

4.4

AIR QUALITY

INTRODUCTION

The Air Quality section of the EIR describes the impacts of the Wildhorse Ranch project on local and regional air quality. The section includes a discussion of the existing air quality, construction-related air quality impacts resulting from grading and equipment emissions, direct and indirect emissions associated with the project, the impacts of these emissions on both the local and regional scale, and mitigation measures warranted to reduce or eliminate any identified significant impacts. The air quality section is based primarily on an air quality analysis conducted using URBEMIS 2007 (Version 9.2.4) air quality modeling software. Information for this section was also drawn from the *City of Davis General Plan*¹ and CALINE-4 air quality modeling software for the evaluation of carbon monoxide concentrations conducted by Don Ballanti, a certified consulting meteorologist. The results of the URBEMIS 2007 and CALINE-4 modeling analysis are included in Appendix D of this DEIR.

EXISTING ENVIRONMENTAL SETTING

The following setting information provides an overview of the existing air quality in the Wildhorse Ranch area, located in the City of Davis in Yolo County. In addition, the regulatory agencies and required permits associated with air quality are described.

Air Basin Characteristics

The amount of a given pollutant in the atmosphere is determined by the amount of pollutant released and the atmosphere's ability to transport and dilute the pollutant. The major factors affecting transport and dilution are: terrain, wind, atmospheric stability, and, for photochemical pollutants, sunshine.

The project is located in southern Yolo County, which is within the Sacramento Valley Air Basin (SVAB). The basin is relatively flat and bordered by mountains on the east, west and north. Movement of air into the SVAB is through the Carquinez Strait in a northeasterly direction from the Sacramento-San Joaquin River Delta. Quality of the air is either fresh from the marine environment or polluted from the urbanized San Francisco Bay area, depending on the meteorological conditions. Davis' climate includes primarily hot, dry summers and cool, rainy winters. Prevailing winds are from the south-southwest. Atmospheric temperature inversions occur frequently that limit the vertical dispersion of pollutants. These inversions may result in elevated levels of carbon monoxide (CO) during the winter months and high ozone levels during summer and fall.

Ambient Air Quality Standards

Both the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) have established ambient air quality standards for common pollutants. These ambient air quality standards represent safe levels that avoid specific adverse health effects for each contaminant. Pollutants for which air quality standards have been established are called “criteria” pollutants. Table 4.4-1 identifies the major pollutants, characteristics, health effects and typical sources. The federal and California ambient air quality standards are summarized in Table 4.4-2.

The federal and State ambient standards were developed independently with differing purposes and methods. As a result, the federal and State standards differ in some cases. In general, the State of California standards are more stringent, particularly for ozone and particulate matter (PM₁₀ and PM_{2.5}).

Ozone

Ground-level ozone is the most prevalent of a class of photochemical oxidants formed in the urban atmosphere. Stratospheric ozone occurs in the atmosphere and is generally considered to be beneficial. The creation of ozone is a result of a complex chemical reaction between reactive organic gases (ROG) and nitrogen oxide (NO_x) emissions (ozone precursors) in the presence of sunshine. Unlike other pollutants, ozone is not released directly into the atmosphere from any sources. Factories, automobiles, and evaporation of solvents and fuels are the major sources of ozone precursors. The health effects of ozone include difficulty breathing, lung tissue damage, and eye irritation.

Carbon Monoxide (CO)

Carbon monoxide is a colorless, odorless, poisonous gas produced by incomplete burning of carbon-based fuels such as gasoline, oil, and wood. When CO enters the body, the CO combines with chemicals in the body, which prevents blood from carrying oxygen to cells, tissues, and organs. Symptoms of exposure to CO can include problems with vision, reduced alertness, and general reduction in mental and physical functions. Exposure to CO can result in chest pain, headaches, reduced mental alertness, and death at high concentrations.

Nitrogen Oxide Gases

Nitrogen dioxide is a nitrogen oxide (NO_x) gas that is produced from burning fuels, including gasoline and coal. Nitrogen oxides react with ROG (found in paints and solvents) to form smog, which can harm health, damage the environment, and cause poor visibility. Additionally, NO_x emissions are a major component of acid rain. Health effects related to NO_x include lung irritation and lung damage.

