4.2 AIR QUALITY

This chapter summarizes information on air quality in the San Carlos city limit and Sphere of Influence (SOI) and provides an evaluation of the effects the Draft 2030 General Plan and Climate Action Plan (CAP) would have on air quality. Table 4.2-1 provides a list of acronyms used throughout this section.

The ambient air quality in a given area depends on the quantities of pollutants emitted within the area, transport of pollutants to and from surrounding areas, local and regional meteorological conditions, and the topography of the surrounding air basin. Air quality is described by the concentration of various pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is determined by comparing the concentration to an appropriate ambient air quality standard. The standards represent the allowable pollutant concentrations designed to ensure that the public health and welfare are protected, while including a reasonable margin of safety to protect the more sensitive individuals in the population.

A. Regulatory Framework

The federal Clean Air Act governs air quality in the United States. In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulations under the California Clean Air Act. At the federal level, the United States Environmental Protection Agency (EPA) administers the Clean Air Act (CAA). The California Clean Air Act is administered by the California Air Resources Board (CARB) at the State level and by the Air Quality Management Districts at the regional and local levels. The Bay Area Air Quality Management District (BAAQMD) regulates air quality at the county level.

1. Federal Laws and Regulations

The EPA is responsible for enforcing the federal CAA. The EPA is also responsible for establishing the National Ambient Air Quality Standards

TABLE 4.2-1 **LIST OF ACRONYMS**

Acronym	Definition
$\mu g/m^3$	micrograms per cubic meter
ABAG	Association of Bay Area Governments
BAAQMD	Bay Area Air Quality Management District
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAP	Clean Air Plan
CARB	California Air Resources Board
CARE	Community Air Risk Evaluation
CO	carbon monoxide
DPM	diesel particulate matter
EPA	Environmental Protection Agency
LOS	level of service
MTBE	methyl tert buytl ether
MTC	Metropolitan Transportation Commission
NAAQS	National Ambient Air Quality Standards
NO	nitric oxide
NO_2	nitrogen dioxide
NOx	nitrogen oxides
O_3	ozone
Pb	lead
PM, PM_{10}, $PM_{2.5}$	particulate matter (10 and 2.5 = micron diameter)
ppm	parts per million
ROG	reactive organic gases
SIP	State Implementation Plan
SO_2	sulfur dioxide
SOI	Sphere Of Influence
TACs	toxic air contaminants
TCMs	transportation control measures
TDM	transportation demand management
VMT	vehicle miles traveled

(NAAQS). The NAAQS are required under the 1977 CAA and subsequent amendments. The EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships and certain types of locomotives. The EPA has jurisdiction over emission sources outside state waters (e.g. beyond the outer continental shelf) and establishes various emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission standards established by the CARB.

2. State Laws and Regulations

a. California Air Resources Board

In California, the CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for meeting the State requirements of the federal CAA, administering the California CAA and establishing the California Ambient Air Quality Standards (CAAQS). The California CAA, as amended in 1992, requires all air districts in the State to endeavor to achieve and maintain the CAAQS. The CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles. The CARB regulates mobile air pollution sources, such as motor vehicles. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. The CARB established passenger vehicle fuel specifications, which became effective on March 1996. The CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level.

b. Assembly Bill (AB) 32

This law requires that the State's global warming emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on global warming emissions that will be phased in starting in 2012. AB 32 directs the CARB to develop appropriate regulations and establish a mandatory reporting system to track and monitor global

warming emissions levels.[1] Greenhouse gas emissions are discussed in detail in Section 4.14.

3. Bay Area Air Quality Management District

In 1955, the California Legislature created the BAAQMD. The agency is primarily responsible for assuring that the national and State ambient air quality standards are attained and maintained in the Bay Area. The BAAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle greenhouse gas emissions, conducting public education campaigns, as well as many other activities.

B. Air Pollutants and Ambient Air Quality Standards[2]

The federal Clean Air Act required the EPA to set NAAQS for different pollutants. The NAAQS were established by the federal Clean Air Act of 1970 (amended in 1977 and 1990) for six criteria pollutants. These criteria pollutants include carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), particulate matter with a diameter less than 10 microns (PM_{10}), sulfur dioxide (SO_2) and lead (Pb). Recently, fine particulate matter or $PM_{2.5}$ was added as a criteria pollutant. Air quality studies generally focus on five pollutants that are most commonly measured and regulated: CO, O_3, NO_2, SO_2 and suspended particulate matter (i.e. PM_{10} and $PM_{2.5}$).

California established ambient air quality standards as early as 1969 through the Mulford-Carrol Act. Pollutants regulated under the California Clean Air

[1] AB 32 Fact Sheet, www.arb.ca.gov/cc/factsheets/ab32factsheet.pdf, accessed on May 21, 2009.

[2] U.S. Environmental Protection Agency's website. http://www.epa.gov/air/criteria.html, accessed on May 21, 2009.

Act are similar to those regulated under the federal Clean Air Act. In many cases, California standards are more stringent than the national ambient air quality standards. Federal and State air quality standards are shown in Table 4.2-2. Both the national and California ambient air quality standards have been adopted by the BAAQMD.

i. Carbon Monoxide

Carbon monoxide (CO), a colorless and odorless gas, interferes with the transfer of oxygen to the brain. It can cause dizziness and fatigue, and can impair central nervous system functions. CO is emitted almost exclusively from the incomplete combustion of fossil fuels. Automobile exhaust and residential wood burning in fireplaces and woodstoves emit most of the CO in the Bay Area. CO is a non-reactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. The highest CO concentrations are typically recorded during the winter.

ii. Ozone

Ground-level O_3 is the principal component of smog. Ozone is not directly emitted into the atmosphere, but instead forms through a photochemical reaction of reactive organic gases (ROG) and nitrogen oxides (NO_X), which are known as O_3 precursors. Ozone levels are highest from late spring through autumn when precursor emissions are high and meteorological conditions are warm and stagnant. Motor vehicles create the majority of reactive organic gas and nitrogen oxide emissions in the Bay Area. Exposure to levels of O_3 above current ambient air quality standards can lead to human health effects such as lung inflammation and tissue damage and impaired lung functioning. Ozone exposure is also associated with symptoms such as coughing, chest tightness, shortness of breath and the worsening of asthma symptoms. The greatest risk for harmful health effects belongs to outdoor workers, athletes, children and others who spend greater amounts of time outdoors during smoggy periods.

