SELECTED SECTIONS

REVISED DRAFT

ENVIRONMENTAL IMPACT REPORT

THE PRESERVE

STOCKTON, CALIFORNIA

EIR FILE NO. 11-05

SCH#2006092063

LSA

August 2008

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EIR FILE NO. 11-05

SCH#2006092063

Submitted to:

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CHAPTER 1.0 INTRODUCTION

This document has been prepared to document changes that have occurred with the proposed project and/or conditions that potentially affect previous findings presented in the November 2007 Draft Environmental Impact Report (EIR) prepared for The Preserve project. Specifically, this document includes revisions to the Air Quality Section (Section 4.2) of the November 2007 DEIR, which address comments received by the City of Stockton during the public circulation period and revisions to the Air Quality Section that address consistency with the City's recently adopted 2035 General Plan.

Revised Project Description

Subsequent to circulating the Draft EIR for public review, the applicant and the City agreed to modify a portion of the discretionary approvals to achieve benefits for both parties. The modification involves the elimination of the application to process a Master Development Plan, and substituting it with the Planned Development process. A Master Development Plan, per the provisions of the Development Code, is intended to provide a comprehensive framework for the development of property which has a mix of land uses. However, because the project site will be primarily developed with residential uses and amenities, it does not meet the Master Development Plan criteria. Therefore, a Planned Development (PD) application was submitted in June, 2008 to replace the MDP application. The Planned Development process does not require approval of a Development Agreement, but the completion of Public Facilities Financing Plan and Fiscal Impact Analysis need be required before scheduling the Planning Commission public hearing. As a result of the similarities between the Master Development Plan process and the Planned Development process, all applications that request for land use entitlement including General Plan Amendment, Rezoning, and Vesting Tentative Map reviews, etc. remain in place as previously submitted and unchanged. Further, the type, nature, and intensity of environmental effects remain unchanged.

Revised/New EIR Sections (Section 4.2 Air Quality, Section 4.15 Global Climate Change)

On November 21, 2007, the City of Stockton circulated the Preserve Draft EIR document for public review initiating a 45 day public review period that ended on January 4, 2008. A number of comments were received by the City of Stockton on the project that will be addressed in conjunction with the preparation of the Final Environmental Impact. At this time, comments for several projects involving greenhouse gas (GHG) emissions and the potential effects expected on global warming were received by the City. As the issues involving GHG are evolving as a science, information and the analysis contained in the document was presented to address the project impacts to the extent available at the time. In light of the comments received, and recent availability of information and analytical tools, the City of Stockton has re-examined the project's effects on global warming due to the contribution of GHG and has prepared the supplemental information and analyses presented in this revised document.

The November 2007 EIR includes a section on air quality (Section 4.2) that addresses project-related climate changes. The new information included in this document has resulted in a clarification to the

findings presented in the November 2007 Draft EIR with respect to the air quality section and specifically to global warming and climate change issues. In the document, the EIR concludes that the project does not generate sufficient GHG emissions to create a significant impact. Specifically, the EIR concludes:

"The proposed project would contribute to greenhouse gas concentrations due to increase vehicle trips and stationary pollution sources such as the consumption of natural gas and electricity. Concerns associated with GHG emissions include the rise in sea levels and the associated rise in delta water levels. The Atlas Tract levee systems will provide adequate freeboard up to the 300 year storm event and protection against long term delta rise. Mitigation measures proposed in this section and compliance with the local air quality district will help reduce greenhouse gas emissions. The proposed project is considered to have a less than significant impact regarding global warming due to the high degree of uncertainty in modeling near-term climate scenarios."

Based on project-related greenhouse gas emissions estimates, it is anticipated that the project emissions will contribute to the global inventory of greenhouse gas emissions. As a result of the blending of the air quality assessment with the global warming/climate change assessment, the project level findings and cumulative level findings require additional clarity. For this reason, a separate global warming/climate change section was created to assist in distinguishing the project's effects from GHG emissions.

In accordance with CEQA Guidelines Section 15088.5, "Recirculation of an EIR Prior to Certification", the City has determined that based on the new information and change to the previous findings with respect to global warming issues, recirculation is appropriate. As allowed in subsection (2), when an EIR is revised in part and the lead agency is recirculating only the revised chapters or portions of the EIR, the lead agency may request that reviewers limit their comments to the revised chapters.

Overall, all other sections, discussions, analysis, etc., included in the November 2007 EIR remain as presented in that document. Only the section involving Section 4.2 Air Quality has been amended/changed. This section has been modified to eliminate the global warming/climate changes from the Air Quality Section, creating an entirely new section on Global Climate Change (Section 4.15). Other minor modifications have also been included in this section for clarification purposes.

The remaining air quality section remains valid despite the removal of the global warming/climate discussions from Section 4.2, Air Quality. With the reformatting of the EIR to provide a separate Global Climate Change section, Section 4.2 Air Quality must also be revised to omit the global climate change discussion. The previously described Impact AIR-7 statement has been removed and the Air Quality Section reformatted and impact statements renumbered accordingly. The revised Section 4.2 Air Quality is attached for the reader presenting the new format for separating the Air Quality and Global Climate Change sections per the selected sections of this recirculated DEIR.

4.2 AIR QUALITY

Air quality analysis is provided in Appendix E.

4.2.1 Existing Setting

Air pollution in the project area is from a combination of natural and man-made sources. Natural and man-made sources of air pollution consist of windblown dust, agricultural operations, fires from prescribed burning and agricultural burning, hydrocarbons emitted from natural vegetation, and other pollutants from mobile and stationary sources.

Climate and Meteorology

A region's topographic features have a direct correlation with air pollution flow and therefore are used to determine the boundary of air basins. A local air district is then assigned to each air basin and is responsible for providing air quality strategies to bring the air basin into compliance with the National Ambient Air Quality Standards (NAAQS). The proposed project is located in the San Joaquin Valley Air Basin (SJVAB), which is comprise of approximately 25,000 square miles and covers all of seven counties including Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus and Tulare, and the western portion of an eighth, Kern. San Joaquin Valley Air Pollution Control District (SJVAPCD) is the agency responsible for air quality in SJVAB.

The SJVAB is defined by the Sierra Nevada mountains in the east (8,000 to 14,000 feet in elevation), the Coast Ranges in the west (averaging 3,000 feet in elevation), and the Tehachapi mountains in the south (6,000 to 8,000 feet in elevation). 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. An aerial view of the SJVAB would simulate a 'bowl' opening only to the north. These topographic features restrict air movement through and out of the basin.

Although marine air generally flows into the basin from the San Joaquin River Delta, the Coast Range hinders wind access into the SJVAB from the west, the Tehachapi mountains prevent southerly passage of air flow, and the high Sierra Nevada range is a significant barrier to the east. These topographic features result in weak air flow which becomes blocked vertically by high barometric pressure over the SJVAB. As a result, the SJVAB is highly susceptible to pollutant accumulation over time. Most of the surrounding mountains are above the normal height of summer inversion layers (1,500 to 3,000 feet).

Local climatological effects, including wind speed and direction, temperature, inversion layers, and precipitation and fog, can exacerbate the air quality in the SJVAB. Wind speed and direction play an important role in dispersion and transport of air pollutants. Wind at the surface and aloft can disperse pollution by mixing vertically and by transporting it to other locations. For example, in the summer, wind usually originates at the north end of the SJVAB and flows in a south-southeasterly direction through the SJVAB, through Tehachapi pass, into the Southeast Desert Air Basin. However, in the winter, wind direction is reversed and flows in a north-northwesterly direction. In addition to the seasonal wind flow, a sea breeze flows into SJVAB during the day and a land breeze flowing out of the SJVAB at night. The diversified wind flow enhances the pollutant transport capability within SJVAB.

The climatological station monitoring temperature closest to the project site is the Stockton Hazelton Station. Monthly average temperature recorded at the Stockton Hazelton Station for the last 57 years ranges from 54.1° F in January to 92.5°F in July. January is typically the coldest month in this area. The Stockton Hazelton monitoring station also records precipitation throughout the year. The majority of annual rainfall in the Basin occurs between November and April. Summer rainfall is minimal and generally limited to scattered thundershowers along the coastal side of the mountains. Average monthly rainfall measured at the station during that period varied from 3.25 inches in January to 0.48 inches or less between May and October, with an annual total of 16.09 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather. The locations of air quality monitoring stations are shown on Figure 4.2.1.

The vertical dispersion of air pollutants in the SJVAB is limited by the presence of persistent temperature inversions. Because of expansional cooling of the atmosphere, air temperature usually decreases with altitude. A reversal of this atmospheric state, where the air temperature increases with height, is termed an inversion. Inversions can exist at the surface, or at any height above the ground. The height of the base of the inversion is known as the "mixing height." This is the level within which pollutants can mix vertically. Air above and below the inversion base does not mix because of the differences in air density. Warm air above the inversion is less dense than below the base. The inversion base represents an abrupt density change where little exchange of air occurs. Semi-permanent systems of high barometric pressure fronts frequently establish themselves over the SJVAB, deflecting low pressure systems that might otherwise bring cleansing rain and winds.

Inversion layers are significant in determining ozone formation, and carbon monoxide (CO) and fine particulate matter (PM_{10}) concentrations. Ozone and its precursors will mix and react to produce higher ozone concentrations under an inversion. The inversion will also simultaneously trap and hold directly emitted pollutants such as carbon monoxide. PM_{10} is both directly emitted and created in the atmosphere as a chemical reaction. Concentration levels are directly related to inversion layers due to the limitation of mixing space.

Surface or radiation inversions are formed when the ground surface becomes cooler than the air above it during the night. The earth's surface goes through a radiative process on clear nights, where heat energy is transferred from the ground to a cooler night sky. As the earth's surface cools during the evening hours, the air directly above it also cools, while air higher up remains relatively warm. The inversion is destroyed when heat from the sun warms the ground, which in turn heats the lower layers of air; this heating stimulates the ground level air to float up through the inversion layer.

The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are lowest. Periods of low inversions and low wind speeds are conditions favorable to high concentrations of CO and PM_{10} . In the winter, the greatest pollution problems are carbon monoxide and oxides of nitrogen (NO_x) because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and oxides of nitrogen to form photochemical smog.

Figure 4.2.1: Air Quality Monitoring Stations

The following describes the six criteria air pollutants and their attainment status in the Basin based on ARB's Area Designations (Activities and Maps) (http://www.arb.ca.gov/desig/desig.htm). ARB provided the Environmental Protection Agency (EPA) with California's recommendations for eight-hour ozone area designations on July 15, 2003. The recommendations and supporting data were an update to a report submitted to the EPA in July 2000. On December 3, 2003, the EPA published its proposed designations. EPA's proposal differs from the State's recommendations primarily on the appropriate boundaries for several nonattainment areas. ARB responded to the EPA's proposal on February 4, 2004. EPA finalized the eight-hour ozone designations in April 2004. The EPA issued the final $PM_{2.5}$ implementation rule in fall 2004 and issued the final designations on December 14, 2004.

Ozone

Ozone (smog) is formed by photochemical reactions between oxides of nitrogen and reactive organic gases, rather than being directly emitted. Ozone is a pungent, colorless gas. Elevated ozone concentrations result in reduced lung function, particularly during vigorous physical activity. This health problem is particularly acute in sensitive receptors such as the sick, elderly, and young children. Ozone levels peak during the summer and early fall months.

Carbon Monoxide

Carbon monoxide (CO) is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. CO passes through the lungs into the bloodstream, where it interferes with the transfer of oxygen to body tissues.

Nitrogen Oxides

Nitrogen dioxide (NO_2), a reddish-brown gas, and nitric oxide (NO), a colorless, odorless gas, are formed from fuel combustion under high temperature or pressure. These compounds are referred to as nitrogen oxides, or NOx. NOx is a primary component of the photochemical smog reaction. Nitrogen oxides also contribute to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition. NO_2 decreases lung function and may reduce resistance to infection.

Sulfur Dioxide

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

Particulate Matter

Particulate matter is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles are those that are larger than 2.5 microns but smaller than 10 microns, or PM_{10}. $PM_{2.5}$ refers to fine suspended particulate matter with an aerodynamic diameter of 2.5 microns or less that is not readily filtered out by the lungs. Nitrates, sulfates, dust, and combustion particulates are major components of PM_{10} and $PM_{2.5}$. These small particles can be directly emitted into the atmosphere as by-products of fuel combustion, through abrasion, such as tire or brake lining wear, or through fugitive dust (wind or mechanical erosion of soil). They can also be formed in the atmosphere through chemical reactions. Particulates may transport carcinogens and other toxic compounds that adhere to the particle surfaces, and can enter the human body through the lungs.

