4.2 AIR QUALITY

4.2.1 Introduction

This section of the EIR provides an evaluation of potential air quality impacts that could occur with implementation of the Proposed Project. Information in this section is based on the "Air Quality Assessment and Diesel Particulates Health Risk Assessment" prepared by Mestre Greve Associates dated October 5, 2011, October 10, 2011, respectively. The Air Quality Studies are included in Appendix B.

4.2.2 Environmental Setting

Regional Setting

The Proposed Project is located in the South Coast Air Basin (SCAB). The SCAB is comprised of parts of Los Angeles, Riverside and San Bernardino counties and all of Orange County. The basin is bounded on the west by the Pacific Ocean, the San Gabriel Mountains north, the San Bernardino Mountains north and east, the San Jacinto Mountains to the southeast, and Santa Ana Mountains to the south. The basin forms a low plain and the mountains channel and confines airflow, which trap air pollutants.

The primary agencies responsible for regulations to improve air quality in the SCAB are the South Coast Air Quality Management District (SCAQMD) and the California Air Resources Board (CARB). The Southern California Association of Governments (SCAG) is an important partner to the SCAQMD, as it is the designated metropolitan planning authority for the area and produces estimates of anticipated future growth and vehicular travel in the basin, which is used for air quality planning. The SCAQMD sets and enforces regulations for non-vehicular sources of air pollution in the basin and works with SCAG to develop and implement Transportation Control Measures (TCM). TCM measures are intended to reduce and improve vehicular travel and associated pollutant emissions.

CARB was established in 1967 by the California Legislature to attain and maintain healthy air quality, conduct research into the causes and solutions to air pollution, and systematically attack the serious problem caused by motor vehicles, which are the major causes of air pollution in the State. CARB sets and enforces emission standards for motor vehicles, fuels, and consumer products. It sets the health based California Ambient Air Quality Standards (CAAQS) and monitors air quality levels throughout the state.

CARB identifies and sets control measures for toxic air contaminants (TACs). The Board also performs air quality related research, provides compliance assistance for businesses, and produces education and outreach programs and materials. CARB provides assistance for local air quality districts, such as SCAQMD.

The U.S. Environmental Protection Agency (U.S. EPA) is the primary federal agency for regulating air quality. The EPA implements the provisions of the Federal Clean Air Act (FCAA). This Act establishes national ambient air quality standards (NAAQS) that are applicable

nationwide. The EPA designates areas with pollutant concentrations that do not meet the NAAQS as non-attainment areas for each criteria pollutant. States are required by the FCAA to prepare State Implementation Plans (SIP) for designated non-attainment areas. The SIP is required to demonstrate how the areas will attain the NAAQS by the prescribed deadlines and what measures will be required to attain the standards. The EPA also oversees implementation of the prescribed measures. Areas that achieve the NAAQS after a non-attainment designation are redesignated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the NAAQS.

The CCAA required all air pollution control districts in the state to prepare a plan prior to December 31, 1994 to reduce pollutant concentrations exceeding the CAAQS and ultimately achieve the CAAQS. The districts are required to review and revise these plans every three years. The SCAQMD satisfies this requirement through the publication of an Air Quality Management Plan (AQMP). The AQMP is developed by SCAQMD and SCAG in coordination with local governments and the private sector. The AQMP is incorporated into the SIP by CARB to satisfy the FCAA requirements.

Climate

The climate in and around the project area, as with all of Southern California, is controlled largely by the strength and position of the subtropical high pressure cell over the Pacific Ocean. It maintains moderate temperatures and comfortable humidity, and limits precipitation to a few storms during the winter "wet" season. Temperatures are normally mild, excepting the summer months, which commonly bring substantially higher temperatures. In all portions of the basin, temperatures well above 100 degrees F. have been recorded. The annual average temperature in the basin is approximately 62 degrees Fahrenheit.

Winds in the project area are usually driven by the dominant land/sea breeze circulation system. Regional wind patterns are dominated by daytime onshore sea breezes. At night, the wind generally slows and reverses direction traveling towards the sea. Wind direction will be altered by local canyons, with wind tending to flow parallel to the canyons. During the transition period from one wind pattern to the other, the dominant wind direction rotates into the south and causes a minor wind direction maximum from the south. The frequency of calm winds (less than 2 miles per hour) is less than 10 percent. Therefore, there is little stagnation in the project vicinity, especially during busy daytime traffic hours.

Southern California frequently has temperature inversions, which inhibit the dispersion of pollutants. Inversions may be either ground based or elevated. Grounds based inversions, sometimes referred to as radiation inversions, are most severe during clear, cold, early winter mornings. Under conditions of a ground-based inversion, very little mixing or turbulence occurs, and high concentrations of primary pollutants may occur local to major roadways. Elevated inversions can be generated by a variety of meteorological phenomena. Elevated inversions act as a lid or upper boundary and restrict vertical mixing. Below the elevated inversion, dispersion is not restricted. Mixing heights for elevated inversions are lower in the summer and more persistent. This low summer inversion puts a lid over the SCAB and is responsible for the high levels of ozone observed during summer months in the air basin.

Regulatory Setting

Both the State and the federal government have established health-based Ambient Air Quality Standards (AAQS) for six air pollutants. These pollutants are carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead, and suspended particulate matter ($PM_{2.5}$ and PM_{10}). Refer to Table 4.2-1 for both federal and State standards for these criteria pollutants. The State AAQS are more stringent than the federal AAQS.

Ozone (O_3)

Ozone is a secondary pollutant (it is not directly emitted). Ozone is the result of chemical reactions between volatile organic compounds (VOC) (also referred to as reactive organic gasses, ROG) and nitrogen oxides (NO_x). These occur only in the presence of bright sunlight. Sunlight and hot weather cause ground-level ozone to form in the air (aka. summertime air pollutant). Ground-level ozone is the primary constituent of smog. As ozone is formed in the atmosphere, high concentrations can occur in areas well away from sources of its constituent pollutants.

Children, older adults, and people with lung disease or who are active can be affected when ozone levels are unhealthy.

Particulate Matter (PM_{10} & $PM_{2.5}$)

Particulate matter includes both aerosols and solid particles of a wide range of size and composition. Of particular concern are those particles smaller than 10 microns in size (PM_{10}) and smaller than or equal to 2.5 microns ($PM_{2.5}$). The size of the particulate matter is referenced to the aerodynamic diameter of the particulate. Smaller particulates are of greater concern as they can penetrate deeper into the lungs than large particles.

The principal health effect of airborne particulate matter is on the respiratory system. Short-term exposures to high $PM_{2.5}$ levels are associated with premature mortality and increased hospital admissions and emergency room visits. Long-term exposures to high $PM_{2.5}$ levels are associated with premature mortality and development of chronic respiratory disease. Short-term exposures to high PM10 levels are associated with hospital admissions for cardiopulmonary diseases, increased respiratory symptoms and possible premature mortality. The EPA has concluded that available evidence does not suggest an association between long-term exposure to PM_{10} at current ambient levels and health effects.

$PM_{2.5}$ is directly emitted in combustion exhaust and formed from atmospheric reactions between of various gaseous pollutants including NO_x ,SO_x, and VOC. PM_{10} is generally emitted directly as a result of mechanical processes that crush or grind larger particles or the re suspension of dusts most typically through construction activities and vehicular travels. $PM_{2.5}$ can remain suspended in the atmosphere for days and weeks and can be transported long distances. PM_{10} generally settles out of the atmosphere rapidly and are not readily transported over large distances.

Table 4.2-1
State and Federal
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[2,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	---	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.07 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation*	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetic Analysis
	Annual Arithmetic Mean	20 µg/m^3		---		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetic Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation*	15 µg/m^3		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Nondispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Nondispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Gas Phase Chemiluminescence	53 ppb (100 µg/m^3)[8]	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (339 µg/m^3)		100 ppb (188 µg/m^3)[8]		
Lead[10]	30-day average	1.5 µg/m^3	Atomic Absorption	–	–	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average[11]	--		0.15 µg/m^3	Same as Primary Standard	
	Calendar Quarter	–		1.5 µg/m^3		
Sulfur Dioxide (SO_2)	24-Hour	0.04 ppm (105 µg/m^3)	Ultraviolet Fluorescence		–	Spectrophotometry (Pararosaniline Method)
	3-Hour	–		–	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		75 ppd (196 µg/m^3)[9]	–	
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Source: ARB, September 8, 2010.
1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.
8. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010). Note that the (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.
9. On June 2, 2010, the U.S. EPA established a new 1-hour SO2 standard, effective August 23, 2010, The secondary SO2 standard was not revised at that time; however, the secondary standard is undergoing a separate review by EPA. Note that the new standard is in units of parts per billion (ppb). California permeated State monitoring networks. The EPA also revoked both the existing 24-hour SO2 standard concentrations. EPA also proposed a new automated Federal Reference Method (FRM) using ultraviolet technology, but will retain the older pararosaniline methods until the new FRM have adequately EPA standards are in units of parts per billion (ppb). California standards are in units of parts per million which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum of 0.14 ppm and the annual primary SO2 standard of 0.030 ppm, effective August 23, 2010. standards are in units of parts per million (ppm). To directly compare the new primary national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
10. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
11. National lead standard, rolling 3-month average: final rule signed October 15, 2008.

