Chapter 5E. Air Quality

INTRODUCTION

To provide the context on which potential impacts can be assessed, this chapter describes existing air quality conditions of the planning area. Pollutants discussed in this chapter include carbon monoxide (CO), ozone, and particulate matter smaller than 10 microns in diameter (PM10). Air quality information for this chapter was provided by the Yolo-Solano Air Pollution Control District (APCD); the California Air Resources Board (ARB); and appropriate federal, state, and local regulations governing air emissions.

SETTING

Climate and Topography

The City's planning area is located in the southeast portion of Yolo County (County), along Interstate 80 (I-80). The County is at the southern end of the Sacramento Valley and the Sacramento Valley Air Basin (SVAB). The SVAB is bounded by the Coast and Diablo Ranges on the west and the Sierra Nevada range on the east. The Carquinez Strait is a sea-level gap between the Coast Ranges and the Diablo Range; the strait is 45 miles southwest of the planning area and the intervening terrain is flat. Primarily because of sea breezes through the Carquinez Strait, the prevailing wind direction in the planning area is from the south and southwest. During winter, the sea breezes diminish and winds from the north occur more frequently (Figure 5E-1). Table 4E-1 shows the average climatological data for the planning area.

Table 5E-1. Climatological Data for the City of Davis Planning Area

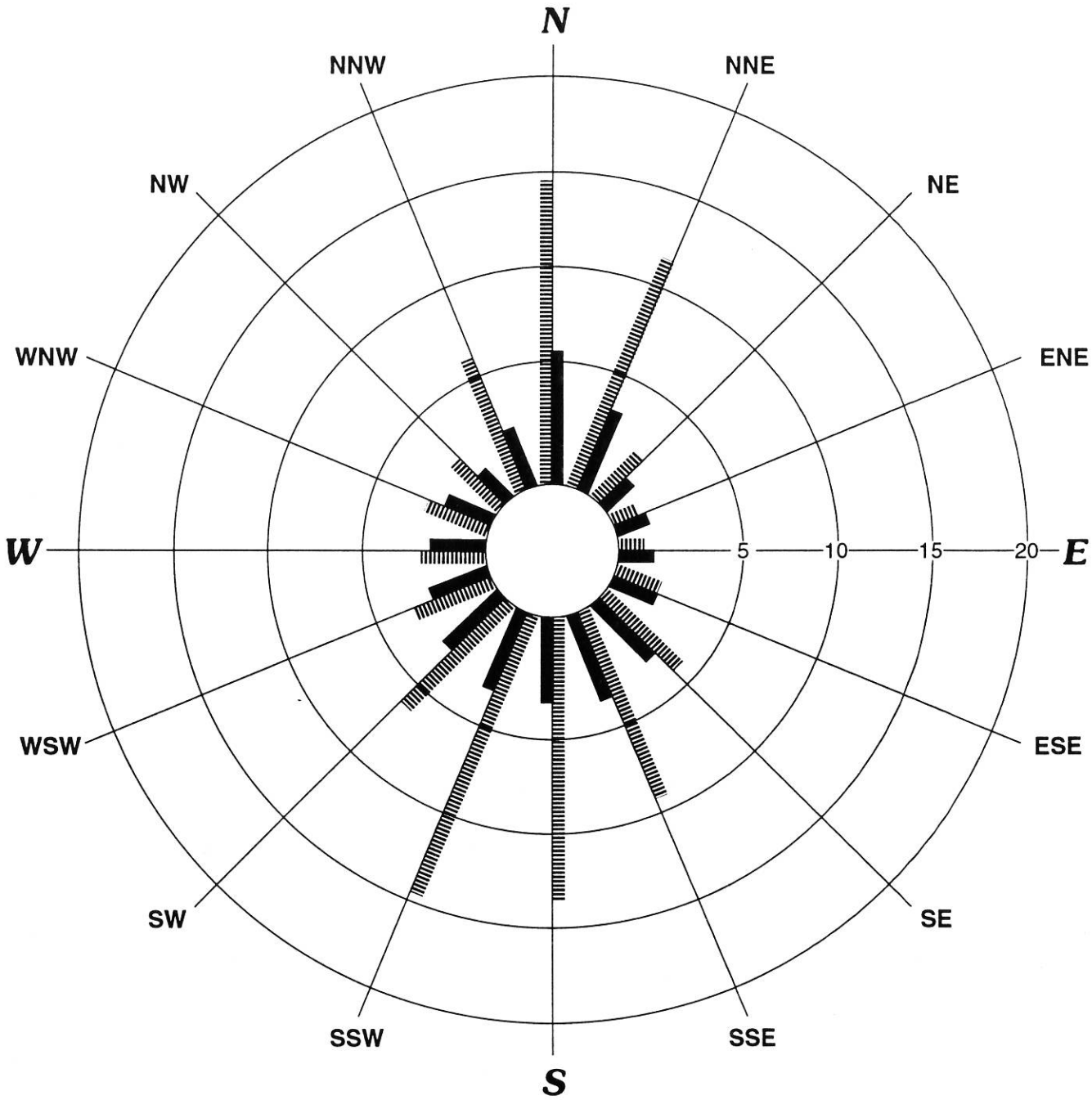
Month	Normal Temperatures (°F)			Average Precipitation (inches)
	Maximum	Minimum	Average	
January	53	38	45	3.6
February	60	41	51	2.8
March	64	43	54	2.4
April	71	46	59	1.3
May	80	50	65	0.4
June	87	55	72	0.1
July	93	58	76	T
August	91	58	75	0.1
September	87	56	72	0.3
October	78	50	64	1.0
November	63	43	53	2.4
December	53	38	46	2.8
Year	73	48	61	17.3

T = trace amounts (<.05 inch)
Source: National Oceanic and Atmospheric Administration 1999.