Reactive Organic Gases

Reactive organic gases (ROG) are not a criteria pollutant, but are precursors to ozone formation. They are formed from combustion of fuels and evaporation of organic solvents. ROG is a prime component of the photochemical smog reaction. Consequently, ROG accumulates in the atmosphere much quicker during the winter when sunlight is limited and photochemical reactions are slower.

Table 4.2.A shows both federal and State standards for these criteria pollutants. Table 4.2.B lists the sources, primary health effects, and status of meeting the standards of these criteria air pollutants. These health effects would not occur unless the standards are exceeded by a large margin or for a prolonged period of time. The State of California has also established standards (SAAQS) for criteria pollutants which are more stringent than the NAAQS.

Air quality monitoring stations are located throughout the nation and maintained by the local air pollution control district and state air quality regulating agencies. Ambient air data collected at permanent monitoring stations are used by the EPA to identify regions as "attainment" or "non-attainment" depending on whether the regions met the requirements stated in the primary NAAQS. Attainment areas are required to maintain their status through moderate, yet effective air quality maintenance plan. Non-attainment areas are imposed with additional restrictions as required by the EPA. In addition, different classifications of attainment such as marginal, moderate, serious, severe, and extreme are used to classify each air basin in the state on a pollutant-by-pollutant basis. Different classifications have different mandated attainment dates and are used as guidelines to create air quality management strategies to improve air quality and comply with the NAAQS by the attainment date.

A region is determined to be unclassified when the data collected from the air quality monitoring stations do not support a designation of attainment or non-attainment, due to lack of information, or a conclusion cannot be made with the available data.

Table 4.2.A: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	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	0.070 ppm (137 µg/m^3)		0.08 ppm (157 µg/m^3)[8]		
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 Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		50 µg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard		65 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric 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)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive 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	--	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.25 ppm (470 µg/m^3)		--		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	--	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	--	Spectrophotometry (Pararosaniline Method)
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	--	
	3-Hour	--		--	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		--	--	
Lead[9] (Pb)	30 Day Average	1.5 µg/m^3	Atomic Absorption	--	--	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	--		1.5 µg/m^3	Same as Primary Standard	
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 Cloride[9]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Table 4.2.A: Ambient Air Quality Standards (Cont.)

Source: ARB, November 29, 2005.
Footnotes:

[1] California standards for ozone; carbon monoxide (except Lake Tahoe); sulfur dioxide (1 and 24 hour); nitrogen dioxide; suspended particulate matter - PM_{10}, $PM_{2.5}$, 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 PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, 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 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 that 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] New federal eight-hour ozone and fine particulate matter standards were promulgated by EPA on July 18, 1997. Contact EPA for further clarification and current federal policies.

[9] 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.

Table 4.2.B: Public Health Impacts Summary of the Major Criteria Air Pollutants

Pollutants	Sources	Health Effects
Particulate Matter (PM10: less than or equal to 10 microns)	• Cars and trucks, especially diesels • Fireplaces, woodstoves • Windblown dust, from roadways, agriculture and construction	• Increased respiratory disease • Lung damage • Premature death
Ozone (O3)	• Formed by chemical reactions of air pollutants in the presence of sunlight. Common sources: motor vehicles, industries, and consumer products	• Breathing difficulties • Lung damage
Carbon Monoxide (CO)	• Any source that burns fuel such as cars, trucks, construction and farming equipment, and residential heaters and stoves	• Chest pain in heart patients • Headaches, nausea • Reduced mental alertness • Death at very high levels
Nitrogen Dioxide (NO2)	• See Carbon Monoxide sources	• Lung damage
Toxic Air Contaminants	• Cars and trucks, especially diesels • Industrial sources such as chrome platers • Neighborhood businesses, such as dry cleaners and service stations • Building materials and products	• Cancer • Chronic eye, lung, or skin irritation • Neurological and reproductive disorders

Source: CARB 2001

The attainment status in the San Joaquin County area of the SJVAB is shown in Table 4.2.C as follows:

Table 4.2.C: Attainment Status in San Joaquin County Area

POLLUTANT	STATE	FEDERAL
Ozone - 1 hour	Non-attainment/Severe	No Federal Standard
Ozone 8 hour	No State Standard	Non-attainment/Serious
PM_{10}	Non-attainment	Non-attainment/Serious
$PM_{2.5}$	Non-attainment	Non-attainment
CO	Attainment	Attainment/Unclassified
NO_2	Attainment	Attainment/Unclassified
Sulfur Dioxide	Attainment	Unclassified
Lead	Attainment	No Designation
Hydrogen Sulfide	Unclassified	No Federal Standard
Sulfates	Attainment	No Federal Standard
Visibility Reducing Particles	Unclassified	No Federal Standard

Maps & Tables of the Area Designations for the State and National Ambient Air Quality Standards and Expected Peak Day Concentrations and Designation Values, Air Resources Board, January 1998; Classification letter, ARB Staff, March 16, 1993; ARB Action, November 9, 1994; ARB Action, November 21, 1996;CO: (1) 40 CFR Parts 52 and 81 -- Fresno Urbanized Area, Bakersfield Metropolitan Area, Stockton Urbanized Area and Modesto Urbanized Area redesignated on March 31, 1998, effective June 1, 1998
Note: The Federal One Hour Ozone National Ambient Air Quality Standard was revoked on June 15, 2005.
Source: CARB

Local Air Quality

The SJVAPCD, together with the ARB, maintains ambient air quality monitoring stations in the Basin. The air quality monitoring station closest to the site is the Stockton-Hazelton Station, and its air quality trends are representative of the ambient air quality in the project area. The pollutants[1] monitored are CO, O_3, PM_{10}, $PM_{2.5}$, and NO_2.

The ambient air quality data in Table 4.2.D show that CO and NO_2 levels are well below relevant State and federal standards. $PM_{2.5}$ levels were consistently lower than standards. O_3 and PM_{10} levels occasionally exceeded State and federal standards during the last three years. Also shown in Table D, SO_2 levels are not monitored in the San Joaquin Basin.

[1] Air quality data. 2002-2005; EPA and ARB Web sites.

Table 4.2.D: Ambient Air Quality at Stockton-Hazelton Street Air Monitoring Station

Pollutant	Standard	2005	2004	2003
Carbon Monoxide (CO)				
Maximum 1 hr concentration (ppm)		3.2	3.7	5.8
Number of days exceeded:	State: > 20 ppm	0	0	0
	Federal: > 35 ppm	0	0	0
Maximum 8 hr concentration (ppm)		2.9	2.5	3.1
Number of days exceeded:	State: ≥ 9.0 ppm	0	0	0
	Federal: ≥ 9 ppm	0	0	0
Ozone (O_3)				
Maximum 1 hr concentration (ppm)		0.099	0.096	0.104
Number of days exceeded:	State: > 0.09 ppm	3	1	3
Maximum 8 hr concentration (ppm)		0.086	0.080	0.088
Number of days exceeded:	State: > 0.07 ppm	ND	ND	ND
	Federal: > 0.08 ppm	1	0	1
Coarse Particulates (PM_{10})				
Maximum 24 hr concentration ($\mu g/m^3$)		79.0	60.0	88.0
Number of days exceeded:	State: > 50 $\mu g/m^3$	8	3	3
	Federal: > 150 $\mu g/m^3$	0	0	0
Annual arithmetic average concentration ($\mu g/m^3$)		29.8	29.4	28.4
Exceeded for the year:	State: > 20 $\mu g/m^3$	Yes	Yes	Yes
	Federal: > 50 $\mu g/m^3$	No	No	No
Fine Particulates ($PM_{2.5}$)				
Maximum 24 hr concentration ($\mu g/m^3$)		44.0	41.0	45.0
Number of days exceeded:	Federal: > 65 $\mu g/m^3$	0	0	0
Annual arithmetic average concentration ($\mu g/m^3$)		ND	13.2	13.6
Exceeded for the year:	State: > 12 $\mu g/m^3$	No	Yes	Yes
	Federal: > 15 $\mu g/m^3$	No	No	No
Nitrogen Dioxide (NO_2)				
Maximum 1 hr concentration (ppm)		0.087	0.079	0.088
Number of days exceeded:	State: > 0.25 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.017	0.017	0.018
Exceeded for the year:	Federal: > 0.053 ppm	No	No	No
Sulfur Dioxide (SO_2) (Bethel Island, Contra Costa)				
Maximum 1 hr concentration (ppm)		0.017	0.015	0.016
Number of days exceeded:	State: > 0.25 ppm	0	0	0
Maximum 3 hr concentration (ppm)		0.010	0.009	0.013
Number of days exceeded:	Federal: > 0.5 ppm	0	0	0
Maximum 24 hr concentration (ppm)		0.006	0.006	0.008
Number of days exceeded:	State: > 0.04 ppm	0	0	0
	Federal: > 0.14 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.002	0.002	0.002
Exceeded for the year:	Federal: > 0.030 ppm	No	No	No

Source: ARB and EPA Web sites.
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
ND = No data. There was insufficient (or no) data to determine the value.

Methodology

There are a number of air quality modeling tools available to assess air quality impacts of projects, however, certain air districts such as the SJVAPCD have created guidelines and requirements to conduct air quality analysis. SJVAPCD's document, Guide for Assessing and Mitigating Air Quality Impacts (1998) was adhered to in the assessment of air quality impacts for the proposed project. The air quality models of URBEMIS 2002 and CALINE4 are recommended by SJVAPCD and were used in this air quality assessment. A brief discussion of each model is described below.

The air quality assessment includes estimating emissions associated with short-term construction and long-term operation of the proposed project. Criteria pollutants with regional impacts would be emitted by stationary or area (direct) sources and mobile (indirect) sources associated with the proposed project. Long-term stationary or area sources emissions include electricity and natural gas usage. Long-term mobile sources emissions include vehicle trips associated with the proposed project. In addition, localized air quality impacts, i.e., higher carbon monoxide concentrations (CO hot spots) near intersections or roadway segments in the project vicinity would potentially occur due to project generated vehicle trips.

The URBEMIS 2002 (Urban Emission Model) computer program is the most current air quality model available for estimating emissions associated with land use development projects such as residential development, shopping centers, office buildings, and hotels. URBEMIS 2002 calculates long-term stationary or area sources emissions and long-term mobile sources emissions associated with these land uses.

The CALINE4 model is widely used by Caltrans to predict CO concentrations near roadways. Caltrans also developed a document, Transportation Project-Level Carbon Monoxide Protocol (Caltrans, 1997) to provide guidance and consistency for air quality analysis conducted in the State of California. The CALINE4 model estimates CO concentrations at designated receptor locations near intersections or roadway segments based on traffic volume, roadway geometry, topography, and meteorological data. Receptor locations are placed at areas accessible by the public such as sidewalk, school, residential property, and any other locations deemed sensitive to bad air quality. The purpose is to determine the impact of the proposed project on the general public in the local vicinity. CALINE4 estimates the CO concentration at these receptor locations and the results are used to determine the significance of the project's impact on local air quality.

The results from the air quality models, URBEMIS 2002 and CALINE4, were used to determine the net changes in ambient air pollutants concentrations between the baseline (future with approved projects) scenario, and the horizon (future with proposed project) scenario. Because the baseline emissions would occur if the proposed project is not approved and implemented, the net changes of pollutant concentrations determine the significance and impact on regional and local air quality as a result of the proposed project. The results also allow the local government to determine whether the proposed project will deter the region from achieving the goal of reducing pollutants in accordance with the AQAP in order to comply with federal and State ambient air quality standards.

Construction Emission Measures

Specific criteria for determining the potential air quality impacts of a project are set forth in the SJVAPCD's Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI, 1998). A project's construction phase produces many types of emissions, but PM $_{10}$ is the pollutant of greatest concern. The SJVAPCD's approach to CEQA analyses of construction impacts is to require implementation of effective and comprehensive control measures rather than to require detailed quantification of emissions. The SJVAPCD has determined that compliance with Regulation VIII for all sites and implementation of all other control measures indicated in Tables 4.2.I and 4.2.J below (as appropriate, depending on the size and location of the project site) will constitute sufficient mitigation to reduce PM_{10} impacts to a level considered less than significant.

The control measures listed in Table 4.2.I (Regulation VIII Control Measures) are required for all construction sites by regulation. Table 4.2.J lists additional measures that may be required due to sheer project size or proximity of the project to sensitive receptors. Table 4.2.J also lists additional control measures (Optional Measures) that may be implemented if further emission reductions are deemed necessary by the Lead Agency.