Carbon Monoxide (CO)

Carbon monoxide (CO) is a colorless and odorless gas, which in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. CO combines with hemoglobin in the bloodstream and reduces the amount of oxygen that can be circulated through the body. High carbon monoxide concentrations can lead to headaches, aggravation of cardiovascular disease, and impairment of central nervous system functions. CO concentrations can vary greatly over comparatively short distances. Relatively high concentrations are typically found near crowded intersections, along heavily used roadways carrying slow-moving traffic, and at or near ground level. Even under the most severe meteorological and traffic conditions, high concentrations of carbon monoxide are limited to locations within a relatively short distance (i.e., up to 600 feet or 185 meters) of heavily traveled roadways. Overall CO emissions are decreasing as a result of the Federal Motor Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973.

Nitrogen Dioxide (NO_2)

Nitrogen gas, normally relatively inert (unreactive), comprises about 80% of the air. At high temperatures (i.e., in the combustion process) and under certain other conditions it can combine with oxygen, forming several different gaseous compounds collectively called NO_x. Nitric oxide (NO) and NO_2 are the two most important compounds. Nitric oxide is converted to nitrogen dioxide in the atmosphere. Nitrogen dioxide (NO_2) is a red-brown pungent gas. Motor vehicle emissions are the main source of NO_x in urban areas.

NO_2 is toxic to various animals as well as to humans. Its toxicity relates to its ability to form nitric acid with water in the eye, lung, mucus membrane and skin. In animals, long-term exposure to nitrogen oxides increases susceptibility to respiratory infections lowering their resistance to such diseases as pneumonia and influenza. Laboratory studies show susceptible humans, such as asthmatics, exposed to high concentrations of NO_2 can suffer lung irritation and potentially, lung damage. Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes and with hospital admissions for respiratory conditions.

NO_x is a combination of primarily NO and NO_2. While the NAAQS addresses NO_2, NO and the total group of nitrogen oxides are of concern. NO and NO_2 are both precursors in the formation of ozone and secondary particulate matter. Because of this and that NO emissions largely convert to NO_2, NO_x emissions are typically examined when assessing potential air quality impacts.

Sulfur Dioxide (SO_2)

Sulfur oxides (SO_x) constitute a class of compounds of which sulfur dioxide (SO_2) and sulfur trioxide (SO_3) are of greatest importance. Ninety-five percent of pollution related SO_x emissions are in the form of SO_2. SO_x emissions are typically examined when assessing potential air quality impacts of SO_2. Combustion of fossil fuels for generation of electric power is the primary contributor of SO_x emissions. Industrial processes, such as nonferrous metal smelting, also

contribute to SO_x emissions. SO_x is also formed during combustion of motor fuels. However, most of the sulfur has been removed from fuels greatly reducing SO_x emissions from vehicles.

SO_2 combines easily with water vapor, forming aerosols of sulfurous acid (H_2SO_3), a colorless, mildly corrosive liquid. This liquid may then combine with oxygen in the air, forming the even more irritating and corrosive sulfuric acid (H_2SO_4). Peak levels of SO_2 in the air can cause temporary breathing difficulty for people with asthma who are active outdoors. Longer-term exposures to high levels of SO_2 gas and particles cause respiratory illness and aggravate existing heart disease. SO_2 reacts with other chemicals in the air to form tiny sulfate particles which are measured as $PM_{2.5}$.

Lead (Pb)

Lead is a stable compound, which persists and accumulates both in the environment and in animals. In humans, it affects the blood-forming or hematopoietic, the nervous, and the renal systems. In addition, lead has been shown to affect the normal functions of the reproductive, endocrine, hepatic, cardiovascular, immunological, and gastrointestinal systems, although there is significant individual variability in response to lead exposure. Since 1975, lead emissions have been in decline due in part to the introduction of catalyst-equipped vehicles, and decline in production of leaded gasoline. In general, an analysis of lead is limited to projects that emit significant quantities of the pollutant (i.e. lead smelters) and are not applied to transportation projects.

Visibility Reducing Particulates

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. The Statewide standard is intended to limit the frequency and severity of visibility impairment due to regional haze. A separate standard for visibility-reducing particles that is applicable only in the Lake Tahoe Air Basin is based on reduction in scenic quality.

Sulfates

Sulfates 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 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.

The CARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease.

Sulfates are particularly effective in degrading visibility, and, due to fact that they are usually acidic, can harm ecosystems and damage materials and property.

Hydrogen Sulfide (H_2S)

Hydrogen sulfide (H_2S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. It can also be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation. Breathing H_2S at levels above the standard will result in exposure to a very disagreeable odor. In 1984, an ARB committee concluded that the ambient standard for H_2S is adequate to protect public health and to significantly reduce odor annoyance.

Vinyl Chloride (Chloroethene)

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.

Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure to vinyl chloride through inhalation and oral exposure causes in liver damage. Cancer is a major concern from exposure to vinyl chloride via inhalation. Vinyl chloride exposure has been shown to increase the risk of angiosarcoma, a rare form of liver cancer in humans.

Local Air Quality

Based on monitored air pollutant concentrations, the U.S. EPA and CARB designate areas relative to their status in attaining the NAAQS and CAAQS respectively. Table 4.2-2 lists the current attainment designations for the SCAB. For the Federal standards, the required attainment date is also shown. The Unclassified designation indicates that the air quality data for the area does not support a designation of attainment or nonattainment.

As shown in Table 4.2-2, the U.S. EPA has designated SCAB as Severe-17 non-attainment for ozone, serious non-attainment for PM_{10}, non-attainment for $PM_{2.5}$, and attainment/maintenance for CO and NO_2. The basin has been designated by the state as non-attainment for ozone, PM_{10}, and $PM_{2.5}$. For the federal designations, the qualifiers, Severe-17 and Serious, affect the required attainment dates as the federal regulations have different requirements for areas that exceed the standards by greater amounts at the time of attainment/non-attainment designation. The SCAB is designated as in attainment of the Federal SO_2 and lead NAAQS as well as the state CO, NO_2, SO_2, lead, hydrogen sulfide, and vinyl chloride CAAQS.

Table 4.2-2
Designations of Criteria Pollutants for the SCAB

Pollutant	Designation/Classification	
	Federal Standards	**State Standards**
Ozone	Severe-17 Nonattainment (2021)	Nonattainment
PM_{10}	Serious Nonattainment (2006)	Nonattainment
$PM_{2.5}$	Nonattainment (2015)	Nonattainment
Carbon Monoxide	Attainment/Maintenance (2000)	Attainment
Nitrogen Dioxide	Attainment/Maintenance (1995)	Attainment
Sulfur Dioxide	Attainment	Attainment
Lead (Particulate)	Attainment	Attainment
Hydrogen Sulfide	N/A	Attainment
Sulfates	N/A	Unclassified
Visibility Reducing Particles	N/A	Unclassified
Vinyl Chloride	N/A	Attainment

Source: CARB

In July 1997, U.S. EPA issued a new ozone NAAQS of 0.08 ppm using an 8-hour averaging time. Implementation of this standard was delayed by several lawsuits. Attainment/non-attainment designations for the new 8-hour ozone standard were issued on April 15, 2004 and became effective on June 15, 2005. The SCAB was designated severe-17 non-attainment, which requires attainment of the Federal Standard by June 15, 2021. As a part of the designation, the EPA announced that the 1-hour ozone standard would be revoked in June of 2005. Therefore, the 8-hour ozone standard attainment deadline of 2021 supersedes and replaces the previous 1-hour ozone standard attainment deadline of 2010.

The SCAQMD and CARB are requesting that U.S. EPA change the nonattainment status of the 8-hour ozone standard to extreme, which would extend the attainment date by three years to 2024.

On March 12, 2008, U.S. EPA announced that it was lowering the 8-hour average NAAQS for ozone to 0.075 ppm. Attainment/non-attainment designations for the revised standard are to be issued by March 2009 with attainment plans due by March 2013. Non-attainment areas will be required to meet the standards by deadlines that may vary based on the severity of the problem in the area that will be determined at time of attainment/non-attainment designation.

On April 28, 2005, CARB adopted an 8-hour ozone standard of 0.070 ppm. The California Office of Administrative Law approved the rulemaking and filed it with the Secretary of State on April 17, 2006. The standard became effective on May 17, 2006. California has retained the 1-hour concentration standard of 0.09 ppm. To be redesignated as attainment by the state the basin will need to achieve both the 1-hour and 8-hour ozone standards.

The SCAB was designated as moderate non-attainment of the PM_{10} standards when the designations were initially made in 1990 with a required attainment date of 1994. In 1993, the

basin was redesignated as serious non-attainment with a required attainment date of 2006 because it was apparent that the basin could not meet the PM_{10} standard by the 1994 deadline. As of 2006, the Basin had met the federal PM_{10} standards at all monitoring stations except the western Riverside where the annual PM_{10} standard had not been met. However, on September 21, 2006, the U.S. EPA announced that it was revoking the annual PM_{10} standard as research had indicated that there were no considerable health effects associated with long-term exposure to PM_{10}. With this change, the basin is technically in attainment of the federal PM_{10} standards although the redesignation process has not yet begun.