There are two types of inversions that occur in the area. The first occurs most often between late spring and early fall when a layer of warm air often covers another layer of cool air from the Delta and San Francisco Bay resulting in an inversion. In winter, inversions are formed when the sun heats the upper air layers, trapping air below that has been cooled by contact with the colder surface of the earth during the night. Although each inversion type predominates at certain times of the year, both types can occur at any time. Local topography produces many variations that can affect the inversion base and, thus, influence local air quality.

Air Quality Pollutants and Ambient Air Quality Standards

Both the State of California and the federal government have established ambient air quality standards for several different pollutants. The pollutants for which ambient standards have been set are known as criteria pollutants. For some pollutants, separate standards have been set for different sampling periods. Most ambient standards have been set to protect public health. Some noncriteria pollutants standards, however, have been based on other values, such as the protection of crops, the protection of materials, or the avoidance of nuisance conditions. The current state and federal standards are shown in Table 5E-2 and are discussed below.



LEGEND

Percent by direction

Mean wind speed (mph)

Based on 25,340 observations during 1979 to 1982.

Source: California Air Resources Board Aerometric Data Division 1984.

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Figure 5E-1
Windrose Depicting Average Wind Speed and Directional Frequency at Davis, California

Carbon Monoxide

CO levels are a public health concern because CO combines with hemoglobin and reduces the rate at which oxygen is transported in the bloodstream. Low concentrations of CO can significantly affect the amount of oxygen in the bloodstream because CO binds to hemoglobin 220-245 times more strongly than oxygen does. Both the cardiovascular system and the central nervous system can be affected when 25-40% of the hemoglobin in the blood stream is bound to CO rather than to oxygen. State and federal ambient air quality standards for CO have been set at levels intended to keep CO from combining with more than 15% of the blood's hemoglobin.

State and federal CO standards have been set for both 1-hour and 8-hour averaging times. As shown in Table 5E-2, the state 1-hour CO standard is 20 parts per million (ppm), and the federal 1-hour CO standard is 35 ppm. State and federal standards are both 9 ppm for an 8-hour averaging period. State CO standards are values that are not to be exceeded; whereas, federal CO standards are values that are not to be exceeded more than once per year.

Ozone

Ozone is not emitted directly into the air, but is formed by a photochemical reaction in the atmosphere. Ozone precursors, reactive organic gases (ROG), and oxides of nitrogen (NO_x) react in the atmosphere in the presence of sunlight to form ozone (referred to as a photochemical reaction). Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem. Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and causes substantial damage to vegetation and other materials.

State and federal standards for ozone have been set for a 1-hour averaging time. As shown in Table 5E-2 , the state 1-hour ozone standard is 0.09 ppm, which is not to be exceeded at any time. The federal 1-hour ozone standard is 0.12 ppm, which is not to be exceeded more than three times in any 3-year period. The U.S. Environmental Protection Agency (EPA) replaced the 1-hour ozone standard with an 8-hour standard of 0.08 ppm in 1997. However, areas classified as nonattainment for ozone must attain the 1-hour ozone standard. After an area has achieved attainment of the 1-hour standard, the 1-hour standard is no longer applicable, and the area must strive to meet the 8-hour ozone standard.

Particulate Matter

Health concerns associated with suspended particles focus on those particles small enough to reach the lungs when inhaled. Few particles larger than 10 microns in diameter reach the lungs. These smaller suspended particles or droplets, designated as PM10, can lodge in the lungs and contribute to respiratory problems. PM10 arises from such sources as road dust, diesel soot, combustion products, abrasion of tires and brakes, construction operations, and windstorms. It is also formed in the atmosphere from reactions of NO_x and sulfur dioxide (SO_2) with ammonia. Fine

particles pose a serious health hazard, alone or in combination with other pollutants. The smallest particles inhaled will be deposited in the lungs and can cause permanent lung damage. Fine particles can also have a damaging effect on health by interfering with the body's mechanism for clearing the respiratory tract or by acting as a carrier of an absorbed toxic substance.

Both the state and federal air quality standards for particulate matter apply to PM10. State and federal PM10 standards have been set for 24-hour and annual averaging times. As shown in Table 5E-2, the state 24-hour PM10 standard equals 50 micrograms per cubic meter ($\mu g/m^3$) and the federal 24-hour standard is 150 $\mu g/m^3$. The state annual PM10 standard is 30 $\mu g/m^3$ (annual geometric mean), whereas the federal annual PM10 standard equals 50 $\mu g/m^3$ (annual arithmetic mean). State and federal 24-hour PM10 standards may not be exceeded more than 1 day per year and both annual standards may not be exceeded.

Air Quality Monitoring Data

Monitoring data and emission inventory information for CO, ozone, and PM10 in the planning area are presented below. PM10 and ozone are discussed because the County is classified as a state and/or federal nonattainment area for these pollutants. Although the County is classified as a CO attainment area, the development proposed under the General Plan update would generate a substantial number of vehicle trips and associated CO emissions that could cause a violation of the CO standards. Therefore, CO is discussed as well.

Table 5E-2. Ambient Air Quality Standards Applicable in California

Pollutant	Symbol	Averaging Time	Standard (ppm)		Standard ($\mu g/m^3$)		Violation Criteria	
			California	National	California	National	California	National
Ozone	O3	1 hour	0.09	0.12	180	235	If exceeded	If exceeded on more than 3 days in 3 years
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
		1 hour	20	35	23,000	40,000		
(Lake Tahoe only)		8 hours	6	--	7,000	--		
Nitrogen dioxide	NO_2	Annual average	--	0.053	--	100	If exceeded	If exceeded
		1 hour	0.25	--	470	--		
Sulfur dioxide	SO_2	Annual average	--	0.03	--	80	If exceeded	If exceeded
		24 hours	0.05	0.14	131	365		If exceeded on more than 1 day per year
Hydrogen sulfide	H_2S	1 hour	0.03	--	42	--	If equaled or exceeded	
Vinyl chloride	C_2H_3Cl	24 hours	0.010	--	26	--	If equaled or exceeded	
Particulate matter 10 microns or less	PM_{10}	Annual geometric mean	--	--	30	--	If exceeded	
		Annual arithemetic mean	--	--	--	50		If exceeded
		24 hours	--	--	50	150		If exceeded on more than 1 day per year
Sulfate particulates	SO_4	24 hours	--	--	25	--	If equaled or exceeded	
Lead particles	Pb	Calendar quarter	--	--	--	1.5	If equaled or exceeded	If exceeded on more than 1 day per year
		30 days	--	--	1.5	--		

