6

AIR QUALITY

INTRODUCTION

This chapter discusses the Plan's potential impacts on the local and regional air quality. Development projects of this type in the San Joaquin Valley are most likely to cause air quality impacts from emissions generated during construction and indirect emissions from vehicle trips related to built-out projects. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has published the Guide for Assessing and Mitigating Air Quality Impacts that was used to conduct this air quality analysis[1]. The Plan's potential greenhouse gas impacts are discussed separately in Chapter 10.

SETTING

TOPOGRAPHIC CONSIDERATIONS

The City of Ceres is located in the northern portion of the San Joaquin Valley in the area designated as the San Joaquin Valley Air Basin by the California Air Resources Board (CARB). The Sierra Nevada Mountains in the east, the Coast Ranges in the west, and the Tehachapi mountains in the south define the air basin. The valley is basically flat with a slight downward gradient to the northwest. The valley opens to the sea at the Carquinez Straits, where the San Joaquin-Sacramento Delta empties into San Francisco Bay. The San Joaquin Valley, thus, could be considered a "bowl" with the primary opening to the north. The surrounding topographic features restrict air movement through and out of the basin and, as a result, impede the dispersion of pollutants from the basin. Wind flow is usually down the valley from the north, but the Tehachapi Mountains block or restrict the southward progression of airflow. The Sierra Nevada is a substantial barrier from winds with a general westerly flow. The topographical features result in weak airflow. The flow is further restricted vertically by inversion layers that are common in the San Joaquin Valley air basin throughout the year. An inversion layer is created when a mass of warm dry air sits over cooler air near the ground, preventing vertical dispersion of pollutants from the air mass below. During the summer, the San Joaquin Valley experiences daytime temperature inversions at elevations from 1,500 to 3,000 feet above the valley floor. These inversions lead to a buildup of ozone and ozone precursor pollutants. During the fall and winter months, strong surface-based inversions occur from 500 to 1,000 feet above the valley floor (SJVAPCD 1998). Wintertime inversions have very stable air trapped near the surface and lead primarily to a buildup of particulate matter air pollutants.

AIR BASIN CHARACTERISTICS

The climate of the Plan area is characterized by hot dry summers and cool, mild winters. Clear days are common from spring through fall. Daytime temperatures in the summer often exceed 100 degrees, with lows in the 60's. In the winter, daytime temperatures are usually in the 50's, with lows around 35 degrees. Radiation fog is common in the winter, and may persist for days. Partly to mostly cloudy

[1] SJVAPCD. 1998. Guide for Assessing and Mitigating Air Quality Impacts. Revised January 2002.

days are common in winter, as most precipitation received in the Valley falls from November through April.

Winds are predominantly up-valley (from the north) in all seasons, but more so in the summer and spring months (CARB 1984)[2]. In this flow, winds are usually from the north end of the Valley and flow in a south-southeasterly direction, through Tehachapi Pass, into the Southeast Desert Air Basin. Annually, up-valley wind flow (i.e., northwest flow with marine air) is most common, occurring about 40 percent of the time. This type of flow is usually trapped below marine and subsidence inversions, restricting outflow through the Sierra Nevada and Tehachapi Mountains. The occurrence of this wind flow is almost 70 percent of the time in summer, but less than 20 percent of the time in winter. Winter and fall are characterized by mostly light and variable wind flow. Pacific storm systems do bring southerly flows to the valley during late fall and winter. Light and variable winds, less than 10 mph, are common in the colder months.

Superimposed on this seasonal regime is the diurnal wind cycle. In the Valley, this cycle takes the form of a combination of sea breeze-land breeze and mountain-valley regimes. The sea breeze-land breeze regime typically has a sea breeze flowing into the Valley from the north during the late day and evening and then a land breeze flowing out of the Valley late at night and early in the morning. The mountain-valley regime has an upslope (mountain) flow during the day and a down slope (valley) flow at night. These effects create a complexity of regional wind flow and pollutant transport within the Valley.

The pollution potential of the San Joaquin Valley is very high. The San Joaquin Valley has one of the most severe air pollution problems in the State and the Country. Surrounding elevated terrain in conjunction with temperature inversions frequently restrict lateral and vertical dilution of pollutants. Abundant sunshine and warm temperatures in late spring, summer, and early fall are ideal conditions for the formation of ozone, where the Valley frequently experiences unhealthy air pollution days. Low wind speeds, combined with low inversion layers in the winter, create a climate conducive to high carbon monoxide (CO) and particulate matter (PM_{10}) concentrations.

REGULATORY SETTING

The Federal and California Clean Air Acts have established ambient air quality standards for different pollutants. National ambient air quality standards (NAAQS) were established by the Federal Clean Air Act of 1970 (amended in 1977 and 1990) for six "criteria" pollutants. These criteria pollutants now include carbon monoxide (CO), ozone (O_3), nitrogen dioxide ($N0_2$), particulate matter with a diameter less than 10 microns (PM_{10}), sulfur dioxide ($S0_2$), and lead (Pb). In 1997, EPA added fine particulate matter or $PM_{2.5}$ as a criteria pollutant. The air pollutants that standards have been established for are considered the most prevalent air pollutants that are known to be hazardous to human health. California ambient air quality standards (CAAQS) include the NAAQS pollutants and also hydrogen sulfide, sulfates, vinyl chloride, and visibility reducing particles. These additional CAAQS pollutants tend to have unique sources and are not typically examined in environmental air quality assessments. In addition, lead concentrations have decreased dramatically since it was removed from motor vehicle fuels.

FEDERAL REGULATIONS

At the federal level, the United States Environmental Protection Agency (U.S. EPA) administers and

[2] CARB 1984. California Surface Wind Climatology. June.

enforces air quality regulations. Federal air quality regulations were developed primarily from implementation of the Federal Clean Air Act. If an area does not meet NAAQS over a set period (three years), EPA designates it as a "nonattainment" area for that particular pollutant. EPA requires states that have areas that do not comply with the national standards to prepare and submit air quality plans showing how the standards would be met. If the states cannot show how the standards would be met, then they must show progress toward meeting the standards. These plans are referred to as the State Implementation Plan (SIP). In severe cases, EPA may impose a federal plan to make progress in meeting the federal standards.

EPA also has programs for identifying and regulating hazardous air pollutants. The Clean Air Act requires EPA to set standards for these pollutants and sharply reduce emissions of controlled chemicals. Industries were classified as major sources if they emitted certain amounts of hazardous air pollutants. The US EPA also sets standards to control emissions of hazardous air pollutants through mobile source control programs. These include programs that reformulated gasoline, national low emissions vehicle standards, Tier 2 motor vehicle emission standards, gasoline sulfur control requirements, and heavy-duty engine standards.

The San Joaquin Valley Air Basin is subject to major air quality planning programs required by the federal Clean Air Act (CAA) (1977, last amended in 1990, 42 United States Code [USC] 7401 *et seq.*) to address ozone and particulate matter air pollution. The CAA requires that regional planning and air pollution control agencies prepare a regional Air Quality Plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled in order to achieve all standards within the deadlines specified in the Clean Air Act. These plans are submitted to the State, which after approval submits them to US EPA as the State Implementation Plan (SIP).

STATE REGULATIONS

The California Clean Air Act (CCAA) of 1988, amended in 1992, outlines a program for areas in the State to attain the California ambient air quality standards (CAAQS) by the earliest practical date. The California Air Resources Board (CARB) is the state air pollution control agency, and is a part of the California Environmental Protection Agency. The California Clean Air Act sets more stringent air quality standards for all of the pollutants covered under national standards, and additionally regulates levels of vinyl chloride, hydrogen sulfide, sulfates, and visibility-reducing particulates. If an area does not meet CAAQS, CARB designates the area as a nonattainment area. The San Joaquin Valley Air Basin does not meet the CAAQS for ozone, PM_{10} and $PM_{2.5}$. CARB requires regions that do not meet CAAQS for ozone to submit clean air plans that describe plans to attain the standard or show progress toward attainment.

In addition to the US EPA, CARB regulates the amount of air pollutants that can be emitted by new motor vehicles sold in California. California motor vehicle emission standards have always been more stringent than federal standards since they were first imposed in 1961. CARB has also developed Inspection and Maintenance (I/M) and "Smog Check" programs with the California Bureau of Automotive Repair. Inspection programs for trucks and buses have also been implemented. CARB also has authority to set standards for fuel sold in California.