In July 1997, U.S. EPA issued NAAQS for $PM_{2.5}$. The $PM_{2.5}$ standards include an annual standard set at 15 micrograms per cubic meter ($\mu g/m^3$), based on the three-year average of annual mean $PM_{2.5}$ concentrations and a 24-hour standard of 65 $\mu g/m^3$, based on the three-year average of the 98th percentile of 24-hour concentrations. Implementation of these standards was delayed by several lawsuits. On January 5, 2005, EPA took final action to designate attainment and nonattainment areas under the NAAQS for $PM_{2.5}$ effective April 5, 2005. The SCAB was designated as non-attainment with an attainment required as soon as possible but no later than 2010. EPA may grant attainment date extensions of up to five years in areas with more severe $PM_{2.5}$ problems and where emissions control measures are not available or feasible.

On September 21, 2006, the U.S. EPA announced that the 24-hour $PM_{2.5}$ standard was lowered to 35 $\mu g/m^3$. Attainment/non-attainment designations for the revised $PM_{2.5}$ standard will be made by December of 2009 with an attainment date of April 2015 although an extension of up to five years could be granted by the U.S. EPA.

The Federal attainment deadline for CO was to be December 31, 2000 but at that time the basin still had measured exceedances of the CO NAAQS. The basin was granted an extension to attain the standard and has not had any violations of the federal CO standards since 2002. In March 2005, the South Coast AQMD adopted a CO Redesignation Request and Maintenance Plan. On May 11, 2007, the U.S. EPA announced approval of the Redesignation Request and Maintenance Plan and that, effective June 11, 2007, the SCAB would be re-designated as attainment/maintenance for the federal CO NAAQS. The plan provides for maintenance of the federal CO air quality standard until at least 2015 and commits to revising the Plan in 2013 to ensure maintenance through 2025.

The federal annual NO_2 standard was met for the first time in 1992 and has not been exceeded since. The SCAB was redesignated as attainment for NO_2 in 1998. The basin will remain a maintenance/attainment area until 2018, assuming the NO_2 standard is not exceeded.

4.2.3 Applicable Polices, Plans and Regulations

Federal

The CAA requires plans to demonstrate attainment of the NAAQS for which an area is designated as nonattainment. The CCAA requires SCAQMD to revise its plan to reduce pollutant concentrations exceeding the CAAQS every three years. In the SCAB, SCAQMD and SCAG, in coordination with local governments and the private sector, develop the Air Quality Management

Plan (AQMP) for the air basin to satisfy these requirements. The AQMP is the most important air management document for the basin because it provides the blueprint for meeting state and federal ambient air quality standards.

The l997 AQMP with the 1999 amendments is the current Federally approved applicable air plan for ozone. The successor 2003 AQMP was adopted locally on August 1, 2003, by the governing board of the SCAQMD. CARB adopted the plan as part of the California State Implementation Plan on October 23, 2003. The PM_{10} attainment plan from the 2003 AQMP received final approval from the U.S. EPA on November 14, 2005 with an effective date of December 14, 2005. As of February 14, 2007 the U.S. EPA had not acted on the ozone attainment plan of the 2003 AQMP. On this date, CARB announced that it was rescinding the ozone attainment plan from the 2003 AQMP with the intention to expedite approval of the 2007 AQMP. The 2007 AQMP was adopted by the SCAQMD on June 1, 2007. CARB adopted the plan as a part of the California State Implementation Plan on September 27, 2007. The State Implementation Plan was submitted to the U.S. EPA on November 16, 2007. The U.S. EPA has not taken action on the 2007 AQMP at this time.

Implementation of the 2007 AQMP is based on a series of control measures and strategies that vary by source type (i.e., stationary or mobile) as well as by the pollutant that is being targeted. Short-term and mid-term control measures are defined to achieve the $PM_{2.5}$ standard by 2015. These measures are designed to also contribute to reductions in ozone levels. Additional, long-term measures are defined to attain the 8-hour ozone standard by 2024. The measures rely on actions to be taken by several agencies that have statutory authority to implement such measures. Each control measure will be brought for regulatory consideration in a specified time frame. Control measures deemed infeasible will be substituted by other measures to achieve the total emission reduction target for each agency.

The control measures in the 2007 AQMP are based on facility modernization, energy efficiency and conservation, good management practices, market incentives/compliance flexibility, area source programs, emission growth management and mobile source programs. In addition, CARB has developed a plan of control strategies for sources controlled by CARB (i.e. on-road and off-road motor vehicles and consumer products). Further, Transportation Control Measures (TCM) defined in SCAG's Regional Transportation Plan (RTP) and Regional Transportation Improvement Program (RTIP) are needed to attain the standards.

The Final 2007 AQMP includes additional short- and mid-term control measures aimed at reducing emissions from sources that are primarily under state and federal jurisdiction including on-road and off-road mobile sources, and consumer products. Measures committed to be enacted by CARB include (1) improvements to the smog check program, (2) cleaner in-use heavy duty truck emission regulations, (3) increased regulations on goods movement sources including ships, harbor craft, and port trucks, (4) regulations for cleaner in-use off-road equipment including agricultural equipment, (5) various measures to reduce evaporative VOC emissions from fuel storage and dispensing, (6) tightened emission standards and product reformulation for consumer products that emit VOC's, and (7) reductions in emissions from pesticide applications.

State

Monitored Air Quality

Air quality at any site is dependent on the regional air quality and local pollutant sources. Regional air quality is determined by the release of pollutants throughout the air basin. Estimates for the SCAB have been made for existing emissions ("2007 Air Quality Management Plan", June 2007). The data indicate that on-road (e.g.; automobiles, busses and trucks) and off-road (e.g.; trains, ships, and construction equipment) mobile sources are the major source of current emissions in the SCAB. Mobile sources account for approximately 64% of VOC emissions, 92% of NOx emissions, 39% of direct PM2.5 emissions, 59% of SOx emissions and 98% of CO emissions. Area sources (e.g., architectural coatings, residential water heaters, and consumer products) account for approximately 30% of VOC emissions and 32% of direct $PM_{2.5}$ emissions. Road dust account for approximately 20% of direct $PM_{2.5}$ emissions.

The SCAQMD has divided the SCAB into 38 air monitoring areas with a designated ambient air monitoring station in most areas. The project is in the Central San Bernardino Source-Receptor Area 34 and the San Bernardino monitoring station is the facility identified for this source-receptor area. The data collected at this station is considered representative of the air quality experienced in the vicinity of the project and includes ozone, $PM_{2.5}$, PM_{10}, NO_2, and CO.

The air quality data monitored from 2008 to 2010 are presented in Table 4.2-3 and were obtained from the CARB. The San Bernardino monitoring data presented in Table 4.2-3 show that ozone and particulate matter (PM_{10} and $PM_{2.5}$) are the air pollutants of primary concern in the project area. The national 8-hour ozone standard was exceeded 1 out of every 5 days for the period between 2008 and 2010. The concentrations and the number of days the standard was exceeded has been steadily decreasing.

Particulate concentrations have not exceeded federal standards for the past two years at the San Bernardino station. The state standard exceeded a few days each year. The drop in particulate concentrations has not been as sharp as with the ozone levels, but is showing steady improvement over the years.

CO historically has been an important pollutant. CO levels are due mainly to motor vehicles. Currently, CO levels in the project region are in compliance with the state and federal 1-hour and 8-hour standards. NO_2 levels are low in the project area and throughout the basin, and no exceedances have occurred for many years.

Diesel Particulate Matter (DPM)

DPM has historically been used as a surrogate measure of exposure for whole diesel exhaust emissions. Although uncertainty exists as to whether DPM is the most appropriate parameter to correlate with human health effects, it is considered a reasonable choice until more definitive information about the mechanisms of toxicity or mode(s) of action of diesel exhaust becomes available. DPM consists of fine particles (fine particles have a diameter <2.5 µm), including a subgroup with a large number of ultrafine particles (ultrafine particles have a diameter <0.1 µm).