Notes: All standards are based on measurements at 25°C and 1 atmosphere pressure.
National standards shown are the primary (health effects) standards.
T[e] California 24-hour standard for SO_2 applies only when state 1-hour O_3 or 24-hour PM_{10} standards are being violated concurrently.

ppm = parts per million.
$\mu g/m^3$ = micrograms per cubic meter.

Ozone

The state and federal 1-hour ozone standards have been exceeded at monitoring stations in the County several times during the last 5 years (Table 5E-3). As a consequence of these and other recorded violations throughout the SVAB, the entire basin, including the County, has been designated an ozone nonattainment area. This indicates that the ozone levels in the SVAB are a potential threat to public health. Motor vehicles are the primary source of ozone precursors (e.g., ROG, NO_x) in the County. Secondary sources of ROG and NO_x in the County include solvent evaporation and other miscellaneous industrial processes (California Air Resources Board 1995).

Table 5E-3. Summary of Ozone Air Quality Monitoring Data for Yolo County

Monitoring Station	Averaging Period	Ozone Levels				
		1994	1995	1996	1997	1998
UC Davis campus	Peak-hour value [b]	0.10	0.11	0.12	0.10	0.12
	Days above standard [c]	4	7	12	1	9
Woodland - 40 Sutter[a]	Peak-hour value [b]	0.10	0.11	0.12	0.10	n/a
	Days above standard [c]	1	6	6	2	n/a

[a] Ozone monitoring discontinued after 1997.

[b] Peak-hour values given as parts per million.

[c] Days with a peak 1-hour value exceeding the state standard of 0.09 parts per million.

n/a Data not available

Source: California Air Resources Board 1999.

Particulate Matter

Table 5E-4 shows PM10 monitoring results for the County. Several violations of the state PM10 standards have resulted in the entire Sacramento Valley being classified as a PM10 nonattainment area. As Table 5E-4 shows, the 24-hour state PM10 standard has been violated in the County in each of the past 5 years; however, no violation of the federal 24-hour or annual PM10 standard has been recorded in the County during the same time frame. Primary PM10 sources in the County are construction related and include dust from demolition and paved and unpaved road surfaces. Secondary sources of PM10 in the County include farming operations and windblown dust (California Air Resources Board 1995)

Table 5E-4. Summary of PM10 Air Quality Monitoring Data for Yolo County

		PM10 Levels				
Monitoring Station	**Averaging Period**	**1994**	**1995**	**1996**	**1997**	**1998**
Woodland - 40 Sutter	Annual arithmetic mean [a]	33	36	27	27	28
	Annual geometric mean [a]	30	28	23	24	22
	24 hour average [a]	84	145	77	126	130
	Days above state standard	6	11	7	2	10
West Sacramento	Annual arithmetic mean [a]	29	30	24	24	21
	Annual geometric mean [a]	26	25	21	21	19
	24 hour average [a]	98	83	76	109	63
	Days above state standard	5	7	2	2	2

Note: California PM10 ambient standard equals 50 $\mu g/m^3$ for the 24-hour average and 30 $\mu g/m^3$ for the annual geometric mean.

[a] Values given as $\mu g/m^3$.

Source: California Air Resources Board 1999.

Carbon Monoxide

Table 5E-5 shows CO monitoring results for the County. No violation of either the state or federal CO standards has occurred in the County during the past 5 years. The highest 1-hour average during the past 5 years was 10.0 ppm and occurred at the Russell Boulevard CO monitoring station. The highest 8-hour average during the past 5 years was 6.6 ppm, occurring at the same station. Motor vehicles are the primary source of CO in the County. Secondary sources of CO in the County include other mobile sources and miscellaneous industrial processes. (California Air Resources Board 1995)

Table 5E-5. Summary of Carbon Monoxide Air Quality Monitoring Data for Yolo County

Monitoring Station	Averaging Period	Carbon Monoxide Levels				
		1994	1995	1996	1997	1998
Davis Russell Boulevard [a]	Peak-hour value [b]	10.0	5.0	n/a	n/a	n/a
	Peak 8-hour value [b]	6.6	3.1	n/a	n/a	n/a
	Days above standard [c]	0	0	n/a	n/a	n/a
U C Davis campus [d]	Peak-hour value [b]	n/a	n/a	2.0	3.0	n/a
	Peak 8-hour value [b]	n/a	n/a	1.8	1.8	1.1
	Days above standard [c]	n/a	n/a	0	0	0

Note: California ambient standards for carbon monoxide equal 20 parts per million for the 1-hour standards and 9 parts per million for the 8-hour standard.

[a] Carbon monoxide monitoring discontinued after 1995.

[b] Peak-hour and peak 8-hour values given as parts per million.

[c] Indicates days above state 8-hour standard.

[d] Carbon monoxide monitoring began in 1996.

n/a Data not available

Source: California Air Resources Board 1999.

Sites Being Studied

Due to the constant movement and mixing that occurs in the atmosphere, the existing air quality conditions for the planning area as a whole are very similar to the conditions over any one of the sites being studied. In addition, existing air quality data is only available from monitoring stations in and near the planning area. Therefore, this chapter does not contain an individual description of the setting over each site being studied.