TABLE 4.2-2 **STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Time	State Standards	Federal Standards	
			Primary[a]	Secondary[b]
Ozone	8-hour	0.07 ppm[c] (137 $\mu g/m^3$)[d]	0.08 ppm (157 $\mu g/m^3$)	—
	1-hour	0.09 ppm (180 $\mu g/m^3$)	—[e]	Same as primary
Carbon monoxide	8-hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	—
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—
Nitrogen dioxide	Annual	—	0.053 ppm (100 $\mu g/m^3$)	Same as primary
	1-hour	0.25 ppm (470 $\mu g/m^3$)	—	—
Sulfur dioxide	Annual	—	0.03 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 (1,300 $\mu g/m^3$)
	1-hour	0.25 ppm (655 $\mu g/m^3$)	—	—
PM_{10}	Annual	20 $\mu g/m^3$ (geometric mean)	—[f]	Same as primary
	24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	Same as primary
$PM_{2.5}$	Annual	12 $\mu g/m^3$	15 $\mu g/m^3$	—
	24-hour	—	35 $\mu g/m^3$	—
Lead	Calendar quarter	—	1.5 $\mu g/m^3$	Same as primary
	30-day average	1.5 $\mu g/m^3$	—	—

Notes: Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis. (a) Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the EPA. (b) Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. (c) ppm: parts per million. (d) ug/m3: Micrograms per Cubic Meter. (e) The national 1-hour O_3 standard was revoked by the US EPA on June 15, 2005. (f) The annual PM_{10} standard was revoked by the US EPA on September 21, 2006 and a new PM 2.5 24-hour standard was established.
Source: CARB, 2005.

Elevated O_3 levels can reduce crop and timber yields, as well as damage native plants. Ozone can also damage materials such as rubber, fabrics and plastics. In April 2005, the California Air Resources Board approved a new eight-hour standard of 0.070 ppm and retained the one-hour O_3 standard of 0.09 ppm after an extensive review of the scientific literature. Evidence from the reviewed studies indicates that significant harmful health effects could occur among both adults and children if exposed to levels above these standards. In 2008, the U.S. EPA revised the 8-hour standard to 0.075 ppm for 8-hour exposures.

iii. Nitrogen Dioxide

Nitrogen dioxide (NO_2), a reddish-brown gas, irritates the lungs. It can cause breathing difficulties at high concentrations. Like O_3, NO_2 is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as nitrogen oxides (NO_x) and are major contributors to O_3 formation. NO_2 also contributes to the formation of PM_{10} (see discussion of PM_{10} below). Levels of NO_2 in the Bay Area are relatively low.

iv. Sulfur Dioxide

Sulfur dioxide (SO_2) is a colorless gas with a strong odor and potential to damage materials. It is produced by the combustion of sulfur containing fuels such as oil and coal. Refineries, chemical plants, and pulp mills are the primary industrial sources of sulfur dioxide emissions. Sulfur dioxide concentrations in the Bay Area are well below the ambient standards, and therefore, are not a concern to regulators in San Carlos. Adverse health effects associated with exposure to high levels of sulfur dioxide include aggravation of chronic obstruction lung disease and increased risk of acute and chronic respiratory illness.

v. Lead

Lead (Pb) occurs in the atmosphere as particulate matter. It was primarily emitted by gasoline-powered motor vehicles, although the use of lead in fuel has been virtually eliminated. Because of lead being eliminated from fuels,

levels in the Bay Area have dropped dramatically. Lead concentrations in the Bay Area are well below the ambient standards.

vi. Suspended Particulate Matter (PM)

Particulate matter (PM) is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, and dust. Particles 10 microns or less in diameter are defined as "respirable particulate matter" or "PM_{10}." Fine particles are 2.5 microns or less in diameter ($PM_{2.5}$) and can contribute significantly to regional haze and reduction of visibility. Inhalable particulates come from smoke, dust, aerosols and metallic oxides. Although particulates are found naturally in the air, most particulate matter found in the area are emitted either directly or indirectly by motor vehicles, industry, construction, agricultural activities and wind erosion of disturbed areas. Most $PM_{2.5}$ is comprised of combustion products such as smoke. Extensive research reviewed by CARB indicates that exposure to outdoor PM_{10} and $PM_{2.5}$ levels exceeding current ambient air quality standards is associated with increased risk of hospitalization for lung and heart-related respiratory illness, including emergency room visits for asthma. PM exposure is also associated with increased risk of premature deaths, especially in the elderly and people with pre-existing cardiopulmonary disease. In children, studies have shown associations between PM exposure and reduced lung function and increased respiratory symptoms and illnesses. Besides reducing visibility, the acidic portion of PM (nitrates, sulfates) can harm crops, forests, aquatic and other ecosystems. In June 2002, the CARB adopted new ambient air quality standards for PM_{10} and $PM_{2.5}$, resulting from an extensive review of the health-based scientific literature. The U.S. EPA recently updated the 24-hour standard for $PM_{2.5}$ and eliminated the annual PM_{10} standard.

vii. Toxic Air Contaminants

Toxic Air Contaminants (TACs) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer) and include, but are not limited to, the criteria air pollutants listed above. TACs are found

in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion and commercial operations (e.g. dry cleaners). TACs are typically found in low concentrations, even near their source (e.g. diesel particulate matter and benzene near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, State and federal level. CARB has identified the particulate portion of diesel exhaust, or diesel particulate matter (DPM) as a TAC. Diesel exhaust is the predominant TAC in urban air and is estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average). Diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the State's Proposition 65 or under the federal Hazardous Air Pollutants program. California has adopted a comprehensive diesel risk reduction program. The U.S. EPA has adopted low sulfur diesel fuel standards that will reduce diesel particulate matter substantially, which went into effect in June 2006. CARB recently adopted regulations that require fleet owners of off-road construction equipment or on-road trucks to retrofit or replace their fleets to reduce the overall DPM emissions.

