4.3 AIR QUALITY

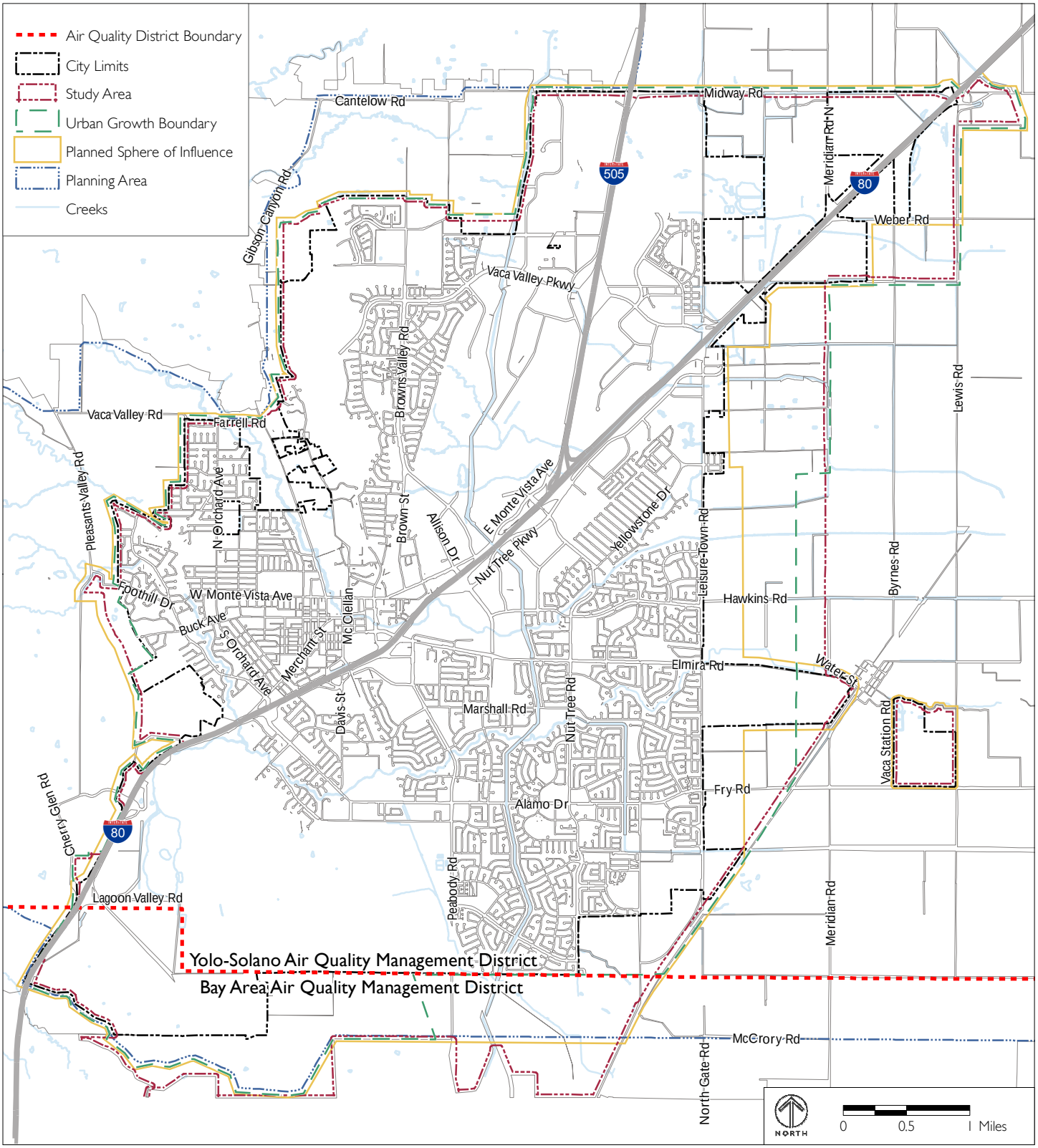
This chapter has been prepared using methods and assumptions recommended in the Handbook for Assessing and Mitigating Air Quality Impacts of the Yolo-Solano Air Quality Management District (YSAQMD).[1] In keeping with these guidelines, this analysis describes existing air quality and the potential impacts of emissions generated by the proposed General Plan and Energy and Conservation Action Strategy (ECAS) on local carbon monoxide levels, toxic air contaminants, odors, and regional air pollution. Mitigation measures to reduce or eliminate significant air quality impacts are identified, where appropriate. As noted in Chapter 3, Project Description, impacts are determined by comparing the proposed General Plan and ECAS to existing conditions, rather than to the existing General Plan. The following evaluation is based on a quantitative and spatial analysis and examines effects on existing air quality; conflicts with air quality standards, regulations, or plans; increases in specific pollutants; exposure of sensitive receptors (i.e. people or types of facilities particularly vulnerable to the harmful effects of pollution); and the creation of odors. The air quality data used in this analysis is contained in Appendix D of this Draft EIR.

A. Regulatory Framework

This section summarizes existing local, State, and federal laws, policies, and regulations that apply to air quality in and around Vacaville.

In Vacaville, there are two agencies responsible for regulating air pollution emissions from stationary sources (e.g. factories) and indirect sources (e.g. traffic associated with new development), as well as for monitoring ambient pollutant concentrations at the regional level. As shown in Figure 4.3-1, YSAQMD covers the majority of Vacaville, while a small southeastern portion of the EIR Study Area falls within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). However, YSAQMD still reviews projects in this part of BAAQMD's jurisdiction because of its location and topography. Air pollution emissions are regional in nature, so it is important for the cities within the region, such as Vacaville, to work together with YSAQMD to achieve State and federal clean air standards. The California Air Resources Board (ARB), part of the California Environmental Protection Agency (Cal EPA) charged with reducing air pollutants, and the US Environmental Protection Agency (EPA) regulate direct emissions from motor vehicles.

[1] Yolo-Solano Air Quality Management District, 2007, *Handbook for Assessing and Mitigating Air Quality Impacts*.



Source: City of Vacaville, Solano County GIS.

FIGURE 4.3-1
AIR QUALITY MANAGEMENT DISTRICT BOUNDARIES

1. Federal Clean Air Act

The 1970 federal Clean Air Act (CAA) authorized the establishment of national health-based air quality standards and set deadlines for their attainment. The federal CAA Amendments of 1990 changed deadlines for attaining National Ambient Air Quality Standards (NAAQS) as well as the remedial actions required of areas of the nation where pollutants exceed the limits in the standards. Under the CAA, State and local agencies in areas that exceed the NAAQS are required to develop State Implementation Plans (SIP) to show how they will achieve the NAAQS by specific dates. Vacaville is included in the Sacramento Regional SIP prepared by the Sacramento Air Quality Management District in conjunction with YSAQMD. Other jurisdictions located in Sacramento and Yolo counties, and portions of Placer, El Dorado, Solano, and Sutter counties, are also included in this SIP.

These standards identify levels of air quality for "criteria pollutants" that are considered the maximum levels of ambient (background) air pollutants considered safe, with an adequate margin of safety, to protect the public health and welfare. As shown in Table 4.3-1, the "criteria pollutants" regulated by the NAAQS are: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead (Pb).

2. State Laws and Regulations

This section summarizes State laws and regulations pertaining to air quality in Vacaville.

a. California Clean Air Act

In 1988, the CAA required that all air districts in the State endeavor to achieve and maintain California Ambient Air Quality Standards (CAAQS) for CO, O_3, SO_2, and NO_2 by the earliest practical date. The California CAA provides air districts with authority to regulate indirect sources and mandates that air districts focus particular attention on reducing emissions from transportation and area-wide emission sources. Each nonattainment district is required to adopt a plan to achieve a 5-percent annual reduction, averaged over consecutive three-year periods, in district-wide emissions of each nonattainment pollutant or its precursors. A Clean Air Plan shows how an air district would reduce emissions to achieve air quality standards. As shown in Table 4.3-1, State standards for these pollutants (i.e. the CAAQS) are generally more stringent than the national standards (i.e. the NAAQS).