SAN JOAQUIN VALLEY

The San Joaquin Valley Air Pollution Control District (SJVAPCD) is made up of eight counties in California’s Central Valley: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and the San Joaquin Valley portion of Kern. The primary role of the SJVAPCD is to develop plans and implement control measures in the San Joaquin Valley to control air pollution. These controls

primarily affect stationary sources such as industry and power plants. Rules and regulations have been developed by SJVAPCD to control air pollution from a wide range of air pollution sources. Recently, an indirect source review rule was adopted that controls air pollution from new land developments. SJVAPCD also conducts public education and outreach efforts such as the Spare the Air, Wood Burning, and Smoking Vehicle voluntary programs.

NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

The CAA and CCAA promulgate, respectively, national and state ambient air quality standards. Air quality standards have been established by US EPA (i.e., NAAQS) and California (i.e., CAAQS) for specific air pollutants most pervasive in urban environments. The NAAQS and CAAQS are shown in Table 6.1. Ambient standards specify the concentration of pollutants to which the public may be exposed without adverse health effects. Individuals vary widely in their sensitivity to air pollutants, and standards are set to protect more pollution-sensitive populations (*e.g.*, children and the elderly). National and state standards are reviewed and updated periodically based on new health studies. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent.

For planning purposes, regions like the San Joaquin Valley Air Basin are given an air quality status designation by the federal and state regulatory agencies. Areas with monitored pollutant concentrations that are lower than ambient air quality standards are designated “attainment” on a pollutant-by-pollutant basis. When monitored concentrations exceed ambient standards within an air basin, it is designated “nonattainment” for that pollutant. US EPA designates areas as “unclassified” when insufficient data are available to determine the attainment status; however, these areas are typically considered to be in attainment of the standard.

CRITERIA AIR POLLUTANTS

Ambient air quality standards have been established by state and federal environmental agencies for specific air pollutants most pervasive in urban environments. These pollutants are referred to as criteria air pollutants because the standards established for them were developed to meet specific health and welfare criteria set forth in the enabling legislation. The criteria air pollutants emitted by development of the proposed Plan include ozone (O_3) precursors (NO_x and ROG), carbon monoxide (CO), nitrogen dioxide (NO_2), and suspended particulate matter (PM_{10} and $PM_{2.5}$). Other criteria pollutants, such as lead (Pb) and sulfur dioxide (SO_2), would not be substantially emitted by the development of the proposed Plan or the generated traffic, and air quality standards for them are being met throughout the San Joaquin Valley Air Basin.

Ozone (O_3)

While O_3 serves a beneficial purpose in the upper atmosphere (stratosphere) by reducing ultraviolet radiation potentially harmful to humans, when it reaches elevated concentrations in the lower atmosphere it can be harmful to the human respiratory system and to sensitive species of plants. O_3 concentrations build to peak levels during periods of light winds, bright sunshine, and high temperatures. Short-term O_3 exposure can reduce lung function in children, make persons susceptible to respiratory infection, and produce symptoms that cause people to seek medical treatment for respiratory distress. Long-term exposure can impair lung defense mechanisms and lead to emphysema and chronic bronchitis. Sensitivity to O_3 varies among individuals, but about 20 percent of the population is sensitive to O_3, with exercising children being particularly vulnerable. O_3 is formed in the atmosphere by a complex series of photochemical reactions that involve “ozone precursors” that are two families of pollutants: oxides of nitrogen (NO_x) and reactive organic gases (ROG). NO_x and

ROG are emitted from a variety of stationary and mobile sources. While NO_2 (an oxide of nitrogen) is another criteria pollutant itself, ROGs are not in that category, but are included in this discussion as O_3 precursors.

Recently, CARB adopted an 8-hour health based standard for O_3 of 0.070 ppm. More recently, US EPA revised the 8-hour NAAQS for O_3 from 0.08 ppm to 0.075 ppm.

Carbon Monoxide (CO)

Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause dizziness and fatigue, impair central nervous system function, and induce angina in persons with serious heart disease. Primary sources of CO in ambient air are passenger cars, light-duty trucks, and residential wood burning. The monitored CO levels in the Valley during the last 10 years have been well below ambient air quality standards.

Nitrogen Dioxide (NO_2)

The major health effect from exposure to high levels of NO_2 is the risk of acute and chronic respiratory disease. NO_2 is a combustion by-product, but it can also form in the atmosphere by chemical reaction. NO_2 is a reddish-brown colored gas often observed during the same conditions that produce high levels of O_3, and can affect regional visibility. NO_2 is one compound in a group of compounds consisting of oxides of nitrogen (NO_x). As described above, NO_x is an O_3 precursor compound. As described above, NO_x is an O_3 precursor compound. Monitored levels of NO_2 in the Valley are below ambient air quality standards.

Particulate Matter (PM)

Respirable particulate matter, PM_{10}, and fine particulate matter, $PM_{2.5}$, consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled and cause adverse health effects. PM_{10} and $PM_{2.5}$ are a health concern, particularly at levels above the Federal and State ambient air quality standards. $PM_{2.5}$ (including diesel exhaust particles) is thought to have greater effects on health because minute particles are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Children are more susceptible to the health risks of $PM_{2.5}$ because their immune and respiratory systems are still developing. Very small particles of certain substances (e.g., sulfates and nitrates) can also directly cause lung damage or can contain absorbed gases (e.g., chlorides or ammonium) that may be injurious to health.

Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter (such as mining, demolition and construction activities) are more local in nature, while others (such as vehicular traffic) have a more regional effect. In addition to health effects, particulates also can damage materials and reduce visibility. Dust comprised of large particles (diameter greater than 10 microns) settles out rapidly and is more easily filtered by human breathing passages. This type of dust is considered more of a soiling nuisance rather than a health hazard.

In 1983, CARB replaced the standard for “suspended particulate matter” with a standard for suspended PM_{10} or “respirable particulate matter.” This standard was set at 50 $\mu g/m^3$ for a 24-hour average and 30 $\mu g/m^3$ for an annual average. CARB revised the annual PM_{10} standard in 2002, pursuant to the Children's Environmental Health Protection Act. The revised PM_{10} standard is 20

µg/m^3 for an annual average. $PM_{2.5}$ standards were first promulgated by the EPA in 1997 and were recently revised to lower the 24-hour $PM_{2.5}$ standard to 35 µg/m^3 for 24-hour exposures and revoked the annual PM_{10} standard due to lack of scientific evidence correlating long-term exposures of ambient PM_{10} with health effects. CARB has adopted an annual average $PM_{2.5}$ standard, which is set at 12 µg/m^3, which is more stringent than the Federal standard of 15 µg/m^3.

TOXIC AIR CONTAMINANTS

Besides the "criteria" air pollutants, there is another group of substances found in ambient air referred to as Hazardous Air Pollutants (HAPs) under the Federal Clean Air Act and Toxic Air Contaminants (TACs) under the California Clean Air Act. These contaminants tend to be localized, and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods. They are regulated at the local, state, and federal level.

HAPs are the air contaminants identified by US EPA as known or suspected to cause cancer, serious illness, birth defects, or death. Many of these contaminants originate from human activities, such as fuel combustion and solvent use. Mobile source air toxics (MSATs) are a subset of the 188 HAPS. Of the 21 HAPs identified by EPA as MSATs, a priority list of six priority HAPs were identified that include: diesel exhaust, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene. While vehicle miles traveled in the United States is expected to increase by 64% over the period 2000 to 2020, emissions of MSATs are anticipated to decrease substantially as a result of efforts to control mobile source emissions (by 57% to 67% depending on the contaminant)[3].

California developed a program under the Tanner Toxics Act (AB 1807) to identify, characterize and control toxic air contaminants (TACs). Subsequently, AB 2728 incorporated all 188 HAPs into the AB 1807 process. TACs include all HAPs plus other containments identified by CARB. These are a broad class of compounds known to cause morbidity or mortality (cancer risk). TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal level.

