AIR QUALITY IMPACT ANALYSIS FOR THE PROPOSED SECOND STREET CROSSING PROJECT, CITY OF DAVIS

Prepared for:

Raney Planning & Management
1401 Halyard Drive, Suite 120
West Sacramento, CA. 95691

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INTRODUCTION

This report describes the impacts of the proposed project on local and regional air quality. The section was prepared using thresholds of significance recommended by the Yolo-Solano Air Quality Management. This report describes existing air quality; construction-related impacts, 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.

EXISTING CONDITIONS

Air Pollution Climatology

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's 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

Criteria Pollutants

Both the U. S. Environmental Protection Agency and the California Air Resources Board have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants which represent safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. The federal and California state ambient air quality standards are summarized in Table 1.

The federal and state ambient standards were developed independently with differing purposes and methods, although both processes attempted to avoid health-related effects. As a result, the federal and state standards differ in some cases. In general, the California state standards are more stringent. This is particularly true for ozone and particulate matter (PM_{10} and $PM_{2.5}$)

The U.S. Environmental Protection Agency established new national air quality standards for ground-level ozone and for fine particulate matter in 1997. The existing 1-hour ozone

Table 1: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standard	State Standard
Ozone	1-Hour 8-Hour	0.12 PPM 0.08 PPM	0.09 PPM 0.07 PPM
Carbon Monoxide	8-Hour 1-Hour	9.0 PPM 35.0 PPM	9.0 PPM 20.0 PPM
Nitrogen Dioxide	Annual Average 1-Hour	0.05 PPM --	-- 0.25 PPM
Sulfur Dioxide	Annual Average 24-Hour 1-Hour	0.03 PPM 0.14 PPM --	-- 0.04 PPM 0.25 PPM
PM_{10}	Annual Average 24-Hour	50 µg/m^3 150 µg/m^3	20 µg/m^3 50 µg/m^3
$PM_{2.5}$	Annual 24-Hour	15 µg/m^3 65 µg/m^3	12 µg/m^3 --
Lead	Calendar Quarter 30 Day Average	1.5 µg/m^3 --	-- 1.5 µg/m^3
Sulfates	24 Hour	25 µg/m^3	--
Hydrogen Sulfide	1-Hour	0.03 PPM	--
Vinyl Chloride	24-Hour	0.01 PPM	--

PPM = Parts per Million
µg/m^3 = Micrograms per Cubic Meter
Source: California Air Resources Board, Ambient Air Quality Standards (5/6/05) http://www.arb.ca.gov.aqs/aaqs2.pdf

standard of 0.12 PPM microns or less) is to be phased out and replaced by an 8-hour standard of 0.08 PPM. Implementation of the 8-hour standard was delayed by litigation, but was determined to be valid and enforceable by the U. S. Supreme Court in a decision issued in February of 2001.

The State of California regularly reviews scientific literature regarding the health effects and exposure to PM and other pollutants. On May 3, 2002, the California Air Resources Board (CARB) staff recommended lowering the level of the annual standard for PM_{10} and establishing a new annual standard for $PM_{2.5}$ (particulate matter 2.5 micrometers in diameter and smaller). The new standards became effective on July 5, 2003.

On April 28, 2005 the California Air Resources Board established a new 8-hour standard for ozone (0.07 PPM), expected to become effective in early 2006.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are another group of pollutants of concern. There are many different types of TACs, 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 forty different toxic air contaminants. The most important, in terms of health risk, 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.

Health Effects of Pollutants

The primary air quality problems in the Sacramento Valley Air Basin are ozone and particulate matter. Carbon monoxide has been a problem in the past within urban Sacramento. The following is a discussion of the health effects of these important pollutants.

Ozone

Ozone is produced by chemical reactions, involving nitrogen oxides (NOx) and reactive organic gases (ROG) that are triggered by sunlight. Nitrogen oxides are created during combustion of fuels, while reactive organic gases are emitted during combustion and evaporation of organic solvents. Since ozone is not directly emitted to the atmosphere, but is formed as a result of photochemical reactions, it is considered a secondary pollutant. In the Sacramento Valley Air Basin ozone is a seasonal problem, occurring roughly from April through October.