TABLE 4.3-1 **FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS**

Pollutant	Average Time	California Standards[a] Concentration[c]	Federal Standards[b] Primary[c,d]	Federal Standards[b] Secondary[c,e]
Ozone (O_3)	1-Hour	0.09 ppm (180 $\mu g/m^3$)	No federal Standard	Same as Primary Standard
	8-Hour	0.07 ppm (137 $\mu g/m^3$)	0.075 ppm (147 $\mu g/m^3$)	
Respirable Particulate Matter (PM_{10})	24-Hour	50 $\mu g/m^3$	150 $\mu g/m^3$	Same as Primary Standard
	Annual Arithmetic Mean	20 $\mu g/m^3$	–	
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard	35 $\mu g/m^3$	Same as Primary Standard
	Annual Arithmetic Mean	12 $\mu g/m^3$	15 $\mu g/m^3$	
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	None
	1-Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
	8-Hour Lake Tahoe	6 ppm (7 mg/m^3)	–	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.03 ppm (57 $\mu g/m^3$)	0.053 ppm (100 $\mu g/m^3$)	Same as Primary Standard
	1-Hour	0.18 ppm (339 $\mu g/m^3$)	0.100 ppm[f]	None
Lead (Pb)[g]	30-Day Avg	1.5 $\mu g/m^3$	–	–
	Calendar Qtr	–	1.5 $\mu g/m^3$	Same as Primary Standard
	Rolling 3-Month Avg[g]	–	0.15 $\mu g/m^3$	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	0.030 ppm (80 $\mu g/m^3$)	–
	24-Hour	0.04 ppm (105 $\mu g/m^3$)	0.14 ppm (365 $\mu g/m^3$)	–
	3-Hour	–	–	0.5 ppm (1300 $\mu g/m^3$)
	1-Hour	0.25 ppm (655 $\mu g/m^3$)	75 ppb (196 $\mu g/m^3$)	

TABLE 4.3-1 FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Average Time	California Standards[a] Concentration[c]	Federal Standards[b] Primary[c,d]	Federal Standards[b] Secondary[c,e]
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer – visibility of 10 miles or more (0.07–30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.	No Federal Standards	
Sulfates	24-Hour	25 $\mu g/m^3$	No Federal Standards	
Hydrogen Sulfide	1-Hour	0.03 ppm (42 $\mu g/m^3$)		
Vinyl Chloride[h]	24-Hour	0.01 ppm (26 $\mu g/m^3$)		

Note: ppm = parts per million; ppb = parts per billion.

[a] California standards for O3, CO (except for Lake Tahoe), SO2 (1- and 24-hour), NO2, suspended particulate matter—PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[e] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor must not exceed 0.100 ppm (effective January 22, 2010).

[g] CARB has identified Pb and vinyl chloride as "toxic air contaminants (TACs)" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[h] National Pb standard, rolling 3-month average: final rule signed October 15, 2008.

Source: California Air Resources Board, 2012.

b. California Air Resources Board

The California Air Resources Board (CARB) administers the air quality standards in California. Based on air monitoring results for areas within California, CARB designates the areas as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved. Under the California CAA, areas are designated as nonattainment for a pollutant if air quality data shows that a State standard for the pollutant was violated at least once during the previous three calendar years.

CARB has developed an Air Quality and Land Use Handbook (Handbook) that is intended to serve as a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land-use decision-making process.[2] The Handbook recommends that planning agencies, such as the City of Vacaville, strongly consider proximity to air pollution sources when siting new "sensitive" land uses, such as homes, medical facilities, day-care centers, schools, and playgrounds.

Air pollution sources of concern include freeways, rail yards, ports, refineries, distribution centers, chrome plating facilities, dry cleaners, and large gasoline service stations. Key recommendations in the Handbook include taking steps to avoid siting new, sensitive land uses in the following locations:

- Within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day.
- Within 1,000 feet of a major service and maintenance rail yard.
- Immediately downwind of ports (in the most heavily impacted zones) and petroleum refineries.
- Within 300 feet of any dry cleaning operation (for operations with two or more machines, provide 500 feet).
- Within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater).

The Handbook specifically states that its recommendations are advisory and acknowledges that land-use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality-of-life issues.

[2] California Air Resources Board, 2005, *Air Quality and Land Use Handbook: A Community Health Perspective.*

3. Yolo-Solano Air Quality Management District (YSAQMD)

YSAQMD is tasked with achieving and maintaining healthful air quality for its residents by establishing programs, plans, and regulations enforcing air pollution control rules in order to attain all State and federal ambient air quality standards and to minimize public exposure to airborne toxins and nuisance odors. YSAQMD encourages local jurisdictions to include General Plan policies or elements that, when implemented, would improve air quality. YSAQMD has adopted several attainment plans to achieve State and federal air quality standards and comply with California and federal CAA requirements. YSAQMD continuously monitors its progress in implementing attainment plans and must periodically report to CARB and the EPA. YSAQMD, in partnership with the five air districts in the Sacramento Metropolitan Area, CARB, and the Sacramento Area Council of Governments (SACOG), periodically revises its attainment plans to reflect new conditions and requirements in accordance with schedules mandated by the California and federal CAAs.

The California CAA requires a triennial assessment of the extent of air quality improvements and emissions reductions achieved with control measures. The 2006 and 2009 Triennial Assessment and Plan Update developed by YSAQMD was prepared pursuant to ARB guidance, complies with plan revision requirements, and compares and incorporates updated population, industry, and vehicle-related projections, as necessary. The 2006 and 2009 Assessment Plan provided emissions projections for the years 2010, 2015, and 2020 for stationary, area, and on- and off-road mobile sources.

The Sacramento Area Regional Ozone Attainment Plan and Reasonable Further Progress (RFP) Plan[3] is the current federal O_3 SIP for YSAQMD, and sets out stationary source control programs and statewide mobile source control programs for attainment of the 8-hour O_3 standard. The air districts of the Sacramento region have also prepared the 2006 Sacramento Regional Nonattainment Area 8-Hour Ozone Rate-of-Progress (ROP) Plan (Early Progress Plan), which fulfills the federal 8-hour ozone requirements for a 2002-2008 RFP Plan for the Sacramento regional nonattainment area. This Early Progress Plan continues the strategies found in the 1-hour O_3 SIP, and sets new motor vehicle emission budgets for transportation conformity. The updated on-road motor vehicle emissions budgets were based on vehicle miles traveled (VMT) and trips developed as part of the Sacramento region's 2035 Metropolitan Transportation Plan (MTP).

In June 2005, the EPA revoked the 1-hour O_3 standard and enacted the 8-hour O_3 standard, which required the air districts and CARB to prepare a new attainment demonstration SIP. The latest SIP for the 8-hour ozone standard, the 2009 Sacramento Metropolitan Area 8-Hour

[3] Sacramento Metropolitan Air Quality Management District, 2008, *Sacramento Area Regional Ozone Attainment Plan and Reasonable Further Progress Plan*.

Ozone Attainment Plan, contains additional control measures to demonstrate that the region will attain the 8-hour standard by the target date of 2018.

YSAQMD's primary means of implementing air quality plans is by adopting rules and regulations. The Health and Safety Code (H&SC) §42300 et. seq. authorizes air quality management districts to adopt rules and regulations and to pursue civil and criminal penalties for violations. YSAQMD rulebook contains more than 85 rules. Some new rules adopted by YSAQMD apply to sources never before regulated, such as Rule 2.40 – Wood Burning Appliances, which prohibits installation of any new traditional "open hearth" type fireplaces within YSAQMD's jurisdiction.

