, and focused control of NO_x and VOC by 2015. The eight-hour ozone control strategy builds upon the $\text{PM}_{2.5}$ strategy, augmented with additional NO_x and VOC reductions to meet the standard by 2024, assuming an extended attainment date is obtained.

The AQMP provides local guidance for the State Implementation Plan, which provides the framework for air quality basins to achieve attainment of the state and federal ambient air quality standards. Areas that meet ambient air quality standards are classified as attainment areas, while areas that do not meet these standards are classified as nonattainment areas. Severity classifications for nonattainment range in magnitude: marginal, moderate, serious, severe, and extreme. The attainment status for the SoCAB is listed in Table 5.3-2. The SoCAB is designated as in attainment of the CAAQS for SO_2 , and sulfates. According to the 2007 AQMP, the SoCAB will have to meet the new federal $\text{PM}_{2.5}$ standards by 2015 and the 8-hour ozone standard by 2024, and will most likely have to achieve the recently revised 24-hour $\text{PM}_{2.5}$ standard by 2020. The SCAQMD has recently designated the SoCAB as nonattainment for NO_2 (entire basin) and lead (Los Angeles County only) under the CAAQS and has requested to designate the SoCAB as attainment/maintenance for PM_{10} under the NAAQS.

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Table 5.3-2

Attainment Status of Criteria Pollutants in the South Coast Air Basin

<i>Pollutant</i>	<i>State</i>	<i>Federal</i>
Ozone – 1-hour	Extreme Nonattainment	Extreme Nonattainment ¹
Ozone – 8-hour	Extreme Nonattainment	Severe-17 Nonattainment ²
PM ₁₀	Serious Nonattainment	Serious Nonattainment Proposed Attainment/Maintenance ³
PM _{2.5}	Nonattainment	Nonattainment
CO	Attainment	Attainment ⁴
NO ₂	Nonattainment ⁵	Attainment/Maintenance
SO ₂	Attainment	Attainment
Lead	Nonattainment ⁶	Nonattainment ⁶
All others	Attainment/Unclassified	Attainment/Unclassified

Source: CARB 2010.

¹ Under prior standard.

² SCAQMD may petition for “Extreme Nonattainment” designation.

³ Annual standard revoked September 2006. CARB approved the SCAQMD’s request to redesignate the SoCAB from serious nonattainment for PM₁₀ to attainment for PM₁₀ under the National AAQS on March 25, 2010 because the SoCAB has not violated federal 24-hour PM₁₀ standards during the period from 2004 to 2007. However, the USEPA has not yet approved this request.

⁴ The EPA granted the request to redesignate the SoCAB from nonattainment to attainment for the CO NAAQS on May 11, 2007 (Federal Register Volume 71, No. 91), which became effective June 11, 2007.

⁵ The state NO₂ standard was made stricter in 2007 from 0.25 ppm to 0.18 ppm. Under the revised standards, the entire SoCAB was designated nonattainment on March 25, 2010. In addition, the USEPA adopted a new 1-hour NO₂ standard of 0.100 ppm on January 22, 2010.

⁶ The Los Angeles County portion of the SoCAB was designated nonattainment for lead under the new federal and existing state AAQS as a result of large industrial emitters. Remaining areas within the SoCAB, including the area in which the Proposed Project Site is located, are unclassified.

Existing Ambient Air Quality

Existing levels of ambient air quality and historical trends and projections in the vicinity of the Proposed Project Site and Irvine are best documented by measurements made by SCAQMD. The Proposed Project Site is located within Source Receptor Area (SRA) 19 – Saddleback Valley (Central Orange County). The air quality monitoring station closest to the Proposed Project Site is the Mission Viejo Monitoring Station. However, this station does not monitor NO₂ or SO_x. Consequently, data was obtained from the Costa Mesa Monitoring Station for these criteria pollutants. Data from these stations are summarized in Table 5.3-3. The data shows that the area occasionally exceeds the state and federal one-hour and eight-hour O₃ standards. The data also indicates that the area occasionally exceeds the state PM₁₀ and federal PM_{2.5} standards. The federal PM₁₀ standard has not been violated in the last five years at the Mission Viejo Monitoring Station. The CO, SO₂, or NO₂ standard have not been violated in the last five years at the Mission Viejo (CO) and Costa Mesa (SO₂ and NO₂) Monitoring Stations.

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Table 5.3-3
Ambient Air Quality Monitoring Summary

Pollutant/Standard	Number of Days Threshold Were Exceeded and Maximum Concentration Levels During Such Violations				
	2005	2006	2007	2008	2009
Ozone (O₃)¹					
State 1-Hour ≥ 0.09 ppm	3	13	5	9	7
State 8-hour ≥ 0.07 ppm	10	23	10	25	14
Federal 8-Hour > 0.075 ² ppm	6	12	5	15	10
Max. 1-Hour Conc. (ppm)	0.125	0.123	0.108	0.118	0.121
Max. 8-Hour Conc. (ppm)	0.086	0.106	0.090	0.104	0.095
Carbon Monoxide (CO)¹					
State 8-Hour > 9.0 ppm	0	0	0	0	0
Federal 8-Hour ≥ 9.0 ppm	0	0	0	0	0
Max. 8-Hour Conc. (ppm)	1.59	1.64	2.16	1.10	1.00
Nitrogen Dioxide (NO₂)³					
State 1-Hour ≥ 0.18 ⁴ ppm	0	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.085	0.101	0.074	0.081	0.065
Sulfur Dioxide (SO₂)³					
State 1-Hour ≥ 0.04 ppm	0	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.008	0.005	0.004	0.003	0.004
Coarse Particulates (PM₁₀)¹					
State 24-Hour > 50 µg/m ³	0	1	3	0	1
Federal 24-Hour > 150 µg/m ³	0	0	0	0	0
Max. 24-Hour Conc. (µg/m ³)	41.0	57.0	74.0	42.0	56.0
Fine Particulates (PM_{2.5})¹					
Federal 24-Hour > 35 ^{5,6} µg/m ³	0	1	2	0	1
Max. 24-Hour Conc. (µg/m ³)	35.3	46.9	46.8	32.6	39.2

Source: SCAQMD 2011.

ppm: parts per million; µg/m³: or micrograms per cubic meter; NS: No Standard.

¹ Data obtained from the Mission Viejo Monitoring Station.

² The USEPA recently revised the 8-hour O₃ standard from 0.08 ppm to 0.075 ppm, effective May 2008.

³ Data obtained from the Costa Mesa Monitoring Station.

⁴ The NO₂ standard was amended on February 22, 2007, to lower the 1-hr standard from 0.25 ppm to 0.18 ppm.

⁵ Percentage of samples exceeding standard.