One aspect of this air quality assessment that is more localized is the assessment of CO "hotspots". This analysis, presented as Impact AQ-3 at the end of this chapter, looks at the potential for the existing General Plan and General Plan update to cause a localized concentration of CO emissions. This phenomenon can occur at crowded intersections in urban areas where a number of cars may be idling at an intersection. Modeled information on existing conditions is presented with this impact discussion.

Regulatory Setting - Air Quality Management

Air quality management in California is governed by the California and federal Clean Air Acts and the California Health and Safety Code. The ARB, a department of the California Environmental Protection Agency (Cal-EPA), oversees air quality planning and control throughout California and regulates directly emitted mobile-source pollutants and fuel content. ARB has divided the state into air basins, based on meteorological, geographical, and, to the extent feasible, political boundaries in order to facilitate air quality management throughout the state. The EPA oversees implementation of the federal Clean Air Act.

The California Clean Air Act requires that an air quality attainment plan be prepared for areas that violate air quality standards for CO, SO_2, NO_x, or ozone. The air quality attainment plan requirements established by the California Clean Air Act are based on the severity of air pollution problems caused by locally generated emissions. Upwind air pollution control districts are required to establish and implement emission control programs commensurate with the amount of pollutants transported from their districts to downwind districts.

The federal Clean Air Act requires that the air quality attainment plans prepared pursuant to the California Clean Air Act for each district within the state be combined collectively as the state implementation plan (SIP) and forwarded to EPA Region IX for approval, after review by ARB. EPA requires a separate compliance plan for each nonattainment pollutant.

In the SVAB, the APCD is responsible for stationary and indirect source control, air monitoring, and preparation of air quality attainment plans in the County and in the portion of Solano County within the SVAB.

The five air districts included within the southern portion of the SVAB, including the APCD along with ARB and SACOG, assisted in the preparation of a Sacramento Area Regional Ozone Attainment Plan (El Dorado County Air Pollution Control District et al. 1994). That plan, which was prepared to fulfill requirements of the federal Clean Air Act of 1990, was submitted to the EPA on November 15, 1994, as part of California's SIP and was subsequently approved.

IMPACTS AND METHODOLOGY

This section presents an assessment of the potential impacts on air quality. Impacts assessed include both construction- and operation-related emissions of CO, ROG, NO_x, and PM10. Impacts were evaluated based on existing published information regarding air quality conditions within the City's planning area. Consistency with air quality plan is measured through application of threshold values from each appropriate plan as part of Impacts AQ-2 and AQ-3. This section also provides appropriate mitigations to reduce significant impacts on air quality issues.

Construction-Related Emissions

Sources of construction-related emissions include construction equipment exhaust and fugitive. Detailed information on construction activities is not available for the land use map alternatives or the sites being studied that comprise each alternative. For these sites, information on the type of construction equipment or duration of construction activity will not be know until projects are proposed. Consequently, the approach described in Appendix D of the Yolo-Solano Air Quality Management District (YSAQMD) Air Quality Handbook was used to estimate construction emissions (Yolo-Solano Air Quality Management District 1996).

Construction emissions occur in two distinct phases—Phase I is the grading phase of construction, and Phase II is the actual construction of facilities, such as roadways, structures, and parking areas. Emissions associated with both phases were estimated for each alternative. Both construction phases generate vehicle exhaust emissions from heavy equipment, employee commute vehicle emissions, and PM10 fugitive dust from vehicles operating on overexposed earth.

Pollutant emissions associated with asphalt application and the painting of buildings also are assessed in this analysis. ROG emissions are released during asphalt paving of roads, driveways, and parking lots because asphalt contains organic compounds that are released during drying. ROG emissions are also emitted as buildings are painted and as applied paint dries.

In the past, burning of trees and vegetation in the process of clearing and grading the site has been another source of PM10. Open burning also releases CO, ROG, and NO_x. However, this practice is now prohibited by air quality regulations. Therefore, emissions associated with opening burning are not part of this analysis.

Key Assumptions

Several important assumptions were used in estimating construction emissions associated with each alternative. The following key assumptions were used in this analysis.

- Construction emissions associated with land development were assumed to occur uniformly over a 10-year period for 250 days per year. Although actual development is unlikely to occur uniformly over the 10-year period, the actual development timelines for individual projects is not currently known.

- Half of the gross acreage slated for development (excluding parks) was assumed to be paved with a paving schedule of 22 days per month and nine months per year.

- A maximum of 5,000 square feet of buildings was assumed to be coated per day.

- Construction emissions were assumed to occur concurrently with operational emissions. Because this EIR evaluates the overall General Plan update program, construction emissions would overlap operational emissions during buildout of the planning area.

- The specific sites being studied under each alternative were assumed to develop during the General Plan update time period (by 2010) to the levels stated in Chapter 3, "Project Description".

Operation-Related Emissions

Sources of operation-related emissions include motor vehicle exhaust and area source emissions from space and water heating, landscape maintenance, and other similar activities. These sources are described below.

Motor Vehicle Emissions

Two separate methods were used to estimate motor vehicle emissions in this analysis. CO concentrations generated by motor vehicles were estimated using the CALINE4 model. Descriptions of the model and the modeling assumptions that were used are included in Appendix C, "Air Quality Technical Information" of this EIR. Traffic numbers used to model CO concentrations for all the alternatives were provided by the traffic analysis (see Chapter 5D of this report). A plot of the traffic network and sensitive receptors that were used to perform the CALINE4 modeling is shown in Figure 5E-2.

Estimates of mobile source ROG, NO_x, CO, and PM10 emissions resulting from the project were made using ARB's URBEMIS7G, a computer program that estimates emissions from land use development projects. Refer to Appendix C, "Air Quality Technical Information", of this EIR for a description of how URBEMIS7G was used to estimate mobile source emissions.