In addition to YSAQMD's primary role of controlling stationary sources of pollution, YSAQMD is required to implement transportation control measures and identify indirect source control programs to reduce mobile source emissions. To accomplish this, YSAQMD works closely with cities, including the City of Vacaville, and with counties and regional transportation planning agencies.

YSAQMD regulates agriculture emissions through a permitting process for stationary agriculture emission sources, confined animal facilities, and agriculture engines. YSAQMD has also enhanced its participation in the California Environmental Quality Act (CEQA) by actively reviewing and commenting on prepared environmental documents, such as those prepared by the City of Vacaville.

Relevant YSAQMD rules include but are not limited to the following:

- **Rule 2-5, Nuisance**: To restrict discharge from any source quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any such persons or the public or which cause to have a natural tendency to cause injury or damage to business or property.
- **Rule 2-8, Open Burning:** To limit emissions to the atmosphere from open burning.
- **Rule 2-11, Particulate Matter:** To limit release or discharge into the atmosphere, from any source, particulate matter in excess of 0.3 grains per cubic foot of exhaust volume as calculated standard conditions.
- **Rule 2-14, Architectural Coatings:** To limit the quantity of volatile organic compounds (VOC) in architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within the YSAQMD.

- **Rule 2-40, Wood Burning Appliances**: To manage the emissions of particulate matter, carbon monoxide, and other air contaminants from wood burning appliances.
- **Rule 3-1, General Permit Requirements**: To provide an orderly procedure for the review of new sources of air pollution and of the modification and operation of existing sources through the issuance of permits.
- **Rule 9-9, Asbestos**: To limit the emission of asbestos into the atmosphere and require an appropriate work practice standards and waste disposal procedures.

4. Attainment Status

Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. The YSAQMD operates three ozone monitors within its jurisdiction. Based on the most recent three years of verified monitoring data, the site with the highest design value is Davis at 0.070 ppm. This design value is below the 0.075 ppm federal NAAQs for ozone. However, the YSAQMD has been included by the EPA in the Sacramento Federal Nonattainment Area (SFNA). The ozone design value for the SFNA is currently 0.095. While the YSAQMD's monitoring data has not shown exceedances of the federal 8-hour standard within its jurisdiction, the larger nonattainment area, of which the YSAQMD is a part of, does not attain the standard. Therefore, the YSAQMD and subsequently the City of Vacaville do not meet CAAQS or NAAQS for ground level O_3, nor State standards for PM_{10} or national standards for $PM_{2.5}$.[4] Table 4.3-2 provides a summary of YSAQMD's attainment status.

B. Existing Conditions

This section summarizes the existing air quality conditions in the EIR Study Area.

1. Climate and Meteorology

The City of Vacaville is located primarily within the boundaries of the Sacramento Valley Air Basin (SVAB), however, a small portion of Vacaville, namely Lagoon Valley, is located within the San Francisco Bay Area Air Basin. The SVAB encompasses eleven counties, including all of Shasta, Tehama, Glenn, Colusa, Butte, Sutter, Yuba, Sacramento, and Yolo counties, as well as the westernmost portion of Placer County and the northeastern half of Solano County. The SVAB is bounded by the North Coast Ranges on the west and Northern Sierra Nevada Mountains on the east. The intervening terrain is relatively flat. Hot dry summers and mild rainy winters characterize the Mediterranean climate of the SVAB. During the year, the temperature may

[4] Although there were no exceedances of the federal $PM_{2.5}$ standard recorded at the Davis monitoring station, other exceedances within the YSAQMD prevent the District from meeting this standard.

range from 20 to 115 degrees Fahrenheit (°F), with summer highs usually in the 90s and winter lows occasionally below freezing. Average annual rainfall is about 20 inches, and the rainy season generally occurs from November through March.

TABLE 4.3-2 **YOLO-SOLANO AIR QUALITY MANAGEMENT DISTRICT ATTAINMENT STATUS**

Pollutant	Averaging Time	State Standards	National Standards
Ozone (O_3)	1-Hour	Nonattainment	N/A[a]
	8-Hour	Nonattainment	Nonattainment
Carbon Monoxide (CO)	1-Hour	Attainment	Unclassified Attainment[b]
	8-Hour	Attainment	Unclassified Attainment
Nitrogen Dioxide (NO_2)	1-Hour	Attainment	N/A
	Annual	N/A	Attainment
Sulfur Dioxide (SO_x)	1-Hour	Attainment	N/A
	24-Hour	Attainment	Attainment
	Annual	N/A	Attainment
Particulate Matter (PM_{10})	24-Hour	Nonattainment	Unclassified
	Annual Average	Nonattainment	N/A
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	N/A	Partial Nonattainment
	Annual Average	N/A	
Sulfates	24-Hour	Attainment	N/A
Lead (Pb)	30-Day Avg.	Attainment	N/A
	Calendar Qtr.	N/A	Attainment
Hydrogen Sulfide	1-Hour	Attainment	N/A
Vinyl Chloride	24-Hour	Attainment	N/A
Visibility Reducing Particles	8-Hour	Attainment	N/A

[a] N/A – Not applicable. State or federal standard does not exist for the combination of pollutant and averaging time.
[b] Unclassified areas are those for which air monitoring has not been conducted but which are assumed to be in attainment.
Source: Yolo-Solano Air Quality Management District, 2012.

The prevailing winds are moderate in strength and vary from moist clean breezes from the south to dry land flows from the north. The mountains surrounding the SVAB create a barrier to airflow, which can trap air pollutants under certain meteorological conditions. The highest frequency of air stagnation occurs in the autumn and early winter when large high-pressure cells cover the Sacramento Valley. The lack of surface wind during these periods and the reduced vertical flow caused by less surface heating reduces the influx of outside air and allows air pollu-

tants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with temperature inversions that trap pollutants near the ground.

The ozone season in the SVAB (May through October) is characterized by stagnant morning air or light winds with the Delta sea breeze arriving from the southwest in the afternoon. Usually the evening breeze transports the airborne pollutants to the north out of the SVAB. During about half of the days from July to September, however, a phenomenon called the "Schultz Eddy" prevents this from occurring. Instead of allowing for the prevailing wind patterns to move north, carrying the pollutants out, the Schultz Eddy causes the wind pattern to circle back to the south. Essentially, this phenomenon causes air pollutants to be blown south toward Vacaville and the surrounding areas. This phenomenon exacerbates the pollution levels in the area and increases the likelihood of violating federal and/or State standards. The eddy normally starts in the afternoon or evening, then dissipates around noon the following day when the delta sea breeze arrives.[5]

2. Air Pollutants and Monitored Air Pollutant Levels

Air quality is a function of both local climate and local sources of air pollution. Air quality is the balance of the natural dispersal capacity of the atmosphere and emissions of air pollutants from human uses of the environment. Pollutants can be diluted by both vertical and horizontal mixing in the atmosphere. Vertical mixing and dilution of pollutants are often suppressed by inversion conditions, when a warm layer of air traps cooler air close to the surface. During the summer, inversions are generally elevated above ground level, but are present during more than 90 percent of both the morning and afternoon hours. In winter, surface-based inversions dominate in the morning hours, but frequently dissipate by afternoon.

CARB and EPA monitor for air pollutants throughout California. Pollutant monitoring results for the years 2009 to 2011 at the Vacaville air quality monitoring station indicate that air quality in the Vacaville area has generally been moderate with only a few exccedances of air quality standards. These results are shown in Table 4.3-3.

Criteria air pollutants and their effects are discussed below.

[5] Yolo-Solano Air Pollution Control District, 2007, *Handbook for Assessing and Mitigating Air Quality Impacts*.