⁶ The USEPA revised the 24-hour PM_{2.5} standard from 65 µg/m³ to 35 µg/m³; this standard did not take effect until December 2006.

Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardiorespiratory diseases.

Residential areas are also considered to be sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Other sensitive receptors include retirement facilities, hospitals, and schools. Recreational land uses are considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial, commercial, retail, and office areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time.

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In addition, the working population is generally the healthiest segment of the public (SCAQMD 1993, SCAQMD 2003, SCAQMD 2005).

5.3.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the City has determined that a project would normally have a significant effect on the environment if the project would:

- AQ-1 Conflict with or obstruct implementation of the applicable air quality plan.
- AQ-2 Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- AQ-3 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 standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
- AQ-4 Expose sensitive receptors to substantial pollutant concentrations.
- AQ-5 Create objectionable odors affecting a substantial number of people.

Chapter 8, *Impacts Found Not to Be Significant*, substantiates the City's determination in the Initial Study for the 2012 Modified Project (Appendix A to this DSSEIR) that impacts associated with the following impacts would be less than significant: AQ-5. This impact will not be addressed in the following analysis.

South Coast Air Quality Management District Thresholds

Regional Significance Thresholds

CEQA allows for a lead agency to utilize the significance criteria established by the applicable air quality management or air pollution control district to assess the significance of a project's impacts on air quality. The SCAQMD has established thresholds of significance for air quality for construction activities and project operation as shown in Table 5.3-4. There are other state and federal criteria pollutants such as lead (state and federal) and hydrogen sulfide (state only) that are not relevant to this analysis.

Table 5.3-4
SCAQMD Regional Significance Thresholds

<i>Air Pollutant</i>	<i>Construction Phase</i>	<i>Operational Phase</i>
Volatile Organic Compounds (VOC)	75 lbs/day	55 lbs/day
Nitrogen Oxides (NO _x)	100 lbs/day	55 lbs/day
Carbon Monoxide (CO)	550 lbs/day	550 lbs/day
Sulfur Oxides (SO _x)	150 lbs/day	150 lbs/day
Particulates (PM ₁₀)	150 lbs/day	150 lbs/day
Fine particulates (PM _{2.5})	55 lbs/day	55 lbs/day
Lead (Pb) ¹	3 lbs/day	3 lbs/day

Source: SCAQMD 2011

¹ Lead is typically generated by industrial project and is not a pollutant of concern for the 2011 Approved Project or the 2012 Modified Project.

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CO Hotspot Thresholds

Localized CO impacts are determined based on the presence of congested intersections. The significance of localized project impacts depends on whether the project would cause substantial concentrations of CO. A project is considered to have a significant impact if project-related mobile-source emissions result in an exceedance of the California one-hour and eight-hour CO standards, which are:

- 1 hour = 20 parts per million
- 8 hour = 9 parts per million

Localized Significance Thresholds

The SCAQMD has developed localized significance thresholds (“LSTs”) for emissions of NO₂, CO, PM₁₀, and PM_{2.5} generated at a project site (off-site mobile-source emissions are not included the LST analysis). LSTs represent the maximum emissions at a project site that are not expected to cause or contribute to an exceedance of the most stringent federal or state AAQS. Projects larger than five acres can determine the localized significance for construction by performing dispersion modeling using the thresholds in Table 5.3-5 for emissions that exceed the LSTs.

Table 5.3-5
SCAQMD Localized Significance Thresholds

<i>Air Pollutant Standard (Relevant AAQS)</i>	<i>Concentration</i>
1-Hour CO Standard (CAAQS)	20 ppm
8-Hour CO Standard (CAAQS)	9.0 ppm
1-Hour NO ₂ Standard (CAAQS)	0.18 ppm
24-Hour PM ₁₀ Standard – Construction (SCAQMD) ¹	10.4 µg/m ³
24-Hour PM _{2.5} Standard – Construction (SCAQMD) ¹	10.4 µg/m ³
24-Hour PM ₁₀ Standard – Operation (SCAQMD) ¹	2.5 µg/m ³
24-Hour PM _{2.5} Standard – Operation (SCAQMD) ¹	2.5 µg/m ³

ppm – parts per million

µg/m³ – micrograms per cubic meter

¹ Threshold is based on SCAQMD Rule 403. Since the SoCAB is in nonattainment for PM₁₀ and PM_{2.5}, the threshold is established as an “allowable change” in concentration. Therefore, background concentration is irrelevant.

Health Risk Analysis

Whenever project activities would include the use of chemical compounds that have been identified in SCAQMD Rule 1401 relating to TACs, placed on CARB’s TAC list pursuant to AB 1807, or placed on the EPA’s National Emissions Standards for Hazardous Air Pollutants, a health risk assessment is required by the SCAQMD. Table 5.3-6 lists the SCAQMD’s TAC incremental risk thresholds for operation of a project. Residential, commercial, and office uses do not use substantial quantities of TACs and these thresholds are typically applied for new industrial projects. A health risk assessments was not performed for stationary sources for the 2012 Modified Project because the 2012 Modified Project does not propose changes to the types of non-residential land uses identified by the 2011 Approved Project.

Table 5.3-6

SCAQMD Toxic Air Contaminants Incremental Risk Thresholds

Maximum Individual Cancer Risk	≥ 10 in 1 million
Cancer Burden	≥ 0.5 excess cancer cases (in areas ≥ 1 in 1 million)
Hazard Index (project increment)	≥ 1.0

Source: SCAQMD 2011

5.3.3 The 2011 Approved Project

In analyzing the air quality related impacts of the 2011 Approved Project, the 2011 Certified EIR used SCAQMD’s CEQA Handbook methodologies and thresholds and identified the following conclusions regarding the air quality emissions.

- **AQMP Consistency:** The 2011 Certified EIR concluded that the emissions from the residential and non-residential land uses of the 2011 Approved Project would not impair SCAQMD’s ability to meet NAAQS or CAAQS.

Construction-Related Regional Air Quality Impacts: The 2011 Certified EIR concluded that construction air emissions would be above the significance thresholds for VOC, CO, NO_x, PM₁₀, and PM_{2.5}. The 2011 Certified EIR described the construction air impacts after mitigation as significant and unavoidable.

Operational Phase Regional Air Quality Impacts: The 2011 Certified EIR concluded that the operational emissions would exceed the significance thresholds for VOC, NO_x, CO, and PM_{2.5}, and would be significant after mitigation. Accordingly, the operational emissions were identified as a significant and unavoidable impact.