In cooler weather, smoke from residential wood combustion can be a source of TACs. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind, the pollution can persist for many hours. This occurs in sheltered valleys during the winter. Wood smoke also contains a significant amount of PM_{10} and $PM_{2.5}$. Wood smoke is an irritant and is implicated in worsening asthma and other chronic lung problems.

C. Existing Conditions

San Carlos is located in the western portion of the San Francisco Bay Area Air Basin. The basin includes the counties of San Francisco, Santa Clara, San Mateo, Marin, Napa, Contra Costa, Alameda, along with the southeast por-

tion of Sonoma County and the southwest potion of Solano County. The local air quality regulatory agency responsible for this basin is the BAAQMD.

1. Regional Climate and Meteorological Conditions

The climate of San Carlos is characterized by warm dry summers and cool moist winters. The proximity of the San Francisco Bay and Pacific Ocean has a moderating influence on the climate. San Carlos is located in the Peninsula climate sub region of the Bay Area.

The major large-scale weather feature controlling the area's climate is a large high pressure system located in the eastern Pacific Ocean, known as the Pacific High. The strength and position of the Pacific High varies seasonally. It is strongest during summer and located off the west coast of the United States. Large-scale atmospheric subsidence associated with the Pacific High produces an elevated temperature inversion along the West Coast. The base of this inversion is usually located from 1,000 to 3,000 feet above mean sea level, depending on the intensity of subsidence and the prevailing weather condition. Vertical mixing is often limited to the base of the inversion, trapping air pollutants in the lower atmosphere. Marine air trapped below the base of the inversion is often condensed into fog or stratus clouds by the cool Pacific Ocean. This condition is typical of the warmer months of the year from roughly May through October. Stratus-type clouds usually form offshore and move into the Bay Area during the evening hours. Stratus also forms over the San Francisco Bay during the evening hours. Stratus cover over the Peninsula, including San Carlos, is common during late night and early morning hours. As the land warms the following morning, the clouds often dissipate. The stratus then redevelops and moves inland late in the day along with an increase in winds. Otherwise, clear skies and dry conditions prevail during summer.

As winter approaches, the Pacific High becomes weaker and shifts south, allowing weather systems associated with the polar jet stream to affect the region. Low pressure systems produce periods of cloudiness, strong shifting winds, and precipitation. The number of days with precipitation can vary

greatly from year to year, resulting in a wide range of annual precipitation totals. Precipitation is generally lowest along the Bay with much higher amounts occurring along south and west facing mountain slopes that are west of San Carlos. San Carlos, which lies mostly on the lee side of the coastal mountains in San Mateo County, receives about 15 to 20 inches of precipitation annually. Mountains to the west receive 30 to 40 inches. Most of the rainfall occurs from November through April. High-pressure systems are also common in winter with low-level inversions that trap and produce cool stagnant conditions. Radiation fog and haze trapped near the surface are common during extended winter periods where high-pressure systems influence the weather.

The proximity of the eastern Pacific High and relatively lower pressure inland produces a prevailing westerly sea breeze along the central and northern California coast for most of the year. As this wind is channeled through the Golden Gate and other topographical gaps to the west, it branches off to the northeast and southeast, following the general orientation of the San Francisco Bay system. Marine air penetrates the eastern Peninsula mainly from the northwest and through gaps in the lower mountains. The prevailing wind in most of San Carlos is primarily from a northwest direction, especially during spring and summer. In winter, winds become variable with more of a southeasterly orientation. Nocturnal winds and land breezes during the colder months of the year prevail with variable drainage out of the mountainous areas. Wind speeds are highest during the spring and early summer and lightest in fall. Winter storms bring relatively short episodes of strong southerly winds.

Temperatures in San Carlos tend to be less extreme compared to inland locations due to the moderating effect of the Pacific Ocean and the Bay. High temperatures are generally in the upper 70s in the summer and in the 50s during winter. Low temperatures range from the 50s in summer to the 30s in winter.

2. Air Pollution Potential

For the most part, San Carlos enjoys good air quality due to the almost persistent northwesterly flow of air. Episodes of high particulate levels can occur in late fall and winter when the Pacific High can combine with high pressure over the interior regions of the western United States (known as the Great Basin High) to produce extended periods of light winds and low-level temperature inversions. Although less common, this pattern in summer can produce fair weather and very warm temperatures throughout the Bay Area. This condition frequently produces poor atmospheric mixing that results in degraded regional air quality. Ozone standards traditionally are exceeded in downwind portions of the Bay Area when this condition occurs during the warmer months of the year. Emissions from most of the Bay Area, including San Carlos, contribute to O_3 ambient air quality violations that occur on up to about 20 days per year.

3. Air Quality Conditions

Air quality is affected by the rate of pollutant emissions and by meteorological conditions such as wind speed, atmospheric stability, and mixing height, all of which affect the atmosphere's ability to mix and disperse pollutants. Long-term variations in air quality typically result from changes in air pollutant emissions, while short-term variations result from changes in atmospheric conditions.

a. Existing Air Pollutant Levels

The BAAQMD monitors air pollutant levels continuously throughout the nine-county Bay Area Air Basin. The nearest air monitoring station to San Carlos is located in Redwood City at 897 Barren Avenue. A summary of air quality monitoring data is shown in Table 4.2-3. The values in the table are the highest air pollutant levels measured at these stations over the past five years (2003 to 2007). The number of days that measured concentrations exceeded the NAAQS or CAAQS are given in Table 4.2-4.