TABLE 4.3-3 AIR POLLUTANT MONITORING DATA

Pollutant	Standard	2009	2010	2011
Carbon Monoxide (CO)[a]				
Maximum 1-hour concentration (ppm)		2.8	2.9	3.0
Number of days exceeded	State: >20 ppm	0	0	0
	Federal: >35 ppm	0	0	0
Maximum 8-hour concentration (ppm)		2.23	1.94	2.41
Number of days exceeded	State: >9 ppm	0	0	0
	Federal: >9 ppm	0	0	0
Ozone (O_3) [b]				
Maximum 1-hour concentration (ppm)		0.106	0.105	0.088
Number of days exceeded	State: >0.09 ppm	3	2	0
Maximum 8-hour concentration (ppm)		0.085	0.078	0.073
Number of days exceeded:	State: >0.07ppm	2	3	3
	Federal: >0.075 ppm	2	1	0
Coarse Particulates (PM_{10}) [c]				
Maximum 24-hour concentration ($\mu g/m^3$)		51.7	36.1	54.4
Number of days exceeded	State: >50 $\mu g/m^3$	1	0	1
	Federal: >150 $\mu g/m^3$	0	0	0
Annual arithmetic average concentration ($\mu g/m^3$)		18.5	17.4	20.2
Exceeded for the year	State: >20 $\mu g/m^3$	No	No	Yes
Fine Particulates ($PM_{2.5}$) [a]				
Maximum 24-hour concentration ($\mu g/m^3$)		38.9	29.5	30.6
Number of days exceeded	Federal: >35 $\mu g/m^3$	5	0	0
Annual arithmetic average concentration ($\mu g/m^3$)		9.8	9.1	ND

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

TABLE 4.3-3 **AIR POLLUTANT MONITORING DATA**

Pollutant	Standard	2009	2010	2011
Exceeded for the year	State: >12 μg/m^3	No	No	ND
	Federal: >15 μg/m^3	No	No	ND
Nitrogen Dioxide (NO_2) [a]				
Maximum 1-hour concentration (ppm)		0.049	0.055	0.047
Number of days exceeded	State: >0.18 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.010	0.009	0.010
Exceeded for the year	Federal: >0.053 ppm	No	No	No
Sulfur Dioxide (SO_2)[a]				
Maximum 1-hour concentration (ppm)		0.010	0.011	0.007
Number of days exceeded	State: >0.25 ppm	0	0	0
Maximum 3-hour concentration (ppm)		ND	ND	ND
Number of days exceeded	Federal: >0.5 ppm	ND	ND	ND
Maximum 24-hour concentration (ppm)		0.003	0.002	0.002
Number of days exceeded	State: >0.04 ppm	0	0	0
	Federal: >0.14 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.000	0.000	0.000
Exceeded for the year	Federal: >0.030 ppm	No	No	No

Notes: ppm = parts per million
μg/m^3= micrograms per cubic meter
ND = No data. There was insufficient (or no) data to determine the value.

[a] Vallejo – 304 Tuolumne Street was the closest monitoring station for this pollutant.

[b] Vacaville – Ulatis Drive was the closest monitoring station for this pollutant.

[c] Napa – Jefferson Avenue was the closest monitoring station for this pollutant.

Source: ARB and EPA, 2012.

a. Ozone (O_3)

Rather than being directly emitted, O_3 is formed by photochemical reactions between NO_2 and reactive organic gases (ROG). O_3 is a pungent, colorless gas. Elevated O_3 concentrations result in reduced lung function, particularly during vigorous physical activity. This health problem isparticularly acute in sensitive receptors such as the sick, the elderly, and young children. O_3

levels peak during the summer and early fall months. State 1-hour O_3 standards were exceeded in 2009 and 2010 at the Vacaville monitoring station. State 8-hour O_3 standards were exceeded each of the three years at this monitoring station, while the federal 8-hour standard was exceeded in 2009 and 2010.

b. Carbon Monoxide (CO)

CO is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. CO passes through the lungs into the bloodstream, where it interferes with the transfer of oxygen to body tissues. State and federal CO standards have not been exceeded in the EIR Study Area for the last three years.

c. Nitrogen Oxides (NO_2 and NO)

NO_2, a reddish-brown gas, and nitric oxide (NO), a colorless, odorless gas, are formed from fuel combustion under high temperature or pressure. These compounds are referred to as nitrogen oxides, or NO_x. NO_2 is a primary component of the photochemical smog reaction, and is a regulated pollutant. NO_2 also contributes to other pollution problems, including a high concentration of $PM_{2.5}$, poor visibility, and acid deposition. NO_2 decreases lung function and may reduce resistance to infection. NO_2 standards have not been exceeded in the EIR study area for the last three years.

d. Sulfur Dioxide (SO_2)

SO_2 is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels in the region. SO_2 irritates the respiratory tract, can injure lung tissue when combined with $PM_{2.5}$, and reduces visibility and the level of sunlight. SO_2 standards have not been exceeded at the Vallejo monitoring station (the closest monitoring station to Vacaville) in the last three years.

e. Particulate Matter (PM)

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

Particulates may transport carcinogens and other toxic compounds that adhere to the particle surfaces, and can enter the human body through the lungs. As indicated in the Davis monitoring results, there were multiple violations per year of the State PM_{10} standard and one violation of the federal PM_{10} standard during the last three years. $PM_{2.5}$ levels exceeded the State's standard during two of the past three years; however, no violations of the federal $PM_{2.5}$ standard were recorded during this three -year period.

3. Existing Sources of Air Pollution

The primary source of air pollution in Vacaville is from on-road mobile sources such as automobiles, trucks, motorcycles, buses, and motor homes. These sources account for the majority of the O_3 precursor emissions in the city. On-road mobile source emissions are directly related to regional VMT on both local roadways and interstate freeways. As population growth in the region occurs, VMT increases, resulting in increased O_3 precursor emissions. Particulate emissions are generated by woodsmoke from residential fireplaces and from construction activities. Consumer products, architectural coatings, fertilizers, and asphalt paving are also sources of air pollution within Vacaville. Agriculture operations such as harvesting and tilling in the region account for a portion of the area's PM emissions. Mobile-source agriculture equipment emissions account for less than 10 percent of the region's mobile-source emissions.

4. Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. TACs are injurious in small quantities and are regulated by the EPA and CARB. Health risks from TACs are a function of both concentration and duration of exposure. Some examples of TACs include: benzene, butadiene, formaldehyde, and hydrogen sulfide. The identification, regulation, and monitoring of TACs is relatively recent compared to that for criteria pollutants.

While TACs are produced by many different sources, the largest contributor to inhalation cancer risk in California is PM from diesel-fueled engines (diesel PM). Exposure to diesel PM can result in an increased risk of cancer and an increase in chronic non-cancer health effects, including a greater incidence of cough, labored breathing, chest tightness, wheezing, and bronchitis. These risks generally affect sensitive receptors near the emission source. CARB reports that the average cancer risk statewide from exposure to diesel PM was estimated to be over 500 potential cases per million in 2007. Diesel PM was estimated to be responsible for about 70 percent of total risks from all toxics. On a local scale, diesel PM can present varying cancer risks to the public, which can be greater or less than the statewide average.

CARB developed the "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles," which, through tailpipe regulations, reduced diesel PM by 75

percent and aims to have a total reduction of 85 percent reduction by 2020. High volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic (e.g. distribution centers and truck stops) were identified as posing the highest risk to adjacent receptors. Other facilities associated with increased risk include warehouse distribution centers, large retail or industrial facilities, high-volume transit centers, and schools with a high volume of bus traffic. The risk from diesel PM is expected to decrease over time.

Interstate 80, which transverses Vacaville, and Interstate 505 in northeast Vacaville are considered high-volume roadways and a potential source of TACs.