The SJVAPCD recognizes that the measures listed in Tables 4.2.I and 4.2.J focus on PM_{10} emissions from fugitive dust sources. It indicates that Lead Agencies seeking to reduce emissions from construction equipment exhaust should also consider the mitigation measures listed in Table 4.2.E. The SJVAPCD recognizes that these measures are difficult to implement due to poor availability of alternative fueled equipment and the challenge of monitoring these activities.

Rule 9510-Indirect Source Review The San Joaquin Valley Air Pollution Control District is required by federal law to adopt control measures to reduce smog-forming and particulate emissions generated by new projects within their jurisdiction. All construction emissions must comply with these emission standards.

Table 4.2.E: Construction Equipment Mitigation Measures

Emission Source	Mitigation Measures
Heavy duty equipment (scrapers, graders, trenchers, earth movers, etc.)	• Use of alternative fueled equipment or catalyst equipped diesel construction equipment. • Minimize idling time (e.g., 10 minutes maximum) • Limit the hours of operation of heavy duty equipment and/or the amount of equipment in use • Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set) • Curtail construction during periods of high ambient pollutant concentrations; this may include ceasing of construction activity during the peak-hour of vehicular traffic on adjacent roadways • Implement activity management (e.g., rescheduling activities to reduce short-term impacts)

Source: SJVAPCD 2002

4.2.2 Impact Significance Criteria

State CEQA Guidelines indicate that a project would normally have a significant adverse air quality impact if project-generated pollutant emissions would:

AQ-a: Cause a violation of an ambient air quality standard or worsen an existing violation;

Air pollutant emissions associated with the project would occur over the short term from construction, such as fugitive dust from grading, site preparation, and equipment exhaust. Long-term emissions would result from the occupation and use of the proposed land uses. There would be long-term emissions with regional effects associated with project related vehicular trips and long-term emissions with local impacts associated with congested intersections or roadway segments. In addition, long-term stationary or area source emissions would occur due to energy consumption such as natural gas and electricity usage by the proposed land uses. Feasible mitigation measures are required whenever a significant impact is identified to minimize the amount of pollutants emitted.

Project operational emissions refer to the pollutants generated by the stationary area (direct) sources and mobile (indirect) sources. Stationary sources include electricity and natural gas consumption; mobile sources are the motor vehicles traveling to and from the development. These sources contribute to the deterioration of air quality and potentially prevent the region from compliance with the Clean Air Act. Hence, pollutant thresholds are created to determine the significance of a project's impact on air quality. The thresholds of significance from operation are as follows:

Emissions Thresholds for Pollutants with Regional Effects

a. 10 tons per year of ROG

b. 10 tons per year of NO_X

Projects in the region with operation-related emissions that exceed any of the emission thresholds are considered significant by the SJVAPCD.

Emission Standards for Pollutants with Local Impacts

a. California State one hour CO standard of 20.0 ppm

b. California State eight hour CO standard of 9.0 ppm

The significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below State and federal CO standards. If ambient levels are below the standards, a project is considered to have significant impacts if project emissions result in an exceedance of one or more of these standards.

AQ-b: Contribute substantially to an existing or projected air quality violation;

AQ-c: Expose sensitive receptors to substantial pollutant concentrations; or

AQ-d: Conflict with adopted environmental plans, policies, or regulations for air pollutants

AQ-e: Threshold for Odor

Offensive odors rarely cause any physical harm, but they can be unpleasant. Any project with the potential to frequently expose members of the public to objectionable odors will be deemed to have a significant impact.

AQ-f: Threshold for Hazardous Air Pollutants

Any project with the potential to expose sensitive receptors (including residential areas) or the general public to substantial levels of hazardous air pollutants (HAP) would be deemed to have a potentially significant impact. The significance of localized project impact depends on the following criteria:

a. Probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds ten in one million.
b. Ground-level concentrations of non-carcinogenic hazardous air pollutants would result in a Hazard Index greater than 1 for the MEI.

4.2.3 Impacts and Mitigation Measures

Effects Considered to be Less than Significant

Impact AIR-1: Long-term air quality impacts with localized effects are not expected with project implementation.

Vehicular trips associated with the proposed project would contribute to the congestion at intersections and along roadway segments in the project vicinity. As indicated in the traffic analysis, the proposed project would generate a total of 14,300 daily vehicular trips.

The primary mobile source pollutant of local concern is CO. Carbon monoxide concentration is a direct function of vehicle idling time and, thus, traffic flow conditions. Carbon monoxide disperses rapidly with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations proximate to a congested roadway or intersection may reach unhealthful levels, affecting local sensitive receptors (residents, school children, elderly, hospital patients, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service or with extremely high traffic volumes. In areas with high ambient background CO concentration, modeling of CO concentrations is recommended in determining a project's effect on local CO levels.

Existing CO concentrations in the immediate project vicinity are not available. The EPA has recommended that in areas without available CO levels, the higher of the second highest monitored CO levels in the last two years should be used as the existing or future baseline ambient CO levels for the project area. These second highest CO concentrations are 4.9 ppm and 3.0 ppm, respectively, for

the one hour and eight hour concentrations. These CO concentrations were used as baseline ambient air level to determine the significance of impact as a result of the proposed project.

The highest CO concentrations typically occur during peak traffic hours, which would best represent a worst case analysis for the calculation of CO impacts. Modeling of the CO hot spot analysis was based on the traffic volumes generated by Fehr & Peers Associates (2005). This traffic study identified existing (year 2005), cumulative (year 2025) conditions, and future conditions (year 2035) without and with project traffic volumes during the morning and afternoon peak hours. The CO hot spot analysis was conducted using the afternoon peak hour period because the project and ambient traffic volumes are slightly higher than the morning peak hour period and would provide for a worst case analysis. CO concentrations were calculated for the one hour averaging period and compared to the State one hour CO standard of 20 ppm. Carbon monoxide eight hour averages were calculated from the one hour CO calculations, using techniques outlined in the Caltrans Carbon Monoxide Protocol and compared to the State eight hour CO standard of 9.0 ppm. Concentrations are expressed in parts per million (ppm) at each receptor location.

The impact on local CO levels was assessed using methodology outlined in the SJVAPCD guideline, GAMAQI. The guideline recommended using the protocol, Transportation Project-Level Carbon Monoxide Protocol (Caltrans, 1997), to conduct the CO analysis. The protocol provides guidance, screening methodology, and modeling data requirements for estimation of CO concentrations along roadway corridors or near intersections. The protocol was adhered to for the air quality analysis conducted for this project.

As shown in Table 4.2.F, the intersection of Trinity Parkway and Eight Mile Road exceeds the eight-hour CO concentration under the existing (2005) plus approved project with and without project. However, as CO concentrations would decrease with the implementation of the project due to roadway improvements on Eight Mile Road, the proposed project would not have a significant impact. Also, as shown in Tables 4.2.G and 4.2.H, none of the nine intersections analyzed would have a one-hour CO concentration exceeding the State standard of 20 ppm under the 2025 and 2035 conditions. The eight-hour CO concentration at these intersections would also be below the State standard of 9.0 ppm. Therefore, the proposed project will not have a significant impact on local air quality for CO, no mitigation measures would be required, and the conditions outlined in **Significance Criterion AQ-a** will not occur.

Impact AIR-2: The project is not expected to create objectionable odors.

Heavy-duty equipment in the project area during construction would emit odors. However, the construction activity would be short-term and would cease to occur after individual construction is completed. No other sources of objectionable odors have been identified for the proposed project. No mitigation measures are recommended, and the conditions outlined in **Significance Criterion AQ-e** will not occur.

Impact AIR-3: The project is not expected to create Hazardous Air Pollutants Impacts.

The proposed project is not expected to generate any HAPs that would result in significant air quality impacts. Compliance with the City and SJVAPCD rules and regulations will ensure that no

significant HAPs impacts will occur. No mitigation measures are recommended, and the conditions outlined in **Significance Criterion AQ-f** will not occur.

Impact AIR-4: The proposed project will contribute to short-term/incremental cumulative air quality impacts. The project is consistent with the Air Quality Attainment Plan.

A number of individual projects in the City will be under construction simultaneously with the proposed project. Depending on construction schedules and actual implementation of projects in the area, generation of fugitive dust and pollutant emissions during construction may result in substantial short-term increases in air pollutants. This contribution will be incremental and short-term.

Air Quality Attainment Plan Consistency Analysis

An Air Quality Attainment Plan (AQAP) describes air pollution control strategies to be taken by counties or regions classified as nonattainment areas. The AQAP's main purpose is to bring the area into compliance with the requirements of federal and State air quality standards. CEQA requires that projects resulting in a General Plan Amendment be analyzed for consistency with the AQAP. For a project to be consistent with the AQAP, the pollutants emitted from the project must not exceed the SJVAPCD significance thresholds or cause a significant impact on air quality. However, if feasible mitigation measures are implemented and are shown to reduce the impact level from significant to less than significant, the project is deemed consistent with the AQAP. The AQAP uses the assumptions and projections by local planning agencies to determine control strategies for regional compliance status. Therefore, any projects causing a significant impact on air quality would impede the progress of the AQAP.

A consistency analysis determination plays an essential role in local agency project review by linking local planning and unique individual projects to the AQAP in the following ways. It fulfills the CEQA goal of fully informing local agency decision makers of the environmental costs of the project under consideration at a stage early enough to ensure that air quality concerns are fully addressed. It provides the local agency with ongoing information, assuring local decision makers that they are making real contributions to clean air goals defined in the most current AQAP. Since the AQAP is based on projections from local General Plans, projects that are consistent with the local General Plan are considered consistent with the AQAP.

Air quality models are used to demonstrate that the project's emissions will not contribute to the deterioration or impede the progress of air quality goals stated in the AQAP. The air quality models use project specific data to estimate the amount of pollutants generated from the implementation of a project. The results for the “without project” and the “with project” scenarios in the horizon year are compared to the AQAPs air quality projections. If the analyses comply with the requirements, it is considered to be consistent with the AQAP.

Currently, the region is in non-attainment for ozone and PM_{10}. Implementation of the proposed project, in conjunction with other planned developments within the cumulative study area and the region, would contribute to the delay of the attainment in the region. However, the proposed project land use has been designated in the adopted General Plan and, therefore, is consistent with the AQAP. Conditions outlined in **Significance Criterion AQ-b** will not occur.

Table 4.2.F: Existing (Year 2005) Plus Approved Project without and with CO Concentrations

Intersection	Receptor Distance to Road Centerline (Meters)	Project-Related Increase 1 Hr/8 Hr (ppm)	Without/with Project One-Hour CO Concentration (ppm)	Without/with Project Eight-Hour CO Concentration (ppm)	Exceeds State Standards?[1]	
					1 Hr	8 Hr
Regatta Drive and Eight Mile Road	14 / 14	0.0 / 0.0	7.5 / 7.5	4.8 / 4.8	No	No
	14 / 14	0.0 / 0.0	7.1 / 7.1	4.5 / 4.5	No	No
	10 / 10	0.0 / 0.0	7.0 / 7.0	4.5 / 4.5	No	No
	7 / 7	0.0 / 0.0	6.9 / 6.9	4.4 / 4.4	No	No
Trinity Parkway and Eight Mile Road	15 / 17	-1.1 / -0.7	15.1 / 14.0	10.1 / 9.4	No	Yes
	15 / 17	-0.5 / -0.3	13.8 / 13.3	9.2 / 8.9	No	Yes
	10 / 14	-1.0 / -0.7	13.3 / 12.3	8.9 / 8.2	No	No
	7 / 7	-0.4 / -0.3	12.2 / 11.8	8.1 / 7.8	No	No
Trinity Parkway and McAuliffe Road	14 / 14	0.3 / 0.2	8.9 / 9.2	5.8 / 6.0	No	No
	14 / 14	0.2 / 0.2	8.5 / 8.7	5.5 / 5.7	No	No
	14 / 14	0.4 / 0.3	8.0 / 8.4	5.2 / 5.5	No	No
	10 / 10	0.3 / 0.2	7.9 / 8.2	5.1 / 5.3	No	No
Aksland Drive/ Otto Drive	17 / 17	1.6 / 1.2	6.8 / 8.4	4.3 / 5.5	No	No
	17 / 17	1.1 / 0.8	6.8 / 7.9	4.3 / 5.1	No	No
	17 / 17	1.4 / 0.9	6.4 / 7.8	4.1 / 5.0	No	No
	14 / 14	1.4 / 1.0	6.3 / 7.7	4.0 / 5.0	No	No
Mariners Drive/ Otto Drive	12 / 12	2.5 / 1.8	8.2 / 10.7	5.3 / 7.1	No	No
	12 / 12	1.9 / 1.3	8.0 / 9.9	5.2 / 6.5	No	No
	8 / 8	1.8 / 1.3	7.5 / 9.3	4.8 / 6.1	No	No
	7 / 7	1.8 / 1.2	7.3 / 9.1	4.7 / 5.9	No	No
Mariners Drive/ Whitewater Lane	12 / 12	1.7 / 1.2	7.2 / 8.9	4.6 / 5.8	No	No
	12 / 12	1.5 / 1.1	7.1 / 8.6	4.5 / 5.6	No	No
	12 / 12	1.6 / 1.1	7.0 / 8.6	4.5 / 5.6	No	No
	8 / 8	1.6 / 1.2	6.8 / 8.4	4.3 / 5.5	No	No
Mariners Drive/ Blackswain Place	12 / 12	1.7 / 1.2	7.2 / 8.9	4.6 / 5.8	No	No
	8 / 8	1.5 / 1.1	7.1 / 8.6	4.5 / 5.6	No	No
	8 / 8	1.5 / 1.1	7.1 / 8.6	4.5 / 5.6	No	No
	8 / 8	1.6 / 1.1	6.7 / 8.3	4.3 / 5.4	No	No
Mariners Drive/ Sturgeon Road	12 / 12	1.7 / 1.2	7.3 / 9.0	4.7 / 5.9	No	No
	12 / 12	1.5 / 1.1	7.2 / 8.7	4.6 / 5.7	No	No
	12 / 12	1.5 / 1.1	7.1 / 8.6	4.5 / 5.6	No	No
	8 / 8	1.5 / 1.1	6.8 / 8.3	4.3 / 5.4	No	No
Mariners Drive/ Hammer Lane	20 / 20	1.7 / 1.2	9.7 / 11.4	6.4 / 7.6	No	No
	14 / 14	1.7 / 1.2	9.1 / 10.8	5.9 / 7.1	No	No
	14 / 14	1.2 / 0.8	8.9 / 10.1	5.8 / 6.6	No	No
	8 / 8	1.3 / 0.9	8.7 / 10.0	5.7 / 6.6	No	No