TABLE 4.2-3 **HIGHEST MEASURED AIR POLLUTANT CONCENTRATIONS**

Pollutant	Average Time	Measured Air Pollutant Levels 2003	2004	2005	2006	2007
Redwood City						
O_3	1-Hour	**0.11** ppm	**0.10** ppm	0.084 ppm	0.085 ppm	0.077 ppm
	8-Hour	0.08 ppm	0.07 ppm	0.061 ppm	0.063 ppm	0.069 ppm
CO	8-Hour	2.6 ppm	2.1 ppm	2.3 ppm	2.4 ppm	2.3 ppm
NO_2	1-Hour	0.08 ppm	0.06 ppm	0.06 ppm	0.07 ppm	0.06 ppm
	Annual	0.015ppm	0.015 ppm	0.015ppm	0.014ppm	0.013ppm
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	34 ug/m^3	36 ug/m^3	31 ug/m^3	**75** ug/m^3	**45** ug/m^3
	Annual	9 ug/m^3	9 ug/m^3	9 ug/m^3	10 ug/m^3	10 ug/m^3
Respirable Particulate Matter (PM_{10})	24-Hour	38 ug/m^3	**65 ug/m^3**	**81 ug/m^3**	**70** ug/m^3	**56** ug/m^3
	Annual	20 ug/m^3	**21 ug/m^3**	**21 ug/m^3**	20 ug/m^3	20 ug/m^3
Bay Area (Basin Summary)						
O_3	1-Hour	**0.12** ppm	**0.11** ppm	**0.12** ppm	**0.12** ppm	**0.12** ppm
	8-Hour	**0.10** ppm	**0.08** ppm	**0.09** ppm	**0.11 ppm**	**0.09 ppm**
CO	8-Hour	4.0 ppm	3.4 ppm	3.1 ppm	2.9 ppm	2.7 ppm
NO_2	1-Hour	0.09 ppm	0.07 ppm	0.07 ppm	0.11 ppm	0.07 ppm
	Annual	0.021ppm	0.019ppm	0.019ppm	0.018ppm	0.017ppm
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	56 ug/m^3	52 ug/m^3	55 ug/m^3	**75** ug/m^3	**58** ug/m^3
	Annual	12 ug/m^3	12 ug/m^3	12 ug/m^3	11 ug/m^3	11 ug/m^3
Respirable Particulate Matter (PM_{10})	24-Hour	**60** ug/m^3	**65** ug/m^3	**81** ug/m^3	**73** ug/m^3	**78** ug/m^3
	Annual	**25** ug/m^3	**26** ug/m^3	**24** ug/m^3	**23** ug/m^3	**26** ug/m^3

Notes: ppm = parts per million ug/m^3 = micrograms per cubic meter NA = data not available.
Values reported in **bold** exceed ambient air quality standard.

Source: BAAQMD Air Pollutant Summaries for 2003, 2004, 2005, 2006, 2007.

TABLE 4.2-4 **SUMMARY OF MEASURED AIR QUALITY EXCEEDANCES**

Pollutant	Standard	Monitoring Station	Days Exceeding Standard 2003	2004	2005	2006	2007
O_3	NAAQS 1-hr	Redwood City	0	0	X	X	X
		Bay Area	1	0	X	X	X
	NAAQS 8-hr	Redwood City	0	0	0	0	0
		Bay Area	7	0	1	12	1
	CAAQS 1-hr	Redwood City	1	1	0	0	0
		Bay Area	19	7	9	18	4
	CAAQS 8-hr	Redwood City	–	–	0	0	0
		Bay Area	–	–	9	22	9
PM_{10}	NAAQS 24-hr	Redwood City	0	0	0	0	0
		Bay Area	0	0	0	0	0
	CAAQS 24-hr	Redwood City	0	1	2	2	1
		Bay Area	6	7	6	15	4
$PM_{2.5}$	NAAQS 24-hr	Redwood City	0	0	0	1	1
		Bay Area	0	1	0	10	14
All Other (CO, NO_2, Lead, SO_2)	All Other	Redwood City	0	0	0	0	0
		Bay Area	0	0	0	0	0

i. Criteria Air Pollutants in the Bay Area

The San Francisco Bay Area annually exceeds the National Ambient Air quality Standards for O_3 and $PM_{2.5}$, and also exceeds the California Ambient Air Quality Standard for O_3, PM_{10}, and $PM_{2.5}$. Throughout the Bay Area, the previous national one-hour ozone standard (revoked in 2005) was exceeded at one or more stations from zero to three days annually over the last five years and the new 8-hour ozone standard was exceeded from zero to 12 days annually. The number of days that, on an annual basis, exceeded the more stringent one-hour State ozone standard at one or more stations in the Bay Area ranged from 7 to 22 days over the last five years. Most exceedances of the

ozone standards in the Bay Area occur in downwind portions of the basin, such as Livermore, Concord, and Gilroy.

The NAAQS for PM_{10} is not exceeded anywhere in the Bay Area, but the more stringent state standard is routinely exceeded in the Bay Area and most other parts of the state. The new NAAQS for $PM_{2.5}$ is routinely exceeded at monitors in Vallejo and San Jose. Some monitors in the Bay Area exceed the State annual $PM_{2.5}$ standard. No other air quality standards are exceeded in the Bay Area.

ii. Criteria Air Pollutants in San Carlos

Air quality conditions measured at Redwood City are likely similar to those in San Carlos given the close proximity and similar land uses. The NAAQS for 1- and 8-hour ozone was not exceeded in Redwood City over the last five years, while the 1-hour State standard was exceeded once in 2003 and 2004. Measured exceedances of the State PM_{10} standards occurred on 0 to 2 sampling days per year over the last five years in Redwood City.

The older $PM_{2.5}$ NAAQS of 65 $\mu g/m^3$ (established in 1997) was not exceeded in Redwood City, but the new 35 $\mu g/m^3$ standard set in 2006 was exceeded once in 2006 and once in 2007. PM_{10} and $PM_{2.5}$ are only measured once every sixth day (most monitoring stations measure particulates every sixth day according to a national schedule). PM_{10} and $PM_{2.5}$ are both a regional and localized air pollutant. The primary sources of these pollutants are wood smoke and local traffic. Meteorological conditions that are common during the winter result in calm winds and strong surface-based inversions that trap pollutants near the surface. The buildup of these pollutants is greatest during the evenings and early morning periods. The high levels of particulate matter result in not only health effects, but also reduced visibility.