Table 4.2-3
Air Quality Levels Measured at the San Bernardino Monitoring Station

Pollutant	California Standard	National Standard	Year	Max. Level	Days State Standard Exceeded[2]	Days National Standard Exceeded[2]
Ozone	0.09 ppm	None	2010	0.129	27	1
1 Hour			2009	0.150	53	2
Average			2008	0.157	62	11
Ozone	0.070 ppm	0.08 ppm[4]	2010	0.104	60	40
8 Hour			2009	0.126	78	61
Average			2008	0.122	87	62
CO	9.0 ppm	9 ppm	2010	1.73	0	0
8 Hour			2009	1.90	0	0
Average			2008	1.65	0	0
NO_2	0.25 ppm	None	2010	0.069	0	n/a
1 Hour			2009	0.084	0	n/a
Average			2008	0.091	0	n/a
NO_2	None	0.053 ppm	2010	0.024	n/a	No
AAM[2]			2009	0.021	n/a	No
			2008	0.023	n/a	No
SO_2	0.04 ppm	0.14 ppm	2010		not monitored	
(24 Hour)			2009		not monitored	
			2008		not monitored	
Respirable	50 µg/m^3	150 µg/m^3	2010	63.0	not reported	0
Particulates			2009	66.0	10	0
PM_{10}			2008	76.0	17	0
(24 Hour)						
Respirable	20 µg/m^3	50 µg/m^3	2010	32.4	no reported	No
Particulates			2009	35.6	not reported	No
PM_{10}[3]			2008	42.7	Yes	No
AAM[4]						
Fine	None	65 µg/m^3	2010	39.3	n/a	0
Particulates			2009	37.8	n/a	0
$PM_{2.5}$[3]			2008	43.5	n/a	0
(24 Hour)						
Fine	12 µg/m^3	15 µg/m^3	2010	12.5	Yes	No
Particulates			2009	14.7	Yes	No
$PM_{2.5}$			2008	16.3	Yes	Yes
AAM[2]						

1. Percent of year where high pollutant levels were expected that measurements were made.
2. AAM - Annual Arithmetic Mean
3. On September 21, 2006 U.S. EPA announced that it was revoking the annual average PM_{10} standard and lowering the 24-hour $PM_{2.5}$ standard to 35 µg/m^3. The previous standards are presented, as the new standards are not fully implemented at this time.
4. On March 12, U.S. EPA announced that it was revising the 8-hour Ozone standard from 0.08 ppm to 0.075 ppm. The previous standard is presented, as the new standard has not been fully implemented at this time.
-- Data Not Reported
n/a – no applicable standard
Source: CARB Air Quality Data Statistics web site www.arb.ca.gov/adam/accessed 07/07/2011

Collectively, these particles have a large surface area which makes them an excellent medium for absorbing organics.

Diesel exhaust emissions vary significantly in chemical composition and particle sizes between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), and fuel formulations (high/low sulfur fuel). There are emission differences between on-road and non-road engines as the non-road engines are generally of older technology. The mass of particles emitted and the organic components of the particles from on-road diesel engines have been reduced over the years.

The ARB's Office of Environmental Health Hazards Assessment (OEHHA) found that human exposure to DPM resulted in an increased risk of cancer and chronic non-cancer health effects, including a greater incidence of cough, labored breathing, chest tightness, wheezing, and bronchitis. The OEHHA estimated that, based on available studies, the potential cancer risk from exposure to DPM of 1 microgram per cubic meter (µg/m3) over a 70-year lifetime ranged from 130 to 2,400 excess cancers per million people. The ARB's Scientific Review Panel (SRP) approved the OEHHA's determination concerning health effects and approved these values as the range of risk for DPM. This wide range demonstrates the uncertainty in the cancer risk from DPM.

The SRP concluded that a value of 300 excess cancers per million people per $\mu g/m^3$ of DPM was appropriate as a point estimate of unit risk factor (URF) for DPM. There is not yet a scientific consensus concerning the appropriate URF for DPM. In "Health Assessment Document for Diesel Engine Exhaust" (May 2002), the U.S. EPA determined that the literature did not support identifying a URF for DPM. The EPA data indicated that the potential cancer risk from exposure to DPM of 1 microgram per cubic meter ($\mu g/m^3$) over a 70-year lifetime ranged from 10 to 1,000 excess cancers per million, although lower risk and even zero risk cannot be ruled out by the current data.

The OEHHA also concluded that exposure to DPM concentrations greater than 5 $\mu g/m^3$ may result in a number of long-term (chronic) non-cancer heath effects including greater incidence of cough, phlegm, and bronchitis. The EPA has come to the same conclusion. The 5 $\mu g/m^3$ value is referred to as the Chronic Reference Exposure Value (REL) for DPM. The SRP supported the OEHHA's conclusion and noted that the REL may need to be lowered further as more data emerge on potential adverse non-cancer effects of DPM.

To provide a perspective on the contribution that DPM has on the overall statewide average ambient air toxics potential cancer risk, the ARB evaluated risks from specific compounds using data from ARB's ambient monitoring network. ARB maintains a 21-site air toxics monitoring network which measures outdoor ambient concentration levels for approximately 60 air toxics. The ARB has determined that, of the top ten inhalation risk contributors, DPM contributes 71% of the total potential cancer risk (the remaining 29% is split among butadiene, benzene, carbonyls and other pollutants).

The SCAQMD also conducted a study of air toxics in the South Coast Air Basin (SCAB), Multiple Air Toxics Exposure Study II (MATES-II), in 1998 and 1999, updated by MATES III

in 2008. The MATES-III study estimated that the average basin wide potential cancer risk from DPM was about 1,000 excess cancers per million, or 84 percent of the 1,200 average excess cancers per million from all air toxics in the SCAB. This is consistent with the ARB findings. This estimated risk is based on a 70-year exposure to TAC concentrations measured and modeled during the study period and do not take into account any future reductions in TAC concentrations.

Average ambient concentrations of air toxics are higher in the SCAB than elsewhere in the state, resulting in higher estimates of risk for residents in the SCAB. In general, the highest risks areas have high concentrations of mobile sources. Higher risk levels occur in the south-central Los Angeles area and in the Los Angeles/Long Beach harbor area.

Addressing impacts of DPM, the ARB developed a DPM Risk Reduction Plan in 2008 containing several measures including new vehicle emission standards, reformulated diesel fuels, idling limitations, retrofitting existing diesel fueled vehicles used by government agencies, along with measures to control rail emissions as well as other DPM sources. The emissions calculations in this report used EMFAC2007 to calculate emission factors. EMFAC2007 is a computer model published by the ARB that calculates vehicular emission factors. Emission factors calculated with EMFAC2007 include the effects of the new diesel fueled vehicle emissions standards as well as other DPM Risk Reduction measures. However, as a part of their Diesel Risk Reduction Program, CARB is enacting regulations requiring retrofitting of existing diesel sources with emissions control equipment that will further reduce emissions. Reductions from potential regulations are not included in the EMFAC2007 program.

4.2.4 Project Impact Analysis and Mitigation Measures

4.2.4.1 Thresholds of Significance

Significant impacts to air quality may result if the Proposed Project would:

- Conflict with or obstruct implementation of an 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 standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). Note that potential cumulative impacts resulting from the Project are assessed in Section 5 of this EIR, *Other CEQA Required Impact Analysis*;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

Methodology

Air quality impacts are divided into short term and long term effects. Short-term impacts are the result of construction or grading operations. Long-term impacts are associated with the built out condition of the Proposed Project.

The SCAQMD has established significance thresholds to assess the impact of project related short-term construction and long-term operational air pollutant emissions (see Table 4.2-4). A project with daily emission rates below these thresholds are considered to have a less than significant effect on air quality.

Table 4.2-4
SCAQMD Regional Pollutant Emission Thresholds of Significance

	Pollutant Emissions (lbs./day)					
	CO	**VOC**	**NOx**	**PM10**	**PM2.5**	**SOx**
Construction	550	75	100	150	55	150
Operation	550	55	55	150	55	150

Source: SCAQMD website (http://www.aqmd.gov/ceqa/hdbk.html), March 2011

Construction and Operational Evaluation

Construction and Operational emissions were calculated using the California Emissions Estimator Model (CalEEMod). CalEEMod is a computer program developed by the SCAQMD in conjunction with the California Air Resources Board (CARB). The model calculates emissions for construction and operation of various projects. For on-road vehicular emissions, the CalEEMod model utilizes the EMFAC2007 emission rates that have also been developed by CARB. Project emissions were compared to SCAQMD thresholds listed in Table 4.2-4.

Localized Significance Threshold (LST) Evaluation

In accordance with Governing Board direction, SCAQMD staff developed localized significance threshold (LST) methodology and mass rate look-up tables by Source Receptor Area (SRA) that can be used to determine whether or not a project may generate significant adverse localized air quality impacts. This approach was used in the analysis.

Diesel Particulate Matter Evaluation

Estimating cancer risk increase and non-cancer health hazards from DPM requires estimating DPM concentrations at sensitive receptors in the vicinity of the source. Concentrations are the mass of pollutant per volume of air and are typically measured in terms of micrograms (µg) of DPM per cubic meter (m^3) of air. Concentrations are location specific and depend on the amount of pollutants emitted, the location of the emissions relative to the receptor, how the emissions are released, and weather conditions (primarily wind speed and direction). Determination of pollutant concentrations requires the use of a dispersion model which takes the entire pollutant source and weather information and estimates pollutant concentrations based well accepted mathematical equations.

4.2.4.2 Issues Determined To Have No Impact

As a result of the analysis conducted, no identified areas of environmental concern related to air quality were determined to have no impact.

4.2.4.3 Impacts Determined To Be Less Than Significant

Conflict with or obstruct implementation of an applicable air quality plan.

Regional plans that apply to the Proposed Project include the South Coast AQMP. The SCAQMD's CEQA Handbook states "New or amended GP Elements (including land use zoning and density amendments), Specific Plans, and significant projects must be analyzed for consistency with the AQMP." Strict consistency with all aspects of the AQMP is usually not required. A Proposed Project should be considered to be consistent with the AQMP if it furthers one or more policies and does not obstruct other policies. The Handbook identifies two key indicators of consistency:

(1) Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.