5. Existing Sensitive Receptors

Sensitive receptors refer to those segments of the population most susceptible to poor air quality, such as children, the elderly, and sick people. This designation also applies to certain at-risk sensitive land uses such as schools, hospitals, parks, or residential communities. Air quality problems arise when sources of air pollutants and sensitive receptors are located near one another. The potential for adverse air quality impacts increases as the distance between the source of emissions and members of the public decreases. Impacts on sensitive receptors are of particular concern when air pollutant emission sources are located nearby.

Residential areas are located throughout the City of Vacaville, as are schools and parks. Vacaville hospitals include Vaca Valley Hospital in central Vacaville and Kaiser Permanente Hospital in northeast Vacaville. Several convalescent hospitals are also located throughout the city.

6. Odors

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g. irritation, anger, or anxiety) to physiological (e.g. circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Known as odor fatigue, a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Typical sources of odors include: wastewater treatment plants, landfills, certain manufacturing operations, and restaurants. Additionally, commercial services such as auto service stations, auto body shops, or other similar uses can be a source of odor complaints in urban areas where these uses are in close proximity to residential areas.

C. Standards of Significance

Implementation of the proposed General Plan and ECAS would have a significant impact with regard to air quality if they would:

- ♦ Conflict with or obstruct implementation of the applicable air quality plan.
- ♦ Violate any air quality standard or contribute substantially to an existing or projected air quality violation. YSAQMD further defines the thresholds of significance as follows:
  - Generation of ROG or NO_x emissions for construction or operations in excess of 10 tons per year; or
  - Generation of PM_{10} emissions for construction or operations in excess of 80 pounds per day.
- ♦ Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors). YSAQMD further defines the threshold of significance as follows:
  - Emissions would be considered cumulatively considerable if they are individually significant.
  - CO impacts are also cumulatively considerable when an exceedance of CO air quality standards results from project CO emissions combined with and CO emissions from other planned projects.
- ♦ Expose sensitive receptors to substantial pollutant concentrations.
- ♦ Create objectionable odors affecting a substantial number of people.

D. Impact Discussion

This section discusses potential impacts of the proposed General Plan and ECAS on air quality.

1. Project Impacts

The discussion of potential project impacts is organized by and responds to each of the potential impacts identified in the Standards of Significance.

a. Conflict with or obstruct implementation of the applicable air quality plan.

Regional air quality plans are developed to meet requirements of both the federal and California CAAs. The federal CAA requires that areas not attaining the air quality standards develop an

attainment plan demonstrating how control strategies help the area meet reasonable further progress goals and attain the air quality standard. As mentioned in Section A.3, Yolo-Solano Air Quality Management District, the California CAA also requires a triennial assessment of the extent of air quality improvements and emissions reductions achieved with control measures.

Air quality plan projections, including the Sacramento Regional 8-Hour Ozone Attainment Draft Report and the 2006 and 2009 Triennial Assessment and Plan Update, are based on analysis and forecasts of air pollutant emissions throughout the entire region. These forecasts rely on projections of VMT, population, and employment made by Sacramento Area Council of Governments (SACOG), which are based on land use projections made by local jurisdictions (e.g. through the General Plan update process). The SACOG MTP provides vehicle data that are used to estimate mobile source emissions and demonstrate transportation conformity. The proposed General Plan was therefore evaluated to determine consistency with the MTP and relevant air quality plans.

YSAQMD and Sacramento Metropolitan Air Quality Management District (SMAQMD) work with SACOG and local agencies to ensure that each air quality plan is developed with the most recent available data. Therefore, the most recent air quality plans, including the Sacramento Regional 8-Hour Ozone Attainment Plan and Reasonable Further Progress Plan[6] and the 2006 and 2009 Triennial Assessment and Plan Update are the most appropriate clean air plans for comparison to the proposed General Plan and ECAS.

i. Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan

The Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan was prepared using population and employment data assumptions based on Vacaville's current General Plan, as adopted in 1990 and amended through 2007. The proposed General Plan would not increase the 2035 population or employment forecast. As demonstrated in Chapter 4.14, Traffic and Transportation, total VMT with implementation of the proposed General Plan would slightly increase beyond the level predicted for the current General Plan in 2035; however, this increase would not generate substantial emissions that would result in a violation of air quality standards. Further, with implementation of the proposed ECAS measures, VMT would be reduced substantially below the current General Plan. This reduction in VMT would ensure the project would not conflict with the air quality assumptions in any of the plans adopted for the purpose of reducing air quality emissions. Additionally, the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan proposes implementation of reasonably available control measures. Control measures included in the Plan include Intelligent Transportation System (ITS) Projects, Park and Ride Lots/Transit Centers, Transit Service Funding Programs, Transportation Demand project funding, the Spare the Air Program, and the Urban

[6] SMAQMD, et.al., December 2008. *Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan.*

Forest Development Program. The Plan also includes local regulatory measures including architectural coating, automotive refinishing, degreasing/solvent cleaning, graphic arts, natural gas production, and large water heaters. The measures outlined in the Plan are not specifically applicable to Vacaville's General Plan. Therefore, the proposed General Plan and ECAS would be consistent with the MTP and clean air plans, and the impact would be *less than significant*.

ii. Triennial Assessment and Plan Update

The 2006 and 2009 Triennial Assessment and Plan Update includes control measures that focus on emission sources that are regulated by YSAQMD, including stationary sources and some area-wide sources. The Plan includes rules and regulations to reduce emissions from agricultural sources, industrial sources, and from vehicle emissions. The proposed project would implement vehicle emission reduction measures through its ECAS measures.

Through commitments in the Plan, in order to achieve a reduction in ozone precursor emissions, the YSAQMD is committed to implementing feasible measures to obtain future emission reductions. Similar to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan, these commitments include controls on architectural coatings, industrial and commercial boilers, steam generators and heaters, graphic arts, internal combustion engines, and large water heaters. Implementation of the proposed General Plan and ECAS would not conflict with the fulfillment of these commitments. The project would contribute to a reduction in air emissions by implementing measures that would reduce regional VMT. Therefore, the project would not conflict with plans adopted for the purpose of reducing air pollutant emissions, and the impact would be *less than significant*.

b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

This section considers potential impacts from violations of air quality standards for criteria air pollutants, construction emissions, and carbon monoxide hotspots.

i. Criteria Air Pollutant Analysis

Mobile and area air pollutant sources resulting from development allowed by the proposed General Plan could create long-term air quality impacts. Mobile source emissions result from vehicle trips generated by development allowed by the proposed General Plan, and result in air pollutant emissions that affect the entire air basin.

Regional emissions under existing (2008) conditions and emissions associated with vehicle trips generated by the proposed General Plan in 2035 were calculated using the Air Resources Board's Emission Factors (EMFAC) 2011 model. The results are presented in Table 4.3-4. EMFAC 2011 uses vehicle population, trips, and VMT to estimate regional motor vehicle emissions.

Citywide VMT data were used as an input to the EMFAC 2011 model. See Chapter 4.14, Traffic and Transportation, for a description of the assumptions included in the 2035 traffic conditions.

TABLE 4.3-4 **REGIONAL EMISSIONS FROM THE PROPOSED GENERAL PLAN IN 2035**

	ROG (Tons/Year)	NO_x (Tons/Year)	PM_{10} (Pounds/Day)
Existing General Plan (2008 Conditions)	483	2,057	540
Proposed General Plan (2035 Conditions)	238	809	700
Existing General Plan (2035 Conditions)[a]	238	805.8	680
Net New Emissions	**-245**	**-1,248**	**160**
YSAQMD Significance Threshold	**10.0**	**10.0**	**80.0**
Exceed?	No	No	Yes

[a] Existing General Plan 2035 emissions are presented for informational purposes only. The impact analysis in this section is based on a comparison between existing conditions and conditions under the proposed General Plan.
Source: LSA Associates, Inc., 2012.