Particulate matter from diesel exhaust is the predominant TAC in urban air and is estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average). According to CARB, diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by ARB, and are listed as carcinogens either under State Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB reports that recent air pollution studies have shown an association that diesel exhaust and other cancer-causing toxic air contaminants emitted from vehicles are responsible for much of the overall cancer risk from TACs in California. Particulate matter emitted from diesel-fueled engines (diesel particulate matter [DPM]) was found to comprise much of that risk. In August 1998, CARB formally identified DPM as a TAC. Diesel particulate matter is of particular concern, since it can be distributed over large regions, thus leading to widespread public exposure. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by EPA as hazardous air

[3] Federal Highway Administration, 2006. Interim Guidance on Air Toxic Analysis in NEPA Documents.

pollutants, and by CARB as TACs. Diesel engines emit particulate matter at a rate about 20 times greater than comparable gasoline engines. The vast majority of diesel exhaust particles (over 90 percent) consist of $PM_{2.5}$, which are the particles that can be inhaled deep into the lung. Like other particles of this size, a portion will eventually become trapped within the lung, possibly leading to adverse health effects. While the gaseous portion of diesel exhaust also contains TACs, CARB's 1998 action was specific to DPM, which accounts for much of the cancer-causing potential from diesel exhaust. California has adopted a comprehensive diesel risk reduction program to reduce DPM emissions 85 percent by 2020. The U.S. EPA and CARB adopted low sulfur diesel fuel standards in 2006 that will reduce diesel particulate matter substantially.

Smoke from residential wood combustion can be a source of TACs. Wood smoke is typically emitted during wintertime when dispersion conditions are poor. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind; the pollution can persist for many hours, especially in sheltered valleys during winter. Wood smoke also contains a significant amount of PM_{10} and $PM_{2.5}$. Wood smoke is an irritant and is implicated in worsening asthma and other chronic lung problems.

Exposure to TACs is usually evaluated in terms of health risk or cancer risk. For cancer health effects, the risk is expressed as the number of chances in a population of a million people who might be expected to get cancer over a 70-year lifetime. CARB estimates 2001 lifetime cancer risk at about 250 excess cases per million people in the Ceres area[4]. This is a lower risk than the calculated overall 2000 San Joaquin Valley basin-wide cancer risk of 586 cancer cases per million people[5]. The cancer risk in Ceres is expected to be about 100 to 200 cases per million people in 2010, and less than 100 cases per million if CARB adopts most of the diesel risk reduction measures. These maps are based on emissions from major roadways, inventoried industrial and areas sources, and off road equipment (except aircraft).

NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

The CAA and CCAA promulgate, respectively, national and state ambient air quality standards for carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), particulate matter 10 microns or less in diameter (PM_{10}), and particulate matter 2.5 microns or less in diameter ($PM_{2.5}$).[6] Ambient standards specify the concentration of pollutants to which the public may be exposed without adverse health effects. Individuals vary widely in their sensitivity to air pollutants, and standards are set to protect more pollution-sensitive populations (e.g., children and the elderly). National and state standards are reviewed and updated periodically based on new health studies. California ambient standards tend to be at least as protective as national ambient standards, and are often more stringent. National and California ambient air quality standards are shown in **Table 6.1**.

For planning purposes, regions like the San Joaquin Valley Air Basin are given an air quality status designation by the federal and state regulatory agencies. Areas with monitored pollutant concentrations that are lower than ambient air quality standards are designated "attainment" on a pollutant-by-pollutant basis. When monitored concentrations exceed ambient standards within an air basin, it is designated "nonattainment" for that pollutant. U.S. EPA designates areas as "unclassified"

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[4] See CARB Maps of Estimated Cancer Risk from Air Toxics - http://www.arb.ca.gov/toxics/cti/hlthrisk/hlthrisk.htm

[5] California Air Resources Board. 2008. The California Almanac of Emissions and Air Quality – 2007 Edition.

[6] Other pollutants (*e.g.*, lead, sulfur dioxide) also have ambient standards, but they are not discussed in this document because emissions of these pollutants from the Project are expected to be negligible.

when insufficient data are available to determine the attainment status. However, these areas are typically considered to be in attainment of the standard.

TABLE 6.1: HEALTH-BASED AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standard	National Standard
Ozone	1 Hour	0.09 ppm	---
	8 Hour	0.070 ppm	0.75 ppm
Carbon Monoxide	1 Hour	20 ppm	35 ppm
	8 Hour	9.0 ppm	9 ppm
Nitrogen Dioxide	1 Hour	0.18 ppm	0.100 ppm
	Annual	0.03 ppm	0.053 ppm
Sulfur Dioxide	24 Hour	0.04 ppm	0.14 ppm
	Annual	---	0.03 ppm
Particulates	24 Hour	50 ug/m3	150 ug/m3
< 10 microns	Annual	20 ug/m3	---
Particulates	24 Hour	---	35 ug/m3
< 2.5 microns	Annual	12 ug/m3	15 ug/m3

Concentrations: ppm = parts per million ug/m3 = micrograms per cubic meter
Source: California Air Resources Board February 16, 2010

EXISTING AIR QUALITY

As previously discussed, the San Joaquin Valley experiences poor air quality conditions, due primarily to elevated levels of ozone and particulate matter. CARB, in cooperation with SJVAPCD, monitors air quality throughout the San Joaquin Valley Air Basin. A monitoring station located 8 miles south in Turlock measures O_3, CO, NO_2, and PM_{10}, while another station 3 miles to the north in Modesto measures O_3, CO, SO_2, NO_2, PM_{10} and $PM_{2.5}$. **Table 6.2** summarizes exceedances of the state and federal standards at these two sites.

The table above shows that air quality is problematic in the San Joaquin Valley as a result of exceedances of O_3 and PM_{10} standards. In recent years, both federal and State O_3 standards have been exceeded at least somewhere in the Valley on 65 to 95 days per year. At Turlock, the State O_3 standard was exceeded on 1 to 21 days per year, and the federal standard was exceeded 2 to 15 days. At Modesto, the State O_3 standard was exceeded on 1 to 14 days per year, and the federal standard was exceeded 0 to 8 days. PM_{10} is just as problematic in the San Joaquin Valley, where exceedances of State standards are estimated at over 150 days per year. However, the Valley has only exceeded the federal PM_{10} standard on 1 to 5 days per year. It is estimated that the older federal $PM_{2.5}$ 24-hour standard of 65 micrograms per cubic meter was exceed 3 days per year in Modesto (Turlock does not measured $PM_{2.5}$). In 2006, US EPA reduced the 24-hour $PM_{2.5}$ standard to 35 micrograms per cubic meter. The estimated number of days that the Modesto site would exceed the standard in 2008 is 39 days. Standards for CO and NO_2, or any other criteria air pollutant are not exceeded anywhere in the San Joaquin Valley.

Air quality in the Valley has improved significantly despite a natural low capacity for pollution, created by unique geography, topography, and meteorology. Emissions have been reduced at a rate similar or better than other areas in California. Since 1990, emissions of NOx and ROG have been reduced by 40% or greater, resulting in much fewer days where ozone standards have been exceeded. Direct emissions of PM_{10} and $PM_{2.5}$ have been reduced by 10% to 13%. As a result, the San Joaquin

Valley is the first air basin classified as "serious nonattainment" under the NAAQS to come into attainment of the PM_{10} standards.

TABLE 6.2: SUMMARY OF CRITERIA AIR POLLUTION MONITORING DATA

Pollutant	Standard	Monitoring Site	Days Standard Exceeded		
			2006	2007	2008
Ozone	State 1-Hour	Modesto	14	1	10
		Turlock	15	1	21
		SJV Air Basin	90	69	95
Ozone	Federal 8-Hour	Modesto	8	0	8
		Turlock	12	2	15
		SJV Air Basin	86	65	82
PM_{10}	Federal 24-Hour	Modesto	0	0	0
		Turlock	0	0	0
		SJV Air Basin	4	1	5
PM_{10}	State 24-Hour	Modesto	46	38	--
		Turlock	--	55	--
		SJV Air Basin	167	145	182
$PM_{2.5}$	1997 Federal 24-Hour	Modesto	3	0	3
		Turlock	--	--	--
$PM_{2.5}$	2006 Federal 24-Hour	Modesto	27	49	39
		Turlock	--	--	--
Carbon Monoxide	State/Federal 8-Hour	Modesto	0	0	0
		Turlock	0	0	0
Nitrogen Dioxide	State 1-Hour	Modesto	0	0	0
		Turlock	0	0	0

Note: PM_{10} and $PM_{2.5}$ are measured every sixth day, so the number of days exceeding the standard is estimated.

Source: California Air Resources Board Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html)

Attainment Status

Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data, and are judged for each air pollutant. The San Joaquin Valley as a whole does not meet State or federal ambient air quality standards for ground level O_3 and State standards for PM_{10} and $PM_{2.5}$. The attainment status for the Valley is described in **Table 6.3**.