(2) Whether the project will exceed the assumptions in the AQMP in 2010 or increments based on the year of project buildout and phase.

Criterion 1 - Increase in the Frequency or Severity of Violations?

Based on the air quality modeling analysis, there will be significant short-term construction impacts due to the project based on the SCAQMD thresholds of significance. Emissions generated during construction will be in excess of SCAQMD's LST threshold criteria for PM_{10} and $PM_{2.5}$. However, it is unlikely that short-term construction activities will increase the frequency or severity of existing air quality violations due to required compliance with SCAQMD Rules and Regulations. Additionally, mitigation measures are proposed for construction that will bring the level of emissions under the significance thresholds.

The Proposed Project will increase regional emissions, but will increase regional emissions by an amount less than the SCAQMD thresholds. However, the consistency criteria pertains to local air quality impacts, rather than regional emissions, as defined by the SCAQMD. The SCAQMD has identified CO as the best indicator pollutant for determining whether air quality violations would occur, as CO hot-spot is most directly related to increase in traffic. Nevertheless, the SCAB is now in attainment for the CO standards and exceedances of the CO standards are not expected, and local air quality impact modeling is no longer performed. Local air pollutant concentrations would not be expected to exceed the ambient air quality concentration standards due to local traffic, with or without the project. Because the project is not projected to impact the local air quality, the project is found to be consistent with the AQMP for the first criterion.

Criterion 2 - Exceed Assumptions in the AQMP?

Consistency with the AQMP assumptions is determined by performing an analysis of the project with the assumptions in the AQMP. Thus, the emphasis of this criterion is to insure that the analyses conducted for the project are based on the same forecasts as the AQMP. The Regional Comprehensive Plan and Guide (RCP&G) consist of three sections: Core Chapters, Ancillary Chapters, and Bridge Chapters. The Growth Management, Regional Mobility, Air Quality, Water Quality, and Hazardous Waste Management chapters constitute the Core Chapters of the document. These chapters currently respond directly to federal and state requirements placed on SCAG. Local governments are required to use these as the basis of their plans for purposes of consistency with applicable regional plans under CEQA.

Since the SCAG forecasts are not detailed, the test for consistency of this project is not specific. The traffic modeling methodologies are based on the City's General Plan and the ITE Trip Generation 8th Edition. The AQMP assumptions are based upon projections from local general plans. Projects that are consistent with the local general plan are consistent with the AQMP assumptions. The Proposed Project would result in a slight increase in emissions, but the emissions are below the significance thresholds. Therefore, the second criterion is met for consistency with the AQMP.

4.2.4.4 Impacts Determined To Be Potentially Significant

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 standard (including releasing emissions which exceed quantitative thresholds for ozone precursors) (This impact is addressed in Section 5.2, Other CEQA Required Impact Analysis.).

Expose sensitive receptors to substantial pollutant concentrations.

Create objectionable odors affecting a substantial number of people.

Impact AQ-1:

The Proposed Project's activities could increase emissions of criteria pollutants and potentially violate air quality standards, or contribute substantially to an existing or projected air quality violation.

Construction Activities

Temporary impacts are typically associated with construction activities. Air pollutants are emitted by construction equipment and fugitive dust is generated during grading and construction. Emissions during construction activities were calculated using the CalEEMod.

The project site is approximately 17 acres. The primary activities would include site preparation, grading, construction and paving of the parking lots. It is anticipated that the construction of the project would start in early 2012 and be completed in 2013. The appropriate number of acres, duration of each construction phase, and other key elements of the project were input into the CalEEMod to generate the estimate of emissions. It was assumed that the overlap between construction phases would be minimal. Refer to Appendix B for CalEEMod data worksheets.

Construction Emissions

Short-term construction emissions are shown in Table 4.2-5. The highest daily construction emissions are presented below and represent a worst- case scenario. The projected emissions are compared to the Significance Thresholds. Refer to Appendix B for CalEEMod data worksheets.

Table 4.2-5
Peak Construction Emissions

	Pollutant Emissions (lbs./day)					
Activity	**ROG**	**NOX**	**CO**	**SOx**	**PM10**	**PM2.5**
Demolition	9.5	75.3	45.4	0.1	4.0	3.8
Site Preparation	10.6	84.9	49.3	0.1	22.6	14.2
Grading	12.6	**104.0**	56.8	0.1	14.0	8.3
Building Const.	8.4	55.1	48.9	0.1	7.2	3.4
Paving	7.0	33.9	22.0	0.0	3.2	3.0
Architectural Coating	**633.7**	3.2	5.1	0.0	0.9	0.3
SCQAMD Thresholds	75	100	550	150	150	55
Exceed Threshold?	**Yes**	**Yes**	**No**	**No**	**No**	**No**

Source: Mestre Greve Associates October 2011

As shown in Table 4.2-5, ROG (architectural coating, painting both inside and outside the buildings) and NOx (grading phase) exceeds SCAQMD thresholds. Therefore, mitigation measures for the architectural coating phase and grading phase will be necessary to reduce impacts.

Diesel Particulate Matter Emissions During Construction

In 1998, the CARB identified particulate matter from diesel-fueled engines (DPM) as a TAC. It is assumed that the majority of the heavy construction equipment utilized during construction would be diesel fueled and emit DPM.

Impacts from toxic substances are related to cumulative exposure and are assessed over a 70-year period. Cancer risk is expressed as the maximum number of new cases of cancer projected to occur in a population of one million people due to exposure to the cancer-causing substance over a 70-year lifetime (California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Guide to Health Risk Assessment.) Grading for the project, when the peak diesel exhaust emissions would occur, is expected to take less than 2 months with all construction expected to be completed in about 24 months. Because of the relatively short

duration of construction compared to a 70-year lifespan, diesel emissions resulting from the construction of the project are not expected to result in a significant health impact.

Localized Significance Thresholds

As part of the SCAQMD's environmental justice program, attention was focused on localized effects of air quality. In accordance with Governing Board direction, SCAQMD staff developed localized significance threshold (LST) methodology and mass rate look-up tables by SRA that can be used to determine whether or not a project may generate significant adverse localized air quality impacts. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area. The LST methodology is described in "Final Localized Significance Threshold Methodology" updated in 2009 by the SCAQMD and is available at the SCAQMD.

The LST mass rate look-up tables provided by the SCAQMD allow one to determine if the daily emissions for proposed construction or operational activities could result in significant localized air quality impacts. If the calculated on-site emissions for the proposed construction or operational activities are below the LST emission levels found on the LST mass rate look-up tables and no potentially significant impacts are found to be associated with other environmental issues, then the proposed construction or operation activity is not significant for air quality.

The LST mass rate look-up tables are applicable to the following pollutants only: oxides of NO_x, CO, PM_{10}, and $PM_{2.5}$. LSTs are derived based on the location of the activity (i.e., the source/receptor area); the emission rates of NO_x, CO, $PM_{2.5}$ and PM_{10}; and the distance to the nearest exposed individual.

The LST methodology presents mass emission rates for each SRA, project sizes of 1, 2, and 5 acres, and nearest receptor distances of 25, 50, 100, 200, and 500 meters. For project sizes between the values given, or with receptors at distances between the given receptors, the methodology uses linear interpolation to determine the thresholds. If receptors are within 25 meters of the site, the methodology document says that the threshold for the 25-meter distance should be used.

The project is located in SRA 34. The nearest existing land uses are single family residence located approximately 60 feet west of the project site. Refer to Table 4.2-6 for LSTs values for construction and operational allowable values.

The threshold for operation listed in Table 4.2-6 is based on a 5 acre site with a sensitive receptor located at a 60-foot (18 meters) distance. However, the project consists of approximately 17 acres, however, 5 acres is the largest parcel available in the LST methodology. A project with daily emission rates below these thresholds during operation is considered to have a less than significant effect on local air quality.

Table 4.2-6
Localized Significance Thresholds (lbs/day)

Description	NO_x	CO	PM_{10}	$PM_{2.5}$
Construction Activities	270	1,746	14	8
Operation	270	1,746	4	2

Source: Mestre Greve Associates October 2011

Construction Emissions – LST Analysis

The on-site emissions were calculated utilizing CalEEMod. The total on-site construction emissions are compared to the LSTs. Refer to Table 4.2-7 for LST significance. Refer to Appendix B for worksheets calculations.

Table 4.2-7
Emissions By Construction Activity

	Daily Emissions (lbs./day)			
Activity	**NOX**	**CO**	**PM10**	**PM2.5**
Demolition	75.1	44.2	3.8	3.8
Site Preparation	84.7	47.8	**22.3**	**14.2**
Grading	103.9	55.1	13.7	**8.3**
Building Construction	37.4	23.7	2.5	2.5
Paving	33.8	20.9	2.9	2.9
Architectural Coating	3.0	1.9	0.3	0.3
LST Thresholds	***270***	***1,746***	***14***	***8***
Exceed Threshold?	*No*	*No*	***Yes***	***Yes***

Source: Mestre Greve Associates October 2011

As shown in Table 4.2-7, PM_{10} and $PM_{2.5}$ are anticipated to exceed thresholds during site preparation, and grading, respectively. These emissions are forecasted without mitigation (e.g., no watering). Therefore, mitigation measures will be necessary to reduce impacts.