**Table 4.4-1
Major Criteria Pollutants**

Pollutant	Characteristics	Health Effects	Examples of Sources
Ozone	A strong smelling, pale blue, reactive toxic chemical gas consisting of three oxygen atoms. Ozone exists in the upper atmosphere ozone layer (stratospheric ozone) as well as at the Earth's surface in the troposphere (ozone). Ozone in the troposphere causes numerous adverse health effects and is a criteria air pollutant, and is a major component of smog.	<ul style="list-style-type: none"> • Breathing difficulties • Lung tissue damage • Damage to rubber and some plastics • Eye and skin irritation 	Formed when reactive organic gases (ROG) and nitrogen oxides (NO _x) react in the presence of sunlight. ROG and NO _x sources include any source that burns fuel (e.g., gasoline, natural gas, wood, oil), solvents, petroleum processing and storage, and pesticides.
Carbon Monoxide	A colorless, odorless gas resulting from the incomplete combustion of hydrocarbon fuels. Over 80 percent of the carbon monoxide emitted in urban areas is contributed by motor vehicles.	<ul style="list-style-type: none"> • Chest pain in heart patients • Headaches and nausea • Reduced mental alertness • High concentration can result in death 	Any source that burns fuel such as automobiles, trucks, heavy construction equipment, farming equipment, and residential heating.
Nitrogen Dioxide	Nitrogen dioxide is typically created during combustion processes, and is a major contributor to smog formation and acid deposition.	<ul style="list-style-type: none"> • Lung irritation and damage • Reacts in the atmosphere to form ozone and acid rain 	Any source that burns fuel such as automobiles, trucks, heavy construction equipment, farming equipment, and residential heating.
Sulfur Dioxide	A strong smelling, colorless gas that is formed by the combustion of fossil fuels.	<ul style="list-style-type: none"> • Increased lung disease and breathing problems for asthmatics • Reacts in the atmosphere to form acid rain 	Coal or oil burning power plants and industries, refineries, and diesel engines.
Particulate Matter (PM ₁₀ and PM _{2.5})	Any material, except pure water, that exists in the solid or liquid state in the atmosphere. The size of particulate matter can vary from coarse, wind-blown dust particles to fine particle combustion products.	<ul style="list-style-type: none"> • Increased respiratory disease • Lung damage • Premature death • Reduced visibility 	Fuel combustion in motor vehicles, equipment and industrial sources, residential and agricultural burning. Particulate matter is also formed from reaction of other pollutants (acid rain, NO _x , SO _x , organics).

Source: <http://www.arb.ca.gov/html/gloss.htm>, December 2007.

Table 4.4-2 Ambient Air Quality Standards				
Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary	Secondary
Ozone	1 Hour	0.09 ppm	-	Same as primary
	8 Hour	0.07 ppm	0.075 ppm	Same as primary
Carbon Monoxide	8 Hour	9 ppm	9 ppm	None
	1 Hour	20 ppm	35 ppm	
Nitrogen Dioxide	Annual Mean	0.03 ppm	0.053 ppm	Same as primary
	1 Hour	0.18 ppm	-	
Sulfur Dioxide	Annual Mean	-	0.030 ppm	-
	24 Hour	0.04 ppm	0.14 ppm	-
	3 Hour			0.50 ppm
	1 Hour	0.25 ppm		-
Respirable Particulate Matter (PM ₁₀)	Annual Mean	20 ug/m ³		Same as primary
	24 Hour	50 ug/m ³	150 ug/m ³	
Fine Particulate Matter (PM _{2.5})	Annual Mean	12 ug/m ³	15 ug/m ³	Same as primary
	24 Hour	-	35 ug/m ³	
Sulfates	24 Hour	25 ug/m ³	-	-
Lead	30 Day Average	1.5 ug/m ³	-	-
	Calendar Quarter	-	1.5 ug/m ³	Same as primary
Hydrogen Sulfide	1 Hour	0.03 ppm	N/A	N/A
Vinyl Chloride	24 Hour	0.01 ppm	N/A	N/A

ppm = Parts per Million
ug/m³ = Micrograms per Cubic Meter
Source: California Air Resources Board, Ambient Air Quality Standards, November 17, 2008.