Ozone is a strong irritant that attacks the respiratory system, leading to the damage of lung tissue. Asthma, bronchitis and other respiratory ailments as well as cardiovascular diseases are aggravated by exposure to ozone. A healthy person exposed to high concentrations may become nauseated or dizzy, may develop headache or cough, or may experience a burning sensation in the chest.

Research has shown that exposure to ozone damages the alveoli (the individual air sacs in the lung where the exchange of oxygen and carbon dioxide between the air and blood takes place). Research has shown that ozone also damages vegetation.

Suspended Particulate Matter

Suspended particulate matter (PM) is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, and dust. "Inhalable" PM consists of particles less than 10 microns in diameter, and is defined as "suspended particulate matter" or PM_{10}. Fine particles are less than 2.5 microns in diameter ($PM_{2.5}$). $PM_{2.5}$, by definition, is included in PM_{10}.

The major components of suspended particulate are dust particles, nitrates, and sulfates. A portion of suspended particulate is directly emitted to the atmosphere as a by-product of combustion, wind erosion of soil and unpaved road travel. Small particles are also created in the atmosphere through chemical reactions.

Particles greater than 10 microns in diameter can cause irritation in the nose, throat, and bronchial tubes. Natural mechanisms remove much 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.

Carbon Monoxide

Carbon monoxide is a local pollutant in that high concentrations occur only very near the source. The major source of carbon monoxide, a colorless, odorless, poisonous gas, is automobile traffic. Elevated concentrations, therefore, are usually only found near areas of high traffic volumes.

Carbon monoxide's health effects are related to its affinity for hemoglobin in the blood. At high concentrations, carbon monoxide reduces the amount of oxygen in the blood, causing heart difficulties in people with chronic diseases, reduced lung capacity and impaired mental abilities.

Carbon monoxide concentrations are highly seasonal, with the highest concentrations occurring in the winter. This is partly due to the fact that automobiles create more carbon monoxide in colder weather and partly due to the very stable atmospheric conditions that exist on cold winter evenings when winds are calm. Concentrations typically are highest during stagnant air periods within the period November through January.

Regulatory Context

Federal Regulations

Yolo County is included in the Greater Sacramento Ozone non-attainment area as delineated by the U. S. Environmental Protection Agency.

The Federal Clean Air Act Amendments (FCAAA) of 1990 set deadlines for attaining the ozone standard. The Sacramento Area was classified as a “serious” non-attainment area and given a date of 1999 by which to achieve attainment. Because achieving attainment by this date was later found to be infeasible, the region was “bumped up” to “severe” classification and an attainment date of 2005 was designated. The Clean Air Act Amendments also set specific planning requirements to ensure that the attainment goal would be met. In 1994, the Air Resources Board, in cooperation with the air districts of the Sacramento non-attainment area, fulfilled one of these requirements by preparing the 1994 Sacramento Area Regional Ozone Attainment Plan. The plan identified a detailed comprehensive strategy for reducing emissions to the level needed for attainment and showed how the region would make expeditious progress toward meeting this goal.

On April 15, 2004 the Environmental Protection Agency (EPA) designated the Greater Sacramento Ozone non-attainment area as a "serious" non-attainment area for the federal 8-hour ozone standard. The 8-hour ozone standard, 0.08 parts per million (ppm), averaged over eight hours, replaces the 1-hour standard that has been in place since 1979. The region has been given an attainment date of June, 2013.

State Regulations

The CARB, California's state 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 by state standards and vehicle emission standards, by conducting research activities, and through its planning and coordinating activities.

Local Regulations

The project site is in Yolo County, under the jurisdiction of the Yolo-Solano Air Quality Management District (YSAQMD). The YSAQMD is responsible for implementing emissions standards and other requirements of federal and state laws.

Yolo-Solano Air Quality Management District developed the 1992 Yolo-Solano Air Quality Attainment Plan. The plan 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, by encouraging compliance through positive influence and behavior, and through public education in both the public and private sectors. 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.[1]

Current Air Quality

The California Air Resources Board operates an air quality monitoring site within the UC Davis Campus that monitors the gaseous pollutants ozone, nitrogen dioxide and carbon monoxide. The closest particulate monitoring site is operated by the Yolo-Solano AQMD operates a monitoring site in Woodland on Gibson Street. The Woodland monitoring site measures several gaseous pollutants as well as PM_{10}. A three-year summary of air quality data from these two monitoring sites is shown in Table 2. Table 2 shows that the federal/state standards for ozone, PM_{10} and $PM_{2.5}$ are sometimes exceeded in the project area.