Table 4.3-4 identifies the daily emissions associated with the project for ROG and NO_x (the two precursors of ozone), and PM_{10}. YSAQMD has established thresholds of significance for ROG and NO_x of 10 tons per year and for PM_{10} of 80 pounds per day. The proposed project emissions shown in Table 4.3-4 would exceed these thresholds of significance for PM_{10} due to the increase in traffic that would occur in 2035 compared to existing conditions. ROG and NO_x emissions would be reduced under the proposed General Plan scenario due to more stringent tailpipe emission controls that would be implemented by the year 2035. However, these State and federal regulations would not result in a similar decrease in PM_{10}. The increase in PM_{10} from 540 to 700 pounds per day results from mobile source emissions associated with an increase in VMT from development allowed under the proposed General Plan. This increase of 160 pounds per day is above the YSAQMD significance threshold of 80 pounds per day and therefore, the proposed General Plan includes policies to help mitigate air impacts from mobile and area sources.

The proposed General Plan includes the following policies that would help to mitigate air quality impacts from mobile and area air pollutant sources:

- Policy COS-P12.3 encourages project designs that protect and improve air quality, and minimize direct and indirect air pollutant emissions by including components that reduce vehicle trips and promote energy efficiency.

- Policy COS-12.4 requires development projects to implement Best Management Practices (BMPs) to reduce air pollutant emissions associated with construction and operation of development projects. These practices include watering the construction site twice per day during construction and other dust suppression measures. Operational practices include street lighting, provision of bicycle parking and pedestrian connections, and tree plantings.
- Policy COS-P12.6 requires that any fireplaces in new and significantly renovated residential projects or commercial projects are pellet-fueled heaters, US EPA Phase II certified wood burning heaters, or gas fireplaces, consistent with YSAQMD requirements, which would reduce air pollutant emissions from future development projects in Vacaville.

The proposed project would have a less-than-significant impact related to the violation of ozone air quality standards and would not contribute substantially to an existing or projected air quality violation. However, it would increase PM_{10} emissions by more than 80 pounds per day and would result in a *significant* impact.

Impact AIR-1: Mobile-source air pollutant emissions associated with the proposed General Plan would exceed the significance criterion of 80 pounds per day of PM_{10}. This would be a significant project-level and cumulative impact.

Motor vehicle emissions are regulated by the California ARB and the federal EPA. Therefore, the proposed General Plan does not have the authority to reduce PM_{10} tailpipe emissions. When considering regional emissions, a change to the General Plan land use map to restrict housing growth would not necessarily lead to a reduction in VMT to a level sufficient to avoid this impact; people would still travel to and from Vacaville to work or shop, therefore the existing land use patterns would not change. In addition, the proposed ECAS includes many measures to reduce VMT in Vacaville, which would contribute to a reduction in PM_{10} emissions. No additional mitigation is available to reduce this impact, resulting in a *significant and unavoidable* impact.

ii. Construction Emissions Analysis

During construction, short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other activities. Emissions from construction equipment are also anticipated and would include CO, NO_x, ROG, directly emitted particulate matter ($PM_{2.5}$ and PM_{10}), and TACs, such as diesel exhaust particulate matter. Development allowed under the proposed General Plan would require construction, which could contribute to violations of air quality standards.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate ozone precursor emissions, CO, SO_2, and some soot particulate ($PM_{2.5}$ and PM_{10}) in exhaust emissions. If construction activities were to increase

traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction sites. However, development allowed under the proposed General Plan would allow for the construction of multiple projects citywide which could contribute to a violation of air quality standards.

The proposed General Plan includes Policy COS-P12.4, which requires that development projects implement BMPs to reduce air pollutant emissions associated with the construction and operation of the project, which is consistent with the policies and recommendations of YSAQMD. Additionally, Policy COS-P12.5 requires dust control measures as a condition of approval for subdivision maps, site plans, and all grading permits. Implementation of these policies would reduce construction-related air quality impacts associated with the proposed General Plan to a *less-than-significant* level.

iii. Carbon Monoxide (CO) Hot-Spots Analysis

Vehicular traffic generated by development allowed by the proposed General Plan would emit CO into the air along roadway segments and near intersections. As previously described, areas of vehicle congestion can create pockets of high CO concentrations, called "hot spots," affecting local sensitive receptors (e.g. residents, school children, the elderly, and hospital patients). High CO concentrations are typically associated with roadways or intersections operating with extremely high traffic volumes. According to YSAQMD, streets and intersections operating at level of service (LOS) E and F have the "potential" to create a violation of the CO standard (see Chapter 4.14, Transportation and Traffic, for a discussion of traffic LOS).

Vacaville is currently an attainment area for State and federal CO air quality standards. Monitoring data at the closest monitoring station indicate that CO concentrations are currently less than 10 percent of the State standard and projected to decline over time. A screening analysis of the 2035 CO concentrations was performed to determine CO levels for primary Vacaville roadways. The results of the analysis are shown in Table 4.3-5. It should be noted that these results include an existing background concentration of 2.9 ppm for the 1-hour concentration and 2.6 ppm for the 8-hour concentration. As demonstrated in Table 4.3-5, CO levels are generally consistent throughout Vacaville. For ease of reference, Table 4.3-5 only presents the shortest receptor distance and the highest concentration results. Results indicate that future traffic conditions under the proposed General Plan and associated vehicular emissions are not expected to result in any CO concentrations exceeding the 1-hour or 8-hour State CO standards. Roadway-related CO concentrations would be well below State standards and would not exceed standards even with increased traffic in 2035. Because State CO standards are more stringent than the federal standards, concentrations would also not exceed the federal standards. As a result, any impacts to air quality as measured by the 1--and 8-hour standards for CO concentrations would be *less than significant*.

TABLE 4.3-5 **CARBON MONOXIDE MODELING RESULTS FOR 2035**

Intersection	Receptor Distance to Road Centerline (Meters)	2035 Plus Project One-Hour CO Concentration (ppm)	2035 Plus Project Eight-Hour CO Concentration (ppm)	Exceeds State Standards	
				1-Hr	8-Hr
Brown Valley Parkway and Brown Street	7	3.2	2.6	No	No
Monte Vista Avenue and Vaca Valley Parkway	14	3.4	2.8	No	No
N. Village Parkway and Vaca Valley Parkway	15	3.3	2.7	No	No
Kaiser Driveway and Vaca Valley Parkway	14	3.7	3.0	No	No
Nut Tree Road and Orange Drive	15	3.4	2.8	No	No
Nut Tree Road and Yellowstone Drive	7	3.2	2.6	No	No
Nut Tree Road and Ulatis Drive	14	3.4	2.8	No	No
Nut Tree Road and Elmira Road	19	3.3	2.7	No	No
Nut Tree Road and Alamo Drive	15	3.3	2.7	No	No
Bel Air Drive and Alamo Drive	14	3.3	2.7	No	No
Tulare Drive and Alamo Drive	8	3.4	2.8	No	No
Peabody Road and Alamo Drive	15	3.5	2.8	No	No
Alamo Lane and Alamo Drive	7	3.4	2.8	No	No
Davis Street and Alamo Drive	7	3.3	2.7	No	No
Butcher Road and Alamo Drive	14	3.4	2.8	No	No
Note: ppm = parts per million.					
Merchant Street and Alamo Drive	15	3.3	2.7	No	No