Sulfur Oxide Gases

Sulfur dioxide is a sulfur oxide (SO_x) gas which constitutes a major element of pollution in the atmosphere. Sulfur oxides are commonly produced by fossil fuel combustion. In the atmosphere, SO_x is usually oxidized by ozone and hydrogen peroxide to form sulfur dioxide and trioxide.

If SO_x is present during condensation, acid rain may occur. Exposure to high concentrations for short periods of time can constrict the bronchi and increase mucous flow, making breathing difficult. Children, the elderly, those with chronic lung disease, and asthmatics are especially susceptible to these effects.

Particulate Matter (PM)

Suspended particulate matter (airborne dust) consists of solid and liquid particles small enough to remain suspended in the air for long periods. "Respirable" PM consists of particles less than 10 microns in diameter, and is defined as "suspended particulate matter" or PM₁₀. Particles between 2.5 and 10 microns in diameter arise primarily from natural processes, such as wind-blown dust or soil. Fine particles are less than 2.5 microns in diameter (PM_{2.5}). PM_{2.5}, by definition, is included in PM₁₀. Fine particles are produced mostly from combustion or burning

activities. Fuel burned in cars and trucks, power plants, factories, fireplaces, and wood stoves produces fine particles.

Particulate matter is a complex mixture that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These tiny particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials such as metals, soot, soil, and dust. Particulate matter is divided into two classes, primary and secondary. Primary particles are released directly into the atmosphere from sources of generation. Secondary particles are formed in the atmosphere as a result of reactions that involve gases.

Particles greater than 10 microns in diameter can cause irritation in the nose, throat, and bronchial tubes. Natural mechanisms remove many of these particles, but smaller particles are able to pass through the body's natural defenses and the mucous membranes of the upper respiratory tract and enter into the lungs. The particles can damage the alveoli, tiny air sacs responsible for gas exchange in the lungs. The particles may also carry carcinogens and other toxic compounds, which adhere to the particle surfaces and can enter the lungs.

Toxic Air Contaminants

In addition to the criteria pollutants (Table 4.4-1), Toxic Air Contaminants (TACs) are also a category of environmental concern. Toxic Air Contaminants are present in many types with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least 40 different TACs. In terms of health risks, the most volatile contaminants are diesel particulate, benzene, formaldehyde, 1,3-butadiene and acetaldehyde.

Public exposure to TACs can result from emissions from normal operations as well as accidental releases. Health effects of TACs include cancer, birth defects, neurological damage, and death.

Attainment Status and Regional Air Quality Plans

The Federal Clean Air Act and the California Clean Air Act require all areas of California to be classified as attainment, non-attainment, or unclassified as to their status with regard to the national and/or State Ambient Air Quality Standards.

The Federal Clean Air Act of 1990 and the California Clean Air Act of 1988 require that the CARB, based on air quality monitoring data, designate portions of the State where the federal or State ambient air quality standards are not met as "nonattainment areas." Because of the differences between the national and State standards, the designation of nonattainment areas is different under the federal and State legislation. Currently, the Yolo-Solano Air Quality Management District (YSAQMD) is classified as a "serious" nonattainment area for the federal eight-hour ozone standard. In addition, the YSAQMD is a nonattainment area for both the one-hour and eight hour State ozone standards, and the PM₁₀ standards. The YSAQMD is classified as "attainment" or "unclassified" for the other State and national standards.

Local Air Quality Monitoring

The California Air Resources Board (CARB) operates an air quality monitoring site within the UC Davis campus that monitors the gaseous pollutants of ozone, nitrogen dioxide, and carbon monoxide. The closest particulate monitoring site is operated by the YSAQMD, which operates a monitoring site on Gibson Street in the City of Woodland. The Woodland monitoring site measures several gaseous pollutants, as well as PM₁₀. A three-year summary of air quality data from the two monitoring sites is shown in Table 4.4-3. Table 4.4-3 indicates that the federal and State standards for ozone, PM₁₀, and PM_{2.5} are exceeded in the project area.