[1] Yolo-Solano Air Quality Management District, Air Quality Handbook, May 1996 (Revised 2002)

Table 2: Ambient Air Quality at Davis and Woodland

Pollutant/Standard	Year	Days Exceeding Standard at: Davis	Woodland
Ozone/State 1-Hour	2002	3	9
	2003	2	3
	2004	0	0
Ozone/Fed. 1-Hour	2002	0	0
	2003	0	0
	2004	0	0
Ozone/Fed. 8-Hour	2002	2	4
	2003	0	0
	2004	0	0
Carbon Monoxide State/Fed. 8-Hour	2002	0	-
	2003	0	-
	2004	0	-
Nitrogen Dioxide State 1- Hour	2002	0	-
	2003	0	-
	2004	0	-
PM10/State 24-Hour	2002	-	6
	2003	-	2
	2004	-	2
PM_{10}/Federal 24-Hour	2002	-	0
	2003	-	0
	2004	-	0
$PM_{2.5}$/Federal 24-Hour	2002	-	1
	2003	-	0
	2004	-	0

Source: Air Resources Board, Aerometric Data Analysis and Management (ADAM), 2005. (http: //www.arb.ca.gov./adam/cgi-bin/adamtop/d2wstart)

IMPACTS AND MITIGATIONS

Method of Analysis

Construction

The URBEMIS-2002 program[2] was applied to the project to estimate the maximum construction emissions from site grading, equipment exhaust, construction worker vehicle trips and other construction activities. Construction was assumed to be completed over a 12-month period. The types and amounts of equipment to be utilized during the different phases of construction were based on published guidance.[3] The URBEMIS-2002 model output is included in the Appendix.

Operation

Estimates of regional emissions generated by project traffic and area sources were made using a program called URBEMIS-2002. URBEMIS-2002 is a program that estimates the emissions that result from various land use development projects. Inputs to the URBEMIS-2002 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 MPH.

The URBEMIS-2002 program was run to calculate daily operational emissions during the summer months with an ambient temperature of 85 degrees Fahrenheit. Analysis year was 2006. The URBEMIS-2002 output is included in the Appendix

Local Carbon Monoxide Concentrations

A screening procedure for estimating carbon monoxide concentrations was applied to two signalized intersections affected by project traffic under existing and future traffic conditions. Concentrations at signalized intersection would be expected to be the highest carbon monoxide concentrations due to the deceleration, idling and acceleration of vehicles at these locations. Two intersections were selected for analysis as signalized intersections where the Level of Service (LOS) is forecast to be D or worse under cumulative conditions. These locations are worst-case locations in that they should be the location of the highest concentrations of carbon monoxide.

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[2] Jones and Stokes Associates, Software User's Guide: URBEMIS2002 for Windows with Enhanced Construction Module, Version 8.7, 2005.

[3] Sacramento Metropolitan Air Quality Management District, Guide to Air Quality Assessment in Sacramento County, July 2004.

A screening-level form of the CALINE-4 program was used to predict concentrations.[4] Normalized concentrations for each roadway size (2 lanes, 4 lanes, etc.) are adjusted for the two-way traffic volume and emission factor. Calculations were made for a receptor at a corner of the intersection, located at the curb. Emission factors were derived from the California Air Resources Board EMFAC7-2002 computer program based on a 2006 and 2010 Yolo County vehicle mix.

The screening-level form of the CALINE-4 program was developed for Bay Area (coastal valley) meteorology. The assumed worst-case assumed wind speed in the model is 1.0 meters per second. To adjust for the lighter winds typically assumed for the Sacramento Valley (interior valley meteorology), the normalized concentrations were doubled based on the assumption of a 0.5 meter per second worst-case wind speed.

The screening procedure provides a worst-case estimate of concentrations of carbon monoxide generated by vehicles impacting an intersection. Concentrations were calculated at the corner of the intersection, which would be expected to be the location of the highest carbon monoxide concentrations due to the deceleration, idling and acceleration of vehicles at these locations. Concentrations were estimated for a distance of 7 meters (20 feet) from the roadway edge.

The other contribution to the total concentration is the background level attributed to more distant traffic. The background concentration was estimated using the highest concentration of carbon monoxide measured at the UC Davis monitoring site during the period 2002-2004.