Source: LSA Associates, Inc., April 2006.

Table 4.2.G: 2025 Without and With Project CO Concentrations

Intersection	Receptor Distance to Road Centerline (Meters)	Project Related Increase 1 Hr /8 Hr (ppm)	Without/with Project One-Hour CO Concentration (ppm)	Without/with Project Eight-Hour CO Concentration (ppm)	Exceeds State Standards?[1]	
					1 Hr	8 Hr
Regatta Drive and Eight Mile Road	21 / 21	0.0 / 0.0	5.2 / 5.2	3.2 / 3.2	No	No
	21 / 21	0.0 / 0.0	5.2 / 5.2	3.2 / 3.2	No	No
	21 / 21	0.0 / 0.0	5.2 / 5.2	3.2 / 3.2	No	No
	15 / 15	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
Trinity Parkway and Eight Mile Road	17 / 17	0.0 / 0.0	6.0 / 6.0	3.8 / 3.8	No	No
	17 / 17	0.0 / 0.0	6.0 / 6.0	3.8 / 3.8	No	No
	17 / 17	0.0 / 0.0	6.0 / 6.0	3.8 / 3.8	No	No
	17 / 17	0.1 / 0.1	5.8 / 5.9	3.6 / 3.7	No	No
Trinity Parkway/ McAuliffe Road	14 / 14	0.0 / 0.0	5.7 / 5.7	3.6 / 3.6	No	No
	14 / 12	0.1 / 0.1	5.5 / 5.6	3.4 / 3.5	No	No
	12 / 10	0.1 / 0.1	5.5 / 5.6	3.4 / 3.5	No	No
	10 / 10	0.1 / 0.1	5.5 / 5.6	3.4 / 3.5	No	No
Aksland Drive/ Otto Drive	17 / 17	0.2 / 0.1	5.4 / 5.6	3.4 / 3.5	No	No
	17 / 17	0.3 / 0.2	5.3 / 5.6	3.3 / 3.5	No	No
	17 / 17	0.1 / 0.1	5.3 / 5.4	3.3 / 3.4	No	No
	14 / 14	0.1 / 0.1	5.3 / 5.4	3.3 / 3.4	No	No
Mariners Drive/ Otto Drive	17 / 17	0.2 / 0.1	5.3 / 5.5	3.3 / 3.4	No	No
	16 / 16	0.1 / 0.1	5.3 / 5.4	3.3 / 3.4	No	No
	14 / 14	0.1 / 0.1	5.3 / 5.4	3.3 / 3.4	No	No
	14 / 14	0.1 / 0.1	5.3 / 5.4	3.3 / 3.4	No	No
Mariners Drive/ Whitewater Lane	12 / 12	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
	12 / 12	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
Mariners Drive/ Blackswain Place	12 / 12	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
	12 / 12	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
Mariners Drive/ Sturgeon Road	12 / 12	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
	12 / 12	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.1 / 5.1	3.1 / 3.1	No	No
Mariners Drive/ Hammer Lane	21 / 21	0.1 / 0.0	5.4 / 5.5	3.4 / 3.4	No	No
	20 / 21	0.1 / 0.1	5.3 / 5.4	3.3 / 3.4	No	No
	14 / 20	0.1 / 0.1	5.3 / 5.4	3.3 / 3.4	No	No
	14 / 14	0.0 / 0.0	5.3 / 5.3	3.3 / 3.3	No	No

Source: LSA Associates, Inc., April 2006.

[1] The State one-hour standard is 20 ppm, and the eight-hour standard is 9 ppm.

Table 4.2.H: 2035 Without and With Project CO Concentrations

Intersection	Receptor Distance to Road Centerline (Meters)	Project Related Increase 1 Hr /8 Hr (ppm)	Without/with Project One-Hour CO Concentration (ppm)	Without/with Project Eight-Hour CO Concentration (ppm)	Exceeds State Standards?[1]	
					1 Hr	8 Hr
Regatta Drive and Eight Mile Road	21 / 21	0.0 / 0.0	5.4 / 5.4	3.4 / 3.4	No	No
	21 / 21	0.0 / 0.0	5.4 / 5.4	3.4 / 3.4	No	No
	21 / 21	0.0 / 0.0	5.4 / 5.4	3.4 / 3.4	No	No
	16 / 16	0.0 / 0.0	5.3 / 5.3	3.3 / 3.3	No	No
Trinity Parkway and Eight Mile Road	24 / 24	0.0 / 0.0	5.8 / 5.8	3.6 / 3.6	No	No
	24 / 24	0.0 / 0.0	5.7 / 5.7	3.6 / 3.6	No	No
	17 / 17	0.1 / 0.1	5.6 / 5.7	3.5 / 3.6	No	No
	17 / 17	0.0 / 0.0	5.6 / 5.6	3.5 / 3.5	No	No
Trinity Parkway/ McAuliffe Road	14 / 14	0.0 / 0.0	5.4 / 5.4	3.4 / 3.4	No	No
	14 / 12	0.1 / 0.1	5.3 / 5.4	3.3 / 3.4	No	No
	12 / 10	0.1 / 0.1	5.3 / 5.4	3.3 / 3.4	No	No
	10 / 10	0.1 / 0.1	5.3 / 5.4	3.3 / 3.4	No	No
Aksland Drive/ Otto Drive	21 / 21	0.1 / 0.1	5.5 / 5.6	3.4 / 3.5	No	No
	21 / 21	0.2 / 0.1	5.4 / 5.6	3.4 / 3.5	No	No
	19 / 19	0.1 / 0.0	5.4 / 5.5	3.4 / 3.4	No	No
	17 / 15	0.1 / 0.0	5.4 / 5.5	3.4 / 3.4	No	No
Mariners Drive/ Otto Drive	14 / 16	0.1 / 0.1	5.5 / 5.6	3.4 / 3.5	No	No
	14 / 14	0.1 / 0.0	5.4 / 5.5	3.4 / 3.4	No	No
	14 / 14	0.1 / 0.0	5.4 / 5.5	3.4 / 3.4	No	No
	14 / 14	0.0 / 0.0	5.4 / 5.4	3.4 / 3.4	No	No
Mariners Drive/ Whitewater Lane	12 / 12	0.0 / 0.0	5.0 / 5.0	3.1 / 3.1	No	No
	12 / 12	0.0 / 0.0	5.0 / 5.0	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.0 / 5.0	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.0 / 5.0	3.1 / 3.1	No	No
Mariners Drive/ Blackswain Place	12 / 12	0.0 / 0.0	5.0 / 5.0	3.1 / 3.1	No	No
	12 / 12	0.0 / 0.0	5.0 / 5.0	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.0 / 5.0	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.0 / 5.0	3.1 / 3.1	No	No
Mariners Drive/ Sturgeon Road	12 / 12	0.1 / 0.0	5.0 / 5.1	3.1 / 3.1	No	No
	12 / 12	0.1 / 0.0	5.0 / 5.1	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.0 / 5.0	3.1 / 3.1	No	No
	8 / 8	0.0 / 0.0	5.0 / 5.0	3.1 / 3.1	No	No
Mariners Drive/ Hammer Lane	24 / 24	0.0 / 0.0	5.6 / 5.6	3.5 / 3.5	No	No
	24 / 24	0.0 / 0.0	5.5 / 5.5	3.4 / 3.4	No	No
	22 / 22	0.0 / 0.0	5.5 / 5.5	3.4 / 3.4	No	No
	16 / 16	0.0 / 0.0	5.4 / 5.4	3.4 / 3.4	No	No

Source: LSA Associates, Inc., April 2006.

[1] The State one-hour standard is 20 ppm, and the eight-hour standard is 9 ppm.

Potentially Significant Impacts

Impact AIR-5: The project will generate short-term fugitive dust impacts.

Construction activities such as grading, excavation and travel on unpaved surfaces can generate substantial amounts of dust, and can lead to elevated concentrations of PM_{10}. Fugitive dust control measures are required of all construction projects within SJVAPCD jurisdiction. However, if the amount of fugitive dust generated is substantial, enhanced and additional control measures may be required by SJVAPCD to reduce PM_{10} emissions.

The SJVAPCD Regulation VIII, Control Measures for Construction Emissions of PM_{10}, as shown in Tables 4.2.I and 4.2.J, are required to be implemented at all construction sites. Compliance with the above Regulation VIII requirements and implementation of applicable control measures, indicated in Tables 4.2.I and 4.2.J, would lessen the fugitive dust impact during construction to a level considered less than significant. Conditions outlined in **Significance Criterion AQ-a** will not occur.

Mitigation Measure AIR-1a: The SJVAPCD Regulation VIII, Control Measures for Construction emissions of PM_{10}, is required to be implemented at all construction sites.

Mitigation Measure AIR-1b: Architectural coatings and asphalt paving conducted on site shall adhere to rules and regulations stated in the SJVAPCD Rulebook, specifically the project will comply with Rule 4601, Architectural Coatings, and 4641, Asphalt Paving.

Table 4.2.I: Regulation VIII Control Measures for Construction Emissions of PM10

Regulation VIII Control Measures. The following controls are required to be implemented at all construction sites (includes changes effective May 15, 2002).

a. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.

b. All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.

c. All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.

d. With the demolition of buildings up to six stories in height, all exterior surfaces of the building shall be wetted during demolition.

e. When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.

f. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. (The use of dry brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions.) (Use of blower devices is expressly forbidden.)

g. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
h. Within urban areas, trackouts shall be immediately removed when they extend 50 or more feet from the site, and at the end of each workday.
i. Any site with 150 or more vehicle trips per day shall prevent carryout and trackout.

Source: SJVAPCD, 2002.

Table 4.2.J: Enhanced and Additional Control Measures for Construction Emissions of PM_{10}

Enhanced Control Measures - The following measures shall be implemented at construction sites when required to mitigate significant PM_{10} impacts (note, these measures are to be implemented in addition to Regulation VIII requirements):
• Limit traffic speeds on unpaved roads to 15 mph; and
• Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with slope greater than one percent.
Additional Control Measures - The following control measures are strongly encouraged at construction sites that are large in area, located near sensitive receptors, or which for other reason warrant additional emissions reductions:
• Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site;
• Install wind breaks at windward side(s) of construction areas;
• Suspend excavation and grading activity when winds exceed 20 mph; and*
• Limit area subject to excavation, grading, and other construction activity at any one time.

Source: SJVAPCD 2002
Notes: *Regardless of windspeed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation.

Implementation of Mitigation Measures AIR-1a and AIR-1b will lessen fugitive dust impacts to a less than significant level.

Impact AIR-6: The project is not expected to create short-term impact from architectural coatings and asphalt paving.