Under the Federal Clean Air Act, the U.S. EPA has classified the region as *serious nonattainment* for the 8-hour O_3 standard. On March 19, 2008, the U.S. EPA posted a final rule in the Federal Register affirming the agency's October 30, 2006 determination that the Valley has attained the NAAQS for PM_{10}. The Valley is designated *nonattainment* for the $PM_{2.5}$ NAAQS. The U.S. EPA classifies the region as *attainment* or *unclassified* for all other air pollutants, which include PM_{10}.

At the State level, the region is considered *serious non-attainment* for ground level O_3 and *non-attainment* for PM_{10}. California ambient air quality standards are more stringent than the national ambient air quality standards. The region is required to adopt plans on a triennial basis that show progress towards meeting the State O_3 standard. The area is considered *attainment* or *unclassified* for all other pollutants.

REGIONAL AIR QUALITY PLANS

In response to not meeting federal standards, the region is required to submit attainment plans to U.S. EPA through the State, which are referred to as State Implementation Plans (SIP). The region has submitted the 2004 Extreme Ozone Attainment Demonstration Plan to U.S. EPA in 2004, which addressed the old 1-hour national standard. On October 16, 2008, EPA proposed to approve the District's 2004 Extreme Ozone Attainment Demonstration Plan for 1-hour Ozone. The region's 2007 Ozone Plan was submitted to U.S. EPA in June 2007, and is currently under review. That plan predicts attainment of the standard throughout the district by 2024, and earlier for most parts of the Valley. To accomplish these goals, the plan would reduce NOx emissions further by 75% and ROG emissions by 25%. A wide variety of control measures are included in these plans, such as reducing or offsetting emissions from construction and traffic associated with land use developments. While U.S. EPA reviews that plan, commitments made in the previous plan apply.

On April 25, 2008, US EPA proposed to approve the 2007 PM_{10} Maintenance Plan and Request for Redesignation. The region now meets the NAAQS for PM_{10}. The SJVAPCD adopted the 2008 $PM_{2.5}$ Plan on April 30, 2008. The plan was approved by CARB on May 22, 2008 and was submitted to US EPA for review. This plan will assure that the Valley will attain the 1997 $PM_{2.5}$ standard and make progress toward attaining the new 2006 standards as well as the state standard. The plan uses control measures to reduce NOx, which also leads to fine particulate formation in the atmosphere. The plan incorporates measures to reduce direct emissions of $PM_{2.5}$, including a strengthening of the wood-burning rules. Recent and proposed action by CARB to reduce diesel particulate matter emissions from on- and off-road mobiles sources is contained in the plan. Attainment plans for the 2006 $PM_{2.5}$ NAAQS are not required until 2012 at the earliest.

Both the ozone and $PM_{2.5}$ plans include all measures (i.e., federal, state and local) that would be implemented through rule making or program funding to reduce air pollutant emissions. Transportation Control Measures (TCMs) are part of these plans. The plans described above addressing ozone also meet the state planning requirements.

TABLE 6.3: REGIONAL ATTAINMENT STATUS

Pollutant	Federal Status	State Status
Ozone (O_3) – 1-Hour Standard	No Designation	Severe Nonattainment
Ozone (O_3) – 8-Hour Standard	Serious Nonattainment	Nonattainment
Respirable Particulate Matter (PM_{10})	Attainment	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Unclassified/ Attainment	Attainment
Nitrogen Dioxide (No_2	Unclassified/ Attainment	Attainment
Sulfur Dioxide (SO_2)	Unclassified	Attainment
Sulfates	No Designation	Attainment
Lead	No Designation	Attainment
Hydrogen Sulfide	No Designation	Unclassified
Visibility Reducing Particles	No Designation	Unclassified

SJVAPCD RULES AND REGULATIONS

The SJVAPCD has adopted rules and regulations that apply to land use projects, such as the West Landing Specific Plan project. These are described below.

Regulation IX - SJVAPCD Rule 9510 - Indirect Source Review Rule

The SJVAPCD adopted the Indirect Source Review Rule (ISR or Rule 9510) in 2006 to reduce ozone precursors (i.e., ROG and NOx) and PM_{10} emissions from new development projects. The rule is the result of state requirements outlined in the regions' portion of the State Implementation Plan (SIP). The SJVAPCD's SIP commitments are contained in the 2004 Extreme Ozone Attainment Demonstration Plan and the 2003 PM_{10} Plan, which identify the need to reduce PM_{10} and NOx in order to attain and maintain the ambient air-pollution standards on schedule. New projects that would generate substantial air pollutant emissions (for which final discretionary approval was granted after March 1, 2006) are subject to this rule. The rule requires projects to mitigate both construction and operational period emissions by applying the SJVAPCD-approved mitigation measures and paying fees to support programs that reduce emissions. Fees are based on estimated costs to reduce the emissions, and include expected costs to cover administration of the program.

Regulation VIII – Fugitive PM10

SJVAPCD controls fugitive PM_{10} through Regulation VIII (Fugitive PM_{10} Prohibitions). The purpose of this regulation is to reduce ambient concentrations of PM_{10} by requiring actions to prevent, reduce or mitigate anthropogenic fugitive dust emissions. This applies to activities such as construction, bulk materials, open areas, paved and unpaved roads, material transport, and agricultural areas. Sources regulated are required to provide dust control plans that meet the regulation requirements. Fees are collected by the District to cover costs for reviewing plans and conducting field inspections.

Regulation IV, Rule 4901 – Residential Wood Smoke

SJVAPCD Rule 4901 regulates emissions from residential fireplaces and wood burning heaters and provides educational information to reduce wood smoke emissions. The provisions of the rule apply to construction of new homes, retrofit of existing homes, or homes that are transferred through a real estate transfer. Wood burning heaters are required to be U.S. EPA Phase II Certified. Wood burning residential fireplaces are prohibited in residential developments with a density greater than two dwelling units per acre. More than two U.S. EPA Phase II Certified wood burning heaters per acre are prohibited in any new residential development with a density equal to or greater than three dwelling units per acre. Only one fireplace is allowed per dwelling unit where the density is less than two dwelling units per acre.

Regulation IX, Rule 9410 – Employer Based Trip Reduction

On December 17, 2009, the SJVAPCD adopted Rule 9410, Employer Based Trip Reduction. This rule will require larger employers to establish an Employer Trip Reduction Implementation Plan (ETRIP) to encourage employees to reduce single-occupancy vehicle trips, thus reducing pollutant emissions associated with work commutes. The rule applies to employers with at least 100 eligible employees at a worksite. The rule does identify several types of workers that are not included in determining the number of employees at one site (e.g., part-time employees and employees that do not normally commute during the morning). The ETRIP will contain a set of measures an employer chooses that will encourage employees at the worksite to use alternative transportation and ridesharing for their morning and evening commutes. The ETRIP is phased in over a period of 3 years. Employers are required to register with SJVAPCD by July 1, 2010. Phase 1 of the ETRIP, (Marketing and Program Support) is due to SJVAPCD by September 1, 2011. Phase 2 (Services and

Facilities) is due September 1, 2012 and Phase 3 (Transportation, Alternative Schedules, and Incentives) is due September 1, 2013. Implementation for each phase of the ETRIP begins January 1 following the ETRIP phase submittal. Commute verification reporting to SJVAPCD will be required annually, starting March 31, 2015.

CITY OF CERES GENERAL PLAN

The Air Quality section of the Agricultural and Natural Resources Element of the 1997 City of Ceres General Plan includes policies that address air quality:

- Policy 6.F.1 (AQ) The City shall cooperate with other agencies to develop a consistent and effective approach to regional air quality planning and management.

- Policy 6.F.2 (AQ) The City shall support the San Joaquin Unified Air Pollution Control District (SJVUAPCD) in its development of improved ambient air quality monitoring capabilities and the establishment of standards, thresholds, and rules to more adequately address the air quality impacts of new development.

- Policy 6.F.3 (AQ) The City shall require major new development projects (e.g., those generating 4,000 to 5,000 average daily trips or exceeding the SJVUAPCD's small project exemption level) to submit an air quality analysis for review and approval. Based on this analysis, the City shall require appropriate mitigation measures.

- Policy 6.F.4 (AQ) The City shall solicit and consider comments from local and regional agencies on proposed projects that may affect regional air quality. The City shall submit development proposals to the SJVUAPCD for review and comment in compliance with the California Environmental Quality Act (CEQA) prior to consideration by the City.