Table 4.4-3 Ambient Air Quality at Davis and Woodland			
Pollutant/Standard	Year	Days Exceeding Standard	
		Davis Monitoring Site	Woodland Monitoring Site
Ozone/State 1-Hour	2006	3	6
	2007	2	1
	2008	4	4
Ozone/Fed. 1-Hour	2006	0	0
	2007	0	0
	2008	0	0
Ozone/State 8-Hour	2006	9	23
	2007	4	5
	2008	10	12
Ozone/Fed. 8-Hour	2006	4	14
	2007	3	2
	2008	5	4
Carbon Monoxide State/Fed. 8-Hour	2006	0	-
	2007	0	-
	2008	0	-
Nitrogen Dioxide State 1- Hour	2006	0	-
	2007	0	-
	2008	0	-
PM₁₀/State 24-Hour	2006	-	6
	2007	-	3
	2008	-	8
PM₁₀/Federal 24-Hour	2006	-	0
	2007	-	0
	2008	-	1
PM_{2.5}/Federal 24-Hour	2006	-	4
	2007	-	4
	2008	-	1

*Source: Air Resources Board, Aerometric Data Analysis and Management (ADAM), 2009.
(<http://www.arb.ca.gov/adam/cgi-bin/db2www/adamtop4b.d2w/start>, accessed on January 29,2009)*

REGULATORY CONTEXT

Regulation of air quality is achieved through both federal and State ambient air quality standards, and emission limits for individual sources of air pollutants.

Federal Regulations

The United States Environmental Protection Agency (USEPA) is charged with enforcing the Federal Clean Air Act (FCAA). The USEPA has established air quality standards for common pollutants. These ambient air quality standards represent the allowable levels for each contaminant, according to the various thresholds of each pollutant for causing adverse health effects.

The FCAA requires states to classify basins (or portions thereof) as either “attainment” or “non-attainment” with respect to the criteria air pollutants, based on whether or not the national ambient air quality standards (NAAQS) have been achieved, and to prepare air quality plans containing emission reduction strategies for those areas designated as “non-attainment.”

The YSAQMD includes all of Yolo County and eastern portions of Solano County. As previously mentioned, the YSAQMD is classified as a “serious” non-attainment area for the federal eight-hour ozone standard. The YSAQMD is classified as attainment or unclassified for other national standards.

Because the SVAB is designated as a non-attainment area for ozone, the air pollution control districts and air quality management districts within the air basin have prepared the Sacramento Area Regional Ozone Attainment Plan as the basin's contribution to the State Implementation Plan (SIP), pursuant to the FCAA. The SIP includes plans for each of the State's non-attainment areas, along with rules and regulations and other control measures adopted by the air districts and the California Air Resources Board (CARB).

State Regulations

California Clean Air Act

The California Clean Air Act (CCAA) requires that air quality plans be prepared for areas of the State that have not met State air quality standards for ozone, CO, NO_x, and SO_x. Among other requirements of the CCAA, the plans must include a wide range of implemental control measures, which often include transportation control measures and performance standards. In order to implement the transportation-related provisions of the CCAA, local air pollution control districts have been granted explicit authority to adopt and implement transportation controls.

California Air Resources Board (CARB)

The CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for the California Clean Air Act (CCAA) adopted in 1988. The CARB has primary responsibility in California to develop and implement air pollution

control plans designed to achieve and maintain the National Ambient Air Quality Standards established by the USEPA.

The CARB, California's air quality management agency, regulates mobile emissions sources and oversees the activities of County Air Pollution Control Districts (APCDs) and regional Air Quality Management Districts (AQMDs). The CARB regulates local air quality indirectly using State standards and vehicle emission standards, by conducting research activities, and through planning and coordinating activities.

California has adopted ambient standards that are in some cases more stringent than the federal standards for the criteria air pollutants shown in Table 4.4-2. Under the CCAA, areas have been designated as attainment or non-attainment with respect to State standards. As previously mentioned, the project region is considered to be in attainment for the State CO standard, non-attainment for the State ozone standard, and non-attainment for the State PM₁₀ standard.