The proposed project will not create impacts regarding architectural coatings or asphalt paving with implementation of the following regulations:

Architectural coatings and asphalt paving conducted on the project site shall adhere to rules and regulations stated in the SJVAPCD Rulebook. Implementation of Mitigation Measure AIR-1b (Rule 4601, Architectural Coatings, and Rule 4641, Asphalt Paving) would lessen impacts from

architectural coatings and asphalt paving to a level considered less than significant. Conditions outlined in **Significance Criterion AQ-a** will not occur.

Implementation of Mitigation Measure AIR-1b will lessen impacts regarding architectural coatings and asphalt paving to a less than significant level.

Impact AIR-7: The project will create short-term construction equipment exhaust-related impacts.

Air pollutant emissions associated with the project would occur over the short-term from construction activities, such as fugitive dust from site preparation and grading and emissions from equipment exhaust. The SJVAPCD's approach to CEQA analyses of PM_{10} impacts is to require implementation of effective and comprehensive control measures rather than detailed quantification of emissions. Implementation of Mitigation Measure AIR-1a (Compliance with Regulation VIII and implementation of applicable control measures, indicated in Tables 4.2.I and 4.2.J) will reduce PM_{10} impacts during construction to a level considered less than significant. No additional measures are recommended, and the conditions outlined in **Significance Criterion AQ-a** will not occur.

Implementation of Mitigation Measure AIR-1a will lessen construction equipment exhaust impacts to a less than significant level.

Impact AIR-8: The project would create long-term air quality impacts.

The land uses associated with the proposed project consists of approximately 933 single family residential units, 129 cluster residential units, 96 condominium units, and a school. The emissions from the proposed project are calculated using URBEMIS. Stationary source emissions from these land uses would be generated from consumption of natural gas, landscaping, and consumer products. The traffic study prepared for this project predicted vehicular trips associated with the proposed project that would contribute to the congestion at intersections and along roadway segments in the project vicinity. As indicated in the traffic analysis, the proposed project would generate a total of 14,300 additional daily vehicular trips. Using the ARB model URBEMIS2002 (version 8.7.0), emissions associated with project-related vehicular trips were calculated and are included in Table 4.2.K. The total projected emissions from long-term project operations of the proposed project are shown in Table 4.2.K.

Table 4.2.K: Project Operational Emissions

Source	Pollutants (tons/year)	
	ROG	**NO_x**
Proposed Emissions		
Stationary sources:	16.91	4.14
Vehicular traffic:	33.91	46.59
Proposed Subtotal	**50.83**	**50.73**
SJVUAPCD Threshold	**10**	**10**

Exceeds Threshold?	**Yes**	**Yes**
Significant Impact?	**Yes**	**Yes**

Source: LSA Associates, Inc., April 2006

As shown above, the project's additional emissions would exceed the SJVAPCD annual emissions thresholds. Implementation of mitigation measures is required to minimize these impacts to the extent feasible. The project would result in total (vehicular and stationary) daily emissions exceeding the daily emissions thresholds established by the SJVAPCD. Mitigation measures are not available that would completely reduce the impacts to less than significant. However, the proposed project will be required to comply with Title 24 of the California Code of Regulations established by the Energy Commission regarding energy conservation standards.

Mitigation Measure AIR-2 - Project Operations Related Impacts

The project applicant shall incorporate the following in building plans:

a. Solar or low-emission water heaters shall be used with combined space/water heater units.

b. Double-paned glass or window treatment for energy conservation shall be used in all exterior windows.

c. Buildings shall be oriented north/south where feasible.

Implementation of Mitigation Measures AIR-1a, AIR-1b, and AIR-2, as well as GCC-1 through GCC-9 will help to reduce the project's air quality impacts. Even with the implementation of these mitigation measures, this impact will remain significant and unavoidable.

Cumulative Impacts

Cumulative Projects. Past development in the county and throughout the San Joaquin Valley has resulted, in combination with meteorological conditions and transport of pollutants from other air basins, in substantial to severe air quality problems in the San Joaquin Valley Air Basin (SJVAB). As above, San Joaquin County is in nonattainment for ozone and particulate matter 10 microns or less in diameter (PM10). As a result, the San Joaquin Valley Air Pollution Control District (SJVAPCD) has established a significance threshold of 10 tons per year (tpy) for oxides of nitrogen (NOX) and reactive organic gases (ROG), ozone precursors, during construction. For PM10, SJVAPCD requires implementation of effective and comprehensive control measures and compliance with applicable rules and regulations rather than detailed quantification of construction emissions. Construction of the project would contribute cumulatively to the local and regional air pollutants, together with other projects under construction. The project would result in significant operational air quality impacts. Thus, it is anticipated that these additional emissions would result in significant cumulative air quality impacts.

Construction Impacts. A number of individual projects in the City will be under construction simultaneously with the proposed project. Depending on construction schedules and actual implementation of projects in the area, generation of fugitive dust and pollutant emissions during construction may result in substantial short-term increases in air pollutants. However, all construction projects in the San Joaquin Valley are required to meet the requirements of Regulation VIII. The SJVAPCD has determined compliance with Regulation VIII reduces construction related air impacts to a less than significant level. Additionally, the SJVAPCD has included construction emissions as part of the Air Quality Attainment Plan. Therefore construction of this project and cumulative projects in the region would not impede the regions attainment of air quality standards.

Long-Term Operational Impacts. The incremental daily emission increase associated with project operational trip generation is identified in Section 4.2, Air Quality for reactive organic gases (ROG) and nitrogen oxides (NO_x) (two precursors of ozone) and coarse particulate matter (PM_{10}). The SJVAPCD has established thresholds of significance for ozone precursors and fugitive dust of 10 pounds per day. The project regional emissions are based on the additional vehicle trips generated by the proposed project. The emissions associated with the project would be considered significant.

Long-term emissions from related projects, considered in light of the nonattainment status of the air basin, would be cumulatively significant. The proposed project would result in significant and unavoidable long-term regional (operational)-related air quality impacts and would exceed the SJVAPCD thresholds. It would, therefore, contribute considerably to the cumulative air quality impact. Related projects would contribute to a similar degree. Project-related air emissions, cumulative development air emissions, and air emissions from other reasonably foreseeable future projects in the SJVAB as a whole would continue to contribute to long-term increases in emissions that would exacerbate existing and projected nonattainment conditions. Thus, the proposed project would contribute considerably to a significant and unavoidable cumulative air quality impact. With respect to mitigation, the DEIR includes all available feasible mitigation to reduce the proposed project's contribution to cumulative air quality impacts. However, while mitigation measures would substantially reduce air emissions from the proposed project, they are not sufficient to reduce the proposed project's cumulative contribution to below a level that is not considerable. Therefore, the proposed project would contribute considerably to cumulatively significant and unavoidable air quality impacts associated with ROG and NO_X during long-term operation of the proposed project.

Toxic Air Contaminants. Given that compliance with applicable rules and regulations would be required for the control of stationary-source emissions of toxic air contaminants (TACs), both on- and off the site, the proposed project's contribution to longterm cumulative increases in stationary-source TAC concentrations would be considered minor. Construction of proposed project would result in temporary, short-term diesel exhaust emissions from on-site heavy duty equipment. Construction of the proposed project would result in the generation of diesel particulate matter (PM) emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction-related activities. The use of mobilized equipment would be temporary and there are few sensitive receptors located immediately adjacent to the construction site.

4.2.4 Level Of Significance After Mitigation

The above mitigation measures combined with Mitigation Measures GCC-1 through GCC-9 will assist in reducing the project impacts on air quality although impacts cannot be completely mitigated. The proposed project will result in project-level and cumulative-level air quality impacts that are significant and unavoidable.

4.15 GLOBAL CLIMATE CHANGE

In June of 2008, the Office of Planning and Research (OPR) issued a technical advisory concerning CEQA and climate change. The technical advisory is provided by the OPR as a service to CEQA practitioners. OPR publishes technical guidance from time to time on issues that broadly affect the practice of CEQA and land use planning. The following section has been prepared in accordance with this technical advisory.

4.15.1 Existing Setting

Global climate change is happening not because of natural processes, or gradually over thousands of years. Rather, temperatures are rising quickly and dramatically, climbing with the concentrations of greenhouse pollutants that are released into the Earth's atmosphere. Global climate change is a result of human activities.

The effects of global climate change are already present - disappearing glaciers, shrinking snow pack, droughts, coastal erosion, bigger and more regular storms, and more extreme heat waves. Since 2006, eleven of the past twelve years are on the list of the twelve warmest years since reliable record keeping began in 1850. Arctic sea ice declined in 2006 by the largest amount ever, losing an area roughly the size of Texas and California combined.

Greenhouse gases (GHG), including carbon dioxide, methane, water vapor, nitrous oxide, and other atmospheric gases, play an important role in regulating the surface temperature of the Earth. The Earth's atmosphere acts like a greenhouse, warming the planet similar to a greenhouse warming the air inside its glass walls. GHGs allow light to penetrate, and prevent heat from escaping. GHGs are transparent to solar radiation and are effective in absorbing infrared radiation. As a result, radiation that otherwise would reflect back into space is retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect.

The increased consumption of fossil fuels (wood, coal, gasoline, etc.) has substantially increased atmospheric levels of greenhouse gases. As atmospheric concentrations of greenhouse gases rise, so do temperatures. Over time this rise in temperatures would result in climate change. Theories concerning climate change and global warming existed as early as the late 1800s. By the late 1900s that understanding of the earth's atmosphere had advanced to the point where many climate scientists began to accept that the earth's climate is changing. Many climate scientists agree that some warming has occurred over the past century and will continue through this century.

Common Greenhouse Gases:

Carbon dioxide (CO_2) is an odorless, colorless gas, which has both natural and anthropogenic sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of carbon dioxide are from burning coal, oil, natural gas, and wood. Concentrations of carbon dioxide were 379 parts per million (ppm) in 2005, which is an increase of 1.4 ppm per year since 1960. In California, the most common GHG is CO_2, which constitutes approximately 84 percent of all GHG emissions. CO_2 emissions in California are mainly associated

with in-state fossil fuel combustion and with fossil fuel combustion in out-of-state power plants supplying electricity to California. Other activities that produce CO_2 emissions include mineral production, waste combustion, and land use changes that reduce vegetation.

Methane (CH_4) is a flammable gas and is the main component of natural gas. When one molecule of methane is burned in the presence of oxygen, one molecule of carbon dioxide and two molecules of water are released. There are no adverse health effects from methane. A natural source of methane is from the anaerobic decay of organic matter. Geologic deposits, known as natural gas fields, also contain methane, which is extracted for fuel. Other sources are from landfills, fermentation of manure, and cattle.

Water vapor (H_2O) is the most abundant and important GHG. Water vapor maintains a climate necessary for life. The main sources of water vapor are evaporation, sublimation (change from solid to gas of ice and snow), and transpiration from plants.

Nitrous oxide (N_2O) is a colorless greenhouse gas produced by microbial processes in soil and water, including reactions in fertilizer containing nitrogen. Anthropogenic sources include vehicle emissions, fossil-fuel fired power plants, nylon production, nitric acid production, etc. Nitrous oxide is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load.

Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone; therefore, their production was stopped as required by the Montreal Protocol in 1987.

Hydrofluorocarbons (HFCs) are synthetic man-made chemicals that are used as a substitute for CFCs for automobile air conditioners and refrigerants.

Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Aerosols can also affect cloud formation. Sulfate aerosols are emitted when fuel-containing sulfur is burned. Black carbon (or soot) is emitted during bio mass burning or incomplete combustion of fossil fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

Sulfur hexafluoride (SF6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It has the highest GWP of any gas evaluated, 23,900. Concentrations in the 1990s were about 4 ppt (EPA 2006). Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Individual GHGs have varying warming potentials and atmospheric lifetimes. The potential for a GHG to hold heat in the atmosphere is considered its global warming potential (GWP). Carbon Dioxide ($CO_{2)}$ is the reference gas for measuring GWP. CO_2 has a GWP of one. Methane (CH_4) is a more potent GHG than CO_2. Each ton of CH_4 has 21 times the effect on global warming as one ton of CO_2. Therefore, CH_4 has a GWP of 21. Multiplying the GWP for each non-CO_2 GHG provides a standardized carbon dioxide equivalent (CO_2 e), which enables a project's combined global warming potential to be expressed. Table 4.15.A presents the GWPs and estimated lifetimes of common GHGs.