Significance Criteria

The Yolo Solano Air Quality Management District has established the following quantitative standards of significance:[5]

- The District considers increases in emissions during construction or operation of 82 pounds per day of ozone precursors (ROG or NO_x) or 150 pounds per day of PM_{10} as significant.
- A predicted violation of any California Ambient Air Quality Standard (CAAQS) during both construction or operation of the project would be considered a significant impact.
- A project is considered to contribute substantially to an existing or project violation of the CAAQS if it emits pollutants at a level equal to or greater than five percent of the CAAQS.

The Yolo Solano Air Quality Management District has also established the following

[4] Bay Area Air Quality Management District, BAAQMD CEQA Guidelines, 1996 (Revised 1999).

[5] Yolo-Solano Air Quality Management District, Air Quality Handbook, May 1996 (Revised 2002)

qualitative standards of significance:

- Potential to create or be near an objectionable odor.
- Potential for accidental release of air toxic emissions or acutely hazardous materials.
- Potential to emit an air toxic contaminant regulated by the District or on a federal or state air toxic list.
- Burning of hazardous, medical, or municipal waste as waste-to-energy facilities.
- Potential to produce a substantial amount of wastewater or potential for toxic discharge.
- Sensitive receptors (e.g., schools, households, etc.) located with a quarter mile of air toxic emissions or near CO hot spots.
- Carcinogenic or air toxic contaminant emissions that exceed or contribute to an exceedance of the District's action level for cancer, chronic and acute risks.

The YSAQMD has also developed significance criteria for cumulative impacts. Development projects are considered cumulatively significant if:

- The project requires a change in the existing land use designation (i.e., general plan amendment), and
- Projected emissions (ROG, NO_x or PM_{10}) of the proposed project are greater than the emissions anticipated for the site if developed under the existing land use designation.

Project Impacts and Mitigation Measures

Impact 1 Construction activities such as excavation and grading operations, construction vehicle traffic, and wind blowing over exposed earth would generate exhaust emissions and fugitive particulate matter emissions that would affect local and regional air quality during construction of the project. This impact would be **significant**.

Table 3 shows expected maximum daily construction emissions for the project for the various phases of construction. Maximum emissions occur during the first phases of construction when clearing, earthmoving and grading occur. These emissions would not exceed the YSAQMD's significance threshold for ROG ,NO_x or PM_{10}. However, particulate matter emissions during construction would have potential to create a local nuisance whenever construction activities occur near existing residences. Therefore, PM_{10} emissions would be considered significant even though the YSAMQD threshold would not be exceeded.

Mitigation 1: Implement the following dust control mitigation measures during all construction phases:

Table 3: Maximum Construction Emissions (Pounds Per Day)

Construction Phase	**ROG**	**NOx**	**PM_{10}**
Site Grading	8.8	58.9	50.1
Building Construction	8.8	58.7	2.4
Paving	9.4	62.2	2.6
Yolo-Solano AQMD Thresholds	82.0	82.0	150.0

- 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 active construction sites at least three times 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 on unpaved areas.
- All vehicles hauling dirt, sand, soil, or other loose materials should be covered or should maintain at least two feet of freeboard.
- Sweep streets at the end of the day if visible soil material is carried onto adjacent public paved roads.

According to the YSAQMD *Air Quality Handbook* implementation of the above measures would be about 88.6% efficient in controlling PM_{10} emissions. The above mitigation measure reduces would reduce the PM nuisance potential to a level that is **less-than-significant.**

Impact 2: Construction TAC Emissions. During construction various diesel-powered vehicles and equipment would be in use on the site. Exposure of sensitive receptors to diesel particulate would represent a less-than-significant impact.

In 1998 the California Air Resources Board 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.[6] High volume freeways, stationary diesel engines and facilities attracting heavy and constant diesel vehicle traffic (distribution centers, truckstop) were identified as having the highest associated risk.

Health risks from Toxic Air Contaminants are function of both concentration and duration of exposure. Unlike the above types of sources, construction diesel emissions are temporary, affecting an area for a period of days or perhaps weeks. Additionally, construction related sources are mobile and transient in nature, and the bulk of the emission occurs within the project site at a substantial distance from nearby receptors. Because of its short duration, health risks form construction emissions of diesel particulate would be a less-than-significant impact.

Mitigation Measure 2: None required.