The highest carbon monoxide concentrations measured in Redwood City have been well below the national and State ambient standards. Since the primary source of carbon monoxide in is automobiles, highest concentrations would be found away from monitoring stations near congested roadways that

carry large volumes of traffic. These are referred to as "hot spots." Other criteria pollutants, such as nitrogen dioxide, sulfur dioxide, and lead have always been measured at low levels in Redwood City and the rest of the Bay Area. These pollutants should not pose a major air pollution concern in San Carlos.

b. Attainment Status

Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. Areas that do not violate ambient air quality standards are considered to have attained the standard. The Bay Area as a whole does not meet State or federal ambient air quality standards for ground level ozone and $PM_{2.5}$ nor State standards for PM_{10}.

i. NAAQS

Under the Federal Clean Air Act, the U.S. EPA has classified the region as in marginally nonattainment for the 8-hour O_3 standard. EPA required the region to attain the standard by 2007. U.S. EPA has determined that the Bay Area has met this standard, but a formal redesignation request and maintenance plan would have to be submitted before redesignation could be made. In May 2008, U.S. EPA lowered the 8-hour O_3 standard from 0.08 to 0.075 ppm. Final designations based upon the new 0.075 ppm standard will be made by March 2010. The BAAQMD is not likely to make a redesignation request for the older standard since that will be revoked after designations are made with the newer standard.

The U.S. EPA recently designated the region as nonattainment for the 2006 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$ as recent monitoring data indicate levels above the standard in San José and Vallejo. The U.S. EPA's action designated the entire Bay Area air basin nonattainment for the standard. However, the nonattainment designation has not taken place because President Obama ordered a freeze on all new pending regulations enacted by the previous administration. Once the designation takes effect, the region would likely have until 2012 to develop a plan to attain the standard and until 2014 to reach attainment.

The Bay Area has met the CO standards for over a decade and is classified attainment maintenance by the US EPA. The US EPA grades the region unclassified for all other air pollutants, which include PM_{10}.

ii. CAAQS

At the State level, the region is considered to be in serious nonattainment for ground level O_3 and nonattainment for PM_{10} and $PM_{2.5}$. The region is required to adopt plans on a triennial basis that show progress towards meeting the State ozone standard. The area is considered attainment or unclassified for all other pollutants.

c. Toxic Air Contaminants

Concentrations of air toxics throughout the Bay Area are measured by BAAQMD and CARB. Only the BAAQMD makes these measurements in Redwood City. Typical compounds measured by BAAQMD include benzene, 1,3-butadiene, carbon tetrachloride, chloroform, ethylene dibromide, ethylene dichloride, methyl tert buytl ether (MTBE), methylene chloride, acetaldehyde, perchloroethylene, toluene, and 1,3-butadiene. To evaluate health risks associated with TACs, the BAAQMD conducts air quality modeling. This includes an assessment of emissions for the predominant TACs that include:

- *Diesel particulate matter (DPM):* Heavy-duty trucks, buses, construction equipment, and electrical generation. DPM by far makes up the greatest inhalation health risk in the Bay Area.
- *1,3 Butadiene:* Primarily on-road motor vehicles. Like carbon monoxide, older model vehicles without adequate catalytic converters have much higher emission rates.
- *Benzene:* Primarily on-road motor vehicles and gasoline evaporation.
- *Formaldehyde:* Emitted both directly and indirectly into the atmosphere. It is primarily formed through photochemical oxidation in the atmosphere with elevated levels of ozone and nitrogen oxides. Sources of emissions leading to elevated formaldehyde levels are fuel combustion from a

variety of mobile and stationary sources. A primary source is from motor vehicle operations.

As part of the BAAQMD's Community Air Risk Evaluation (CARE) program, inhalation health risks associated with exposure to these TACs was conducted.[3] (Bay Area cancer risks represent the number of excess cancer cases per million people based on a lifetime exposure (70-year) to the annual average concentration in the Bay Area.) The modeled cancer risk in San Carlos generally ranged from 200 to 300 cases per million. Areas to the east and southeast of Highway 101, which are predominantly commercial and industrial, have higher risks. The cancer risk in San Carlos is generally below the Bay Area average risk of about 460 cases per million. More densely urban areas, such as eastern San Francisco and western Oakland had higher risks of 1,000 cases per million. With all diesel risk reduction measures implemented, CARB predicts that the overall inhalation health risk in San Carlos would decrease substantially due to efforts to reduce TAC emissions, especially DPM. The BAAQMD estimates that DPM makes up about 80 percent of the emissions that contribute to the inhalation cancer risk in the Bay Area.

d. Existing Sources of Air Pollution

Sources of air pollution in and around San Carlos are primarily traffic or on-road vehicles. Emissions inventories are maintained for each county by CARB. San Mateo County accounts for about 10 to 14 percent of the daily Bay Area emissions. Traffic accounts for about 40 to 50 percent of the emissions of ozone precursor pollutants (NOx and ROG), while area-wide sources, which include construction activities, residential wood smoke, off-road travel, and agriculture, account for the greatest portion of PM_{10} emissions (about 80 percent). These sources account for over 50 percent of the $PM_{2.5}$ emissions. However, $PM_{2.5}$ is also formed from reactions of NOx and other gaseous air pollutants in the atmosphere.

[3] BAAQMD, 2009.

e. Sensitive Receptors

Sensitive receptors include hospitals, schools, playgrounds, childcare facilities, and convalescent facilities. The BAAQMD considers residences to also be sensitive receptors. In the past, maps have been developed that show locations of schools, hospitals, and convalescence homes to represent sensitive receivers. These maps are not particularly useful since air quality standards are applicable to all areas and not just sensitive receptors. Many people who are susceptible to air pollution (e.g. asthmatics) also reside in residences. Both State and national ambient air quality standards were developed with intent to protect sensitive receptors from the adverse impacts of air pollution.

4. Air Quality Planning

a. Clean Air Plans

To protect public health, the BAAQMD has adopted plans to achieve ambient air quality standards. The BAAQMD must continuously monitor its progress in implementing attainment plans and must periodically report to the California Air Resources Board and the EPA. It must also periodically revise its attainment plans to reflect new conditions and requirements.