The following construction mitigation measures shall be implemented to reduce impacts to less than significant levels:

Mitigation Measure AQ-1:

All paint shall have a low volatile organic compound (VOC) rating of 50 g/l or less for the project and restrict paint usage to 600,000 square feet per day.

During construction all paint should have a VOC rating of 50 g/l or less as defined by the ARB. This is defined as super compliant low-VOC paint and suppliers of this paint can be found on the SCAQMD website. The painted area needs to be limited to 600,000 square feet. The CalEEMod calculates a maximum surface area that might be painted. It does not appear to assume that portions of the building will not be painted or that colored stucco or other surfaces will be used in lieu of painting. CalEEMod determined that 1,093,447 square feet could be painted.

Mitigation Measure AQ-2:

During site preparation phase, at least one grader and one dozer shall meet "Tier II" emission requirements.

During the site preparation and grading phases at least one grader and one dozer shall be "Tier II" equipment as defined by the ARB. With this mitigation measure, the NOx emissions during grading will be reduced to below 100 pounds per day significance threshold. This mitigation is also necessary to reduce the particulate emissions.

Mitigation Measure AQ-3:

All exposed services shall be watered three times a day during the grading and site preparation phases.

Watering the construction site three times per day results in a 61% reduction in particulate emissions due to soil disturbance. These emissions will be below the LST thresholds and therefore, no local impacts would occur.

Construction Emissions with Mitigation Measures

Refer to Tables 4.2-8 and 4.2-9 for construction emissions with the above mitigation incorporated. The projected construction emissions are below the regional significance thresholds established by the SCAQMD for all pollutants with the mitigation measures incorporated.

Table 4.2-8
Peak Construction Emissions With Mitigation

	Pollutant Emissions (lbs./day)					
Activity	**ROG**	**NOX**	**CO**	**SOx**	**PM10**	**PM2.5**
Demolition	8.6	67.9	41.5	0.1	3.7	3.5
Site Preparation	9.3	73.8	56.6	0.1	11.1	7.7
Grading	11.0	90.8	48.9	0.1	8.0	5.6
Building Construction	8.4	55.1	48.9	0.1	7.2	3.4
Paving	7.0	33.9	22.0	0.0	3.2	3.0
Architectural Coating[1]	70.0	1.8	2.8	0.0	0.5	0.2
SCQAMD Thresholds	***75***	***100***	***550***	***150***	***150***	***55***

1. Includes 45% reduction in building surface area to be painted.
Source: Mestre Greve Associates October 2011

Table 4.2-9
On-Site Emissions By Construction Activity
With Mitigation, LST

	Daily Emissions (lbs./day)			
Activity	**NOX**	**CO**	**PM10**	**PM2.5**
Demolition	67.8	40.3	3.5	3.5
Site Preparation	73.7	42.0	10.9	7.7
Grading	90.7	47.3	7.7	5.6
Building Construction	37.4	23.7	2.5	2.5
Paving	33.8	20.9	2.9	2.9
Architectural Coating	3.0	1.9	0.3	0.3
LST Thresholds	***270***	***1,746***	***14***	***8***
Exceed Thresholds	*No*	*No*	*No*	*No*

Source: Mestre Greve Associates October 2011

With mitigation, none of the emissions will exceed the LST thresholds (Table 4.2-9) and no local impacts would occur.

Level of Significance After Mitigation:

As shown in Tables 4.2-8 and 4.2-9 impacts are anticipated to be less than significant with implementation of Mitigation Measures AQ1 thru AQ3.

Operational Emissions

Operational air emissions were calculated using the CalEEMod model. Primary sources of emissions generated by the Proposed Project would be from motor vehicles including customers and the trucks serving the facility. Natural gas combustion and re-current painting of the facilities will also contribute to the emissions. The project is anticipated to generate approximately 5,692 daily trips (Fehr & Peers, August 12, 2011). Refer to Table 4.2-10 for project operational emissions.

Table 4.2-10
Project Emissions for 2013 (pounds per day)

	ROG	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
Total Project Emissions	39.5	**61.7**	218.4	0.3	35.0	3.3
SCQAMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceed Thresholds	No	**Yes**	No	No	No	No

Source: Mestre Greve Associates October 2011

As shown in Table 4.2-10, total project emissions are below the SCAQMD thresholds for all criterion pollutants except NOx. However, much of these emissions will be offset when the previous use is considered.

Previous Land Use Air Emissions

The CalEEMod was used to estimate the air pollutant emissions for the previous existing use. Model input assumptions were consistent with the Proposed Project. The previous existing use consisted of 296 multi-family dwelling units. Approximately 1,719 trips are associated with this use (Fehr & Peers, August 12, 2011). Refer to Table 4.2-11 for emissions estimates.

Table 4.2-11
Previous Land Use Emissions Compared to Proposed Project Emissions
Year 2013 (pounds per day)

	ROG	NOx	CO	SOx	PM10	PM2.5
Total Previous Use Emissions	53.2	33.8	235.0	0.4	36.1	17.7
Total Project Emissions	39.5	61.7	218.4	0.3	35.0	3.3
Difference	***-13.7***	***27.9***	***-16.6***	***-0.1***	***-1.1***	***-14.4***
SCQAMD Thresholds	*55*	*55*	*550*	*150*	*150*	*55*
Exceed Thresholds	***No***	***No***	***No***	***No***	***No***	***No***

Source: Mestre Greve Associates October 2011

As shown in Table 4.2-11, all pollutants except NOx, would result in lower operating emission than if the previous land use continued on-site. When the previous land use is considered into the total emissions, all net emissions generated by the project will be below the SCAQMD thresholds. The project will not have a significant impact on regional air quality. No operational mitigation measures are required.

Impact AQ-2:

The Proposed Project could create objectionable odors and impact sensitive receptors affecting a substantial number of people as the Proposed Project includes the transportation of goods via diesel operated trucks that can emit objectionable odors and may create a significant impact on nearby residences.

EMFAC2007 is the CARB's on-road vehicle emissions model. This model is used for all regulatory modeling of on-road vehicle emissions in the State of California. The EMFAC2007 model was used to estimate particulate emissions from diesel trucks. Specifically, particulate emission rates from Heavy Heavy Duty (over 16 ½ ton) Diesel trucks were calculated for idling conditions as well as trucks traveling at 10 miles per hour and trucks traveling at 25 miles per hour. The trucks were assumed to travel at an overall average speed of 25 miles per hour on public roads and 10 miles an hour within the project site. DPM emission factors decrease as speeds increase (up to approximately 35 miles per hour). Therefore, using lower speeds represents a worst-case assumption. The idling emission factor was used to represent trucks idling as they arrive or depart their destination within the project. Refer to Table 4.2-12 for the emission factors obtained from EMFAC2007 used to modeling diesel truck emissions.

Table 4.2-12
Diesel Truck PM_{10} Emission Factors

Speed	Emission Factor (g/sec)
Idle	0.000359
10 mph	0.00318
20 mph	0.00315

Source: Mestre Greve Associates October 2011

These emissions represent an average diesel truck in the SCAB in 2013. Future newer, cleaner trucks will replace older, higher polluting, trucks reducing the fleet average emissions. EMFAC2007 projects decreases in running emission factors of approximately 3% per year until 2025. Between 2025 and 2040 the annual decrease is projected to be reduced from 3% per year to 0.1 % per year. Idling emission factors are projected to decrease by approximately 1% per year until 2025. Between 2025 and 2040 the annual decrease is projected to be reduced from 1% per year to 0.1 % per year. Cancer risk is based on a multiyear exposure (70 years for residents, 40 years for workers, and 9 years for students). By basing the calculations on 2013 emission factors, worst-case cancer risks will be determined because they will not include projected future emissions reductions that will result in receptors being exposed to reduced concentrations.

Delivery Truck Activity

Delivery truck activity characteristics were associated with the proposed end use as a Home Depot (information provided by the applicant). For the other buildings, specific tenants are not known. A mix of anticipated tenant types was assumed along with activity parameters based on the applicant and consultants experience with similar projects. Refer to Table 4.2-13 for a summary of the truck activity parameters used to model DPM concentrations.

As shown in Table 4.2-13, the data is grouped by the building being served by the delivery trucks. The Home Depot delivery trucks will travel to one of three destinations, the Lumber Yard Loading Dock, the Main Loading Dock and the Garden Center Loading Dock. For each of the other buildings there is a single destination. The Major 1 building has a loading dock and all delivery trucks were assumed to travel to the loading dock. For the shops and the pad buildings, the trucks were assumed to travel to the front of the store.

For each destination, an expected range of weekly delivery trucks was estimated and is presented (refer to Table 4.2-13). The modeling was performed assuming the maximum number of trucks in the expected range to provide a conservative estimate of the project's impacts. Some uses are anticipated to receive deliveries only during the week (Monday through Friday) and others are anticipated to receive deliveries during the week and on Saturday. The maximum number of trucks per week was divided by the number of days per week to estimate the number of trucks per day, on the days in which deliveries are received. A range of times when deliveries are most likely to arrive was estimated. As specific determination of delivery times is not possible as they vary based on operational needs and traffic patterns, the times presented in Table 4.2-13 are not intended to limit or represent the only times in which delivery trucks would be anticipated to arrive at the site. The times represent the periods when the trucks are most likely to arrive at the facility. Cancer risk is based on an annual average concentration and therefore is relative to

annual average operations Occasional trucks arriving outside of the hours shown are not statistically significant.