[6] California Air Resources Board, Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles, October 2000.

Impact 3: The project would change traffic volumes and congestion levels, changing carbon monoxide concentrations at nearby intersections. This impact would be less-than-significant.

On the local scale the pollutant of greatest interest is carbon monoxide. Concentrations of this pollutant are related to the levels of traffic and congestion along streets and at intersections. Predicted worst-case carbon monoxide concentration for existing conditions and future conditions with the project are shown in Table 4.

Table 4 shows that concentrations with existing and approved traffic meet the 1-hour and 8-hour standards. Traffic from the proposed project would increase concentrations by up to 1.1 Parts Per Million (PPM), but concentrations would remain below the most stringent state or federal standards. Concentrations with project and cumulative traffic growth in 2010 would also not exceed the state/federal ambient air quality standards, and would be below current levels due to anticipated reductions in per-mile emission rates as newer, cleaner cars replace older, more polluting cars. Project impacts on local carbon monoxide concentrations and nearby sensitive receptors would be less than significant.

Mitigation Measure 3: None required.

Impact 4: Trips to and from the project and area sources associated with the project would result in new air pollutant emissions within the air basin. This would be a **less-than-significant impact**.

Project traffic emissions would have an effect on air quality outside the project vicinity. Trips to and from the project would result in air pollutant emissions within the air basin. The project would also create some area source emissions, primarily through the combustion of natural gas combustion for water and space heating. The daily increase in regional emissions from vehicles and area sources are shown in Table 5 for Reactive Organic Gases and Nitrogen Oxides (the two precursors of ozone) and PM_{10}. Table 5 shows that proposed project emissions would not exceed the YSAQMD thresholds of significance for ozone precursors or PM_{10}, so project regional air quality impacts would be less-than-significant.

Mitigation Measure 4: None required.

Impact 5: The proposed project is would cumulatively impact regional air quality. This impact is **significant**.

The YSAQMD has developed significance criteria for cumulative impacts (YSAMQD, 1996). Development projects are considered cumulatively significant if:

Table 4: Worst-Case Carbon Monoxide Concentration, in Parts Per Million

Intersection	**Existing (2006)**		**Existing + Project (2006)**		**Cumulative + Project (2010)**	
	1-Hr.	**8-Hr.**	**1-Hr.**	**8-Hr.**	**1-Hr.**	**8-Hr.**
Second Street/ Mace Blvd.	9.6	6.4	10.7	7.2	9.8	6.6
Mace Blvd/ Chiles Road	8.1	5.4	8.2	5.5	7.9	5.3
Most Stringent Standard	20.0	9.0	20.0	9.0	20.0	9.0

Table 5: Project Regional Emissions in Pounds Per Day

	ROG	**NO_x**	**PM_{10}**
Proposed Project: Area Sources Vehicles Total	 2.7 48.5 51.2	 1.6 49.4 51.0	 0.0 37.4 37.4
YSAQMD Threshold of Significance	82.0	82.0	150.0

- The project requires a change in the existing land use designation (i.e., general plan amendment), and
- Projected emissions (ROG, NO_x or PM_{10}) of the proposed project are greater than the emissions anticipated for the site if developed under the existing land use designation.

The site is currently zone BP (Business Park), GC (General Commercial) and P/SP (Public/Semi-Public). The project would re-designate entire site as GR (General Retail). Table 6 below compares regional emissions (as estimated by the URBEMIS-2002 program) for the proposed project and two development scenarios under existing land use designations. Scenario A assumes development of the site as a commercial gym, a full service restaurant, hotel, service station and office/light industrial park. Scenario B was similar to Scenario A, but replaces the hotel and restaurant uses with two automobile dealerships. Scenario A would have the higher emissions.

Table 6 shows that regional emissions for the new zoning designation would be higher than Scenario A or for ROG, NOx and PM_{10}. The project would therefore have a significant cumulative air quality impact with respect to these pollutants.

Mitigation Measure 5: The project should implement the following mitigation strategies:

- Provide preferential parking for carpool/vanpool vehicles.
- Provide showers and lockers for employees bicycling or walking to work.
- Provide secure and conveniently located bicycle parking and storage for workers and patrons.
- Provide preferential parking for Low Emission Vehicles (LEVs).
- Specialty equipment (utility carts, forklifts, etc.) should be electrically, CNG or propane powered.
- Use electric lawn and garden equipment for landscaping.
- Utilize reflective (or high albedo) and emissive roofs and light colored construction materials to increase the reflectivity of roads, driveways, and other paved surfaces, and include shade trees near buildings to directly shield them from the sun's rays and reduce local air temperature and cooling energy demand.
- Use energy-efficient lighting and process systems, such as low NOx water heaters, furnaces and boiler units.