In 1991, the BAAQMD, MTC and ABAG prepared the Bay Area 1991 Clean Air Plan or CAP. This air quality plan addresses the California Clean Air Act. Updates are developed approximately every three years. The plans were meant to demonstrate progress toward meeting the more stringent 1-hour ozone CAAQS. The latest update to the plan, which was adopted in January 2006, is called the *Bay Area 2005 Ozone Strategy*. This plan includes a comprehensive strategy to reduce emissions from stationary, area, and mobile sources. The plan objective is to indicate how the region would make progress toward attaining the stricter state air quality standards, as mandated by the California Clean Air Act. The plan is designed to achieve a region-wide reduction of ozone precursor pollutants through the expeditious implementation of all feasible measures. The plan proposes expanded implementation of transportation control measures (TCMs) and programs such as Spare the Air. TCMs are strategies to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle

emissions. Spare the Air is a public outreach program designed to educate the public about air pollution in the Bay Area and promote individual behavior changes that improve air quality. Some of these measures or programs rely on local governments for implementation. An update to the plan is currently being developed and should be available in 2009. This update is anticipated to address not only ozone, but also include controls for particulate matter and greenhouse gas emissions that lead to climate change.

The Bay Area 2001 Ozone Attainment Plan was prepared as the Bay Area's part of the State Implementation Plan (SIP) to achieve the 1-hour NAAQS for ozone. Since that plan was submitted to the EPA, the region was designated marginally nonattainment for the 8-hour ozone NAAQS and the 1-hour ozone NAAQS was revoked. The commitments in the plan will continue to apply. It is likely a new plan will not be developed before the region is designated with respect to the new 8-hour NAAQS for ozone that is due in March 2010.

There is no formal clean air plan addressing PM_{10} or $PM_{2.5}$. The clean air planning efforts for ozone will also reduce PM_{10} and $PM_{2.5}$, since a substantial amount of this air pollutant comes from combustion emissions such as vehicle exhaust. In addition, the BAAQMD adopts and enforces rules to reduce particulate matter emissions and develops public outreach programs to educate the public to reduce PM_{10} and $PM_{2.5}$ emissions (e.g., Winter Spare the Air Program). SB 656 required further action by CARB and air districts to reduce public exposure to PM_{10} and $PM_{2.5}$. Efforts identified by the BAAQMD in response to SB656 are primarily targeting reductions in wood smoke emissions and adoption of new rules to further reduce NOx and particulate matter from internal combustion engines and reduce particulate matter from commercial charbroiling activities. The BAAQMD recently adopted a rule addressing residential wood burning. The rule restricts operation of any indoor or outdoor fireplace, fire pit, wood or pellet stove, masonry heater or fireplace insert on specific days during the winter when air quality conditions are forecasted to exceed the NAAQS for $PM_{2.5}$. The rule also limits excess visible emissions from wood burning devices and require clean burning technology

for wood burning devices sold (or resold) or installed in the Bay Area. Controls on ozone precursor emissions that include NOx and ROG would reduce particulate matter concentrations in winter. NOx emissions contribute to ammonium nitrate formation that resides in the atmosphere as particulate matter. The Bay Area experiences the highest PM_{10} and $PM_{2.5}$ in winter when wood smoke and ammonium nitrate contributions to particulate matter are highest.

b. CARB Land Use Guidance

In April 2005, the CARB released the most recent version of the *Air Quality and Land Use Handbook: A Community Health Perspective*, which is intended to encourage local land use agencies to consider the risks from air pollution prior to making decisions that approve the siting of new sensitive receptors near sources of air pollution. The CARB recommends setbacks of 500 feet between freeways and new sensitive receptors, such as residences,[4] but does not provide guidance for siting new sensitive receptors near train lines, such as the Caltrain corridor. Currently, Caltrain includes diesel-powered locomotives that are a source of DPM emissions. About 100 daily train passbys occur in San Carlos each day. This is compared to about 4,000 daily large truck trips made on Highway 101 each day.

D. Standards of Significance

The Draft 2030 General Plan and CAP would result in significant impacts on air quality if they would:

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

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

[4] California Air Resources Board, *Air Quality and Land Use Handbook: A Community Health Perspective*, 2005, page 4.

c. Result in a cumulatively considerable net increase of any nonattainment pollutant.

d. Expose sensitive receptors to substantial pollutant concentrations.

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

The BAAQMD has developed guidelines and thresholds of significance for General Plans. Inconsistency with the most recently adopted Clean Air Plan is considered a significant impact. According to the BAAQMD, the following criteria must be satisfied for a local plan to be determined to be consistent with the Clean Air Plan and not have a significant air quality impact:[5]

- The local plan should be consistent with the Clean Air Plan population and vehicle miles traveled (VMT) assumptions. This is demonstrated if the population growth over the planning period will not exceed the values included in the current Clean Air Plan.
- The local plan demonstrates reasonable efforts to implement the TCMs included in the Clean Air Plan that identify cities as implementing agencies.
- For local plans to have a less than significant impact with respect to potential odors and/or toxic air contaminants, buffer zones should be established around existing and proposed land uses that would emit these air pollutants.

In addition, the plans should not lead to development that would lead to violations of ambient air quality standards.

E. Impact Discussion

The following provides an analysis of the effects of the Draft 2030 General Plan on air quality.

[5] BAAQMD, *BAAQMD CEQA Guidelines*, April 1996, revised December 1999.

1. Draft 2030 General Plan Project Impacts

a. Consistency with Clean Air Plan Projections

A key element in air quality planning is to make reasonably accurate projections of future human activities that are related to air pollutant emissions. When the *Bay Area 2005 Ozone Strategy*[6] was developed for the Bay Area it utilized the most recent projections developed by the Association of Bay Area Governments (ABAG) and vehicle activity projected by the Metropolitan Transportation Commission (MTC). These projections are based on the most recent projections using land use designators developed by cities and counties through local and regional planning processes.

Future development under the Draft 2030 General Plan would affect emissions of ozone precursor pollutants and particulate matter ($PM_{2.5}$ and PM_{10}), both of which affect regional air quality. Future changes in development patterns that affect regional air quality are accounted for in the *Bay Area 2005 Ozone Strategy*. However, increased development could lead to greater vehicle use than assumed in the clean air plan.

The population of San Carlos would grow with development consistent with the Draft 2030 General Plan. Population projections under the Draft 2030 General Plan would be generally consistent with the latest Association of Bay Area Government (ABAG) projections that are used in the regional Clean Air Plan. ABAG's *Projections 2007* forecast the population of the San Carlos to be 33,700 residents in 2030, which is slightly above the Draft 2030 General Plan projected buildout population of 32,303. The methodology to determine buildout is described in Chapter 3, Project Description. Since Draft 2030 General Plan buildout is similar to ABAG projections, the rate of population growth would be consistent with Clean Air Plan projections.