Local Regulations

The YSAQMD is the agency responsible for implementing emissions standards and other requirements of federal and State laws in Yolo County. The YSAQMD Yolo-Solano Air Quality Attainment Plan (1992) addresses the requirement to attempt to bring the district into compliance with the federal and State ambient air quality standards. The plan includes carefully planned strategies for progressive reduction of air pollutants by promoting active public involvement, encouraging compliance through positive influence and behavior, and through public education in both the public and private sectors. The YSAQMD also provides a handbook of guidelines for determining air quality thresholds of significance and mitigation measures for proposed development projects that generate emissions from motor vehicles.²

The closest monitoring site for other gaseous pollutants such as carbon monoxide and nitrogen dioxide is the UC Davis campus in Davis. Concentrations of these pollutants at this monitoring site are well within the State and federal standards.

General Plan

The following are applicable goals and policies from the Air Quality Element of the City of Davis General Plan related to air quality:

- | | |
|----------------|---|
| Goal AIR 1 | Maintain and strive to improve air quality. |
| Policy AIR 1.1 | Take appropriate measures to meet the AQMD's goal for improved air quality. |

IMPACTS AND MITIGATION MEASURES

Standards of Significance

- The District considers increases in emissions, during construction or operation, of 10 tons per year of ozone precursors (ROG or NO_x) or 80 pounds per day of PM₁₀ as potentially significant;
- A predicted violation of a State ambient air quality standard for CO would be considered to be potentially significant;
- A project would be considered to result in a potentially significant cumulative impact if the project would individually have a significant air quality impact; or
- A potentially significant cumulative impact related to CO would occur if modeling shows that the combined emissions from the project and other existing and planned projects will exceed air quality standards.

Methods of Analysis

Local Carbon Monoxide Concentrations

The Yolo-Solano AQMD's *Handbook for Assessing and Mitigating Air Quality Impacts*³ recommends that the statewide protocol for carbon monoxide studies⁴ be used to evaluate carbon monoxide impacts.

This statewide protocol provides that within attainment areas for carbon monoxide, signalized intersections having a Level of Service of E or F represent a potential for a CO violation and require further analysis. The traffic analysis for the proposed project shows that existing LOS at signalized study intersections is LOS D or better, but that under the cumulative traffic scenario three signalized intersections would operate at LOS E or F. Two of these intersections were selected for analysis using the CALINE-4 program. It should be noted that the Mace Boulevard/I-80 Westbound ramps intersection was forecast to operate at LOS E in the PM peak hour under the cumulative traffic scenarios, but modeling was not conducted as the intersection is south of a railroad and north of I-80, and sensitive receptors are not located nearby.

The CALINE-4 model is a fourth-generation line source air quality model that is based on the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway. Given source strength, meteorology, site geometry and site characteristics, the model predicts pollutant concentrations for receptors located within 492 feet of the roadway. The CALINE-4 model allows roadways to be broken into multiple links that can vary in traffic volume, emission rates, height, width, etc.

It should be noted that the CALINE-4 analysis conducted for the proposed project was based on a previous project iteration which would have included 259 residential units. The proposed project is composed of a maximum of 191 residential units. Therefore, project emissions resulting from construction, vehicle trips, and household emissions would be reduced as

compared to the previous iteration. As a result, the following analysis is considered to be conservative, and updated studies are not required.

A CALINE-4 model was constructed for each study intersection and the program was run for three traffic scenarios. The method outlined in Appendix B of the *Transportation Project-Level Carbon Monoxide Protocol* was utilized. The method requires that the intersection be broken into numerous "links." Links are either free-stream, approach, or departure links. Approach links and departure links were assumed to be 492 feet in length, and free stream links were assumed to extend out to approximately 2,460 feet from the center of the intersection. For each approach or departure link an average vehicle speed was obtained from tables in the protocol document utilizing the traffic volume per lane, an average cruise speed (speed away from the intersection) of 30 miles-per-hour and an assumed 60 percent red time (of the signal cycle) for each movement.

The EMFAC-2007 program was used to generate emission factors at various speeds. The EMFAC-2007 runs assumed a 30-degree Fahrenheit ambient temperature and 20 percent relative humidity. The default vehicle mix for the YSAQMD was utilized. A 2008 vehicle mix was used for the existing and project traffic cases and a 2015 vehicle mix was used for the cumulative with project traffic case.