Table 4.2-13
Delivery Truck Activity

	Destination	Trucks Per Week		Days of Week	Trucks Per Day	Time of Day[2]	
		Range	Maximum			Start	End
Home Depot							
	Lumber Yard LD	2-5	5	M-F	1.00	6:00 AM	7:00 PM
	Main Loading Dock	6-10	10	M-F	2.00	6:00 AM	7:00 PM
	Garden Center LD	1-6	6	M-F	1.20	6:00 AM	7:00 PM
Major 1 (Super Market)							
	M1 Loading Dock	7-14	14	M-Sat	2.33	6:00 AM	3:00 PM
Pad 1 (Gas Station)							
	Pad 1	4-7	7	M-Sat	1.17	6:00 AM	7:00 PM
Pad 2 (Bank)							
	Pad 2	3-6	6	M-F	1.20	9:00 AM	5:00 PM
Pad 3 (Restaurant)							
	Pad 3	1-3	3	M-F	0.60	6:00 AM	10:00 AM
						and	
						2:00 PM	4:00 PM
Pad 4 (Retail)							
	Pad 4	1-3	3	M-F	0.60	9:00 AM	7:00 PM
Shops							
	Shops	1-5	5	M-F	1.00	9:00 AM	7:00 PM
	Totals		**59**		**11.1**		

1. The "Time of Day" represents the most probable hours when delivery trucks will visit the site and not store operating hours or limits on delivery hours. Occasionally, trucks may arrive outside of these hours, but because cancer risk is based on annual averages these occasional deliveries outside of the hours shown are not statistically significant. Delivery trucks were assumed to arrive randomly within the time period shown (i.e. evenly distributed)
Source: Mestre Greve Associates October 2011

Trucks were assumed to arrive and depart equally to the east and west on the Foothill Freeway (I-210). Those arriving from the west were assumed to exit the freeway and cross Highland Avenue into the project. Except for the Home Depot Lumber Yard trucks, all trucks arriving from the east were assumed to use either the Highland Avenue entrance or the Arden Avenue entrance. All Lumber Yard Trucks are anticipated to use the Highland Avenue entrance exclusively. All trucks were assumed to exit to Arden Avenue as there freeway access is more difficult when exiting onto Highland Avenue.

Dispersion Model

The U.S. EPA's required regulatory pollutant dispersion model, AERMOD is used to estimate pollutant concentrations at sensitive receptors in the vicinity of the project. Specifically, the

AERMOD, 11103 released on April 13, 2011 was used. ISC-AERMOD View by Lakes Environmental was used to generate the input file for AERMOD. The model was set to calculate the highest 24-hour average concentration as well as the annual average concentrations.

Weather data prepared by the SCAQMD specifically for the AERMOD model was used for the dispersion modeling. This data file represents actual measured weather conditions at the San Bernardino Location for the years 2005, 2006, and 2007.

Truck travel paths represent Line Sources. AEROMOD does not directly model Line Sources. Line sources were modeled as Separated Volume Sources using the method described in Volume II of the U.S. EPA User's Guide for the Industrial Source Complex (ISC3) Dispersion Models (US EPA 1992). The line sources were modeled with a 12 foot release height and a 1 meter vertical dimension. The truck idling locations were modeled as area sources with a 12 foot release height and a 1 meter initial vertical dimension. The 25 mph emission factor was assumed for all truck travel on public roads and the 10 mph emission factor was assumed for all truck travel within the project site. The idling emission factor was assumed for each idling area. Each truck was assumed to idle for five minutes at its destination.

Determination of Cancer Risk

Cancer risk represents the probability that a person develops some form of cancer. The estimated risk does not represent mortality rates. The risk described in these calculations reflects a level of exposure that would be virtually impossible to experience, and that for most individuals, exposure to a particular contaminant such as DPM, would be considerably less due to shorter duration of residence in the area, amount of time spent at the residence daily and throughout the year, and the split between time spent indoors versus outdoors. Studies have shown that the typical person spends approximately 87 percent of their time indoors, 5 percent of their time outdoors, and 7 percent of their time in vehicles. Indoor DPM levels are typically lower than outdoor levels.

The cancer risk from DPM is estimated by calculating the dose of DPM through inhalation. The dose is then multiplied by the Cancer Potency Factor to determine potential risk of developing cancer over a 70-year lifetime. The cancer risk is determined by multiplying the Dose with the Cancer Risk Potency Factor. The Cancer Risk Potency Factor describes the potential risk of developing cancer per unit of average daily dose over a 70-year lifetime. The Cancer inhalation potency factors have been determined by the OEHHA or by the U.S. EPA and endorsed by the OEHHA. The inhalation potency factor determined by OEHHA is 1.1 $(mg/kg\text{-}day)^{-1}$. Multiplying this factor by the dose and by 1,000,000 (one-million) gives the cancer risk caused by the DPM in terms of number of cancers per million of exposed persons. Refer to Table 4.2-14 for the Cancer Risk per receptor type.

Determination of Non-Cancer Risks

The relationship for the non-cancer health effects of DPM is estimated by dividing the Worst-case 24-hour average DPM concentration ($\mu g/m^3$) by Reference exposure level (REL) for DPM

as determined by the OEHHA; the DPM concentration at which no adverse health effects are anticipated to get the Hazard Index; an expression of the potential for non-cancer health effects

Table 4.2-14
Cancer Risk Parameters by Receptor Type

Receptor Type	Daily Breathing Rate (L/kg/day)	Inhalation Absorption Factor	Exposure Frequency (Days/Year)	Exposure Duration (Years)
Resident	393	1	365	70
Worker	149	1	261	40
Teacher	149	1	190	40
Student	581	1	180	9

Source: Mestre Greve Associates October 2011

DPM Analysis

SCAQMD recommends significance thresholds for new sources of Hazardous Air Pollutants (HAPS) at its CEQA Air Quality Analysis Guidance Handbook. SCAQMD's recommended significance threshold for increased cancer risk is an increase due to the project of greater than 10 in a million. The recommended threshold for non-carcinogen impacts is a Hazard Index greater than 1.

The Proposed Project would result significant impact due to diesel truck pollutant emissions if:

- The cancer risk due to exposure of DPM from the project is greater than 10 in a million OR
- The Chronic Hazard Index due to exposure of DPM from the project is greater than 1.

Refer to Figures 4.2-1 and 4.2-2 for the results of the dispersion modeling and present projected DPM concentration contours in the areas bounding the project site. Figure 4.2-1 shows the annual average concentrations and Figure 4.2-2 shows the peak 24-rour average concentrations.

Cancer Risk Increase Due to Project

Table 4.2-15 presents the maximum annual average DPM concentrations for the four receptor-types bordering the project; residents, workers, teachers, and students. The resident category represents the residences that bound the project to the west as well as the residences located to the east across Arden Avenue. The worker category represents the commercial area located to the west of the project across Guthrie Street. The teacher and student categories represent the school located to the south of the project across 20th Street. The table also presents the increased cancer risk due to exposure due to DPM calculated from the concentration.

SCAQMD data indicates that the cancer risk from DPM represents approximately 84% of the total cancer risk from all Hazardous Air Pollutants (HAP). The final column estimates the overall increase in cancer risk due to exposure to all HAPs.

Table 4.2-15
Cancer Risk Increase at
Maximum Impacted Receptors

Receptor Category	Annual DPM Concentration ($\mu g/m^3$)	Increase in Cancer Risk Per Million From Exposure to:		Cancer Risk Threshold 10 per Million	Exceeds Threshold?
		DPM	All HAP*		
Resident	0.0050	2.2	2.6	10	No
Worker	0.0028	0.2	0.24	10	No
Teacher	0.0060	0.3	0.36	10	No
Student	0.0060	0.2	0.24	10	No

* Estimated Assuming DPM Represents 84% of Total Cancer Risk

The concentrations shown in Table 4.2-15 represent the highest DPM concentrations in each one of these areas and therefore represent the worst-case cancer risk that assumes that a receptor spends all of their time at that point for the entire exposure period assumed in the cancer risk calculation (i.e.; 70 years/24 hours a day for residents, 40 years/8 hours a day/5 days a week for workers, 40 years/8 hours a day/180 days per year for teachers and 9 years/8 hours a day/180 days per year for a student). Cancer risk away from these maximums scale linearly with the DPM concentration (e.g.; a residential receptor exposed to 0.0035 $\mu g/m^3$ would have an increased cancer risk of 0.0035/0.0050*2.2 = 1.5 per million).

As shown in Table 4.2-15, the maximum cancer risk increase due to the Proposed Project is 2.6 in a million. This is below the significance threshold of 10 in a million. Therefore, the project will not result in a significant impact due to increased cancer risk from DPM emissions.