Table 4.15.A: Green House Gases Lifetimes

Greenhouse Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100 Year Time Horizon)
Carbon Dioxide (Co_2)	50-200	1
Methane (Ch_4)	12 ± 3	21
Nitrous Oxide (N_2o)	120	310

Source: Intergovernmental Panel on Climate Change, 2001

Greenhouse gases in the atmosphere provide hospitable surface temperatures necessary to sustain life on earth. Human activities, however, such as the burning of fossil fuels, have contributed increasing concentrations of heat-trapping GHGs into the atmosphere. Over the past 200 years the global concentration of CO_2 has substantially increased, and it is widely accepted that anthropogenic sources of GHGs are contributing to global climate change.

The specific climatic mechanisms, duration, and severity of effects, however, are not fully understood. A variety of mechanisms and complex feedback loops interact to establish the average global temperature. A change in ocean temperature, for example, may alter circulating ocean currents, which may change ocean temperatures (as seen in el Niño and la Niña events).

According to the National Oceanic and Atmospheric Administration and the National Aeronautics and Space Administration, the Earth's average surface temperature has increased by about 1.2 to 1.4 Degrees Fahrenheit since 1900. The United Nations Intergovernmental Panel on Climate Change (IPCC) predicts that global mean temperature from 1990 to 2100 is expected to rise by 1.1°C to 6.4°C (IPCC 2007).

California is one of the largest contributors of GHGs in the U.S., and has been listed as the sixteenth largest emitter in the world. Transportation activities contribute about 40 percent of the state's total GHG emissions, and electricity generation, the second largest source in the state, contributes over 20 percent of our GHG emissions. Other sources of GHG emissions include manufacturing, agriculture, and other activities.

Worldwide, U.S. & California Emissions of GHG

In 2004, total worldwide GHG emissions were estimated to be 20,135 Tg CO_2 Eq., excluding emissions/removals caused by removal of vegetation and forestry. (Note that sinks, or GHG removal processes, plays an important role in the GHG inventory as forest and other vegetative land uses such as agriculture and rain forest absorb carbon).

In 2004, GHG emissions in the U.S. were 7,074.4 Tg CO_2 Eq. In 2005, total U.S. GHG emissions were 7,260.4 Tg CO_2 Eq., a 16.3 percent increase from 1990 emissions, while U.S. gross domestic product has increased by 55 percent over the same period. Emissions rose from 2004 to 2005, increasing by 0.8 percent. The main causes of the increase were: (1) strong economic growth in 2005, leading to increased demand for electricity; and (2) an increase in the demand for electricity due to warmer summer conditions. However, a decrease in demand for fuels due to warmer winter conditions and higher fuel prices moderated the increase in emissions.

California is a substantial contributor of GHG emissions as it is the second largest contributor in the U.S. and the sixteenth largest in the world. In 2004, California produced 492 Tg CO_2 Eq., which is approximately seven percent of the total nationwide GHG emissions. On the other hand, among the states, California has the fourth lowest per capita rate of GHG emissions, due to its temperate climate and to its enhanced energy regulations. The major source of GHG in California is transportation, contributing 41 percent of the State's total GHG emissions. Electricity generation is the second largest source, contributing 22 percent of the State's GHG emissions.

A study of California's greenhouse gas emissions from 1990 to 2004 concluded emissions from burning gasoline and jet fuel topped other sources, making up 40.7 percent of carbon dioxide pollution. Electricity generation accounted for 22.2 percent, industrial sources for 20.5 percent and agriculture and forestry for 8.3 percent. Other sources rounded out the equation at 8.3 percent. Carbon dioxide made up 84 percent of the state's total greenhouse gas emissions.

Effects of Global Climate Change in California

The impacts from global warming are widespread and potentially devastating. The impacts are immediate, and they will continue to grow. As stated in a report to the Governor in March 2006,

> Today's climate variability and weather extremes already pose significant risks to California's citizens, economy, and environment. They reveal the State's vulnerability and existing challenges in dealing with the vagaries of climate. Continued climate changes, and the risk of abrupt or surprising shifts in climate, will further challenge the state's ability to cope with climate-related stresses.

The Earth's average surface temperature will increase between 2.5° and 10.4°F (1.4°-5.8°C) between 1990 and 2100 if no major efforts are undertaken to reduce the emissions of greenhouse gases (the "business-as-usual" scenario). This is significantly higher than what the Intergovernmental Panel on Climate Change (IPCC) Panel predicted in 1995 (1.8°-6.3°F, or 1.0°-3.5°C), mostly because scientists expect a reduced cooling effect from tiny particles (aerosols) in the atmosphere, secondary impacts to the natural environmental in California may include:

a. **Eroding Coastlines:** Rising sea levels along the California coastline, particularly in San Francisco and the San Joaquin Delta. During the past century, sea levels along California's coast have risen about seven inches. If global warming emissions continue unabated, sea level is expected to rise an additional 22 to 35 inches by the end of the century, inundating coastal areas with salt water, accelerating coastal erosion, threatening vital levees and inland water systems,

and disrupting wetlands and natural habitats. In particular, saltwater intrusion would threaten the quality and reliability of the state's major fresh water supply that is pumped from the southern edge of the Sacramento/San Joaquin River Delta into the system of aqueducts which carry it to Southern California.

b. **Severe Heat:** Extreme-heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent. As temperatures rise from global warming, the frequency and severity of heat waves will grow—as will the potential for bad air days. The risk of illness and death due to dehydration, heart attack, and stroke, will increase as a result. Those most likely to suffer are children, the elderly, and other vulnerable populations.

c. **Air Quality:** An increase in heat-related human deaths, infectious diseases, and a higher risk of respiratory problems caused deteriorating air quality. Global warming increases the frequency, duration, and intensity of conditions conducive to the formation of smog. Most vulnerable are the elderly, those whose health is already compromised (such as children with asthma).

d. **Losses to the Sierra Snow Pack:** Reduced snowpack and stream flow in the Sierra Nevada Mountains, affecting winter recreation and water supplies. Higher temperatures diminish snowfall and cause the snow that does fall to melt earlier. This reduces the amount of water stored in the Sierra snow pack, which accounts for approximately half of the surface water stored in the State. Reductions and early melting of the snow pack will aggravate the State's already overstretched water resources and cause increased flooding.

e. **Severity of Storms:** Potential increase in the severity of winter storms, which can affecting peak stream flows and increase flooding along waterways and low line area. These heavy runoffs of remove natural minerals which are important to local ecosystems. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

f. **Damage to Agriculture:** Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield. By reducing the State's natural water storage capacity, raising temperatures, increasing salt water intrusion in agricultural regions, causing flooding, and increasing the risk of pest infestations and other calamities, global warming poses a serious threat to California's $68 billion agricultural industry. In fact, during the period 1951 to 2000, the growing season lengthened by about a day per decade, this increased crops' exposure to heat ("degree days"). Such changes threaten many of the State's most valuable crops, including stone fruits, grapes, tomatoes and lettuce. Global warming also threatens livestock. The 2006 summer heat wave killed thousands of dairy cows in California's Central Valley and caused a decrease in milk production in surviving animals.

g. **Habitat Modification and Destruction:** Changes in distribution of plant and wildlife species due to changes in temperature, competition from colonizing species, change in hydrologic cycles, and other climate-related effects. While it is difficult to generalize what impacts the changing climate has on the State's varied ecosystems, it already is clear that rising temperatures, altered water supplies, and other environmental variations make some habitats less hospitable for sensitive plants and animals. For example, some local populations of the threatened checkerspot butterfly already have disappeared due to changes in the weather (Stanford Report, May 14, 2004). A similar fate could await other species, such as trout and salmon, which favor cold water and are extremely sensitive to slight changes in temperature. Further, marine algae blooms, associated in part with increases in ocean temperatures, have

proliferated in the past eight years and may help explain the alarming increase in beachings and mass die-offs of whales, dolphins, and other ocean mammals that the federal government has documented over the last quarter century. In California alone, more than 14,000 seals, sea lions and dolphins have landed sick or dead along the shoreline in the last decade.

h. **Higher Risk of Wildfires:** Pest infestation and increasing temperatures make forests more vulnerable to fires. Wildfires are a major environmental hazard that have historically cost California more than $800 million each year and contribute to "bad air days" throughout the state. As global warming accelerates, so will these wildfires, and the damage to health and property that they cause. By century's end, the State may have as many as 55 percent more large wildfires.

i. **Increase Demand for Electricity:** Rising temperatures lead to increased demand for electricity and pressure on the State's supply system. During the summer of 2006 heat wave, power usage in Los Angeles rose so dramatically, that it caught power officials completely off guard.

j. **Financial Cost to Californians:** Apart from the potentially devastating impacts that climate change will have on California's natural resources, public health, and its economy, global warning already places a tremendous strain on the State finances. The State must pay for programs to re-build levees that protect agricultural lands against salt water infiltration; to study and respond to the impacts of a reduced Sierra snow pack on California's water supply; to protect wildlife and habitats from climate-related degradation; to respond to coastal erosion; to prepare for the increased risk of wildfires; to respond to the increased health risks associated with rising temperatures and declining air quality, and more.

These changes in California's climate and ecosystems are occurring at a time when California's population is expected to increase from 34 million to 59 million by the year 2040 (California Energy Commission 2005). As such, the numbers of people potentially affected by climate change as well as the amount of anthropogenic GHG emissions expected under a "business as usual" scenario are expected to increase. Similar changes as those noted above for California would also occur in other parts of the world with regional variations in resources affected and vulnerability to adverse side effects.

State-wide temperature increases due to fossil-fuel consumption are correlated to the severity of the natural environmental impacts as noted in Table 4.15.B.

Regulatory Setting

A variety of governmental agencies have initiated programs directed towards the regulatory environment. These include the United Nations Agreements, and recent California State Legislation and regulations that specifically address greenhouse gas emissions and global climate change. At the time of writing, there are no known applicable regulations setting ambient air quality emissions standards for greenhouse gases.

Table 4.15.B: Climate Change Scenarios for California

IPCC Emissions Scenarios	Summary of Projected Global Warming Impacts (2070-2099, as compared to 1961-1990)	State-wide Temperature Rise
Higher Emissions: Rapid, fossil-fuel intensive growth	• 90% loss in Sierra snow pack • 22-30 inches of sea level rise • 3-4 times as many heatwave days in major urban centers • 2.5 times the number critically dry years • 4-6 times as many heat-related deaths in major urban centers • 20% increase in electricity demand • Increase in days meteorologically conducive to ozone formation	Higher Warming Range: 8-10.4 ºF
Medium-High Emissions: Primarily fossil-fuel dependent growth with some green technology	• 70- 80 % loss in Sierra snow pack • 14-22 inches of sea level rise • 2.5-4 times as many heatwave days in major urban centers • 2-6 times as many heat-related deaths for major urban centers • 75-85% increase in days meteorologically conducive to ozone formation • 2-2.5 times the number critically dry years • 11% increase in electricity demand • 30% decrease in forest yields (pine) • 55% increase in the expected risk of large wildfires	Medium Warming Range: 5.5-7.9 ºF
Lower Emissions: Shift to service & information economy with lots of green technology	• 30-60 % loss in Sierra snow pack • 6-14 inches of sea level rise • 2-2.5 times as many heatwave days in major urban centers • 2-3 times as many heat-related deaths for major urban centers • 25-35% increase in days meteorologically conducive to ozone formation • Up to 1-1.5 times the number critically dry years • 3-6 % increase in electricity demand • 7-14% decrease in forest yields (pine) • 10-35% increase in the risk of large wildfires	Lower Warming Range: 3.0-5.4 ºF

Source: Cayan, D., Luers, A., Hanemann, M., Franco, G. and Croes, B. 2006.

California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, were established in 1978 and are updated periodically to allow incorporation of new energy efficiency technologies and methods. The latest amendments require new homes to use half the energy they used a decade ago. Electricity production by fossil fuels results in GHG emissions. Energy efficient buildings require less electricity. Increased energy efficiency, therefore, results in decreased greenhouse gas emissions.

Assembly Bill 1493: In 2002, Governor Gray Davis signed Assembly Bill (AB) 1493. AB 1493 requires that the California Air Resources Board (ARB) develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by the ARB to be vehicles whose primary use is noncommercial personal transportation in the state." However, setting emission standards on automobiles is solely the responsibility of the federal Environmental Protection Agency (USEPA). The Federal Clean Air Act allows California to set state-specific emission standards on automobiles if it first obtains a waiver from the USEPA. On December 19, 2007 the USEPA denied California's request for a waiver. In response, California sued the USEPA claiming that the denial was not based on the scientific data.

Executive Order S-3-05: Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. The order declares that increased temperatures could reduce the Sierra's snow pack, further exacerbating California air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050.