The above mitigation program would be expected to reduce emissions by 5-10%. Assuming an average reduction within this range (7.5%), the above measures would not reduce project impact to below that associated with development under the current zoning designation. Because all feasible mitigation measures have been applied, the project cumulative air quality impact would be significant and unavoidable.

Impact 6: The project would generate additional deliveries by diesel trucks and would

Table 6: Comparison of Project Regional Emissions with Development under Existing Zoning Designations, in Pounds Per Day

	ROG	**NO_x**	**PM_{10}**
Proposed Project	56.2	56.2	41.3
Scenario A	50.0	47.6	34.3
Scenario B	41.0	37.8	27.5

create a new loading dock at the southwest corner of the store which would increase the exposure to diesel particulate at residences located north of the project site. This would be a less-than-significant impact.

The project would result in additional trucks accessing the receiving docks at southwest corner of the store. The closest residences would be located about 500 feet north of the truck docks. In addition, these closest homes are not downwind of the receiving docks under normal prevailing west winds.

In 1998 the California Air Resources Board 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. [7] The greatest diesel particulate risks from new development are generally associated with stationary diesel engines and locations where diesel engines are allowed to idle for extended periods. Where air districts have developed guidelines for diesel risk assessments for CEQA documents, the identified situations requiring analysis are locations with extended truck idling (truck stops, warehouse/distribution centers, transit centers), ship hoteling at ports and train idling.[8]

Project diesel truck trip generation would be approximately 7-12 deliveries per week for tractor/trailer trucks and 8-10 deliveries per day by smaller local carrier and parcel delivery vans/trucks which may include diesel vehicles. Because of this relatively low level of truck activity, state laws forbidding extended truck idling, lack of receptors downwind of the loading dock area, and generally good ventilation characteristics of the project area during daylight hours when delivers occur, the project would not be expected to result in "carcinogenic or air toxic contaminant emissions that exceed or contribute to an exceedance of the District's action level for cancer, chronic and acute risks." Project impacts related to diesel truck exhaust are considered to be less-than-significant.

[7] California Air Resources Board, Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles, 2000.

[8] South Coast Air Quality Management District, Health Risk Assessment Guidelines for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis, 2003.

Appendix 1: URBEMIS-2002 Output

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\davistargetpro.urb
Project Name: Davis Target
Project Location: Lower Sacramento Valley Air Basin
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

*** 2006 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	8.76	58.71	71.99	0.00	50.06	2.56	47.50

*** 2007 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	9.38	62.24	69.27	0.00	2.63	2.58	0.05

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	2.94	1.78	3.05	0.00	0.01

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	53.24	54.38	537.38	0.42	41.27

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	56.19	56.15	540.42	0.42	41.28

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\davistargetpro.urb
Project Name: Davis Target
Project Location: Lower Sacramento Valley Air Basin
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: June, 2006
Construction Duration: 12
Total Land Use Area to be Developed: 19 acres
Maximum Acreage Disturbed Per Day: 4.75 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 183000

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	47.50	-	47.50
Off-Road Diesel	8.69	58.63	70.52	-	2.56	2.56	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.07	0.08	1.47	0.00	0.00	0.00	0.00
Maximum lbs/day	8.76	58.71	71.99	0.00	50.06	2.56	47.50
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	6.23	49.82	44.34	-	2.30	2.30	0.00
Bldg Const Worker Trips	0.38	0.23	4.87	0.00	0.05	0.00	0.05
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	6.61	50.05	49.21	0.00	2.36	2.31	0.05
Max lbs/day all phases	8.76	58.71	71.99	0.00	50.06	2.56	47.50
*** 2007***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							