The CALINE-4 model was run on worst-case meteorology and used the worst-case wind direction mode to obtain the highest concentration at each receptor. Receptors were located at each corner of the intersection, 10 feet equidistant from the curb and 32.8 feet away from the corner in each direction, for a total of 12 receptors per model. The highest predicted concentration of the 12 receptors was used in the assessment. The CALINE-4 data is included in Appendix D of this DEIR.

The CALINE-4 model provides a worst-case estimate of 1-hour concentrations of carbon monoxide. The 1-hour concentrations were then converted to estimates of 8-hour averaged concentrations using a "persistence factor" (multiplier) of 0.7.

The other contribution to the total concentration is the background level attributed to more distant traffic. A 1-hour background level of 1.0 parts per million (PPM) was used, as recommended by the YSAQMD.

Construction

The URBEMIS-2007 program was applied to the project to estimate the maximum construction emissions from site grading, equipment exhaust, construction worker vehicle trips and other construction activities. Per consultation with the project engineer, construction was assumed to begin in 2010 and would adhere to the phasing and equipment information provided by the engineer (See Appendix D for the project phasing and equipment lists used in the analysis).

Operation

Estimates of regional emissions generated by project traffic and area sources were made using the URBEMIS-2007 (Version 9.2.2) program. URBEMIS-2007 estimates the emissions that

result from various land use development projects. Land use projects can include residential uses such as single-family dwelling units, apartments and condominiums, and nonresidential uses such as shopping centers, office buildings, and industrial parks. Inputs to the URBEMIS-2007 program include trip generation rates, vehicle mix, average trip length by trip type, and average speed. Average trip lengths and vehicle mixes for the Lower Sacramento Valley air basin were used. Average speed for all types of trips was assumed to be 35 miles-per-hour.

The URBEMIS-2007 program was used to calculate daily operational emissions during the summer months with an ambient temperature of 85 degrees Fahrenheit, and a winter temperature of 40 degrees Fahrenheit. Summer results from URBEMIS-2007 are used to assess ozone precursors and winter results are used for PM₁₀ emissions.

Project Impacts and Mitigation Measures

4.4-1 Exhaust emissions and fugitive dust emissions from project-associated construction activities.

Maximum construction emissions would occur during the first phases of construction when clearing, earthmoving, and grading occur. Table 4.4-4 shows expected maximum daily construction emissions for the project without the incorporation of mitigation. According to Table 4.4-4, PM₁₀ emissions generated by the project would exceed the YSAQMD thresholds, while ROG and NO_x emissions would not exceed the YSAQMD thresholds. In addition, particulate matter emitted during construction activities would occur near existing residences (thereby causing a nuisance). Residences currently exist north, west, and south of the project site. The residences to the south are separated from the project site by a roadway; however, the project site is immediately adjacent to the backyards of the residences located north and west of the project site.

The majority of the PM₁₀ from construction would be soil particles, while a small fraction of the PM₁₀ would be from diesel exhaust (during construction, various diesel-powered vehicles and equipment would be used on the site). Diesel exhaust particulate is a pollutant that has come under increased scrutiny in recent years.

Table 4.4-4 Maximum Construction Emissions		
Pollutant	Project Emissions (Unmitigated)	YSAQMD Significance Threshold
ROG	0.19 (tons/year)	10.0 (tons/year)
NO_x	1.19 (tons/year)	10.0 (tons/year)
PM₁₀	259.50 (lbs/day)	80.0 (lbs/day)
<i>Source: URBEMIS 2007. (See Appendix D)</i>		

In 1998, CARB identified particulate matter from diesel-fueled engines as a toxic air contaminant (TAC). CARB has completed a risk management process that identified potential cancer risks for a range of activities using diesel-fueled engines.⁵ High volume

freeways, stationary diesel engines and facilities attracting heavy and constant diesel vehicle traffic (distribution centers, truckstops) were identified as having the highest associated risk. In terms of the project, the diesel-powered vehicles and equipment used during the construction of the project would generate TACs. Health risks from TACs are a function of both concentration and duration of exposure. The YSAQMD does not have permitting authority over mobile sources of TACs; therefore, a standard of significance has not been established for mobile source emissions of TACs.