Localized Air Quality Impacts: The 2011 Certified EIR relied on an analysis that performed dispersion modeling to determine maximum localized concentrations of CO, NO_x, PM₁₀, and PM_{2.5} emissions at individual sensitive receptor locations during construction. It was concluded that the 2011 Approved Project would not result in significant impacts on local air quality resulting from construction. In addition, the 2011 Certified EIR demonstrated that there would be no CO exceedances caused by vehicular emissions when idling at intersections, therefore localized CO “hotspot” impacts of the 2011 Approved Project would be less than significant.

Cumulative Impacts: The 2011 Certified EIR concluded that even with the implementation of mitigation measures, PPPs, and PDFs, the 2011 Approved Project’s construction emissions would exceed the SCAQMD significance thresholds for VOC, NO_x, CO, PM₁₀, and PM_{2.5}. Therefore, the 2011 Approved Project’s contribution to cumulative air quality impacts was determined to be significant and unavoidable.

For long-term operations, the 2011 Certified EIR concluded that regional operational emissions of CO, VOC, NO_x, and PM_{2.5} would be cumulatively considerable. No significant cumulative impacts were identified with regard to CO hot spots.

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5.3.4 Environmental Impacts of the 2012 Modified Project

Modeling Methodology

Construction and operational phase emissions for the 2012 Modified Project were calculated using the California Emission Estimator Model (CalEEMod) Version 2011.1.1, developed by SCAQMD. Localized air dispersion modeling was performed using the US Environmental Protection Agency's Industrial Source Complex 3 Short Term (ISC3ST) model. The analysis includes the following emission sources (see Appendix C for additional details regarding modeling methodology and assumptions)

- **Construction:** one-time emissions associated with construction equipment, construction-related vehicle trips, and off-gas emissions from painting and paving. There are four major construction phases for an urban redevelopment: demolition, site preparation, grading, and building construction. The building construction phase can be broken down into three subphases: building construction, architectural painting, and asphalt paving. Air Quality emissions from these construction phases are largely attributable to fuel use from fuel combustion equipment and vehicles (e.g., construction equipment, hauling, delivery trucks, and worker commuting). The maximum daily construction emissions for the 2011 Approved Project occurred during the grading and site preparation phases. While the 2012 Modified Project may require additional vertical construction², the amount of site preparation and grading construction for the 2012 Modified Project that could occur on a given day is not expected to be any greater than estimated for the 2011 Approved Project. Therefore, the maximum daily construction emissions for the 2012 Modified Project are not expected to be any greater than estimated for the 2011 Approved Project. The additional vertical construction may require additional worker transportation and materials transportation if the construction schedule were to be compressed due to market requirements. Even if this were the case, however, the maximum daily emissions are more likely to be driven by the activity during the site preparation and grading phases. Thus, the emissions from the transportation of these additional workers and materials during vertical construction would not lead to a change in the maximum daily emissions. Although the 2012 Modified Project incorporates the TCA Property into the boundaries of the proposed Combined PA 51, the addition of this acreage is not expected to meaningfully change the total construction emission estimates, since the incremental increase in area for construction is small and the maximum daily site preparation and grading activity is not expected to exceed what was estimated for the 2011 Approved Project.
- **Vegetation Changes:** one-time net carbon sequestration from approximately 18,000 new trees planted on the Proposed Project Site in addition to those incorporated into the 2011 Approved Project.
- **Area Sources:** annual emissions associated with landscape maintenance-related fuel combustion sources, such as lawn mowers, and from natural gas fireplaces. No substantial direct GHG emissions would result from consumer products and architectural coating. Based on information provided by the Applicant, 4,350 dwelling units were assumed to contain natural gas fireplaces for the 2011 Approved Project. For the 2012 Modified Project, 8,444 dwelling units were assumed to contain fireplaces without the optional conversion, and 9,511 dwelling units were

² In the context of this evaluation, "vertical construction" refers to the construction of the building structure as opposed to "horizontal construction" which is related to activities such as demolition and site preparation.

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assumed to contain fireplaces with the optional conversion.³ The landscape-related emissions for the 2012 Modified Project (with and without optional conversion) were reduced by 28% from the CalEEMod defaults, to more accurately represent the type of development and the amount landscaping therein planned in the 2012 Modified Project.

- **Mobile Sources:** annual emissions associated with daily operation of vehicles generated by each project in the post-2030 scenario. Mobile-source emissions are based on the trip rates utilized in the traffic study for the 2012 Modified Project prepared by Urban Crossroads (Appendix K), which are based on the ITAM, a travel-demand estimator. Fleet mix for the land uses is derived from SCAG's traffic model validation and ITE truck trip information. Passenger vehicle fleet mix is based on the Orange County fleet mix; however, the fleet mix for truck trips was assigned according to the SCAG model validation, where available. Reductions in vehicle miles traveled ("VMT") are based on CAPCOA's Quantifying Greenhouse Gas Mitigation Measures for "compact infill" and urban trip lengths since the Proposed Project Site is located near an urban center and transit. The 2011 Approved Project was considered a compact infill development and the 2012 Modified Project will further improve the jobs/housing balance in the region by increasing the amount of residential units while at the same time reducing the amount of non-residential uses; as a result, the 2012 Modified Project reduces the 2011 Approved Project's significant impact on the jobs/housing balance to less than significant. The 2012 Modified Project is also expected to maintain characteristics typical of compact infill development, as described above, and similar to those in the 2011 Approved Project. Reductions are based on a density of approximately 9.6 dwelling units per acre to 11 dwelling units per acre, location no more than two miles from downtown or job center, four miles from a transit center, inclusion of up to an additional 512 (without the option conversion) to up to 645 (with the optional conversion) below-market-rate units, and connecting pedestrian and bike paths within the Proposed Project Site and offsite. The Proposed Project Site will have a density of intersections per square mile that is similar to 2011 Approved Project. As a result, the 2012 Modified Project and 2011 Approved Projects could result in an over 30 percent reduction in vehicle miles traveled ("VMT") compared to the statewide average for a typical similar type of land-use development. However, according to the CAPCOA Manual, a limited number of case studies in Southern California described as compact infill show slightly lower levels of reductions. Therefore, to be conservative, it was assumed that there would be only a 25 percent reduction in VMT, which is within the range observed in Southern California.

Existing Plans, Programs, and Policies

The following measures are existing plans, programs, or policies ("PPP") that apply to both the 2011 Approved Project and the 2012 Modified Project that will help to reduce and avoid their respective potential impacts related to air quality:

- PPP 3-1 **SCAQMD Rule 201 – Permit to Construct:** The SCAQMD requires developers who build, install, or replace any equipment or agricultural permit unit, which may cause new emissions of or reduce, eliminate, or control emissions of air contaminants to obtain a permit to construct from the Executive Officer.