- Policy 6.F.5 (AQ) The City shall require project-level environmental review to include identification of potential air quality impacts and designation of design and other appropriate mitigation measures or offset fees to reduce impacts.

- Policy 6.F.6 (AQ) The City shall encourage development to be located and designed to minimize direct and indirect air pollutants.

- Policy 6.F.7 (AQ) in reviewing project applications, the City shall consider alternatives and amendments that reduce emissions of air pollutants.

- Policy 6.F.8 (AQ) The City shall encourage the use of EPA-certified woodstoves and fireplace inserts in lieu of wood burning fireplaces in new development. The City may limit the number of woodstoves per housing unit to ensure that homeowners are not relying on wood to heat their homes.

- Policy 6.F.9 (AQ) The City shall encourage inclusion of exterior electrical outlets and natural gas hookups, as appropriate, in new residential development in order to encourage the use of electrical, rather than gas-powered equipment, and to encourage the use of natural gas-fired barbecues.

- Policy 6.G.1 (AQ) The City shall continue and, where appropriate, expand the use of synchronized traffic signals on roadways susceptible to emissions improvement through approach control.

- Policy 6.G.2 (AQ) The City shall encourage the use of alternative modes of transportation by incorporating public transit, bicycle, and pedestrian modes in City transportation planning and by requiring new development to provide adequate pedestrian and bikeway facilities.

- Policy 6.G.3 (AQ) As appropriate and as warranted by the demand for transit services, the City shall endeavor to secure adequate funding for transit services so that transit is a viable transportation alternative.

SENSITIVE RECEPTORS

"Sensitive receptors" are defined as facilities where sensitive population groups, such as children, the elderly, the acutely ill and the chronically ill, are likely to be located. These land uses include residences, schools, playgrounds, childcare centers, retirement homes, convalescent homes, hospitals and medical clinics. The Project site is surrounded by mostly agricultural and rural residences to the south and west, and by residential development to the north and east.

BUFFERS FROM SOURCES OF AIR POLLUTION AND ODORS

The SJVAPCD and CARB recommend that communities include buffers between sensitive receptors and sources of air toxic contaminant emissions and odors. In April 2005, CARB released the final version of the Air Quality and Land Use Handbook, which is intended to encourage local land use agencies to consider the risks from air pollution prior to making decisions that approve the siting of new sensitive receptors near sources of air pollution. Unlike industrial or stationary sources of air pollution, siting of new sensitive receptors does not require air quality permits, but could create air quality problems. The primary purpose of the CARB document is to highlight the potential health impacts associated with proximity to common air pollution sources, so that those issues are considered in the planning process. CARB makes recommendations regarding the siting of new sensitive land uses near freeways, truck distribution centers, dry cleaners, gasoline dispensing stations, and other air pollution sources. These “advisory” recommendations are based primarily on modeling information for studies conducted throughout the state and may not be entirely reflective of conditions in Ceres. Siting of new sensitive land uses within these recommendation distances may be appropriate due to site-specific conditions (e.g., source strength or meteorology), but should only be done after site-specific studies are conducted to identify the actual health risks. CARB acknowledges that land use agencies have to balance other siting considerations such as housing and transportation needs, economic development priorities and other quality of life issues. Buffers should be considered with existing and proposed industrial sources to avoid health, odor and nuisance impacts.

IMPACT ANALYSIS

STANDARDS OF SIGNIFICANCE

The SJVAPCD has developed the Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD 1998), also known as the GAMAQI. The following thresholds of significance, obtained from the SJVAPCD's GAMAQI, are used to determine whether a proposed project would result in a significant air quality impact:

1. *Construction Emissions of Particulate Matter (PM).* SJVAPCD recommends a qualitative evaluation of construction PM_{10} emissions that focuses on implementation of effective and comprehensive control measures. Construction impacts associated with the proposed project would be considered significant if the feasible control measures for construction are not included in the project. Construction projects are required to comply with Regulation VIII as listed in the SJVAPCD; however, the size of the project and the proximity to sensitive receptors may warrant additional measures.

2. *Emissions of Ozone Precursors (ROG and NOx).* Direct and indirect emissions associated with the proposed project would be considered significant if the project generates emissions of ROG or NOX that exceed 10 tons/year.

3. *Emissions of Particulate Matter (PM_{10} and $PM_{2.5}$).* SJVAPCD has not published thresholds for long-term emissions of PM. However, a PM_{10} emission level of 15 tons per year and for $PM_{2.5}$ emission level of 10 tons per year were used for this assessment,[7] since this is the level at which SJVAPCD requires "offsets" for new stationary sources. The GAMAQI is not clear whether these thresholds apply to construction. The thresholds were applied to construction emissions for this study. Since $PM_{2.5}$ ambient air quality standards are about 30% below the PM_{10} standard, a threshold of 10 tons per year for PM2.5 was used to judge the significance of the project direct and indirect emissions.[8]

4. *Local CO Concentrations.* Traffic emissions associated with the proposed project would be considered significant if the project contributes to CO concentrations at receptor locations in excess of the ambient air quality standards (i.e., CAAQS of 9.0 ppm for 8 hours or 20 ppm for 1 hour).

5. *Toxic or Hazardous Air Pollutants*. Exposure to hazardous air pollutants (HAPs) or toxic air contaminants (TACs) would be considered significant if the probability of contracting cancer for the Maximally Exposed Individual would exceed 10 in 1 million or would result in a Hazard Index greater than 1.

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[7] While San Joaquin Valley Air Pollution Control District CEQA guidance recognizes that particulate matter (PM_{10} and $PM_{2.5}$) is a major air quality issue in the basin, it has to date not established numerical thresholds for significance for these pollutants. For the purposes of this analysis, a PM_{10} emission threshold of 15 tons per year was used as a measure of significance. This emission is the SJVAPCD threshold level at which new stationary sources requiring permits from the District must provide emissions "offsets". This threshold of significance for PM_{10} is consistent with the District's ROG and NOx thresholds, which are also the offset thresholds, established in SJVAPCD Rule 2201 New and Modified Stationary Source Review Rule.

[8] The Federal 24-hour standard for $PM_{2.5}$ (35 $\mu g/m^3$) is approximately 30 percent lower than the State 24-hour standard for PM10 (35 $\mu g/m^3$).

6. *Odors.* Odor impacts associated with the proposed project would be considered significant if the project has the potential to frequently expose members of the public to objectionable odors through development of a new odor source or placement of receptors near an existing odor source.

Project-related air quality impacts fall into two categories: short-term impacts due to construction, and long-term impacts due to Project operation. During construction, the Project would affect local particulate concentrations primarily due to fugitive dust sources. Over the long-term, the Project would result in an increase in emissions primarily due to increased motor vehicle trips.

CONSTRUCTION IMPACTS

Impact Air-1: **Construction Dust.** Construction activity involves a high potential for the emission of fugitive particulate matter emissions that would affect local air quality.

Construction activities would temporarily affect local air quality, causing a temporary increase in particulate dust and other pollutants. Dust emission during periods of construction would increase particulate concentrations at neighboring properties. This impact is potentially significant, but normally mitigable.

For this analysis, it is assumed that development in the Plan area would occur over a period of about 12 to 15 years, depending on a number of factors, but mostly including housing market conditions. The Project would be constructed in phases that are not yet defined. In any case, grading of the site is likely to occur intermittently throughout the buildout period as individual phases or development projects occur. Grading and site disturbance (e.g., vehicle travel on exposed areas) would result in the greatest emissions of dust and PM_{10}. Windy conditions during construction could cause substantial emissions of PM_{10}. Sensitive receptors are located in large numbers to the north and east. Some of these receptors would be normally downwind of the site, since typical winds are from the north-northwest. As the Plan area develops, new sensitive receptors will also move into the Plan area, potentially immediately adjacent to the active grading sites.

The SJVAPCD's GAMAQI emphasizes implementation of effective and comprehensive control measures rather than requiring a detailed quantification of construction emissions. SJVAPCD adopted a set of PM_{10} fugitive dust rules collectively called Regulation VIII. Compliance with Regulation VIII during the construction phase of the proposed Project would be required. Prior to construction, the Project Applicants would be required to provide dust control plans that meet the regulation requirements. These plans are reviewed by SJVAPCD, and construction cannot begin until District approval is obtained. Construction sites are subject to SJVAPCD inspections. The rule requires stabilization of disturbed areas to reduce dust emissions through watering, chemical stabilizer/suppressants, tarps, or vegetation. Track out on to roadways must be prevented or cleaned immediately. For the most part, compliance with the regulation would reduce dust and PM_{10} emissions to a less than significant level. However, sensitive receptors are located immediately downwind of the site that warrant additional control measures. Without these additional measures, construction impacts would not be adequately protective of the health of nearby sensitive receptors, nor would emissions that could affect regional air quality be reduced. This would be a significant impact.