The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary will also submit biannual reports to the governor and state legislature describing: (1) progress made toward reaching the emission targets; (2) impacts of global warming on California's resources; and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the CalEPA created a Climate Act Team (CAT) made up of members from various state agencies and commission. CAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

Assembly Bill 32, The California Climate Solutions Act of 2006: In September 2006, the Global Warming Solutions Act of 2006 (AB 32) was signed into law by Governor Arnold Schwarzenegger. It was the first legislation cutting global warming pollution in the United States. AB 32 requires that statewide greenhouse gas emissions are reduced to 1990 levels by the year 2020, this result in roughly a 25% reduction under business as usual estimates. This reduction will be accomplished through an enforceable statewide cap on greenhouse gas emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide greenhouse gas emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address greenhouse gas emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle greenhouse gas emissions under the authorization of AB 32.

AB 32 requires that the California Air Resources Board (CARB) adopt a quantified cap on greenhouse emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in greenhouse gas emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affect by the reductions.

Senate Bill 1368: SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (CPUC) to establish a greenhouse gas emission performance standard for base load generation from investor owned utilities. On January 25, 2007, the CPUC adopted an interim GHG Emissions Performance Standard (EPS), which is a facility-based emissions standard requiring that all new long-term commitments for baseload generation to serve California consumers be with power plants that have GHG emissions no greater than a combined cycle gas turbine plant. That level is established at 1,100 pounds of CO2 per megawatt-hour (MW-hr). Further, on May 23, 2007, the California Energy Commission (CEC) adopted regulations that establish and implement an EPS of 1,100 pounds of CO_2 per MW-hr (see CEC order No. 07-523-7).

These standards cannot exceed the greenhouse gas emission rate from a base load combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and CEC.

Senate Bill 97: California Senate Bill 97 (SB 97), passed in August 2007, is designed to work in conjunction with CEQA and AB 32. SB 97 requires the Office of Planning and Research (OPR) to prepare and develop guidelines for the mitigation of GHG emissions or the effects thereof, including but not limited to, effects associated with transportation and energy consumption. These guidelines must be transmitted to the Resources Agency by July 1, 2009, to be certified and adopted by January 1, 2010. The OPR and the Resources Agency shall periodically update these guidelines to incorporate new information or criteria established by CARB. SB 97 will apply retroactively to any EIR, negative declaration, mitigated negative declaration, or other document required by CEQA, which has not been finalized. Under SB 97, transportation projects funded under the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006, and projects funded under the Disaster Preparedness and Flood Prevention Bond Act of 2006 are exempted from analyzing the effects of GHGs in an EIR, negative declaration, mitigated negative declaration, or other CEQA document.

***Massachusetts v. Environmental Protection Agency*:** There has also been activity at the federal level with respect to the regulation of GHGs. In *Massachusetts v. Environmental Protection Agency*, 127 S.Ct. 1438 (2007), the U.S. Supreme Court held that that not only did the USEPA have authority to regulate greenhouse gases, but that the agency's reasons for not regulating this area did not fit the statutory requirements. The U.S. Supreme Court ruled that CO_2 and other greenhouse gases are pollutants under the Federal Clean Air Act, which USEPA must regulate if it determines they pose an endangerment to public health or welfare. To date, the USEPA has not made such a finding or developed a regulatory program for greenhouse gas emissions

4.15.2 Impact Significance Criteria

California has not adopted thresholds of significance for GHG emissions. As noted above, California has established a goal of reducing statewide GHG emissions to below 1990 levels. The climate theories, methodologies and threshold discussions are evolving at a rapid pace with new ideas constantly emerging with respect to global climate change as acknowledged by the Attorney General's office and the scientific community. Disagreements among professionals and the governmental institutions continue to dominate current events lending to the uncertainty for accurately forecasting the potential changes due to any individual project, decision or circumstance. Nevertheless, it is generally agreed that the application of mitigation measures directed towards reducing air quality degradation, energy savings and reduction on the dependency of vehicular usage will lessen the contribution of greenhouse gas emissions and ultimately slow down the consequences associated with global climate changes.

This EIR considers the GHG emissions from the project significant, or "cumulatively considerable," if implementation of the project would:

GCC-a: Substantially increase the total contribution of GHG emissions above current levels.

4.15.3 Impacts and Mitigation Measures

Impact GCC-1: GHG emissions associated with the implementation of the project could result in direct, indirect, and other project-related GHG emission that could substantially increase the total contribution of GHG emissions above current levels.

An analysis of The Preserve's three most important GHG emissions (CO_2, CH_4, and N_2O) is presented below. The emissions of the individual gases were estimated and then converted to their CO_2 equivalents (CO_2e) using the individually determined global warming potential (GWP) of each gas. Thus, total GHG emissions = total CO_2 emissions + total CO_2e emissions form CH_4 and N_2O.

Implementation of the proposed Preserve Development Plan would generate greenhouse gases through the construction and operation of new residential and recreational uses. GHG emissions from the project would specifically arise from project construction and from sources associated with project operation, including direct sources such as motor vehicles, natural gas consumption, solid waste handling/treatment, and indirect sources such as electricity generation.

Average annual uses of electricity and natural gas for residential land uses combined with vehicle trips per day are estimated for the proposed project in Table 4.15.C. Also shown in Table 4.15.C are the estimated project-related greenhouse gas emissions.

Table 4.15.C: Project Specific Analysis

Project Parameters	
	2009
Vehicles (trips/day)	12,000
Electricity used (MWh/year)	10,700
Natural Gas burned (cf/day)	299,000

	Emissions (tons per year)				%
Emission Source	**CO_2**	**CH_4**	**N_2O**	**CO_2e[1]**	
Vehicles	16,000	6.22	1.72	16,700	63%
Electricity Production	3,260	0.0358	0.0198	3,270	12%
Natural Gas Combustion	6,550	0.126	0.12	6,590	25%
Total Annual Emissions	25,800	6.38	1.86	26,560	100%

Based on the above emissions, the total CO_2e are calculated below and are expressed in metric tonne per year (Tg).

Emission Source	**Total CO_2e (Tg per year)**
Vehicles	0.0151
Electricity Production	0.0030
Natural Gas Combustion	0.0060
Total (CO_2e)	0.0241

1.1025	tons/metric tonne	
1,000,000	metric tonne/Tg	

Area GHG Usage			Year of data
State	492	Tg/year	2004

Global warming potentials (GWPs) are used to compare the abilities of different GHGs to trap heat in the atmosphere. GWPs are based on the radiative efficiency (heat-absorbing ability) of each gas relative to that of CO_2, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO_2. The GWP provides a construct for converting emissions of various gases into a common measure, which allows climate analysts to aggregate the radiative impacts of various GHGs into a uniform measure denominated in carbon or CO_2 equivalents.

The generally accepted authority on GWPs is the Intergovernmental Panel on Climate Change (IPCC). In 2001, the IPCC updated its estimates of GWPs for key GHGs. The table below lists the GWPs to calculate carbon dioxide equivalents (CO_2e.)

[1] CO_2e represents total emissions (equivalent) inclusive of a conversion factor for the Global Warming Potential.

Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF_4)	50,000	6,500
PFC: Hexafluoromethane (C_2F_6)	10,000	9,200
Sulfur Hexafluoride (SF_6)	3,200	23,900

Construction GHG Emissions

The project would emit greenhouse gases during construction of the project from the operation of construction equipment and from worker and building supply vendor vehicles. Because the specific size, location, and construction techniques and scheduling that will be utilized for development occurring within the project site is not currently known, the provision of precise emission estimates for development is not currently feasible and would require the City to speculate regarding future projects' potential environmental impacts. As such, the City is not required to engage in such speculation (CEQA Guidelines, Section 15145).

Operational GHG Emissions

The Preserve Development Plan would generate GHG during its operation, principally from motor vehicle use, electricity and natural gas consumption, and solid waste disposal.

Motor Vehicle GHG Emissions: The largest source of GHG emissions associated with the proposed project would be on-and-off site motor vehicle use. CO_2 emissions, the primary greenhouse gas from mobile sources, are directly related to the quantity of fuel consumed. Two important determinants of transportation-related GHG emissions are vehicle miles traveled (VMT) and vehicle fuel efficiency. VMT in the California region has steadily increased over the last quarter-century.

However, while gross incremental global warming impacts related to vehicle or energy usage associated with a project can be quantified, gross calculations result in over counting of emissions because they do not take into account the fact that these emissions are not "new" in a global sense, even if they are newly attributable to a particular project. For example, to determine the increment of change in GHG emissions that is a result of a proposed project's vehicle trips, it would not be sufficient or accurate simply to quantify GHG emissions based on vehicle miles traveled, unless those vehicle miles can be compared to the vehicle miles that are already being traveled by persons who may move to an area that is proposed to be developed. There is not yet any methodology for determining the increment of change that should be attributed to a project, which might result in some drivers relocating from other areas. Further, these calculations are "today's current numbers" in that

they do not take into account anticipated regulatory changes in vehicle efficiency standards which will reduce per vehicle GHG emissions over time.

CO_2 emissions during operation of the project at buildout were estimated using URBEMIS2007. Total CO_2 emissions related to the operation of motor vehicles would be 16,000 tons per year. Combustion of fossil fuels also generates CH_4 and N_2O.

In total, the proposed project would be anticipated to increase greenhouse gas emissions (CO_2e) attributable to mobile sources by 16,700 tons per year. Although motor vehicle energy consumption would increase under the proposed project, the transportation demand management plan and traffic improvements proposed for the project are designed to the improve energy efficiency of the transportation system by increasing use of more fuel-efficient public transit, carpools, and vanpools, and improving circulation system levels of service. Any reductions in traffic congestion realized through implementation of enhanced transit operations would also allow for more energy-efficient vehicular travel.

Electricity and Natural Gas GHG Emissions: The proposed project would use electricity for its residential, school, park and other components, which would contribute to GHG emissions. The generation of electricity through the combustion of fossil fuels typically yields CO_2 and, to a much smaller extent, CH_4 and N_2O. CO_2 emissions during operation of the project at buildout were estimated using URBEMIS2007. Total CO_2 emissions related to electricity and natural gas is 9,860 tons per year.

Solid Waste GHG Emissions: The Preserve Development Plan includes a school, parks and residential homes. Solid waste generated by the project would contribute to State's GHG emissions. Treatment and disposal of municipal, industrial and other solid waste produces significant amounts of CH_4. In addition to CH_4, solid waste disposal sites also produce biogenic CO_2 and non-methane volatile organic compounds (NMVOCs) as well as smaller amounts of N_2O, nitrogen oxides (NO_x) and carbon monoxide (CO). CH_4 produced at solid waste sites contributes approximately 3 to 4 percent to the annual global anthropogenic GHG emissions (IPCC, 2001).

Waste management practices in California have changed significantly over the last decade. State mandated waste minimization and recycling/reuse policies have been introduced to reduce the amount of waste disposed of in landfills, and alternative waste management practices to solid waste disposal on land have been implemented to reduce the environmental impacts of waste management. Landfill gas recovery has become more common as a measure to reduce CH_4 emissions from solid waste disposal sites.

Other Greenhouse Gas Emissions: At present, there is a federal ban on CFCs; therefore, it is assumed the project will not generate emissions of CFCs. The project may emit a small amount of HFC emissions from leakage and service of refrigeration and air conditioning equipment and from disposal at the end of the life of the equipment. However, the details regarding refrigerants to be used in the project and the capacity of these are unknown at this time. PFCs and sulfur hexafluoride are typically used in industrial applications, none of which would be used by the project. Therefore, it is not anticipated that the project would contribute significant emissions of these additional greenhouse gases.

Project Findings

Based on project-related greenhouse gas emissions estimates, it is anticipated that the project emissions will contribute to the global inventory of greenhouse gas emissions. The quantitative analysis above indicates that the project's greenhouse gas emissions would not be considered substantial.

The design concept for The Preserve Development Plan is based upon a set of guiding principles that are intended to result in successful residential neighborhoods and communities. These principles balance the requirements for vehicular access with pedestrian access, density with open space, and facilities with community needs. A well balanced land development plan ultimately reduces vehicular dependency, conserves energy, and reduces project emissions ultimately contributing less or even reversing long-term climate changes and the consequences of global warming.

The issue of global climate change has become increasingly important in the CEQA process. As a result, the City of Stockton, recognizing the significant issue of global climate change and greenhouse gas emissions, has encouraged the development industry to consider implementing new programs such as the Build It Green program. Therefore, the City and the applicant have agreed that additional design features to further reduce the project's greenhouse gas emissions are appropriate.