TABLE 4.3-5 **CARBON MONOXIDE MODELING RESULTS FOR 2035**

Intersection	Receptor Distance to Road Centerline (Meters)	2035 Plus Project One-Hour CO Concentration (ppm)	2035 Plus Project Eight-Hour CO Concentration (ppm)	Exceeds State Standards	
				1-Hr	8-Hr
Davis Street and Mason Street	14	3.2	2.6	No	No
Depot Street and Mason Street	19	3.3	2.7	No	No
Davis Street and Hickory Lane	14	3.2	2.6	No	No
Orchard Avenue and Monte Vista Avenue	14	3.1	2.5	No	No
Dobbins Street and Monte Vista Avenue	14	3.3	2.7	No	No
Depot Street and Monte Vista Avenue	15	3.4	2.8	No	No
Browns Valley Parkway and Monte Vista Avenue	7	3.3	2.7	No	No
Allison Drive and Nut Tree Parkway	12	3.6	2.9	No	No
Peabody Road and Foxboro Drive	7	3.4	2.8	No	No
Peabody Road and Marshall Road	14	3.3	2.7	No	No
Peabody Road and Berryessa Drive	14	3.3	2.7		
Peabody Road and Cliffside Drive	14	3.4	2.8	No	No
Peabody Road and Elmira Road	14	3.5	2.8	No	No
Allison Drive and Elmira Road	14	3.4	2.8	No	No
Note: ppm = parts per million.					
Vanden Road and Alamo Drive	14	3.2	2.6	No	No
Orange Drive and Lawrence Drive	14	3.2	2.6	No	No

TABLE 4.3-5 **CARBON MONOXIDE MODELING RESULTS FOR 2035**

Intersection	Receptor Distance to Road Centerline (Meters)	2035 Plus Project One-Hour CO Concentration (ppm)	2035 Plus Project Eight-Hour CO Concentration (ppm)	Exceeds State Standards	
				1-Hr	8-Hr
Browns Valley Parkway and Vaca Valley Parkway	14	3.1	2.5	No	No
Browns Valley Parkway and Allison Drive	14	3.1	2.5	No	No
Allison Drive and Ulatis Drive	7	3.4	2.8	No	No
Leisure Town Road and Orange Drive	15	3.6	2.9	No	No
Leisure Town Road and Elmira Road	14	3.6	2.9	No	No
Vanden Road and Leisure Town Road	7	3.4	2.8	No	No
Leisure Town Road and Alamo Drive	14	3.5	2.8	No	No
Leisure Town Road and Ulatis Drive	14	3.5	2.8	No	No
Leisure Town Road and Sequoia Drive	14	3.5	2.8	No	No
Airport Road and Monte Vista Avenue	14	3.1	2.5	No	No
Leisure Town Road and Marshall Road	14	3.4	2.8	No	No
Davis Street and Hume Way	7	3.3	2.7	No	No
Cherry Glen Road and Rivera Road	14	3.0	2.5	No	No
Note: ppm = parts per million.					
Pleasant Valley Road and Cherry Glen Road	7	3.1	2.5	No	No
Lyon Road and Lagoon Valley Road	7	3.1	2.5	No	No
Allison Drive and Monte Vista Avenue	15	3.7	3.0	No	No

TABLE 4.3-5 **CARBON MONOXIDE MODELING RESULTS FOR 2035**

Intersection	Receptor Distance to Road Centerline (Meters)	2035 Plus Project One-Hour CO Concentration (ppm)	2035 Plus Project Eight-Hour CO Concentration (ppm)	Exceeds State Standards	
				1-Hr	8-Hr
Leisure Town Road and Midway Road	14	3.1	2.5	No	No
Orange Drive and Orange Tree	7	3.1	2.5	No	No
Marshall Road and Alamo Drive	14	3.5	2.8	No	No
Pleasant Valley Road and Foothill Drive	14	3.1	2.5	No	No
Meridian Road and Midway Road	14	3.1	2.5	No	No
Eubanks Drive and Vaca Valley Parkway	14	3.1	2.5	No	No
Oday Road and Midway Road	14	3.1	2.5	No	No
Eubanks Drive and Midway Road	7	3.1	2.5	No	No
Lewis Road and Midway Road	7	3.1	2.5	No	No
Mariposa Avenue and Alamo Drive	14	3.3	2.7	No	No
Nut Tree Road and Monte Vista Avenue	14	3.4	2.8	No	No

Note: ppm = parts per million. Includes background concentration of 2.9 ppm for 1-hour and 2.6 ppm for 8-hour measured at the Vallejo Air Monitoring Station.
Source: LSA Associates, Inc., 2012.

c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors).

CEQA defines cumulative impacts as two or more individual effects which, when considered together, are either significant or "cumulatively considerable," meaning they add considerably to a significant environmental impact. Cumulative impacts can result from individually minor but collectively significant projects (CEQA Guidelines Section 15355). Project emissions that are not consistent with the air quality attainment plan (AQAP) or SIP, or that exceed YSAQMD thresholds, will have a significant cumulative impact unless offset.

Vacaville and the Yolo-Solano County region is in a designated non-attainment area for O_3. YSAQMD has prepared an AQAP to address attainment of the State and federal O_3 air quality standards. This plan projects growth in O_3 precursor emissions and establishes regional controls on stationary, area, and transportation sources of air pollution in order to offset O_3 precursor emission growth. Development allowed by the proposed General Plan would not exceed O_3 precursor emissions (ROG and NOx) above the individual thresholds, as shown in Table 4.3-4. The AQAP accommodates the growth anticipated under the proposed General Plan. The proposed General Plan is therefore consistent with the AQAP and would not have a significant cumulative impact on regional air quality.

In addition, implementation of the policies included in the proposed General Plan under Goal COS-12 to reduce air pollutant emissions would have a cumulative beneficial impact on criteria air pollutants. However, as shown in Table 4.3-4, PM_{10} emissions would exceed the project-level threshold and would therefore be cumulatively *significant*.

This significant impact is covered under Impact AIR-1 in Section D.1.b, Violate Any Air Quality Standard or Contribute Substantially to an Air Quality Violation.

d. Expose sensitive receptors to substantial pollutant concentrations.

As shown in Table 4.3-5, the proposed General Plan would not result in the generation of substantial concentrations of CO. Other emissions associated with the project are regional in nature and would not be expected to generate substantial pollutant concentrations. The primary pollutants of concern are Toxic Air Contaminants (TACs).

According to data from CARB there are approximately 300 different TACs emitted in the State of California.[7] Many facilities, such as solvent-based dry cleaners, produce toxic emissions, but existing controls often reduce impacts from these sources to less-than-significant levels.

When evaluating potential impacts relating to TACs, lead agencies should consider situations in which (1) a new or modified source of TACs is proposed for a location near an existing residential area or other sensitive receptor, and (2) a residential development or other sensitive receptor is proposed for a site near an existing source of TACs. Jurisdictions must use detailed analyses to determine the potential risk and feasible control measures when considering siting a source of toxic emissions near sensitive receptors. YSAQMD reviews the potential for TAC emissions from new and modified stationary sources through the permitting process. TAC emissions from existing stationary sources are limited by:

- District adoption and enforcement of rules aimed at specific types of sources known to emit high levels of TACs;
- Implementation of the Air Toxics "Hot Spots" (Assembly Bill 2588) Program; and
- Implementation of the federal Title III Toxics program.

The Air Quality and Land Use Handbook[8] developed by CARB is intended to serve as a general reference guide for evaluating and reducing air pollution impacts associated with new development. CARB Handbook indicates that mobile sources continue to be the largest overall contributors to the State's air pollution problems, representing the greatest air pollution health risk to most Californians. The most serious pollutants on a Statewide basis include diesel PM, benzene, and 1,3-butadiene, all of which are emitted by motor vehicles. Additional sources include distribution centers, rail yards, ports, refineries, chrome platers, dry cleaners, and gasoline dispensing facilities. The CARB Handbook recommends that planning agencies strongly consider proximity to these sources when finding new locations for sensitive land uses, such as residential uses, hospitals and nursing/convalescent homes, hotels and lodging, schools and day care centers, and neighborhood parks. The CARB Handbook specifically states that these recommendations are advisory and acknowledges that land-use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality-of-life issues.