Mitigation Measure Air-1: **Dust Suppression.** In addition to compliance with SJVAPCD Regulation VIII, the following enhanced dust control measures shall be included in

construction contracts where applicable and feasible to control fugitive dust emissions during construction.

- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Limit access to the construction sites, so tracking of mud or dirt on to public roadways can be prevented. If necessary, use wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 20 mph or dust clouds cannot be prevented from extending beyond the site.

With required compliance with Regulation VIII and implementation of mitigation measure Air-1, impacts related to construction dust would be reduced to a level of ***less than significant***.

Construction Exhaust

Equipment and vehicle trips associated with construction would emit ozone precursor air pollutants on a temporary basis. However, emissions would be below the GAMAQI significance thresholds, and would be considered a ***less than significant*** impact, as discussed in more detail below.

Construction plans for the development projects within the Plan area are not available. Development of the Plan area, as proposed, would occur in a number of distinct phases (yet to be determined by the Project Applicants). The development of the site is contingent on economic factors that can vary considerably through the development phase. A 12-15-year build out period is the preliminary estimate presented in the Specific Plan document, with construction beginning in 2010 at the earliest. This preliminary construct schedule is subject to change. Full occupancy prior to 2020 is unlikely.

Modeling of air pollutant emissions was conducted using the URBEMIS2007 model released by Rimpo Associates. This model is developed with funding and oversight from California air pollution control districts and uses the CARB EMFAC2007 emissions factor model for on-road vehicles and the CARB OFFROAD2007 emission factor model for construction equipment. The model predicts emissions of ozone precursor pollutants (i.e., ROG and NOx), particulate matter (i.e., PM_{10} and $PM_{2.5}$) as well as approximates emissions of carbon dioxide (CO_2). Since details of construction schedules are not known, a reasonable worst-case assessment was made. Build-out of the entire Plan area was modeled, using URBEMIS2007, to be constructed over a ten to fifteen-year period from 2010 to 2025. Unmitigated emissions from all phases of construction averaged over a ten-year period are presented in **Table 6.4**.

The heavy-duty off-road construction equipment used for construction is diesel-fueled. The pollutants from this equipment that are of greatest concern are diesel particulate matter or DPM (i.e., exhaust PM_{10} and $PM_{2.5}$), which affects local air quality, and ROG and NOx, which can affect regional ozone levels. Grading and site preparation are expected to result in the highest daily emissions of DPM and NOx during construction periods. Grading periods are relatively short compared to building periods; so annualized emissions associated with building activities would be greater. The building phases would result in numerous heavy vehicle trips, along with use of construction equipment. As a result,

emissions of DPM and NOx would be greatest during the building phases. Emission rates for construction equipment and trucks decrease in the future, so emissions for essentially the same type of activity in future years would result in slightly lower emissions. Heavy construction equipment would be used the most during the site preparation phases. These phases are anticipated to last for several months. The numerous truck trips during the building phase would be required for roadway construction and building foundation and concrete work. Annualized construction activities are expected to result in NOx emissions that are below the GAMAQI thresholds.

TABLE 6.4: UNMITIGATED PROJECT CONSTRUCTION EMISSIONS IN TONS PER YEAR DURING BUILD OUT OF THE PROJECT

Construction Year / Primary Activity	ROG	NOx	PM10	PM2.5
Mass grading and paving	0.05	0.29	4.62	0.97
Building	0.29	1.38	0.1	0.07
Coating	7.00	0.01	0	0
Total Emissions	7.04	1.68	4.72	1.04
GAMAQI Thresholds	10.00	10.00	[1]	[1]
Exceeds Threshold?	No	No		

[1] - Rather than establish a numerical threshold of significance the San Joaquin Valley Air Pollution Control District (SJVAPCD) adopted regulations governing various activities that contribute to the overall PM problem. The SJVAPCD has determined that compliance with these regulations will reduce the PM emissions to a less than significant level

Construction activities include the use of architectural coatings (primarily paints) that contain volatile organic compounds, which are emitted to the atmosphere as ROG. The sales of these products in the San Joaquin Valley are subject to CARB and SJVAPCD rules and regulations. SJVAPCD Rule 4601 (Architectural Coatings) limits the VOC content for numerous architectural coatings sold in the District. The URBEMIS2007 model uses a template that reflects current SJVAPCD rules pertaining to VOC content in coatings. According to the model, emissions would be less than significant if all of the buildings would be painted in a 3-year period or longer. This scenario is likely, given that current projections indicate a build out period of greater than 10 years. If no more than one third of the site were coated during any year, than ROG construction emissions would be below the thresholds.

New development within the Plan area would have to comply with SJVAPCD Indirect Source Review Rule (Rule 9510). In accordance with Rule 9510, a detailed air impact assessment would have to be prepared for each development project. It is likely that the Plan area would be constructed as different projects, in terms of obtaining final grading plans and other discretionary approvals from local agencies. SJVAPCD would calculate the construction and operational emissions from each project submitted. Rule 9510 would require that the projects reduce construction exhaust emissions by 20 percent for NOx and 45 percent for PM_{10}. SJVAPCD encourages reductions through on-site mitigation measures. Fees to purchase or sponsor off-site reductions through SJVAPCD apply when on-site mitigation measures do not achieve the requirements. Using less-polluting construction equipment (such as newer equipment or retrofitting older equipment) reduces construction emissions on-site. A combination of on-site and off-site measures can be implemented to meet the overall emission reduction requirements. Based on the findings of the air impact assessment, the Project Applicants would pay to the SJVAPCD a monetary sum necessary to offset the required construction emissions not reduced by on-site measures identified in the permit application submitted to the District. Offset fees would be calculated in accordance with the procedures identified in the Rule 9510 and approved by the SJVAPCD. This rule would not directly affect ROG emissions.

Emissions of ozone precursor air pollutants during build-out of the Plan area would be below the GAMAQI significance thresholds of 10 tons per year for ROG or NOx, and, therefore, are considered less than significant.

Development projects under the Plan would be subject to SJVAPCD Rule 9510 that would require mitigation of construction emissions of 20 percent for NOx and 45 percent for PM_{10}. Measures to meet these requirements usually take the form of newer or retrofitted construction fleets, a reduction of construction traffic, use of electrical-powered stationary equipment, and possibly off site mitigation or fees payable to SJVAPCD to obtain off-site reductions.

OPERATIONAL IMPACTS

Development projects of this type in the San Joaquin Valley are most likely to violate an air quality standard or contribute substantially to an existing or projected air quality violation through vehicle trip generation. New vehicle trips add to ozone precursor concentrations and to carbon monoxide concentrations near roadways that provide access to the site.

Regional Emissions

Impact Air-2: **Ozone Precursors and Particulate Matter.** Mobile emissions generated by Plan area traffic would increase emissions in the region, affecting the attainment and maintenance of ozone and particulate matter air quality standards. These increases would be above GAMAQI significance thresholds.

The URBEMIS2007 model was used to predict annual emissions from the Plan area, once construction was completed and the Plan area was occupied. For the purposes of this analysis, a 10-year build-out period was assumed, with construction beginning in 2010. Traffic forecasts developed by Dowling Associates, Inc. were combined with the Project land uses in the URBEMIS2007 model. The daily trip generation estimates included internal trip capture estimates that were also applied in the URBEMIS2007 modeling. For traffic-related emissions, the model combines trip generation data and emissions factors generated by CARB's EMFAC2007 model. The model also predicts emissions from area sources, such as natural gas usage, consumer products, and landscape equipment. Annual emissions associated with the build out of the Plan area are shown in **Table 6.5**. Since emissions associated with motor vehicle use are anticipated to decrease substantially in future years, emissions are shown for the years 2020 (a conservative or "worst case" condition), 2025 and 2035. These decreases are anticipated as more stringent emission standards become effective and older, more polluting vehicles are retired from the overall fleet.