³ Electrical fireplaces, if incorporated instead of natural gas fireplaces, would result in decreased GHG emissions compared to a similar sized natural gas fireplace.

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- PPP 3-2 **SCAQMD Rule 402 – Nuisance Odors:** The SCAQMD prohibits the discharge of any 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, or have a natural tendency to cause, injury or damage to business or property to be emitted within the SoCAB.
- PPP 3-3 **SCAQMD Rule 403 – Fugitive Dust (PM₁₀ and PM_{2.5}):** The SCAQMD prohibits any person to cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that: (a) the dust remains visible in the atmosphere beyond the property line of the emission source; or (b) the dust emission exceeds 20 percent opacity (as determined by the appropriate test method included in the Rule 403 Implementation Handbook) if the dust emission is the result of movement of a motorized vehicle.
- PPP 3-4 **SCAQMD Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities:** This rule specifies work practice requirements to limit asbestos emissions from building demolition and renovation activities, including the removal and associated disturbance of asbestos-containing materials (ACM). All operators are required to maintain records, including waste shipment records, and are required to use appropriate warning labels, signs, and markings.
- PPP 3-5 **SCAQMD Rule 445 – Wood-Burning Devices:** SCAQMD prohibits installation of wood-burning devices such as fire places and wood-burning stoves in new development unless the development is located at an elevation above 3,000 feet or if existing infrastructure for natural gas service is not available within 150-feet of the development. All fireplaces installed within the Proposed Project Site will be natural gas fueled fireplaces.

Project Design Features

The following project design features (“PDFs”) have been incorporated into the 2012 Modified Project and will help reduce or avoid its potential air quality impacts.

- PDF 4-1 **Compact/Mixed-Use Development:** The California Energy Commission (CEC) considers compact development forms beneficial for minimizing energy consumption that leads to greenhouse gas emissions. In fact, the CEC’s report on the connections between land use and climate change identifies density as the project feature most predictive of the number of vehicle trips and vehicle miles traveled (“VMT”) by project occupants. Like the 2011 Approved Project, the 2012 Modified Project increases the density of development on the Proposed Project Site. Doing so will tend to reduce VMT on a local and regional basis. For the purpose of this analysis, it was assumed that there would be only a 25% reduction in VMT, which is within the range observed in Southern California.
- PDF 4-2 **High Rate of Internal Trip Capture:** With the inclusion of a mix of land uses including office, commercial, industrial, and residential in the Proposed Project Site, the 2012 Modified Project significantly reduces trips outside the Proposed Project Site. This reduces trip length and congestion on the local circulation system outside the Proposed Project Site.

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PDF 4-7 **Energy Star Appliances:** EnergyStar appliances (excluding refrigerators), such as dishwashers, clothes washers, clothes dryers, air conditions, furnaces, and water heaters, shall be offered or installed in all residential dwelling units.

PDF 4-8 **Building Energy Efficiency:** Residential dwellings and non-residential buildings will be constructed so that they achieve 15 percent higher energy efficiency than the applicable standards set forth in the 2008 California Building and Energy Efficiency Standards (Title 24, Part 6 of the California Building Code) or meet the standards in effect at the time of issuance of building permit. The Energy Commission's 2013 Building Energy Efficiency Standards are 25 percent more efficient than the 2008 standards for residential construction and 30 percent more efficient for nonresidential construction. The 2013 Energy Efficiency Standards, which take effect on January 1, 2014, offer builders more efficient windows, insulation, lighting, ventilation systems and other options that would reduce energy consumption in homes and businesses.

The following impact analysis addresses impacts that the Initial Study for the 2012 Modified Project disclosed as potentially significant impacts of the 2012 Modified Project, as compared to the 2011 Approved Project. The applicable potential impacts are identified in brackets after the impact statement.

IMPACT 5.3-1: THE MODIFIED PROJECT IS CONSISTENT WITH THE APPLICABLE AIR QUALITY MANAGEMENT PLAN. [IMPACT AQ-1]

Impact Analysis: The AQMP strategy is a macro-level analysis based on projections from local general plans. The land use designations of the Proposed Project Site are, in part, the foundation for the emissions inventory for the SoCAB in the AQMP. The AQMP is based on projections in population, employment, and VMT in the SoCAB region as projected by SCAG. The two criteria for determining whether a project is consistent with the AQMP are: (1) whether the project would result in an increase in the frequency or severity of existing air quality violations, cause or contribute to new violations, or delay timely attainment of air quality standards and (2) whether the project would exceed the assumptions in the AQMP.

Criterion 1

As shown in Table 5.3.5, SoCAB is designated by the state and USEPA as nonattainment for O₃, PM₁₀, PM_{2.5}. The state has designated SoCAB as nonattainment for NO₂. The analyses below of the criteria pollutant emissions during construction and operations demonstrate that, like the 2011 Approved Project, the 2012 Modified Project would result in short-term and long-term emissions that could potentially cause an increase in the frequency or severity of existing air quality violations, cause or contribute to new violations, or delay timely attainment of air quality standards.

Criterion 2

The 2012 Modified Project proposes a General Plan Amendment to allow an additional 4,606 dwelling units (3,412 base units and 1,194 DB units) or up to 5,806 dwelling units if the optional conversion is implemented. The 2012 Modified Project also proposes a General Plan Amendment to allow 3,364,000 square feet of Medical and Science, 1,1318,200 square feet of non-residential Multi-Use (with an optional conversion to convert up to 535,000 square feet of the Multi-Use to residential units), and 220,000 square feet of Community Commercial. Because the 2012 Modified Project would accommodate a mix of office,

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retail, and residential uses within walking distance, the residents within the Proposed Project Site and surrounding area would have less of a need to travel long distances to employment centers. In addition, although the 2012 Modified Project does increase the number of allowable residential units in the proposed Combined PA 51, as compared to the 2011 Approved Project, there is a corresponding decrease in the allowable amount of non-residential square footage.

The 2007 AQMP is designed to accommodate expected future population, housing, and employment growth such as the 2012 Modified Project. The 2007 AQMP is based on SCAG's 2004 regional population, housing and employment projections. Those housing projections were 7 percent (400,000 units) higher than the current draft 2012 AQMP projections for the region for 2030, the horizon forecast year for the 2004 growth projections. Further, as described in the draft 2012 AQMP, SCAG's current data find that, in 2008, housing units in the SoCAB were 2 percent (100,000 units) below SCAG 2004 projections for 2008. The extended economic downturn, which continues to the present time, has further depressed housing growth. As a result, the 2012 Modified Project's increase in housing units is accommodated by the 100,000 existing excess units and estimated 400,000 total excess housing units by 2030 projected in the 2007 AQMP.