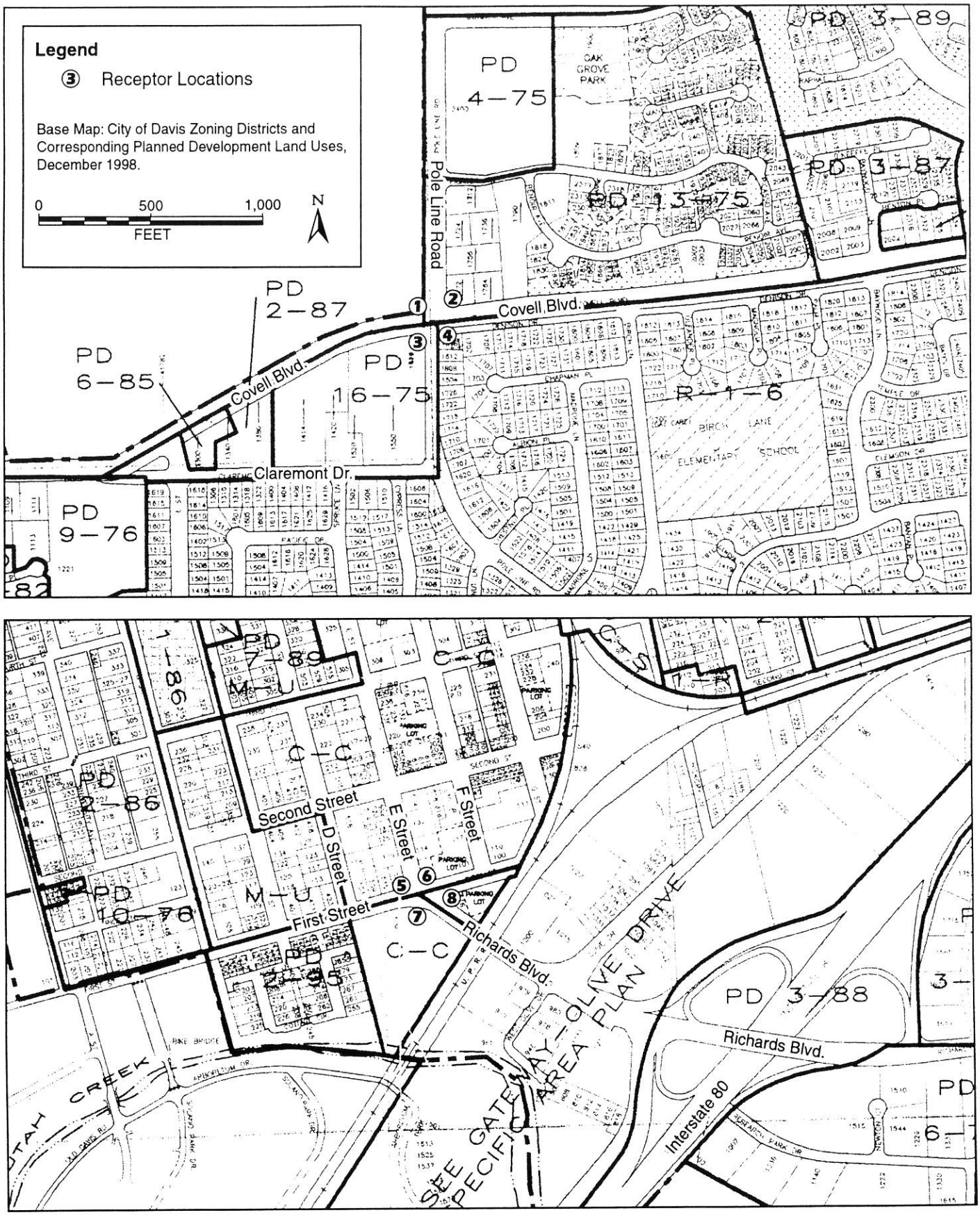

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Figure 5E-2
Roadway Network and Receptor Locations Used in the Carbon Monoxide Modeling Analyses

Area Source Emissions

Area source emissions are those typically associated with natural gas combustion such as those used in space and water heaters; architectural coatings of residential and office buildings; space heating with wood stoves and/or fireplaces; yard maintenance using internal combustion equipment such as lawnmowers, weed cutters, and leaf blowers; and from the use of consumer products such as hairsprays and deodorants. Estimates of area source emissions were made using the URBEMIS7G model. The assumptions used to estimate area source emissions are summarized in Appendix C, "Air Quality Technical Information".

Applicable Policies

The existing and proposed General Plans contain a number of goals, policies, standards, and actions that are designed to reduce or eliminate potential environmental impacts that may be related to the implementation of the update. In evaluating the air quality impacts, Alternative 2 assumes implementation of the existing General Plan and the goals, policies, standards, and actions it contains. A comparison of the major policy differences between the current General Plan and the General Plan update is contained in Chapter 3, "Project Description".

In evaluating the air quality impacts associated with Alternatives 3 through 5, it is assumed that the goals, policies, and actions contained in the General Plan update will be implemented with all future projects. The following is a list of the goals, policies, and actions that affected the impacts assessed in this chapter.

Goals and Policies Specific to Air Quality

The General Plan update includes goals, policies, and actions relating to the maintenance and improvement of air quality in the planning area. Specific policies that affect the assessment of impacts include the following:

GOAL AIR 1. Maintain and strive to improve air quality.

- **Policy AIR 1.1.** Take appropriate measures to reach and exceed the YSAQMD thresholds for air pollution levels.
  - **Action AIR 1.1d**. Work with UC Davis, the Air Resources Board, Yolo-Solano AQMD and the Davis Joint Unified School District (DJUSD) to develop educational materials regarding air quality, impact of air quality on people, plants and animals, and what youth can do to improve air quality. Include such materials in the DJUSD curriculum.