Buildout of the Plan area is not anticipated to result in the construction or modification of stationary air pollutant sources. If such sources are included in the Plan area at a later time, they may require permits from SJVAPCD. Such sources could include combustion emissions from boilers used for heating and cooling or standby emergency generators (rated 50 horsepower or greater). These sources would normally result in minor emissions, compared to those from traffic generation reported above. Sources of air pollutant emissions complying with all applicable SJVAPCD regulations generally will not be considered to have a significant air quality impact. Stationary sources that are exempt from SJVAPCD permit requirements due to low emission thresholds would not be considered to have a significant air quality impact.

As previously mentioned, development projects in the Plan area are subject to SJVAPCD's Indirect Source Review (ISR) or Rule 9510 to reduce NOx and PM_{10} emissions. Under Rule 9510, development projects in the Plan area would be required to reduce operational NOx emissions by 33

percent and operational PM_{10} emissions by 50 percent over 10 years. The actual required reductions would be determined by SJVAPCD when an application is submitted prior to "the last discretionary approval" for a project. However, the methods used by SJVAPCD to determine the required mitigations are consistent with the methods used in this analysis (e.g., use of latest URBEMIS2007 model using project size and trip generation rates). The mitigations required by ISR for development projects in the Plan area may be determined through several permit applications, since each individual project phase could apply at different times as final development plans are developed. The operational PM_{10} and $PM_{2.5}$ emissions shown in Table 6.5 show the Plan's impact to air quality with respect to PM_{10} and $PM_{2.5}$ would be significant. These emissions would be reduced further than the levels reported in **Table 6.5** with the application of the measures outlined in the ISR, Rule 9510. Emissions of ozone precursors (i.e., ROG and NOx) would also be reduced with the required Rule 9510 mitigation. However, the total Plan area emissions are predicted to remain above the SJVAPCD thresholds for ozone precursor emissions. In addition, Rule 9510 only requires offsets to be effective for 10 years. Plan area ozone precursor emissions in 2025 to 2030 would remain well above the GAMAQI significance thresholds, even with the application of Rule 9510.

TABLE 6.5: PREDICTED ANNUAL UNMITIGATED PROJECT OPERATIONAL EMISSIONS (TONS/YEAR)[1]

Year	Source	ROG	NOx	PM_{10}	$PM_{2.5}$
2020	Area	41.82	12.09	12.71	12.23
	Mobile	35.98	37.39	64.76	13.71
	Total	**77.80**	**49.48**	**77.47**	**25.94**
2025	Area	41.82	12.09	12.71	12.23
	Mobile	27.56	26.51	64.79	13.72
	Total	**69.38**	**38.60**	**77.50**	25.95
2030	Area	41.82	12.09	12.71	12.23
	Mobile	22.41	20.90	64.74	13.70
	Total	**64.23**	**32.99**	**77.45**	25.93
Significance Threshold		10	10	15[2]	10[3]

Source: Illingworth and Rodkin, Inc.

[1] Does not include reductions required under ISR

[2] See "Standards of Significance" above for discussion on thresholds.

Emissions projected in **Table 6.5** for all future buildout years would exceed the GAMAQI significance thresholds for ozone precursor air pollutants. The GAMAQI does not have thresholds for PM_{10} or $PM_{2.5}$ and therefore a level of 15 tons per year and 10 tons per year, respectively, was used. Emissions exceeding the thresholds are considered ***significant,*** since they may interfere with progress in the region towards attaining and maintaining ambient air quality standards for ozone.

Development projects in the Plan area would be required by SJVAPCD Rule 9510 to mitigate operational NOx emissions by 33 percent and operational PM_{10} emissions by 50 percent over ten years. All reasonable and feasible measures that could be implemented into the Plan area on site would not achieve these reductions. So, in addition to on–site mitigation measures, development projects in the Plan area would be required to provide off site mitigation that would likely be in the form of fees payable to the SJVAPCD. The District would use these fees to further reduce emissions from a number of ongoing programs. Application of the Rule 9510 would be considered application of the most reasonable mitigation available to the projects.

A number of on-site measures could be implemented to permanently achieve reductions in air pollutant emissions. The following standards are included in the Specific Plan to reduce NOx and PM_{10} emissions:

- Work with Ceres Area Transit to extend bus lines to access the site along Crows Landing Road and Hackett Road
- Development projects in the Plan area shall provide bus stops with pullouts from traffic lanes where appropriate. The bus stops should include shelter, benches, nighttime lighting, signage, transit schedules and route maps.
- Development projects in the Plan area shall include sidewalks with shade trees that provide safe and convenient access through the Project to future bus stops that serve the Project.
- Development projects in the Plan area shall provide bicycle lanes and connections throughout the site along with bicycle amenities such as secure bicycle parking at parks, schools, multi-family housing areas, and commercial areas. Bicycle routes and pedestrian paths should include amenities such as signs and traffic signal activation.
- Commercial sites shall include convenient pedestrian and bicycle access. Amenities for employees at commercial sites could include secure bicycle parking.
- Loading docks at commercial sites shall provide 110 and 220-volt outlets and include signage indicating that trucks with diesel engines are prohibited from idling for more than 5 minutes.
- For all buildings, provide outdoor electrical outlets and encourage the use of electrical landscape maintenance equipment. Also, provide electrical outlets for recharging electrical vehicles in commercial and industrial parking lots/structures.
- Development projects shall provide landscape plans that would shade buildings and walkways in summer to reduce the cooling loads on buildings.
- Development in the Plan area shall incorporate energy efficiency design, materials and/or appliances in order to meet or exceed energy efficiency requirements of the State Title 24 building code.

Adherence to SJVAPCD Rule 9510 would reduce the impact, but emissions would remain above the GAMAQI significance thresholds. The impact would be ***significant and unavoidable***.

Carbon Monoxide

Mobile emissions generated by Plan area traffic would increase carbon monoxide concentrations at intersections in the Plan area vicinity. However, resulting concentrations would be below ambient air quality standards, and therefore, considered a ***less than significant*** impact. Therefore, no mitigation is required.

Plan area traffic would increase concentrations of carbon monoxide along roadways providing access to the Plan area. Carbon monoxide is a localized air pollutant, where highest concentrations are found very near sources. The major source of carbon monoxide is automobile traffic. Elevated concentrations, therefore, are usually only found near areas of high traffic volume and congestion. The GAMAQI recommends air quality modeling of CO concentrations following the Project-Level Carbon Monoxide Protocol developed by UC Davis[9].

[9] UC Davis. 1998. Project-Level Carbon Monoxide Protocol. Institute of Transportation Studies.

Emissions and ambient concentrations of CO have decreased greatly in recent years. These improvements are due largely to the introduction of cleaner burning motor vehicles and motor vehicle fuels. No exceedances of the State or National CO standard have been recorded at any of San Joaquin Valley's monitoring stations in the past 15 years. The San Joaquin Valley Air Basin has attained the State and National CO standard.

However, despite this progress, localized CO concentrations still warrant concern in the Valley, and should be addressed. The region must safeguard against localized high concentrations of CO that may not be recorded at monitoring sites. Because elevated CO concentrations are generally fairly localized, heavy traffic volumes and congestion can lead to high levels of CO, or "hotspots", while concentrations at the closest air quality monitoring station may be below State and National standards.

Future carbon monoxide levels were predicted near three intersections with full build out of the Plan in place, using Plan area traffic projections for local streets provided by Dowling Associates, Inc. The intersections selected were those that had a combination of the highest traffic volumes and level of service. Intersections where the LOS was D or better were not considered.

Emission factors were calculated using the EMFAC2007 model, developed by the CARB, with default assumptions for San Joaquin Valley during winter that include a temperature of 40 degrees Fahrenheit, and slow traffic speeds of 5 miles per hour for all traffic movements. Air quality models such as the one used in this analysis include the assumption that per-mile emission rates will continue to be reduced in future scenarios due to anticipated improvements in the automobile fleet; attrition of older, high-polluting vehicles; and improved fuel mixtures.

Peak-hour traffic and emissions factors along with screening worst-case meteorological conditions were input to the Caline4 model. The model predicted one-hour roadside CO concentrations. A persistence factor of 0.7 was used to calculate 8-hour increases to CO levels. The contribution of Plan area-generated traffic to carbon monoxide levels were added to background levels to predict the resulting concentrations. The closest representative air quality monitoring station to the Plan area is in Modesto, where the highest measured carbon monoxide level over any 8-hour averaging period over the last 3 years was 2.8 parts per million (ppm). There are 1- and 8-hour standards for carbon monoxide. The 8-hour standard is the most stringent, and is always exceeded if the 1-hour standard is exceeded. Therefore, this analysis evaluated impacts against the 8-hour standard. Modeling results are shown in **Appendix B**.