Further, the increase in residential units, vehicle trips, and resultant emissions would not be adverse in light of City, regional, and State plans and policies that favor increased housing production, jobs/housing balance, and workforce housing near employment concentrations such as the Irvine Spectrum and the Irvine Business Center. By providing additional residential uses, the 2012 Modified Project would respond to City policies that encourage a balance of housing and job opportunities, as well as regional policies aimed at reducing home-to-work travel through the placement of housing in the vicinity of major employment centers, activity nodes, and in proximity to transit opportunities. Development of the 2012 Modified Project would also help accommodate growth already anticipated in current local and regional plans and policies in a manner that responds to the most prominent need: more housing units. Specifically, the additional residential units of the 2012 Modified Project address the existing and projected need for more housing in Orange County as whole, as well as jobs-rich areas such as Irvine, as discussed in more detail in Section 5.9, *Population and Housing*, of this DSSEIR.

Although certain of the estimated criteria pollutant emissions would exceed SCAQMD thresholds, as reported below, the 2012 Modified Project would be actually be consistent with the 2007 AQMP, in part because it furthers the objectives of SCAG's Regional Comprehensive Plan to increase residential density in close proximity to existing employment and transportation centers. Moreover, due to the nonattainment status of the basin, and because the 2012 Modified Project is an infill project with transit friendly land uses, it would not conflict or obstruct the 2007 AQMP. The 2012 Modified Project is consistent with the 2007 AQMP because it furthers the objectives of SCAG's Regional Comprehensive Plan to increase residential density in close proximity to existing employment and transportation centers. Impacts would remain less than significant.

IMPACT 5.3-2: CONSTRUCTION EMISSIONS OF THE 2012 MODIFIED PROJECT WOULD, LIKE THE 2011 APPROVED PROJECT, EXCEED SCAQMD'S EMISSIONS THRESHOLDS FOR VOC, NO_x, CO, PM₁₀, AND PM_{2.5}. [IMPACT AQ-2 AND AQ-3]

Impact Analysis:

The construction emissions for the 2011 Approved Project have not been analyzed again and those of the 2012 Modified Project (with and without optional conversion) have not been analyzed. The emissions

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from the off-road equipment associated with construction would be approximately the same for the 2012 Modified Project as for the 2011 Approved Project; merely changing the type of certain of the buildings and increasing density primarily through vertical construction would likely not result in any change to the maximum daily construction emissions as discussed above in Section 5.3.4. Accordingly, this potential increase in construction transportation emissions is not expected to change the results of the assessment done for the 2011 Approved Project in the 2011 Certified EIR. While the TCA Property is being added to Combined PA 51, the addition of these acres is also not expected to change the construction emission estimates since the maximum construction activity on any given day is not expected to increase. Therefore, there is no incremental change in construction criteria pollutant emissions for the 2012 Modified Project as compared to the 2011 Approved Project.

As with the 2011 Approved Project, mass criteria air pollutant emissions during construction of the 2012 Modified Project of VOC, NO_x, CO, PM₁₀, and PM_{2.5} would be greater than the applicable SCAQMD mass daily thresholds and are therefore significant. With the approval of the 2012 Modified Project, the construction criteria pollutant emissions and resulting impacts would be the same as the 2011 Approved Project's construction criteria pollutant emissions and resulting impacts reported in the 2011 Certified EIR.

IMPACT 5.3-3: *LONG-TERM OPERATION OF THE 2012 MODIFIED PROJECT WOULD, LIKE THE 2011 APPROVED PROJECT, EXCEED SCAQMD'S EMISSIONS THRESHOLDS FOR VOC, NO_x, CO, AND PM_{2.5}. [IMPACT AQ-2 AND AQ-3]*

Impact Analysis: The results of the CalEEMod computer modeling are reported in Tables 5.3-7, and 5.3-8. As shown in those tables, like those of the 2011 Approved Project, the operational emissions for the 2012 Modified Project (with and without the optional conversions) exceed the SCAQMD's thresholds for VOC, NO_x, CO, and PM_{2.5}, but not for PM₁₀ and SO₂. As those tables also show, the 2012 Modified Project's emissions exceed the 2011 Approved Project's emissions. The City has considered whether there are additional feasible mitigation measures that would reduce the 2012 Modified Project's increased emissions as compared to the 2011 Approved Project, but has concluded that all feasible mitigation measures have already been adopted in the MMRP for the 2011 Approved Project. Therefore, like the 2011 Approved Project, the operational emissions of the 2012 Modified Project (with and without optional conversions) of VOC, NO_x, CO, and PM_{2.5} are considered to be significant and unavoidable under the SCAQMD thresholds; however, like the 2011 Approved Project, the operational emissions of the 2012 Modified Project (with and without optional conversions) of PM₁₀ and SO₂ are less than significant according to the SCAQMD thresholds.

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Table 5.3-7

Summary Comparison of Operational CAP Emissions, 2011 Approved Project and 2012 Modified Project without Optional Conversion, Heritage Fields, Irvine California

Category ¹	VOC		CO		SO ₂		NO _x		PM ₁₀		PM _{2.5}	
	2011 Approved Project (GPN)	2012 Modified Project										
Annual Emissions Associated with Project2												
<i>tons/year</i>												
Area	56	78	54	104	0	0	0.61	1.20	0.52	1.0	0.52	1.0
Natural Gas Use	1.3	1.8	6.6	8.5	0.06	0.10	11	16	0.88	1.3	0.88	1.3
Traffic	49	52	393	417	1.5	1.6	69	68	13	14	8.5	8.9
Total	107	132	453	529	1.6	1.7	81	85	14	16	9.9	11.1
Daily Maximum Emissions Associated with Project2												
<i>maximum lb/day</i>												
Area	315	442	294	571	0.01	0.03	3.4	6.5	7.5	14	7.4	14.4
Natural Gas Use	7.0	10	36	47	0.36	0.55	61	87	4.8	6.9	4.8	6.9
Traffic	303	326	2,399	2,569	9.6	10	425	435	79	83	52	55
Total	625	779	2,729	3,187	10	11	489	529	91	105	64	76
Mass Daily Threshold	55		550		150		55		150		55	
Exceed Threshold	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES

¹ All operational categories presented in the previous operational tables and are relevant to standards.

² Emissions estimated using CalEEMod or methodologies described in the text.

³ The Main Street options do not result in changes in land use or traffic assumptions, their emissions are equivalent. Therefore, no distinctions for these two options are made in this table.