To further ensure that the proposed development minimizes its contribution to global warming/climate change, the following applicable mitigation measures will be implemented:

Build It Green Program

Mitigation Measure GCC-1. The owners, developers and/or successors-in-interest (ODS) shall be subject to and comply with the City's adopted "Build It Green" Program, green point rated guidelines in effect at the time of construction. In the absence of a City adopted program, the ODS shall adhere to the guidelines of the California Green Builder Program, which is recognized by the California Energy Commission. Accordingly, the ODS shall adhere to the following standards:

a. The builders of non-residential construction in the Preserve Planned Development Project will comply with LEED Silver-certified standards in effect at the time of construction. The builders of non-residential construction will be required to participate in the formal LEED Silver inspection and certification process.

b. Utilize building insulation that exceeds Title 24 standards. Utilize high-performance windows that employ advanced technologies, such as protective coatings and improved frames, to retain heat during winter and prevent heat during summer.

c. Incorporate building techniques that ensure tight building construction and efficient duct systems. Require the use of efficient heating and cooling equipment for all residential buildings.

d. Utilize efficient building products with standards the meet *EnergyStar*™ criteria. *EnergyStar*™ qualified homes may also be equipped with *EnergyStar*™ qualified products-

lighting fixtures, compact fluorescent bulbs, ventilation fans, and appliances, such as refrigerators, dishwashers, and washing machines.

e. Require the use of reflective, *EnergyStar*™ cool roofs on all building structures in the project.

Emission Reduction/Air Quality

Mitigation Measure GCC-2. The owner, developer, and/or successor-in-interest (ODS) shall address the impacts from project-relate emissions through the implementation of the following measures:

a. File an application for each proposed tentative subdivision map or other final entitlements to the San Joaquin Valley Air Pollution Control District (APCD) for a permit pursuant to Rule 9510 indirect Source Rule (ISR), if applicable. The ODS shall incorporate emission reduction measures into the project and pay ISR fees as required by the APCD.

b. Prohibit wood-burning fireplaces and wood stoves within the project.

Land Use

Mitigation Measure GCC-3. The owner, developer and/or successors-in-interest are required to implement the following measures regarding land use to reduce greenhouse gas emission impacts for the proposed project.

a. Provide sidewalks and pedestrian paths throughout as much of the project as possible and connect to open space areas, parks, and schools to encourage walking and bicycling.

b. Mid-block paths shall be installed to facilitate pedestrian movement through long blocks and cul-de-sacs.

c. To the extent practicable, the comprehensive the bicycle circulation system shall provide access to all neighborhoods and amenities within the proposed project and enhances comfort and safety for pedestrians by offering ample lighting, planted medians, tree lined streets, crosswalks and wide sidewalks.

Public Infrastructure/Services

Mitigation Measure GCC-4. The owner, developer, and/or successors-in-interest are required to implement the following measures regarding public services to reduce greenhouse gas emission impacts for the proposed project.

a. A non-potable source of water (e.g., reclaimed) shall be utilized for landscape irrigation in public spaces.

b. Provide transit-enhancing infrastructure that includes bus shelters, benches, street lighting, route signs and displays and bus turn-outs.

Building Construction & Energy Conservation

Mitigation Measure GCC-5. The following measures shall be used to accomplish an overall reduction in residential energy consumption relative to the requirements of State of California Title 24:

a. Energy-efficient design shall be provided for homes and buildings, including automated control systems for heating and air conditioning, lighting controls and energy-efficient lighting in buildings, increased insulation, and light-colored roof materials to reflect heat.

b. Residences shall be constructed with energy efficient appliances and home systems such as Energy Star appliances, energy efficient (i.e., Low E2) windows, tightly sealed ducts, florescent or energy efficient light bulbs with motion sensors where practicable, backyard outlets for electrical mower and other yard equipment operations, R-6 duct insulation, radiant roof barrier sheathing, 14 Seasonal Energy Efficiency Ratio air conditioning and ventilation systems, air conditioning with Thermostatic Expansion Valve metering devices that help regulate flow of liquid refrigerant, 0.95 Annual Fuel Utilization Efficiency furnaces, and gas dryer stubs.

c. Buildings and outdoor structures shall include green-building materials, such as low-emission concrete, recycled aggregate, recycled reinforcing, or waffle pods to be used in foundations; recycled plastics to be used in community structures such as fencing or playground equipment; wood flooring materials treated with low emission varnishes and floor board substrates to be made from low emission particleboard; compact fluorescent light bulbs in all buildings; and use of recycled building materials such as recycled aluminum for window frames or post-consumer plastic for piping.

d. Contractors shall minimize the production of waste and shall recycle construction-related waste where possible.

e. Use locally made building materials for construction of the project and associated infrastructure to reduce truck trips.

f. Large canopy trees shall be carefully selected and located to protect buildings from energy-consuming environmental conditions and shade-paved areas. Trees shall be selected to shade 50% of paved areas within 15 years.

g. Optimize building's thermal distribution by separating ventilation and thermal conditioning systems.

h. For pool and spa heating and maintenance, use solar heating and automatic covers.

i. Design buildings to accommodate solar power systems; solar panels on homes, carports over parking areas; solar and tankless hot water heaters; and energy-efficient heating ventilation and air conditioning.

j. Incorporate the principles of passive solar design shall be incorporated into building structures, including basic design principles are large south-facing windows with proper overhangs, as well as tile, brick, or other thermal mass material used in flooring or walls to store the sun's heat during the day and release it back into the building at night or when the temperature drops.

k. Include energy-conserving features as options for home buyer. These include:

- o increased energy efficiency;
- o high-albedo (reflecting) roofing materials;
- o cool paving;
- o radiant heat barriers;
- o installation of solar water-heating systems;
- o low NOx-emitting or high-efficiency, energy-efficient water heaters;
- o installation of clean-energy features that promote energy self-sufficiency (e.g., photovoltaic cells, solar thermal electricity systems);
- o installation of programmable thermostats for all heating and cooling systems;
- o awnings or other shading mechanisms for windows;
- o porch, patio, and walkway overhangs;
- o ceiling fans or whole-house fans;
- o passive solar cooling and heating designs (e.g., natural convection, thermal flywheels);
- o daylighting (natural lighting) systems such as skylights, light shelves, and interior transom windows;
- o electrical outlets around the exterior of units to encourage the use of electric landscape maintenance equipment;
- o use of low and no-VOC coatings and paints;
- o natural gas fireplaces (instead of wood burning fireplaces or heathers) and natural gas lines (if available to the project area) in backyard or patio areas to encourage the use of gas barbecues;
- o pre-wire units with high-speed modem connections/DSL and extra phone lines; and
- o use of low or nonpolluting landscape maintenance equipment (e.g., electric lawn mowers, reel mowers, leaf vacuums, electric trimmers and edgers).

Water Conservation

Mitigation Measure GCC-6: The owner, developer and/or successors-in-interest are required to prepare a water conservation plan for the proposed project to the satisfaction of the Director of Municipal Utilities. The plan shall address of the following, as appropriate:

a. Water-efficient landscapes shall be provided for all publicly landscaped areas, including parks, roadway medians and roadside landscaping.

b. Water-efficient irrigation systems and devices shall be required in all landscaped areas.

c. All buildings shall include water-efficient fixtures and appliances.

Solid Waste

Mitigation Measure GCC-7: The owner, developer and/or successors-in-interest are required to implement the following to reduce the solid waste impacts from the proposed project.

a. Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).

b. Provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas.

Transportation System Management

Mitigation Measure GCC-8: The owner, developer and/or successors-in-interest of the commercial and industrial land uses are required to form a Transportation Management Association or join and existing association to address the following:

a. Provide bicycle enhancing infrastructure that includes bikeways/paths connecting to a bikeway system.

b. Promote ride sharing programs by designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading and waiting areas for ride sharing vehicles, and providing a web site or message board for coordinating rides.

Trip Reduction

Mitigation Measure GCC-9. The owner, developer, and/or successor-in-interest (ODS) shall address the following measures during the preparation of improvement plans to address an overall reduction in project-related vehicle miles traveled (VMT), including:

Traffic Calming

a. Traffic calming measures shall be included as part of the proposed project design with the objective of improving the overall quality of life for neighborhood residents by reducing safety hazards and nuisance impacts resulting from speeding vehicles, careless drivers and cut-through traffic.

b. Vehicle speeds within the project should be maintained at a level that provides maximum safety for residents. Consistent with the City's adopted Traffic Calming Guidelines, the project shall incorporate roundabouts, short block lengths, traffic circles, and high visibility crosswalks to reduce traffic speeds and enhance pedestrian safety.

Pedestrian Sidewalks & Pathways

a. Sidewalks and bikeways shall be designed to separate pedestrian and bicycle pathways from vehicle paths.

b. Sidewalks and pedestrian pathways shall be easy to navigate and designed to facilitate pedestrian movement through the project and create a safe environment for all potential users from obstacles and automobiles.

c. Sidewalks shall be designed for high visibility (e.g., brightly painted, different color of concrete, etc.) when crossing parking lots, streets, and similar vehicle paths.

Bicycle

a. The bicycle circulation system should be planned to act as a regional circulation system connecting the proposed project to Stockton's roadway/bikeway system.

b. Incorporate bicycle lanes and routes into the street system.

c. Incorporate bicycle-friendly intersections into street design.

d. Create bicycle lanes and walking paths directed to the location of schools, parks and other destination points.

e. The bicycle circulation system should be planned to act as a regional circulation system connecting the proposed project to Stockton's roadway/bikeway system.

Transit

a. A through roadway should connect adjacent developments so as to permit transit circulation between developments.

b. Shielded openings in subdivisions sound walls should be provided to facilitate more direct pedestrian access to transit stops.

c. The project would encourage public transportation by incorporating bus turnouts, shelters, and walkways into the design. As detailed in the *City of Stockton's Traffic Calming Guidelines*, the San Joaquin Regional Transit District (SJRTD) will review project site plans and identify potential bus stop locations.

d. Locate the highest density land use at or within ¼ mile of a transit stop.

e. Contact San Joaquin Regional Transit District (SJRTD) to identify appropriate location(s) for bus stops within the community

f. Provide transit-enhancing infrastructure that includes bus shelters, benches, street lighting, route signs and displays and bus turn-outs.

g. Prior to approval of the Vesting Tentative Map, contact San Joaquin Regional Transit District (SJRTD) to identify appropriate location(s) for bus stops within the community.

Based on the project GHG emissions noted in Table 4.15.C, at a project level, the application of reasonable and feasible measures will assist in reducing the global climate change effects. However, as a result of the uncertainties and professional/scientific disagreements, the ability to forecast project conclusions with absolute certainty remains elusive, irrespective of the implementation of mitigation measures. It is therefore concluded that the project will have a significant and adverse effect absent conclusive findings and measurable thresholds. For this reason, even with the implementation of mitigation measures, including state-of-the-art programs such as Build It Green, the project will have a significant and unavoidable impact on global climate change. The conditions outlined in Significance Criteria GCC-a will occur.

Cumulative Impacts

Operation-related activities would result in The Preserve generated emissions of greenhouse gases (GHGs). The proposed project would accommodate more than 4,366 new residents, which is substantial. Although the overall percentage contribution of project GHG emissions is incremental, when combined with other significant development projects in the City of Stockton and greater San Joaquin County region, the proposed project's contribution to long-term atmospheric GHG emissions would be considered significant on a cumulative basis. The proposed project would produce substantial levels of new GHG emissions, based on a per-capita calculation and a substantial number of new residents, resulting in a significant and unavoidable impact. Mitigation measures would reduce GHG from the proposed project, but they are not sufficient to reduce the proposed project's cumulative contribution to less than significant levels. Because the impact would be significant on a project-by-project basis, it would also result in a significant contribution to global warming impacts on an incremental basis. Thus, the proposed project would result in a substantial contribution to a significant and unavoidable cumulative impact.

Based on the cumulative projects proposed in the City of Stockton and the surrounding region, the incremental contribution of GHG from these projects is substantial in size and scale. When considered collectively, the cumulative effects combine together to create the potential for measurable changes. Even with the application of the proposed measures and design features, the potential climate-related changes will remain significant and unavoidable on a cumulative level. The conditions outlined in Significance Criterion GCC-a will occur.

4.15.4 Level of Significance After Mitigation

Implementation of the additional design features listed above will help reduce the project's contribution to greenhouse gas emissions. However, despite implementation of the project's sustainable design and the mitigation measures, GHG emissions at a project level cannot be completely mitigated and will have an incremental, significant and adverse effect on the environment. When combined with projected growth, the GHG emissions from the project and the total GHG from the region are expected to substantially increase when compared with current conditions. Therefore, estimated cumulative GHG emissions would be considered significant and unavoidable on a cumulative basis.