Construction emissions are temporary, affecting an area for a period of days or perhaps weeks. However, as the proposed project would exceed the standard of significance established for PM₁₀ emissions a *significant* impact could occur.

Mitigation Measure(s)

Implementation of the following Mitigation Measure based on the dust control measures recommended in the YSAQMD *Air Quality Handbook* would reduce emissions of PM₁₀ to approximately 39.82 lbs/day. Therefore, with implementation of Mitigation Measure 4.4-1, the project would result in a *less-than-significant* impact from construction-related fugitive dust.

4.4-1 *Prior to commencement of any ground disturbing activities, the applicant shall submit a dust control plan to the City Engineer and the Yolo-Solano Air Quality Management District. This plan shall ensure that adequate dust controls are implemented during all phases of project construction. The dust control best management practices (BMPs) may include but are not necessarily limited to the following:*

- *Apply nontoxic soil stabilizers according to manufacturer's specifications to all inactive construction areas (previously graded areas inactive for ten days or more);*
- *Reestablish ground cover in disturbed areas quickly;*
- *Water recently disturbed construction areas (ground disturbed within 10 days) at least twice daily to avoid visible dust plumes;*
- *Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites;*
- *Enclose, cover, water twice daily or apply non-toxic soil binders to exposed stockpiles (dirt, sand, etc.);*
- *Enforce a speed limit of 15 MPH for equipment and vehicles operated in unpaved areas;*
- *All vehicles hauling dirt, sand, soil, or other loose materials shall be covered or should maintain at least two feet of freeboard; and*
- *Sweep streets at the end of the day if visible soil material is carried onto adjacent public paved roads.*

4.4-2 New air pollutant emissions within the air basin resulting from operation of the proposed project.

The construction of up to 191 new residential units in the project vicinity would increase the number of vehicle trips on surrounding roadways. Furthermore, project traffic emissions would not only have an effect on local air quality, but also air quality outside the project vicinity. Trips to and from the project site would result in air pollutant emissions within the air basin. In addition, project residences would also result in an increased number of area pollutant sources, such as natural gas combustion, fireplace/woodstove emissions and maintenance equipment.

The project location and amenities would serve to reduce project emissions. In particular, the proposed project is located near several bus stops, which would provide pedestrian access to transit, thereby reducing vehicle trips. In addition, Class I bike paths are located adjacent to the south and east borders of the project site. The proposed project would also include bicycle and pedestrian facilities such as bicycle lanes and pedestrian walkways. These are all factors that would reduce air pollutants because these features allow capturing of trips within the project site, and promotion of non-automotive travel.

As shown in Table 4.4-5, below, the proposed project would not exceed any of the YSAQMD thresholds of significance. Furthermore, it should be noted that the numbers are considered to be conservative as the trip generation rates provided by the traffic study were based on buildout of a single-family development, and the proposed project includes multi-family residences which generate fewer vehicle trips. Therefore, project regional air quality impacts would be considered *less-than-significant*.

Mitigation Measure(s)
None required.

Table 4.4-5 Unmitigated Project Emissions			
Proposed Project Emission Sources	ROG	NO_x	PM₁₀
Area Sources	2.82	0.58	25.73
Vehicles	4.07	5.80	30.39
Total	6.89	6.38	56.12
YSAQMD Threshold of Significance	10 (tons/year)	10 (tons/year)	80.0 (lbs/day)
<i>Source: URBEMIS 2007.</i>			

4.4-3 Increased carbon monoxide concentrations at project-area intersections.

Concentrations of CO are related to the levels of traffic and congestion along streets and at intersections. Future concentrations of CO are determined by two opposing factors. The overall rate of emission of CO for the vehicle fleet has been, and is expected to continue, decreasing as older, more polluting vehicles are retired and replaced with newer, cleaner

vehicles. At the same time increased traffic volumes, deterioration in average speed and increased delay (and resulting idling emissions) all act to increase emissions within and near intersections. Therefore, because of better emissions controls the study intersections are expected to have similar or lower concentrations in 2015 compared to existing concentrations, despite increased traffic volumes.