⁴ GPN – Great Park Neighborhoods

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Table 5.3-8

Summary Comparison of Operational CAP Emissions, 2011 Approved Project and 2012 Modified Project with Optional Conversion, Heritage Fields, Irvine California

Category ¹	VOC		CO		SO ₂		NO _x		PM ₁₀		PM _{2.5}	
	2011 Approved Project (GPN)	2012 Modified Project	2011 Approved Project (GPN)	2012 Modified Project	2011 Approved Project (GPN)	2012 Modified Project	2011 Approved Project (GPN)	2012 Modified Project	2011 Approved Project (GPN)	2012 Modified Project	2011 Approved Project (GPN)	2012 Modified Project
Annual Emissions Associated with Project²												
<i>tons/year</i>												
Area	56	82	54	117	0	0	0.61	1.3	0.52	1.1	0.52	1.1
Natural Gas Use	1.3	2.0	6.6	8.9	0.06	0.11	11	17	0.88	1.4	0.88	1.4
Traffic	49	52	393	417	1.5	1.6	69	68	13	14	8.5	8.9
Total	107	136	453	543	1.6	1.7	81	87	14	16	9.9	11
Daily Maximum Emissions Associated with Project²												
<i>maximum lb/day</i>												
Area	315	464	294	643	0.01	0.04	3.4	7.4	7.5	16	7.4	16
Natural Gas Use	7.0	11	36	49	0.36	0.59	61	93	4.8	7.5	4.8	7.5
Traffic	303	326	2,399	2,569	9.6	10	425	435	79	84	52	55
Total	625	801	2,729	3,261	10	11	489	536	91	108	64	79
Mass Daily Threshold	55		550		150		55		150		55	
Exceed Threshold	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES

¹ All operational categories presented in the previous operational tables and are relevant to standards.

² Emissions estimated using CalEEMod or methodologies described in the text.

³ The Main Street options do not result in changes in land use or traffic assumptions, their emissions are equivalent. Therefore, no distinctions for these two options are made in this table.

⁴ GPN – Great Park Neighborhoods

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*Table 5.3-9
Maximum Daily Operational Phase Emission Comparison*

Summary	Maximum Daily Emissions (lbs/day) – Winter or Summer					
	VOC	CO	SO ₂	NO _x	PM ₁₀	PM _{2.5}
2011 Approved Project ¹	625	2729	10	489	91	64
2012 Modified Project Without Optional Conversion						
Operational Emissions ¹	779	3187	11	529	105	76
Increase over 2011 Approved Project	154	458	1	40	14	12
Exceeds Threshold?	YES	NO	NO	NO	NO	NO
SCAQMD Threshold	55	550	150	55	150	55
2012 Modified Project With Optional Conversion						
Operational Emissions ¹	801	3261	11	536	108	79
Increase over 2011 Approved Project	176	532	1	47	17	15
Exceeds Threshold?	YES	NO	NO	NO	NO	NO
SCAQMD Threshold	55	550	150	55	150	55

¹ Source: ENVIRON 2011.

Bold = Exceeds SCAQMD Threshold

IMPACT 5.3-4: AS COMPARED TO THE 2011 APPROVED PROJECT, CONSTRUCTION OF THE 2012 MODIFIED PROJECT WOULD NOT EXPOSE SENSITIVE RECEPTORS TO SIGNIFICANT AIR POLLUTANT CONCENTRATIONS. [IMPACT AQ-4]

Impact Analysis: The SCAQMD's LST methodology was developed to ensure that a development project would not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standards or to an increase of PM emissions in excess of the control requirement in SCAQMD Rule 403. SCAQMD recommends that construction projects larger than five acres model the CO, NO₂, PM₁₀ and PM_{2.5} emissions to determine if they are below the applicable ambient air quality thresholds. For pollutants in an attainment area (the SoCAB is classified as an attainment area for NO₂ and CO), SCAQMD suggests that the background concentrations be determined and added to the results of the air dispersion modeling to determine if ambient air standards would be violated.⁴ For pollutants in a non-attainment area (the SoCAB is classified as a non-attainment area for PM₁₀ and PM_{2.5}), SCAQMD has determined that concentrations estimated using the modeling guidance provided by SCAQMD to be below 10.4 µg/m³ in a 24-hour averaging period will result in a less-than-significant impact as discussed in its LST guidance.

As noted above, dispersion modeling to evaluate LST during construction was not conducted in the Air Quality Report (Environ 2012) for the 2012 Modified Project because with the approval of the 2012 Modified Project (with and without the optional conversion), the construction concentrations would be

⁴ SCAQMD. 2008. Final Localized Significance Threshold Methodology. Available at: <http://www.aqmd.gov/ceqa/handbook/lst/lst.html>.

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approximately the same as for the 2011 Approved Project calculated in the 2011 Certified EIR. Merely changing the type of buildings and increasing density primarily through vertical construction would result in no change to the maximum daily construction emissions for the 2012 Modified Project as discussed in Section 5.3.4. The anticipated amount of off-road construction equipment is assumed to remain approximately the same. The 2012 Modified Project has the potential to result in a longer vertical construction period but this not expected to change the maximum daily and annual onsite construction mass criteria pollutant emissions. The increased vertical construction period may result in an increase in offsite construction transportation emissions, but it is not expected to change the results of the assessment (i.e., the maximum daily construction emissions or the onsite annual emissions) as discussed above. While the TCA Property will be added to Combined PA 51, the addition of this property is also not expected to meaningfully change the conclusions of the previous construction LST evaluation in the 2011 Certified EIR since the maximum construction daily emissions on any given day is not expected to increase. Further, the addition of the TCA Property to Combined PA 51 is not likely to meaningfully change the location of the maximum impacted receptors since the modeling evaluation included receptors at the boundary of the construction areas, the location of the additional TCA Property area is not likely to influence the maximum impacted receptors. Therefore, like the 2011 Approved Project, impacts resulting from the construction emissions generated by the 2012 Modified Project (with and without the optional conversion) would be less than significant.

IMPACT 5.3-5: AS COMPARED TO THE 2011 APPROVED PROJECT, OPERATION OF THE 2012 MODIFIED PROJECT WOULD NOT EXPOSE SENSITIVE RECEPTORS TO ELEVATED CONCENTRATIONS OF CO AT INTERSECTIONS. [IMPACT AQ-4]

Impact Analysis: SCAQMD has adopted localized significance thresholds for onsite emissions. However, consistent with the 2011 Approved Project, the 2012 Modified Project does not contain any of the land uses, such as industrial, manufacturing, and warehousing land uses, that require a localized significant threshold analysis for operational emissions to be performed under SCAQMD's LST methodology.

With the turnover of older vehicles, introduction of cleaner fuels and implementation of control technology on industrial facilities, CO concentrations in the SCAQMD have steadily declined, based on historical data from the El Toro monitoring station (for the period from 1981 to 2000) and the Mission Viejo monitoring station (for the period from 2000 to 2008). Accordingly, with the steadily decreasing CO emissions from vehicles, even very busy intersections do not result in exceedances of the CO standard.