Non-Cancer Health Risk Due to Project

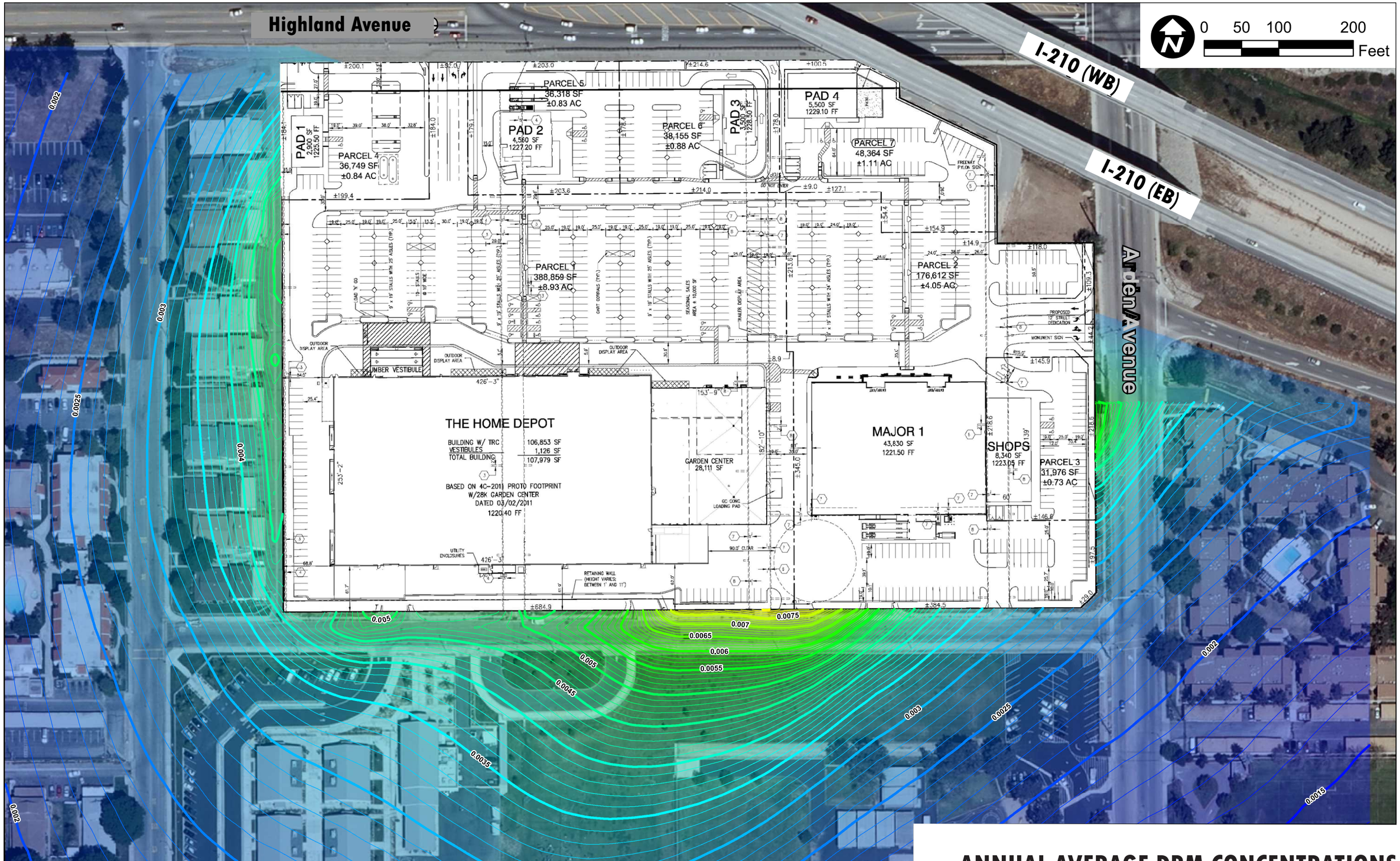
Table 4.2-16 shows the maximum annual average DPM concentrations for the four receptor-types bordering the project; residents, workers, teachers, and students. The resident category represents the residences that bound the project to the west as well as the residences located to the east across Arden Avenue. The worker category represents the commercial area located to the west of the project across Guthrie Street. The teacher and student categories represent the school located to the south of the project across 20th Street. The table also presents the hazard index due to exposure due to DPM calculated.

As shown in Table 4.2-16 the maximum chronic hazard index due to the Proposed Project is 0.007, which is below the significance threshold of 1. Therefore, the Proposed Project will not result in a significant impact due to non-cancer health risk from DPM emissions.

Table 4.2-16
Chronic Hazard Index at
Maximum Impacted Receptors

Type	Concentration ($\mu g/m^3$)	Chronic Hazard Index
Resident	0.0250	0.005
Worker	0.0190	0.004
Teacher	0.0360	0.007
Student	0.0360	0.007

Source: Mestre Greve Associates October 2011



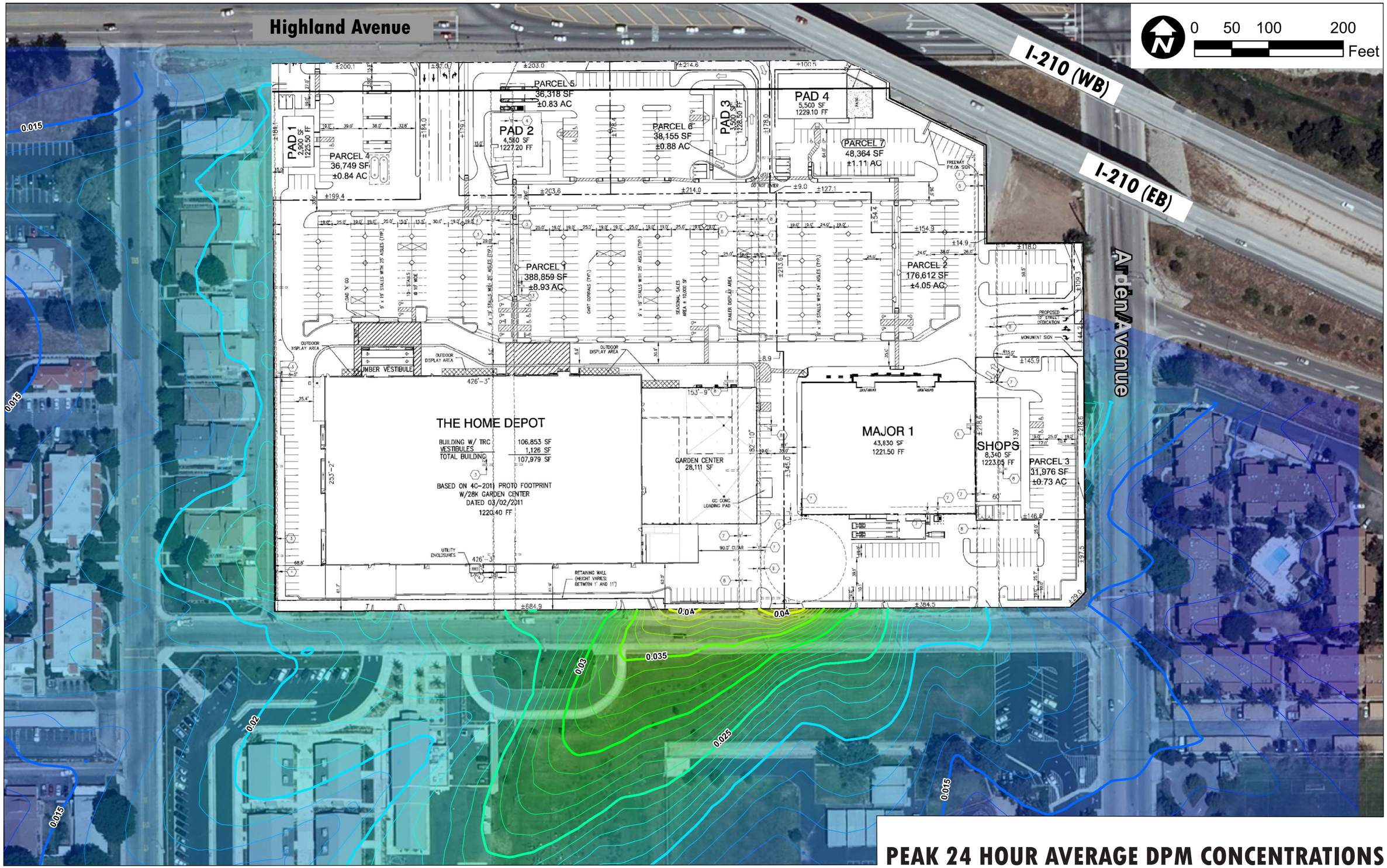
Source: Mestre Greve Associates, 2011.

ANNUAL AVERAGE DPM CONCENTRATIONS

Highland Marketplace EIR
City of San Bernardino, California

FIGURE 4.2-1

LILBURN CORPORATION



Source: Mestre Greve Associates, 2011.

PEAK 24 HOUR AVERAGE DPM CONCENTRATIONS

Highland Marketplace EIR
City of San Bernardino, California

LILBURN CORPORATION

FIGURE 4.2-2