Summary of Impacts Related to Land Use Map Alternatives

This chapter evaluates air quality impacts related to the General Plan update and establishment of a new junior high school, including the four land use map alternatives. For this evaluation, impacts have been assessed in three categories. Table 5E-6 provides an overview of the significance findings made for the General Plan update project and each of the sites being studied under each alternative. The table also outlines the impacts related specifically to the establishment of a new junior high school under the heading "Signature Site" for Alternatives 4 and 5. The following paragraphs provide a brief summary of each impact.

- **Impact AQ-1. Consistency with General Plan Policies**. Consistency with the policies stated in the existing General Plan (Alternative 2) and the General Plan update (Alternatives 3 through 5) were evaluated. All of the land use map alternatives evaluated were found to be consistent with proposed policy guidance in relation to locational decisions. For Alternatives 3 through 5, the proposed changes in policy (accepting higher levels of congestion on roadways) will contribute to an increase in emissions in the planning area and air basin. Since the air basin is currently considered a nonattainment area for ozone (for which automobile emissions are a primary contributor), changes in policy would have a significant and unavoidable environmental impact.

- **Impact AQ-2. Increase in PM10, ROG, and NO_x Emissions During Construction and Operation Phases**. This impact was designed to address the construction- and operation-related PM10, ROG, and NO_x emissions associated with each land use map alternative. Each alternative was found to have a significant and unavoidable impact due to the combined construction and operation emissions that clearly exceed the significance thresholds established by the YSAQMD. Adoption of mitigation measure AQ-2.1, which calls for the amendment of General Plan update policy AIR 1.1 to incorporate by reference specific pollutant control measures recommended by the YSAQMD, WOULD reduce air pollutant emissions, but the impact would remain significant and unavoidable.

- **Impact AQ-3. Increase in Local CO Emissions Resulting from Project-related Traffic Increases**. This impact was designed to address operation-related CO emissions associated with each land use map alternative. Traffic generated under each alternative was shown to cause an exceedance of state CO standards at the intersection of Richards Boulevard and First Street (the intersection with the highest congestion), but is not expected to exceed standards at other intersections. Due to the exceedance at Richards Boulevard and First Street, each alternative was found to have a significant and unavoidable impact related to local CO emissions.

Table 5E-6. Summary of Air Quality Impacts by Alternative

Project Impacts	Project Mitigations	Overall General Plan	Sites Being Studied									In-fill
			Nishi/Gateway	Covell Center	Signature Site	Mace Ranch	Under Second Street	Sutter-Davis	Oeste Campus	Davis Technology	Intervening Lands	
Alternative 2. No-Project Alternative, Existing General Plan as Amended												
AQ-1. Consistency with General Plan Policies	Not required	LS	LS	LS		LS	LS					LS
AQ-2. Increase in PM10, ROG, and NO_x Emissions during Construction and Operation Phases	AQ-2.1	SU	SU	SU		SU	SU					SU
AQ-3. Increases in Local CO Emissions Resulting from Project-related Traffic Increases	N/A	SU	SU	SU		SU	SU					SU
Alternative 3. Reduced Buildout Scenario												
AQ-1. Consistency with General Plan Policies	N/A	SU		SU		SU	SU					SU
AQ-2. Increase in PM10, ROG, and NO_x Emissions during Construction and Operation Phases	AQ-2.1	SU		SU		SU	SU					SU
AQ-3. Increases in Local CO Emissions Resulting from Project-related Traffic Increases	N/A	SU		SU		SU	SU					SU
Alternative 4. Community Expansion Scenario with Oeste Campus												
AQ-1. Consistency with General Plan Policies	N/A	SU	SU	SU	SU	SU	SU	SU	SU			SU
AQ-2. Increase in PM10, ROG, and NO_x Emissions during Construction and Operation Phases	AQ-2.1	SU	SU	SU	SU	SU	SU	SU	SU			SU
AQ-3. Increases in Local CO Emissions Resulting from Project-related Traffic Increases	N/A	SU	SU	SU	SU	SU	SU	SU	SU			SU
Alternative 5. Community Expansion Scenario with Davis Technology Campus												
AQ-1. Consistency with General Plan Policies	N/A	SU	SU	SU	SU	SU	SU	SU		SU	SU	SU
AQ-2. Increase in PM10, ROG, and NO_x Emissions during Construction and Operation Phases	AQ-2.1	SU	SU	SU	SU	SU	SU	SU		SU	SU	SU
AQ-3. Increases in Local CO Emissions Resulting from Project-related Traffic Increases	N/A	SU	SU	SU	SU	SU	SU	SU		SU	SU	SU

SU = Significant unavoidable
S = Significant, but can be reduced to less than significant with mitigations included
LS = Less than significant
NI = No impact
N/A = None available

Project Impacts

Impact AQ-1. Consistency with General Plan Policies

Significance Criteria

- A significant impact would occur if the land use map alternative or one of its components would conflict with the environmental plans and goals of the local community or other planning regulations.
- For Alternatives 3 through 5, a significant impact would occur if a policy change in the General Plan update would result in a substantial adverse change in the environment related to air quality.

Impacts of the proposed project related to General Plan consistency was assessed with application of the above significance criteria. Table 5E-7 provides an overview/comparison of the level of impact associated with the General Plan under the four land use map alternatives evaluated in this EIR. A more detailed discussion of each alternative is described below.

Table 5E-7. General Plan Policy Consistency under Each Land Use Map Alternative

Alternative 2	Alternative 3	Alternative 4	Alternative 5
• Consistent with air quality-related locational policies	• Consistent with air quality-related locational policies • Policy change contributes to adverse increase in emissions	• Consistent with air quality-related locational policies • Policy change contributes to adverse increase in emissions	• Consistent with air quality-related locational policies • Policy change contributes to adverse increase in emissions

Alternative 2. Buildout to 2010 Using Existing General Plan. The existing General Plan does not include goals and polices that provide guidance on project locations in relation to air quality issues. Therefore, this land use map alternative does not conflict the existing General Plan and is considered to be a ***less than significant*** impact.