The proposed General Plan includes Policy COS-P12.8, under which the City would evaluate development projects with sensitive receptors proposed in proximity to stationary or mobile air pollutant sources to ensure that sensitive receptors would not be exposed to an increased cancer risk or to ground-level concentrations of non-carcinogenic toxic air contaminants. In addition,

[7] ARB, March 2009, *California Toxics Inventory*.

[8] California Air Resources Board, 2005, *Air Quality and Land Use Handbook: A Community Health Perspective*.

the proposed General Plan includes Action COS-A12.1, under which the City would amend the Land Use and Development Code to identify land use sources of toxic air contaminants and sensitive users.

During construction and agricultural operations allowed by the proposed General Plan, various diesel-powered vehicles and equipment would be in use. In 1998, CARB identified all particulate matter (PM_{10} and $PM_{2.5}$) from diesel-fueled engines as a TAC. CARB has completed a risk management process that identifies potential cancer risks for a range of activities using diesel-fueled engines.[9]

Health risks from TACs are a function of both concentration and duration of exposure. Unlike some of the types of air pollutant sources discussed above, 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 at a substantial distance from nearby receptors. Because of their short duration, health risks from construction emissions of diesel PM would be a *less-than-significant* impact.

Health risks from agriculture are regulated under YSAQMD rules and regulations. Specifically, agriculture is regulated under Regulation 11, Agriculture Sources. New agricultural activities in the EIR Study Area would be subject to these rules and regulations, which ensure health risks to sensitive receptors from this and other industries are minimized to a *less-than-significant* level.

New development projects that would place sensitive receptors near a stationary or mobile TAC source at distances within 500 feet would be considered to have an elevated risk. Stationary TAC sources are regulated under YSAQMD permitting programs, including Regulation 3, Toxics New Source Review, and Regulation 9, State Designated Toxic Sources. In addition, proposed General Plan Policy COS-P12.7 would require that stationary air pollutant emission sources, such as factories, be located more than 500 feet and/or downwind from residential areas and other sensitive receptors.

Mobile sources of TACs are largely unregulated and can contribute to elevated health risks when located near receptors, particularly concentrations of dense residential uses, such as a residential subdivision. Primary mobile TAC sources include truck traffic on freeways and sources that attract diesel truck traffic, such as warehousing facilities or truck stops. Trains are also a source of mobile TACs; however, emissions from moving trains on a through rail line do not release substantial concentrations of emissions. Substantial train emission concentrations form under idling conditions, such as at a rail yard or train stop. A freight and passenger rail line is located on the

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

eastern side of Vacaville, but all trains are through trains within Vacaville and therefore would not be a significant source of TACs.

Proposed General Plan Policy COS-P12.8 would require an evaluation of any proposed residential development, or other proposed sensitive receptor within 500 feet of a stationary or mobile air pollutant source, to ensure sensitive receptors would not be exposed to an increased cancer risk or to high ground-level concentrations of non-carcinogenic TACs. Proposed General Plan Policy COS-P12.9 would also ensure that sensitive receptors are not exposed to substantial levels of pollutant concentrations, by establishing appropriate land-use buffer zones around new sources of TACs that pose substantial health risks. The combination of these proposed General Plan policies, in conjunction with compliance with existing regulatory programs, would ensure that impacts related to an increase in exposure of sensitive receptors to TACs from development allowed by the proposed General Plan would be *less than significant*.

e. Create objectionable odors affecting a substantial number of people.

This section evaluates potential odor impacts associated with the proposed General Plan, and which could result from either new sources of odor locating near existing receptors, or new receptors locating near existing odor sources. It is unknown at this point what types of and locations for specific establishments could be developed under the proposed General Plan, and it is possible that some uses, such as restaurants, would produce odors. Some objectionable odors may also be generated from the operation of diesel-powered construction equipment and/or asphalt paving during the construction period of individual projects. However, these odors would be short-term in nature and would not result in permanent impacts to surrounding land uses, including sensitive receptors within and adjacent to the project site.

YSAQMD is responsible for enforcing the provisions of California Health and Safety Code Section 41700, which prohibits the discharge of anything that could endanger the comfort or health of the public. Nuisance odors are regulated by this section, although certain odors are exempted, such as odors from agricultural activities and composting facilities. YSAQMD enforces Section 41700 through its nuisance rule. Any actions related to odors are based on citizen complaints to local governments and YSAQMD.

According to YSAQMD, odor complaint records in the past regarding odors from the Vacaville area have been minimal. On June 6, 2007 and August 16, 2007, complaints from the nearby town of Elmira were filed with YSAQMD regarding odors from the nearby wastewater treatment plant. The Easterly Wastewater Treatment Plant (Easterly WWTP) was expanded in 2004 to increase the treatment capacity through the development of new facilities. Then in 2010, the Easterly WWTP Tertiary Treatment Project was approved for additional facility upgrades. Even though the 2004 expansion project included measures to reduce odor generation through both

on-site and off-site improvements, resulting in an overall net decrease in odor emissions at the Easterly WWTP, the odor complaints were registered most likely due to treatment facilities in the North Plant of the Easterly WWTP, which still lacked odor control due to the age of the structures. The 2010 upgrades replaced these structures and relocated other sources of odors associated with the plant to other areas to minimize odors.[10]

On August 26, 2008, a complaint on Mason Street in Vacaville was filed for odors from an unpermitted auto body shop. The shop is now permitted and in compliance with YSAQMD odor regulations. Additionally, there was one complaint from Wakefield Drive on June 8, 2009 for paint odors from a residential garage; however, the homeowner was not in violation of any YSAQMD rules.

Based on the information provided by YSAQMD, there is not enough evidence to suggest that there are existing significant impacts from odors from any one source or that any mitigating action should be taken based on these previous complaints. Therefore, implementation of the proposed General Plan would neither introduce new people into an area significantly impacted by existing odors, nor would it create odors affecting a substantial number of people. The impact would be *less than significant*.

2. Cumulative Impacts

As discussed above, air pollution is a regional issue affected by climate, land use, and topography. Development projects from the past, present, and future contribute to the region's adverse air quality impacts on a cumulative basis because air pollutants, once emitted at a particular location, move throughout the atmosphere and air basin. If a project's contribution at the individual level is considerable, then the project's cumulative impact on air quality would also be considered significant.

The analysis presented in Section D.1, Project Impacts, discusses air quality conditions related to implementation of the proposed General Plan, as well as the General Plan's conformance with regional clean air plans, which are the region's plan for attaining air quality standards and accounts for future cumulative regional growth. Therefore, consistency with the Clean Air Plan would indicate the project would not result in a cumulative air quality impact. The proposed General Plan includes policies that reduce air emissions and would be in compliance with the Clean Air Plan. Therefore, cumulative impacts would be *less than significant*.

However, as discussed above, implementation of the project would result in significant PM_{10} emissions due to mobile source emissions associated with project VMT. This impact, in combi-

[10] AES, 2010, *Easterly WWTP Tertiary Project Draft EIR*.

nation with increased PM_{10} emissions from regional development throughout Solano County, would be considered *significant*.

This significant impact is covered under Impact AIR-1 in Section D.1.b, Conflict with or Obstruct Implementation of the Applicable Air Quality Plan. Because there is no feasible mitigation measure, both the project impact and the cumulative impact are considered *significant and unavoidable*.

E. Full Buildout

The full buildout anticipated under the proposed General Plan would include significantly more development than the 2035 horizon-year development projection analyzed in Section D, Impact Discussion, in terms of both the amount and the extent of development. As a result, air quality-related impacts would be more significant than those identified in this analysis. However, as discussed in Chapter 3, Project Description, it is extremely unlikely that full buildout would ever occur under the proposed General Plan. Therefore, an analysis of full buildout is not required by CEQA.