In the 1992 CO Plan, a CO hot spot analysis was conducted for four busy intersections in Los Angeles at the peak morning and afternoon time periods. The intersections evaluated included: Long Beach Blvd. and Imperial Highway (Lynwood); Wilshire Blvd. and Veteran Ave. (Westwood); Sunset Blvd. and Highland Ave. (Hollywood); and La Cienega Blvd. and Century Blvd. (Inglewood). These analyses concluded that there would not be a violation of CO standards at any four intersections. The busiest intersection evaluated was that at Wilshire Blvd. and Veteran Ave., which has a daily traffic volume of approximately 100,000 vehicles per day. The Los Angeles County Metropolitan Transportation Authority evaluated the LOS in the vicinity of the Wilshire Blvd./Veteran Ave. intersection and found it to be Level E at peak morning traffic and Level F at peak afternoon traffic. The 2003 AQMP estimated that 1-hour concentration for this intersection was 4.6 ppm, which indicates that the most stringent 1-hour CO standard (20.0 ppm) would likely not be exceeded until the daily traffic at the intersection exceeded more

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than 400,000 vehicles per day.⁵ According to the *Heritage Fields Project 2012 General Plan Amendment / Zone Change Traffic Impact Analysis* (the "Traffic Study"), attached as Appendix I to this DSSEIR, the highest average daily trips, at buildout of the 2012 Modified Project, on a segment of road would be 83,200 for Bake Parkway, between Rockfield Boulevard and Marine Way, which is lower than the daily trip volumes studied by SCAQMD for the busy Los Angeles intersections discussed above. The highest average daily trips at an individual intersection at buildout of the 2012 Modified Project would be approximately 120,604 at the Jamboree Road and Barranca Parkway intersection⁶, which is below the daily traffic volumes that would be expected to generate CO exceedances as evaluated in the 2003 AQMP. This daily trip estimate is based on the peak hour conditions of the intersection. There is no reason unique to SoCAB meteorology to conclude that the CO concentrations at the Jamboree Road and Barranca Parkway intersection would exceed the 1-hour COs standard if modeled in detail, based on the studies undertaken for the 2003 AQMP. Thus, the Air Quality Technical Report (Appendix C to this DSSEIR) determined that a carbon monoxide (CO) "hot spots" analysis is not needed to determine whether the change in the level of service (LOS) of an intersection due to the 2012 Modified Project would have the potential to result in exceedances of the California or National Ambient Air Quality Standards (CAAQS or NAAQS). Based on the above, operation of the 2012 Modified Project, like the operation of the 2011 Approved project, would not have a significant impact related to elevated concentrations of CO at intersections.

5.3.5 Cumulative Impacts

In accordance with the SCAQMD's *CEQA Air Quality Analysis Handbook*, any project that produces a significant project-level regional air quality impact in an area that is in nonattainment adds to the cumulative impact. Cumulative projects within the local area include buildout consistent with the City of Irvine General Plan, projects under construction, and approved projects (refer to Chapter 4, *Environmental Setting*). The greatest source of emissions within the SoCAB is from mobile sources. Due to the extent of the area potentially impacted from cumulative project emissions, the SCAQMD considers a project cumulatively significant when project-related emissions exceed the SCAQMD regional emissions thresholds shown above in Tables 5.3-7 and 5.3-8 (ENVIRON 2012).

Construction

The SoCAB is designated nonattainment for O₃, PM₁₀⁷, PM_{2.5}, and lead (Los Angeles County only) under the California and national AAQS, and nonattainment for NO₂ under the California AAQS. Construction of cumulative projects will further degrade the regional air quality. Already-imposed mitigation measures from the 2011 Certified EIR and associated MMRP, as well as PPPs and PDFs specified for the 2012 Modified Project will assist in mitigating these cumulative impacts and PPPs can be applied to all similar cumulative projects. However, even with the implementation of mitigation measures, PPPs, and PDFs, the 2012 Modified Project's construction emissions would still exceed the SCAQMD significance thresholds for VOC, NO_x, CO, PM₁₀, and PM_{2.5}. Therefore, consistent with the 2011 Approved Project, the 2012 Modified Project's contribution to cumulative air quality impacts would be significant.

⁵ Based on the ratio of the CO standard (20.0 ppm) and the modeled value (4.6 ppm).

⁶ Urban Crossroads, 2012. *Heritage Fields Project 2012 GPA/ZC Traffic Impact Analysis. Appendix 8.5*

⁷ CARB approved the SCAQMD's request to redesignate the SoCAB from serious nonattainment for PM₁₀ to attainment for PM₁₀ under the National AAQS on March 25, 2010 because the SoCAB did not violated federal 24-hour PM₁₀ standards during the period from 2004 to 2007. However, the USEPA has not yet approved this request.

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Operation

For operational air quality emissions, any project that does not exceed or can be mitigated to less than the daily regional threshold values is not considered by the SCAQMD to be a substantial source of air pollution and does not add significantly to a cumulative impact. As discussed above, operation of both the 2011 Approved Project and the 2012 Modified Project would result in emissions in excess of the SCAQMD regional daily emissions thresholds for VOC, NO_x, CO, and PM_{2.5}. Therefore, both the 2011 Approved Project's and the 2012 Modified Project's contribution to cumulative operational air quality impacts would be significant.

5.3.6 Applicable Mitigation Measures from the 2011 Certified EIR

The following mitigation measures were adopted in the MMRP for the 2011 Approved Project. These mitigation measures apply to the 2012 Modified Project.

Construction Phase

AQ-1 Prior to the start of demolition and construction within the project area, adjacent sensitive receptors shall be informed of the planned demolition and construction activities. Measures to avoid significantly impacting these receptors shall be developed and implemented by the project proponent in coordination with these uses. Other applicable mitigation measures such as erection of fences around construction areas; staggered use of equipment near sensitive receptors; diversion of truck trips away from receptors; etc.; shall be employed as necessary. Compliance with this measure shall be verified by the Director of Community Development.

AQ-2 Prior to the commencement of construction activities required to demolish and/or remove existing DON structures, including runways, the Director of Community Development shall receive and approve a construction emissions mitigation plan from the chosen demolition contractor. Prior to the issuance of grading permits, the applicant of any future development project shall submit, and the Director of Community Development shall approve a construction emissions mitigation plan. The plan shall identify implementation procedures for each of the following emissions reduction measures and all feasible mitigation measures shall be implemented. If certain measures are determined infeasible, an explanation thereof shall be provided.