Alternative 3. Reduced Build-out Scenario. Implementation of Alternative 3 would only allow growth and development in the City to 2010 for projects that are already entitled and additions in Covell Center (Variation 3, business park). For these projects, application of the policies in the General Plan update is assumed. The General Plan update does not include goals and polices that provides guidance on project locations in relation to air quality issues. Therefore, this

land use map alternative does not conflict the General Plan update and is considered to be a ***less than significant*** impact.

In preparing the General Plan update, City staff has identified the primary areas of policy where the proposed update differs from the existing General Plan. A complete list of these major changes is listed in Chapter 3 under a section labeled "New, Expanded, or Modified Goals and Policies in the General Plan Update". From this list, the following statements represent new policy direction (in bold type) associated with air quality topics.

- **Reduced level of service for roads:**

  — **Current plan: "C" on new streets and "D" on existing streets**

  — **Update: "D" during non-peak hours, "E" during peak hours, and "F" during peak hour in the core area**

  In addition to changing traffic, the above policy change will also result in indirect air quality effects. Within the planning area, one of the largest sources of emissions is associated with automobile traffic. The effect of changing acceptable levels of service on roadways will be to accept higher levels of congestion, and a resulting increase in vehicle emissions, especially near intersections. This adverse increase will be offset in part by other policy changes in the General Plan update. For instance, reduction of automobile use could be achieved through promoting alternative modes of transportation (Goal MOB 3), improving public transit (Goal MOB 4), and continued use of transportation demand management techniques (Goal MOB 5).

  For the planning area overall, the General Plan update was found to have a significant impact on air quality resources due to exceedance of YSAQMD thresholds (see Impact AQ-2 for details). Since the change in level of service will add vehicular emissions to an area already impacted by poor air quality, this policy change was considered to be a ***significant and unavoidable*** impact.

Alternative 4. Community Expansion Scenario with Oeste Campus. Implementation of Alternative 4 includes many new development opportunities on public and private lands within Davis. For these projects, application of the policies in the General Plan update are assumed. The General Plan update does not include goals and polices that provides guidance on project locations in relation to air quality issues. Therefore, this land use map alternative does not conflict the General Plan update and is considered to be a ***less than significant*** impact.

Related to the second significance criteria (impacts related to policy changes), changes in policy will contribute to an increase in emissions in the planning area and air basin. Since the air basin is currently considered a nonattainment area for ozone (for which automobile emissions are a primary contributor), changes in policy would have a ***significant and unavoidable*** environmental impact.

Alternative 5. Community Expansion with Davis Tech Campus. Implementation of Alternative 5 includes many new development opportunities on public and private lands within Davis. For these projects, application of the policies in the General Plan update are assumed. The General Plan update does not include goals and polices that provides guidance on project locations in relation to air quality issues. Therefore, this land use map alternative does not conflict the General Plan update and is considered to be a ***less than significant*** impact.

Related to the second significance criteria (impacts related to policy changes), changes in policy will contribute to an increase in emissions in the planning area and air basin. Since the air basin is currently considered a nonattainment area for ozone (for which automobile emissions are a primary contributor), changes in policy would have a ***significant and unavoidable*** environmental impact.

Mitigation Measures

A significant and unavoidable impact was described above for Alternatives 3 through 5. This impact resulted from the change in policy that accepts a lower level of service on roadways in the planning area, which results in additional traffic congestion. Since the change in level of service is a policy decision presented for consideration by the City, it can not be mitigated without modifying the character of the alternatives proposed. Therefore, impacts associated with Alternatives 3 through 5 remain ***significant and unavoidable***. Alternative 2 was found to be less-than-significant and no mitigation was required.

Impact AQ-2. Increase in PM10, ROG, and NO_x Emissions During Construction and Operation Phases

Significance Criterion

- The proposed land use map alternative was determined to have a significant impact if the alternative would violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations.

  Under this analysis specific criteria developed by the YSAQMD were used in determining the significance of project-related air quality impacts. Project-related emissions were considered significant if emissions exceeded the YSAQMD thresholds of:

  — 82 pounds per day (ppd) of ozone precursor, ROG,
  — 82 ppd of ozone precursor, NO_x, or
  — 82 ppd of PM10.

Impacts of the proposed project related to PM10, ROG, and NO_x emissions were assessed with application of the above significance criteria. Table 5E-8 provides an overview/comparison of the level of impact associated with the General Plan under the four land use map alternatives evaluated in this EIR. A more detailed discussion of each alternative is described below.

Table 5E-8. Impacts Related to PM10, ROG, NO_x Emissions under Each Land Use Map Alternative

Alternative 2	Alternative 3	Alternative 4	Alternative 5
• Substantial construction- and operations-related increases in PM10, ROG, and NOx	• Substantial construction- and operations-related increases in PM10, ROG, and NOx	• Substantial construction- and operations-related increases in PM10, ROG, and NOx	• Substantial construction- and operations-related increases in PM10, ROG, and NOx

Alternative 2. Buildout to 2010 Using Existing General Plan. Implementation of Alternative 2 would result in concurrent construction- and operation-related activities associated with buildout of the alternative. Construction activities would include the use of solvents, nonwaterbase paints, thinners, some insulating materials, and caulking materials that would evaporate into the atmosphere and be part of a photochemical reaction that creates ozone. Demolition and earthmoving activities also would generate sources of fugitive dust during construction-related activities. Additionally, operation-related emissions (e.g., motor vehicles) also would increase under this alternative. As shown in Table 5E-9, the combined construction and operational emissions clearly exceed the significance thresholds established by the YSAQMD. Therefore, development under this alternative is considered ***significant and unavoidable***.