The concentrations in Table 4.4-6 are for worst-case locations under theoretical worst-case meteorological conditions. Carbon monoxide concentrations at greater distances from the intersections listed in Table 4.4-6 would be substantially lower than the concentrations at the intersections. Table 4.4-6 shows that existing concentrations meet State and federal standards. The development of the proposed project would increase CO concentrations; however, the concentrations would remain below the most stringent air quality standards. Therefore, project impacts on local carbon monoxide concentrations would be *less-than-significant*.

Table 4.4-6 Estimated Worst-Case Carbon Monoxide Concentrations (Parts Per Million)						
Intersection	Existing (2008)		Existing + Project (2008)		Cumulative + Project (2015)	
	1-Hour	8-Hour	1-Hour	8-Hour	1-Hour	8-Hour
					1-Hour	8-Hour
Covell Blvd./ Pole Line Road	3.1	2.2	3.1	2.2	2.6	1.8
Mace Blvd./ Second Street	2.9	2.0	3.0	2.1	2.9	2.0
Standard of Significance						
State	20.0	9.0	20.0	9.0	20.0	9.0
Federal	35.0	9.0	35.0	9.0	35.0	9.0

Source: Don Ballanti, 2007.

Mitigation Measure(s)
None required.

Cumulative Impacts and Mitigation Measures

4.4-4 Long-term air quality impacts from the proposed project in combination with existing and future developments in the Davis area.

The cumulative air quality impacts of development projects are primarily related to automobile traffic, as well as area sources of pollutants, such as fuel combustion for heating, maintenance equipment emissions, certain consumer products, evaporation of solvents, etc. The proposed project's cumulative emissions would be the same as the project-specific impacts as the project would not add uses or increase density in the future. The possibility exists that project-specific emissions would decrease over time as stricter environmental controls reduce tailpipe and consumer product emissions. Emissions from development projects have several cumulative impacts. In particular,

growth in emissions will delay attainment of the ambient air quality standards for which the region is non-attainment (ozone, particulate matter) and contribute to visibility reduction.

Because ozone, particulate matter and some constituents of ROG have been shown to be correlated with adverse health effects, cumulative emissions increases in the region would have potential cumulative health effects. Studies have shown that children who participated in several sports and lived in communities with high ozone levels were more likely to develop asthma than active children living in areas with less ozone pollution. Other studies have found a positive association between some volatile organic compounds and symptoms in asthmatic children. A large body of evidence has shown significant associations between measured levels of particulate matter outdoors and worsening of both asthma symptoms and acute and chronic bronchitis. However, predicting increases in severity of disease, hospital visits or deaths from respiratory diseases such as asthma, bronchitis or lung cancer is not possible because of the following reasons:

- Estimating long-term concentrations of pollutants such as ozone, the TAC components of ROG, or particulate matter (PM₁₀ and PM_{2.5}) resulting from an indirect source such as the project is not currently possible; and
- Dose-response relationships are lacking that would allow a quantitative analysis of health effects.

In recognition of the incremental health effects associated with these pollutants, the YSAQMD has established thresholds for each pollutant, which indicate the limits of acceptability in terms of effect on health. Based on the YSAQMD standards of significance the proposed project would result in a significant cumulative impact if the project would result in an individually significant impact to air quality. As indicated in Impact 4.4-3, carbon monoxide concentrations, the proposed project would not result in a potentially significant impact because it would not generate emissions in excess of YSAQMD thresholds for operational emissions. In addition, the proposed project would ultimately result in a less-than-significant impact to air quality as a result of construction emissions with implementation of Mitigation Measure 4.4-1. Therefore, the project's incremental contribution to the long-term cumulative air quality impact would not be cumulatively considerable, resulting in a *less-than-significant* cumulative air quality impact.

Mitigation Measure(s)

None required.

Endnotes

¹ City of Davis General Plan, May 2001.

² Yolo-Solano Air Quality Management District, *Air Quality Handbook*, May 1996.

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- ³ Yolo-Solano Air Quality Management District, Handbook for Assessing and Mitigating Air Quality Impacts, July 11, 2007.
- ⁴ Garza, Vincente J.; Peter Granly; Daniel Sperling, Transportation Project-Level Carbon Monoxide Protocol, Institute of Transportation Studies, University of California, Davis; Report UCD-ITS-RR-97-21, December 1997.
- ⁵ California Air Resources Board, *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, October 2000.