Bldg Const Off-Road Diesel	6.23	47.51	46.08	-	2.12	2.12	0.00
Bldg Const Worker Trips	0.36	0.22	4.58	0.00	0.05	0.00	0.05
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.50	-	-	-	-	-	-
Asphalt Off-Road Diesel	2.24	13.28	19.01	-	0.42	0.42	0.00
Asphalt On-Road Diesel	0.08	1.30	0.29	0.00	0.03	0.03	0.00
Asphalt Worker Trips	0.01	0.01	0.13	0.00	0.00	0.00	0.00
Maximum lbs/day	9.38	62.24	69.27	0.00	2.63	2.58	0.05
Max lbs/day all phases	9.38	62.24	69.27	0.00	2.63	2.58	0.05

Phase 1 - Demolition Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Jun '06
Phase 2 Duration: 1.3 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Crawler Tractors	143	0.575	8.0
1	Off Highway Trucks	417	0.490	8.0
1	Scrapers	313	0.660	8.0

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Jul '06
Phase 3 Duration: 10.7 months
  Start Month/Year for SubPhase Building: Jul '06
  SubPhase Building Duration: 10.7 months
  Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
3	Other Equipment	190	0.620	8.0

  SubPhase Architectural Coatings Turned OFF
  Start Month/Year for SubPhase Asphalt: May '07
  SubPhase Asphalt Duration: 0.5 months
  Acres to be Paved: 2.1
  Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Pavers	132	0.590	8.0
1	Rollers	114	0.430	8.0

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.13	1.77	1.49	0	0.00
Hearth - No summer emissions					
Landscaping	0.25	0.01	1.56	0.00	0.01
Consumer Prdcts	0.00	-	-	-	-
Architectural Coatings	2.56	-	-	-	-
TOTALS(lbs/day,unmitigated)	2.94	1.78	3.05	0.00	0.01

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Target & Garden Center	39.67	39.93	395.00	0.31	30.05
Retail	13.58	14.44	142.38	0.11	11.22
TOTAL EMISSIONS (lbs/day)	53.24	54.38	537.38	0.42	41.27

Includes correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2006 Temperature (F): 85 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Acreage	Trip Rate	No. Units	Total Trips
Target & Garden Center		56.00 trips/1000 sq. ft.	137.00	7,672.00
Retail		55.00 trips/1000 sq. ft.	46.00	2,530.00
		Sum of Total Trips		10,202.00
		Total Vehicle Miles Traveled		27,115.54

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	55.60	2.20	97.30	0.50
Light Truck < 3,750 lbs	15.10	4.00	93.40	2.60
Light Truck 3,751- 5,750	15.90	1.90	96.90	1.20
Med Truck 5,751- 8,500	7.00	1.40	95.70	2.90
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	10.00	20.00	70.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.10	0.00	0.00	100.00
Motorcycle	1.70	82.40	17.60	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.20	0.00	91.70	8.30

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	9.7	3.8	4.6	7.8	4.5	4.5
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip Speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	27.3	21.2	51.5			
% of Trips - Commercial (by land use)						
Target & Garden Center				2.0	1.0	97.0
Retail				2.0	1.0	97.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
has been changed from off to on.

Changes made to the default values for Area

Changes made to the default values for Operations

The pass by trips option switch changed from off to on.
The operational emission year changed from 2005 to 2006.

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\davistargetscen1.urb
Project Name: Davis Target Scen. A
Project Location: Lower Sacramento Valley Air Basin
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	3.79	2.75	6.19	0.00	0.02

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	46.17	44.85	452.48	0.35	34.38

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	49.97	47.60	458.68	0.35	34.40

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\davistargetscen1.urb
Project Name: Davis Target Scen. A
Project Location: Lower Sacramento Valley Air Basin
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.20	2.73	2.29	0	0.00
Hearth - No summer emissions					
Landscaping	0.62	0.02	3.90	0.00	0.01
Consumer Prdcts	0.00	-	-	-	-
Architectural Coatings	2.97	-	-	-	-
TOTALS(lbs/day,unmitigated)	3.79	2.75	6.19	0.00	0.02

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Commercial Recreation (Gy	6.72	6.87	68.22	0.05	5.28
Full Service Restaurant	10.52	11.17	111.67	0.09	8.62
Hotel	7.11	6.23	61.65	0.05	4.95
Service Station/Car wash/	10.63	8.47	85.37	0.05	5.19
Office/Light Industrial B	11.19	12.11	125.58	0.11	10.36
TOTAL EMISSIONS (lbs/day)	46.17	44.85	452.48	0.35	34.38