- Utilize off-road construction equipment that conforms to Tier 3 of the United States Environmental Protection Agency, or higher emissions standards for construction equipment over 50 horsepower that are commercially available. The construction contractor shall be made aware of this requirement prior to the start of construction activities. Use of commercially available Tier 3 or higher off-road equipment, which is:
 - Year 2006 or newer construction equipment for engines rated equal to 175 horsepower (hp) and greater;
 - Year 2007 and newer construction equipment for engines rated equal to 100 hp but less than 175 hp; and

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- Year 2008 and newer construction equipment for engines rated equal to or greater than 50 hp but less than 100 hp.

The requirement to use such equipment shall be stated on all grading plans. The construction contractor shall maintain a list of all operating equipment in use on the project site. The construction equipment list shall state the makes, models, and numbers of construction equipment on-site.

- Water exposed soils at least three times daily and maintain equipment and vehicle engines in good condition and in proper tune.
- Wash off trucks leaving the site.
- Replace ground cover on construction sites when it is determined that the site will be undisturbed for lengthy periods.
- Reduce speeds on unpaved roads to less than 15 miles per hour.
- Halt all grading and excavation operations when wind speeds exceed 25 miles per hour.
- Suspend all emission generating activities during smog alerts.
- Use propane- or butane-powered on-site mobile equipment instead of diesel/gasoline, whenever feasible.
- Properly maintain diesel-powered on-site mobile equipment.
- Prohibit nonessential idling of construction equipment to five minutes or less in compliance with California Air Resources Board's Rule 2449.
- Sweep streets with SCAQMD Rule 1186 compliant PM₁₀-efficient vacuum units at the end of the day if substantial visible soil material is carried over to the adjacent streets.
- Use electricity from power poles rather than temporary on-site diesel- or gasoline-powered generators, whenever feasible.
- Use of low-VOC asphalt.
- Maintain a minimum 24-inch freeboard on trucks hauling dirt, sand, soil, or other loose materials and tarp materials with a fabric cover or other suitable means.
- Provide temporary traffic controls (e.g., flag persons) during all phases of construction to ensure minimum disruption of traffic.
- Schedule construction activities that affect traffic flow on adjoining streets to off-peak hours to the extent possible.

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- Reroute construction trucks away from congested streets, whenever feasible.
- Provide dedicated turn lanes for movement of construction trucks and equipment on- and off-site, whenever feasible.
- Use coatings and solvents with a volatile organic compound (VOC) content lower than required under SCAQMD Rule 1113 (i.e., Super Compliant Paints). All architectural coatings shall be applied either by (1) using a high-volume, low-pressure spray method operated at an air pressure between 0.1 and 10 pounds per square inch gauge to achieve a 65 percent application efficiency; or (2) manual application using a paintbrush, hand-roller, trowel, spatula, dauber, rag, or sponge, to achieve a 100 percent application efficiency. The construction contractor shall also use pre-coated/natural colored building, where feasible. Use of low-VOC paints and spray method shall be included as a note on architectural building plans.

Operational Phase

AQ-3 Prior to the issuance of building permits for any future development, the applicant shall submit, and Director of Community Development shall have approved, an operation-emissions mitigation plan. The plan shall identify implementation procedures for each of the following emissions reduction measures and all feasible mitigation measures shall be implemented. If certain measures are determined infeasible, an explanation thereof shall be provided.

- Utilize built-in energy-efficient appliances to reduce energy consumption and emissions.
- Utilize energy-efficient and automated controls for air conditioners and lighting to reduce electricity consumption and associated emissions.
- Install special sunlight-filtering window coatings or double-paned windows to reduce thermal loss, whenever feasible.
- Utilize light-colored roofing materials as opposed to dark roofing materials to conserve electrical energy for air-conditioning.
- Provide shade trees in residential subdivisions as well as public areas, including parks, to reduce building heating and cooling needs, whenever feasible.
- Ensure that whenever feasible, commercial truck traffic is diverted from local roadways to off-peak periods.
- Centralize space heating and cooling for multiple-family dwelling units and commercial space.
- Orient buildings north/south for reducing energy-related combustion emissions.
- Use solar energy, when feasible.

- Use high rating insulation in walls and ceilings.

AQ-4 Prior to the issuance of building permits, future sales information on available housing and employment opportunities within the project area shall be provided to employees and residents of the project area, so as to encourage employees to live within the residential developments planned on-site and future residents to find employment nearby.

AQ-5 Prior to the issuance of building permits, the applicant shall demonstrate to the satisfaction of the Director of Community Development that future employment generating nonresidential development shall include measures to reduce vehicle trips including: the promotion of carpool incentives and alternative work schedules, easy access to public transit systems, trail linkages between uses, low emissions vehicles fleets, and the provision of on-site facilities such as banking and food courts, and bicycle parking facilities, and other transportation demand management measures, as deemed appropriate.

5.3.7 Level of Significance Before Additional Mitigation

Upon implementation of regulatory requirements, standard conditions of approval, PPPs, PDFs, and the above-listed mitigation measures adopted in the MMRP for the 2011 Approved Project, the following impacts would be less than significant for the 2012 Modified Project: Impact 5.3-1, 5.3-4, and 5.3-5.

Upon implementation of regulatory requirements, standard conditions of approval, PPPs, PDFs, and the above-listed mitigation measures adopted in the MMRP for the 2011 Approved Project, the following impacts would be significant (as they were for the 2011 Approved Project): 5.3-2 and 5.3-3.

5.3.8 Additional Mitigation Measures for the 2012 Modified Project

No additional mitigation measures are identified that would reduce the 2012 Modified Project's construction and operational air pollutant emissions to less than significant levels.

5.3.9 Level of Significance After Additional Mitigation

Impact 5.3-2

Like the 2011 Approved Project, the 2012 Modified Project would result in significant and unavoidable short-term construction air quality impacts due to emissions of VOC, NO_x, CO, PM₁₀ and PM_{2.5} at levels above the applicable thresholds. PPPs 3-1 through 3-4 and Mitigation Measures AQ-1 and AQ-2 would reduce construction emissions to the extent feasible. However, like the 2011 Approved Project, Impact 5.3-2 would remain significant and unavoidable even after mitigation.

Impact 5.3-3

Like the 2011 Approved Project, long-term operation of the 2012 Modified Project (with, and without optional conversion) would result in significant and unavoidable impacts due to emissions of VOC, NO_x, CO, and PM_{2.5}. PPP 3-5, PDFs 4-1, 4-2, 4-7, and 4-8, and Mitigation Measures AQ-3 through AQ-5 would reduce operational phase air quality impacts to the extent feasible. However, like the 2011 Approved Project, Impact 5.3-3 would remain significant and unavoidable even after mitigation.

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