TABLE 6.6: PREDICTED 8-HOUR WORST CASE CARBON MONOXIDE LEVELS (IN PPM)

Intersection	Existing (2010)	Near Term w/o project (2020)	Near Term w/Project (2020)	Build Out (2030)
Crows Landing Rd/Hatch Rd	5.6	3.8	6.7	4.0
Crows Lancing Rd/Whitmore Ave	4.6	3.4	6.5	4.0
Crows Landing Rd/Hackett Rd	4.1	3.3	5.4	3.6
Crows Landing Rd/W. Service Rd	3.7	3.1	5.4	3.6

Significance Thresholds (CAAQS): 9.0 ppm for 8-hour exposure

Source: Illingworth and Rodkin, Inc.

As shown in **Table 6.6**, the modeling indicates that existing 8-hour CO levels are currently below National and California Ambient Air Quality Standards. The 8-hour CO levels with full build out of the Plan area under future conditions (in 2020 and 2030) are predicted to remain below ambient air quality standards. As a result, the impact on local air quality resulting from the Plan is considered to be ***less than significant***.

SENSITIVE RECEPTORS

Impact Air-3: **Nuisances and Odors.** Development of the Plan would not include any activities that are typical sources of objectionable odors. However, future agricultural activities adjacent to the west side of the site could affect some proposed residences.

Typical sources of objectionable odors include chemical plants, sewage treatment plants, large composting facilities, rendering plants, and other large industrial facilities that emit odorous compounds. This Plan would not include any such activities, and thus would not create objectionable odors. Land uses near the Plan area are residential, light industrial, agricultural or generally vacant undeveloped land. Residential or undeveloped lands with no approved future uses do not pose a potential for nuisances caused by odors or dust generation.

The Plan proposes residences along the western and southern boundary that would be adjacent to active farming lands. Agricultural activities could result in short-term nuisances that could affect these lands. The most common nuisance could be blowing dust. Plowing of fields on dry days can create substantial dust that is transported by wind. The Plan would lie downwind of these fields most of the time, especially during spring and summer when northwest winds are most common. New residents may experience episodes of dust blowing across their property. This would result in conflicts between existing agricultural and new residential uses.

The Plan provides for construction of a masonry wall (or a combination berm and wall) at least 6 feet high, together with a landscaped setback area along the proposed residential areas of the Plan area along Ustick Road (the western boundary of the Plan area) and Service Road (the southern boundary of the Plan area). Part of the project, these walls and landscaping will act to buffer and reduce wind-blown dust from adjacent agricultural fields.

Mitigation Measure Ag-4: Deeded Right to Farm would additionally reduce this impact by ensuring that residents who choose to live in the Plan area are aware of potential annoyances related to proximity to farmland and find them acceptable.

The proposed wall, setback and landscaping, along with the deeded right-to-farm specified in mitigation measure Ag-4 would reduce this impact to a level of ***less than significant***.

<u>Railroad Emissions Near Sensitive Receptors</u>

The Project would not place any new residences along the existing Union Pacific Railroad right of way.

Locomotives are a source of diesel particulate matter (DPM) emissions. As previously discussed, DPM is a toxic air contaminant that makes up much of the cancer inhalation health risk in California. CARB recommended setback distances between substantial sources of DPM and new residences. These buffers were identified for freeways, warehouses or distribution centers with large truck trip generation, active railroad yards, and ports. Buffers along railroad lines were not identified by CARB. While trains may emit large quantities of DPM, they pass by the site fairly quickly, and the passbys

are infrequent. There is a separation of at least 1/2 mile between the existing rail line and proposed residential uses. This distance would provide an adequate buffer between trains and residences so that exposures would likely be below any significance standards in the GAMAQI for DPM exposure (e.g., cancer risks would be less than 10 in one million). As a result, the proximity to the railroad would pose a ***less than significant*** impact with respect to DPM exposure.

CUMULATIVE AIR QUALITY IMPACTS

The SJVAPCD has developed criteria to determine if a development Project could result in potentially significant regional emissions. According to Section 4.3.2 of the GAMAQI (Thresholds of Significance for Impacts from Project Operations), any proposed project that would individually have a significant air quality impact (i.e., exceed significance thresholds for ROG or NOx) would also be considered to have a significant cumulative air quality impact. Impacts of local pollutants (CO, HAPs) are cumulatively significant when modeling shows that the combined emissions from the project and other existing and planned projects will exceed air quality standards. For local impacts of PM_{10} from unrelated construction projects, the GAMAQI recommends a qualitative approach where construction activities from unrelated projects in the area should be examined to determine if enhanced dust suppression measures are necessary.

As discussed under 'Significance Criteria" above, cumulative ozone impacts would be considered significant if the project-specific emissions exceed the SJVAPCD significance thresholds for ozone precursors ROG or NOx, or the project is not consistent with the regional clean air plan. As discussed in Impact Air-2 (and shown in Table 6.5) above, project-specific emissions of ozone precursor pollutants (ROG and NOx) and PM_{10} were found to be less-than-significant. As discussed under Impact Air-2 above, the project would not be consistent with clean air planning efforts and could conflict with or obstruct their implementation. Therefore, the project contribution to cumulative regional air quality impacts would be significant and unavoidable.

Construction period PM_{10} emissions would be localized. With implementation of SJVAPCD Regulation VIII and Mitigation Measure Air-1, construction period impacts would be less than significant. Additional construction that may occur in the area concurrently with the project would be subject to SJVAPCD Regulation VIII, as well as the District's Indirect Source Review Rule 9510, which would reduce cumulative construction emissions to less-than-significant levels.

Table 6.6 above shows that CO levels under 2030 cumulative conditions (i.e., background + project in the table) are predicted to be well below the applicable standards, as are 2025 cumulative plus project conditions with General Plan buildout. As such, the cumulative CO impacts would be less than significant under near-term and far-term cumulative conditions.

In summary, the cumulative project impacts to localized air quality impacts would be ***less-than-significant***.

Impact Air-4: **Cumulative Contribution to Ozone Precursors.** Plan emissions of ozone precursors would contribute significantly to cumulative regional air quality problems.

The SJVAPCD has developed criteria to determine if a development project could result in potentially significant regional emissions. Features of the Plan, along with the trip generation rate forecasted by Dowling Associates, Inc., was input to the URBEMIS2007 model. Plan area emissions of ozone precursor pollutants were found to be significant. Elevated ozone levels in the area result from cumulative emissions of air pollutants from numerous sources. There are few, if any, sources that solely have a measurable effect on ozone levels in the region. When all of the sources are

combined, they lead to serious ozone problems. Because development of the Plan would have significant emissions of ozone precursor pollutants, it would have a cumulatively significant contribution to ozone levels.

Compliance with SJVAPCD Rule 9510 and standards included in the Specific Plan as discussed under Impact Air-2 would reduce project-level contributions to cumulative increases in ozone precursors, the impact would remain ***significant and unavoidable***.

Impact Air-5: **Cumulative Operational PM_{10} Impacts.** Plan emissions of PM_{10} would contribute significantly to cumulative regional air quality problems.

PM_{10} emissions would exceed the 15 tons per year threshold. These emissions are subject to SJVAPCD's Indirect Source Review or Rule 9510 (ISR) to reduce NOx and PM_{10} emissions. Under rule 9510 operational PM_{10} emissions would be required to be reduced by 50 percent over 10 years. Even with this mandated reduction the PM_{10} emissions would be greater than the 15 tons per year threshold.

Compliance with SJVAPCD Rule 9510 and standards included in the Specific Plan as discussed under Impact Air-2 would reduce project-level contributions to cumulative increases in PM_{10}, the impact would remain ***significant and unavoidable.***

Summary of Cumulative Contribution to Air Quality Impacts

The project would not contribute to a local cumulative air quality impact with respect to carbon monoxide. The results of the air quality analysis for the West Landing Specific Plan indicate that the Plan's long term ROG, NOx, and particulate matter emissions would be significant. Compliance with regulations, standards included in the Specific Plan, and mitigation measures provided in this section would reduce the emissions, but not to a less than significant level. The plan's cumulative impact to air quality from operational emissions is considered ***cumulatively considerable*** and ***significant and unavoidable***.