Table 5E-9. Comparison of Alternatives - Unmitigated Conditions (pounds per day)

		Construction	Area Sources	Vehicles	Totals	Difference from Alternative 2
Alternative 2	ROG	63	241	535	838	
	NO_x	22	116	859	997	
	CO	N/A	66	3,782	3,848	
	PM10	4	0	418	422	
Alternative 3	ROG	65	174	433	673	-165
	NO_x	15	86	716	818	-179
	CO	N/A	47	3,141	3,188	-660
	PM10	3	0	350	353	-69
Alternative 4	ROG	63	218	757	1,038	+199
	NO_x	21	122	1,310	1,453	+456
	CO	N/A	66	5,754	5,820	+1,972
	PM10	4	0	635	639	+217
Alternative 5	ROG	62	247	850	1,159	+321
	NO_x	24	137	1,469	1,631	+633
	CO	N/A	74	6,457	6,531	+2,683
	PM10	4	0	712	717	+295

Impacts of the proposed project related to CO emissions were assessed with application of the above significance criteria. Table 5E-11 provides an overview/comparison of the level of impact associated with the General Plan under the four land use map alternatives evaluated in this EIR. A more detailed discussion of each alternative is described below.

Table 5E-11. Impacts Related to CO Emissions under Each Land Use Map Alternative

Alternative 2	Alternative 3	Alternative 4	Alternative 5
• Substantial CO increase at Richards Boulevard/ First Street intersection • Other intersections do not exceed thresholds	• Substantial CO increase at Richards Boulevard/ First Street intersection • Other intersections do not exceed thresholds	• Substantial CO increase at Richards Boulevard/ First Street intersection • Other intersections do not exceed thresholds	• Substantial CO increase at Richards Boulevard/ First Street intersection • Other intersections do not exceed thresholds

For each alternative, two of the City's most congested intersections were selected and modeled using CALINE4 – the intersections of Richards Boulevard at First Street, and Pole Line Road at Covell Boulevard. The highest traffic volume out of the 4 alternatives (Alternative 5) was first used to check CO levels to see if they would exceed either the 1-hour or the 8-hour CO standard. If it showed no violation, it could then be assumed that no other alternatives (or other intersections) would exceed the CO standards. The modeling results show that the state 1-hour and 8-hour standards would be violated at the intersection of Richards Boulevard at First Street (the results are presented in Table 5E-12) for each alternative. For the next most congested intersection, Pole Line Road at Covell Boulevard, the traffic emission levels in Alternative 5 did not exceed either the 1-hour or 8-hour standards. Therefore, analysis of the other alternatives or other intersections was not required.

Table 5E-12. CO Modeling Concentrations (ppm) Results

		Alternative 5		Alternative 2		Alternative 3		Alternative 4	
Intersection	**Receptors**	**1-hour**	**8-hour**	**1-hour**	**8-hour**	**1-hour**	**8-hour**	**1-hour**	**8-hour**
Pole Line Road/Covell Boulevard	1	8.0	3.0	-	-	-	-	-	-
	2	7.3	2.6	-	-	-	-	-	-
	3	6.5	2.1	-	-	-	-	-	-
	4	6.7	2.2	-	-	-	-	-	-
Richards Boulevard/ First Street	5	22.1[a]	11.5[b]	21.5[a]	11.1[b]	20.8[a]	10.7[b]	21.8[a]	11.3[b]
	6	13.4	6.2	13.0	6.0	13.0	6.0	13.3	6.2
	7	17.1	8.5	16.7	8.2	16.3	8.0	16.9	8.3
	8	11.4	5.0	11.1	4.9	11.0	4.8	11.3	5.0

[a] Exceeds 1-hour state standard of 20.0 ppm.
[b] Exceeds 8-hour federal and state standard of 9.0 ppm.

Alternative 2. Buildout to 2010 Using Existing General Plan. Under this land use map alternative, the intersection of Richards Boulevard at First Street was found to have a level of CO concentration that exceeds state standards for both the 1-hour and 8-hour average. At the intersection of Pole Line Road at Covell Boulevard, the traffic emission levels were not exceeded for either the 1-hour or 8-hour standards. Since this intersection would not be impacted, other intersections in the planning area were determined to be less than significantly affected.

Due to the exceedance at the intersection of Richards Boulevard at First Street, this impact was considered ***significant and unavoidable***.

Alternative 3. Reduced Buildout Scenario. This impact is similar to the description of Impact AQ-3 described above under Alternative 2. The modeling results show that there is a violation of the state 1-hour and 8-hour standards at the intersection Richards Boulevard at First Street. The highest 1-hour concentration predicted is 20.8 ppm compared to the state standard of 20 ppm. The highest 8-hour concentration predicted is 10.7 ppm which exceeds the state standard of 9 ppm. This impact is considered ***significant and unavoidable***.

Alternative 4. Community Expansion Scenario with Oeste Campus. This impact is similar to the description of Impact AQ-3 described above under Alternative 2. The modeling results show that there is one violation of the state 1-hour and 8-hour standards at the intersection Richards Boulevard at First Street. The highest 1-hour concentrations predicted is 21.8 ppm compared to the state standard of 20 ppm. The highest 8-hour concentration predicted is 11.3 ppm which exceeds the state standard of 9 ppm. This impact is considered ***significant and unavoidable***.

Alternative 5. Community Expansion Scenario with Davis Technology Campus. This impact is similar to the description of Impact AQ-3 described above under Alternative 2. The modeling results show that there is one violation of the state 1-hour and 8-hour standards at the intersection Richards Boulevard at First Street. The highest 1-hour concentrations predicted is 22.1 ppm compared to the state standard of 20 ppm. The highest 8-hour concentration predicted is 11.5 ppm which exceeds the state standard of 9 ppm. This impact is considered ***significant and unavoidable***.

Mitigation Measures

The change in policy to accept a lower level of service on roadways in the planning area and to not widen the intersection of Richards Boulevard at First Street is a policy decision that has been made by the City Council and citizens of Davis, and can not be mitigated without modifying the character of the alternatives proposed. Therefore, impacts associated with Alternatives 2 through 5 remain ***significant and unavoidable***.