Includes correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2006 Temperature (F): 85 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Acreage	Trip Rate	No. Units	Total Trips
Commercial Recreation (Gy	43.00	trips/1000 sq. ft.	28.75	1,236.25
Full Service Restaurant	127.15	trips/1000 sq. ft.	15.55	1,977.18
Hotel	8.17	trips/rooms	124.00	1,013.08
Service Station/Car wash/	152.84	trips/Pumps	16.00	2,445.44
Office/Light Industrial B	12.76	trips/1000 sq. ft.	104.74	1,336.48
		Sum of Total Trips		8,008.43
		Total Vehicle Miles Traveled		22,586.87

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	55.60	2.20	97.30	0.50
Light Truck < 3,750 lbs	15.10	4.00	93.40	2.60
Light Truck 3,751- 5,750	15.90	1.90	96.90	1.20
Med Truck 5,751- 8,500	7.00	1.40	95.70	2.90
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	10.00	20.00	70.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.10	0.00	0.00	100.00
Motorcycle	1.70	82.40	17.60	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.20	0.00	91.70	8.30

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	9.7	3.8	4.6	7.8	4.5	4.5
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip Speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	27.3	21.2	51.5			
% of Trips - Commercial (by land use)						
Commercial Recreation (Gym)				5.0	2.5	92.5
Full Service Restaurant				8.0	4.0	88.0
Hotel				5.0	2.5	92.5
Service Station/Car wash/Conv. Store				2.0	1.0	97.0

Office/Light Industrial Bus. park	48.0	24.0	28.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

Changes made to the default values for Operations

The pass by trips option switch changed from off to on.
The operational emission year changed from 2005 to 2006.

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\davistargetscb.urb
Project Name: Davis Target Scen. B
Project Location: Lower Sacramento Valley Air Basin
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	3.22	1.51	4.37	0.00	0.01

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	37.74	36.33	367.11	0.28	27.47

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	40.96	37.83	371.48	0.28	27.48

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\davistargetscb.urb
Project Name: Davis Target Scen. B
Project Location: Lower Sacramento Valley Air Basin
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.11	1.49	1.25	0	0.00
Hearth - No summer emissions					
Landscaping	0.50	0.02	3.12	0.00	0.01
Consumer Prdcts	0.00	-	-	-	-
Architectural Coatings	2.61	-	-	-	-
TOTALS(lbs/day,unmitigated)	3.22	1.51	4.37	0.00	0.01

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Commercial Recreation (Gy	6.72	6.87	68.22	0.05	5.28
New Car Dealerships	9.20	8.89	87.95	0.07	6.65
Service Station/Car wash/	10.63	8.47	85.37	0.05	5.19
Office/Light Industrial B	11.19	12.11	125.58	0.11	10.36
TOTAL EMISSIONS (lbs/day)	37.74	36.33	367.11	0.28	27.47

Includes correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2006 Temperature (F): 85 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Acreage	Trip Rate	No. Units	Total Trips
Commercial Recreation (Gy		43.00 trips/1000 sq. ft.	28.75	1,236.25
New Car Dealerships		33.34 trips/1000 sq. ft.	52.01	1,734.01
Service Station/Car wash/		152.84 trips/Pumps	16.00	2,445.44
Office/Light Industrial B		12.76 trips/1000 sq. ft.	104.74	1,336.48
		Sum of Total Trips		6,752.19
		Total Vehicle Miles Traveled		18,040.87

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	55.60	2.20	97.30	0.50
Light Truck < 3,750 lbs	15.10	4.00	93.40	2.60
Light Truck 3,751- 5,750	15.90	1.90	96.90	1.20
Med Truck 5,751- 8,500	7.00	1.40	95.70	2.90
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	10.00	20.00	70.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.10	0.00	0.00	100.00
Motorcycle	1.70	82.40	17.60	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.20	0.00	91.70	8.30

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	9.7	3.8	4.6	7.8	4.5	4.5
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip Speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	27.3	21.2	51.5			
% of Trips - Commercial (by land use)						
Commercial Recreation (Gym)				5.0	2.5	92.5
New Car Dealerships				2.0	1.0	97.0
Service Station/Car wash/Conv. Store				2.0	1.0	97.0
Office/Light Industrial Bus. park				48.0	24.0	28.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Area

Changes made to the default values for Operations

The pass by trips option switch changed from off to on.
The operational emission year changed from 2005 to 2006.