The Draft 2030 General Plan would increase the number of jobs in San Carlos at a greater rate than projected by ABAG. The higher rate of job growth would be attributable to the higher rate of growth in non-residential land

[6] Bay Area Air Quality Management District, 2006, *Bay Area 2005 Ozone Strategy*, January.

uses, as compared with residential uses. Using 2008 as the baseline, development under the Draft 2030 General Plan could increase commercial land uses by 26 percent, office land uses by 39 percent and industrial uses by 26 percent over the current General Plan. ABAG projects a housing growth rate of 18 percent from 2008 to 2030 while the Draft 2030 General Plan is projected to increase housing units by 12 percent for this same period. By 2030, ABAG projects the job to housing ratio to be 1.7 jobs per home. However, implementation of the Draft 2030 General Plan at buildout would result in a 2.1 jobs to housing ratio. This ratio suggests that the availability of jobs will be greater than homes.

Traffic modeling conducted for the Draft 2030 General Plan reflects a higher rate of VMT growth than population growth. The rate of VMT growth would increase by 30 percent (from 2005 through 2030), while population growth under the Draft 2030 General Plan would increase by 12 percent. The greater rate of VMT growth would be considered a significant impact, because it exceeds the rate of population growth.

The Draft 2030 General Plan includes goals, policies and implementing actions that would help to reduce the air pollution added by future development in San Carlos. Many of these policies are discussed below under heading 'b' – Consistency with Clean Air Plan TCMs. Goal EM-9 calls for reducing energy consumed citywide which would help to reduce air pollution associated with energy usage.

Goal EM-6 of the Environmental Management Element (support atmospheric conditions that are clean, healthful, provides maximum visibility and meets air quality standards) includes three implementing policies to improve air quality and meet air quality standards. Goal EM-7 (reduce Greenhouse gas) includes policies aimed at reducing greenhouse gas emissions that would also reduce emissions that lead to unhealthy air quality. Goal EM-9 (reduce energy consumed citywide) would reduce indirect air pollutant emissions associated with the generation of electricity, distribution of water, and natural gas

usage. Goal EM-11 (promote and expand alternative modes of transportation) would reduce air pollutant emissions associated with the automobile.

While the various policies and actions outlined above would help to reduce air pollutant emissions that affect both San Carlos and the Bay Area Region, the impact from the Draft 2030 General Plan would be significant, because it would likely result in a higher rate of VMT growth than assumed in the most recent clean air plans. This would be a *significant* impact.

b. Consistency with Clean Air Plan TCMs

Table 4.2-5 lists *Circulation and Scenic Highways Element* policies that are supportive of the Clean Air Plan TCMs. A description of each TCM is provided along with a listing of relevant policies that would implement each measure. The proposed policies support and reasonably implement the applicable Clean Air Plan TCMs.

A transportation demand measures (TDM) program is a key effort to support regional TCMs. The City of San Carlos pursues a goal of reducing vehicle trips by 20 percent through TDM programs from all new development within the city. According to the Circulation and Scenic Highways Element, adopted in 2005 and amended in 2008, "The City shall strive to reduce vehicular trip generation from new development by 20 percent, using a combination of both public and private funds and efforts. The 20 percent reduction shall be obtained through implementation of TDMs."

Therefore, this would be a *less-than-significant* impact.

c. Increase Nonattainment Pollutant

Carbon monoxide emissions from traffic would be the pollutant of greatest concern at the local level. Congested intersections with a large volume of traffic have the greatest potential to cause high-localized concentrations of carbon monoxide. Since the early 1990s, carbon monoxide levels have been at healthy levels (i.e. below State and federal standards) in the Bay Area. As a result, the region has been designated as attainment for the standard. The

TABLE 4.2-5 **RELEVANT DRAFT 2030 GENERAL PLAN GOALS, POLICIES AND ACTIONS SUPPORTING CLEAN AIR PLAN TCMS**

Transportation Control Measures	Relevant General Plan Programs and Policies
TCM #1 Support Voluntary Employer-Based Trip Reduction Programs	Circulation and Transportation Goal 3.3 - TDM Program. Transportation Policy 5 – The City shall encourage City employees to utilize alternative transportation through incentive, ridesharing and guaranteed ride home programs. Policy EM-11.6 – Encourage employers to incentivize employee use of mass transit and alternative modes of transportation. Policy EM-11.0 – Coordinate with major employers, neighboring municipalities, and transit agencies and providers to enhance regional transit and shuttle service.
TCM #9 Improve Bicycle Access and Facilities	Bicycle and Pedestrian Policy 4.3 – Financing and implementation of street modifications for pedestrian or bicycle use shall, whenever possible, be integrated with other related programs, including, but not limited to: street and road projects, street or sidewalk maintenance projects, and traffic mitigation programs. Bicycle and Pedestrian Policy 4.4 – Support traffic controls that recognize bicycles and pedestrians. Bicycle and Pedestrian Policy 4.5 – Provide continuity to bike routes within the City and inter-jurisdictionally. Bicycle and Pedestrian Policy 4.6 – Encourage bicycle storage (public and private) and improved bikeway access to station stops and park and ride facilities. Bicycle and Pedestrian Policy 4.7 – Support the provision of railcars sufficiently equipped for use by bicyclists. Bicycle and Pedestrian Policy 4.9 – The local public path and trail system should be linked with existing private and regional systems and the road system. Bicycle and Pedestrian Policy 4.10 – As lands are subdivided, dedication of trail and path easements should be required where appropriate as a part of the City and County's trail

TABLE 4.2-5 **RELEVANT PROPOSED DRAFT 2030 GENERAL PLAN POLICIES SUPPORTING CLEAN AIR PLAN TCMS** (CONTINUED)

Transportation Control Measures	Relevant General Plan Programs and Policies
	and path system. Subdividers should dedicate, construct and maintain trails and paths wherever feasible. Policy LU-2.11 – Ensure convenient bicycle and pedestrian access to Downtown from surround areas and the TOD corridor. Policy LU-2.12 – Provide for bicycle and pedestrian safety Downtown. Policy LU-3.13 – Provide safe and convenient pedestrian and bicycle connections between residential and commercial areas throughout San Carlos. Policy EM-11.4 – Provide an integrated network of bicycle and pedestrian thoroughfares that connects jobs and housing to other city destinations. Action EM-11.2 – Implement traffic calming devices to increase roadway safety for bicycles and pedestrians. Action EM-11.4 – Coordinate with neighboring jurisdictions, the County and regional agencies to expand bicycle connections to regional destinations.
TCM #10 Youth Transportation	Transportation Policy 4 – The City shall support local school district efforts to reduce traffic through programs such as safe routes to school, school pools and school bus/shuttle programs. Policy EM-11.7 – Support programs to reduce vehicle trips associated with transporting students to and from schools.
TCM #12 Arterial Management Measures	Circulation Policy 4 – The City shall strive to maintain intersection service levels above the mid range of level D. Transportation Policy 11 – The City shall support San Mateo City/County Association of Governments C/CAG policies on Congestion Management.
TCM #15 Local Clean Air Policies and Programs	Transportation Policy 1 – The City shall support the continued operation and upgrading of the railroad commuter service between Gilroy and San Francisco. Transportation Policy 2 – The City supports dedication and

TABLE 4.2-5 **RELEVANT PROPOSED DRAFT 2030 GENERAL PLAN POLICIES SUPPORTING CLEAN AIR PLAN TCMS** (CONTINUED)

Transportation Control Measures	Relevant General Plan Programs and Policies
	preservation of rights of way for future transit service along the rail corridor. Transportation Policy 3 – The City shall consider adoption of a Transportation Impact Fee for new development to support citywide Transportation Demand Measures. Transportation Policy 6 – The City shall support adequate access to affordable transportation alternatives for people with impaired mobility. Goal EM-11 – Promote and expand public and alternative modes of transportation. Policy EM 11.3 – Support the addition of amenities such as bus shelters and directional signage to promote increased transit ridership. Policy EM-11.10 – Evaluate and encourage new forms of mass transit. Action EM-11.1 – Implement measures in the Climate Action Plan to reduce transportation emissions. Action EM-11.5 – Encourage transit providers to utilize vehicles with low polluting technologies, and to reduce or eliminate idling.
TCM #19 Improve Pedestrian Access and Facilities	Transportation Policy 7 – The City shall coordinate with adjacent communities and responsible agencies to provide an interconnected system of pedestrian ways, trails, bikeways, and transit routes. Bicycle and Pedestrian Policy 4.1 – Residential sidewalks shall be a minimum of four feet wide and commercial sidewalks shall be a minimum of eight feet wide wherever possible. Bicycle and Pedestrian Policy 4.2 – Crosswalks at major intersections should be preserved wherever possible, particularly in areas with high pedestrian traffic.

TABLE 4.2-5 **RELEVANT PROPOSED DRAFT 2030 GENERAL PLAN POLICIES SUPPORTING CLEAN AIR PLAN TCMS** (CONTINUED)

Transportation Control Measures	Relevant General Plan Programs and Policies
	Bicycle and Pedestrian Policy 4.3 – Financing and implementation of street modifications for pedestrian or bicycle use shall, whenever possible, be integrated with other related programs, including, but not limited to: street and road projects, street or sidewalk maintenance projects, and traffic mitigation programs.
	Policy LU-1.1 – Recognize Planning Areas 1, 2 and 3 as the city's Transit Oriented Development (TOD) Corridor.
	Policy LU-1.2 – Encourage development of higher density housing and support additional job growth within the TOD corridor while being sensitive to surrounding uses.
	Policy LU-1.3 – Ensure that development within the TOD corridor maintains and improves the mobility of people and vehicles along and across the corridor.
	Policy LU-1.4 – Establish and support the El Camino Real/Caltrain multi-modal TOD corridor for the purposes of the mobility of people and vehicles along and across the corridor.
	Policy LU-1.5 – Support land use patterns in the TOD corridor that will attract and serve riders of public transit.
	Policy LU-2.11 – Ensure convenient bicycle and pedestrian access to Downtown from surrounding areas and the TOD corridor.
	Policy LU-2.12 – Provide for bicycle and pedestrian safety Downtown.
	Action LU-2.6 – Review Downtown parking standards and amend as necessary to encourage and support a pedestrian-oriented environment while minimizing impacts on adjacent neighborhoods.
	Action LU-2.10 – Examine the viability of converting the 600,700, and/or 800 blocks of Laurel Street to a more pedestrian friendly environment.

TABLE 4.2-5 **RELEVANT PROPOSED DRAFT 2030 GENERAL PLAN POLICIES SUPPORTING CLEAN AIR PLAN TCMS** (CONTINUED)

Transportation Control Measures	Relevant General Plan Programs and Policies
	Policy LU-3.9 – Promote development opportunities for regular physical activity by locating residential developments near services.
	Policy LU-3.10 – Encourage the creation of safe, walkable environments that include elements such as wide, smooth sidewalks, good lighting, safe crosswalks, clear signage, curb bulb-outs, curb cuts, street furniture and tress, and traffic-calming measures which allow people of all ages and abilities to exercise and safely access public transportation, community centers and schools and goods and services.
	Policy LU-3.13 – Provide safe and convenient pedestrian and bicycle connections between residential and commercial areas throughout San Carlos.
	Action LU-3.3 – Work with SamTrans and other public agencies to provide a public mass transit stop within a ¼ - 1/2 mile of every home and business in San Carlos.
	Action LU-7.1 – Prepare a community study to seek new ways to enhance walkability and connect all areas of the community. The current Bicycle Transportation Plan could be expanded to be a Bicycle and Pedestrian Transportation Plan.
	Policy LU-8.9 – Encourage design of convenient pedestrian walkways with shade and minimal tripping hazards, preferably with landscape buffers between roadways and walkways.
	Policy EM-11.4 – Provide an integrated network of bicycle and pedestrian thoroughfares that connects jobs and housing to other city destinations.
	Action EM-11.2 – Implement traffic calming devices to increase roadway safety for bicycles and pedestrians.
	Policy PR-2.5 – Promote the development of publicly accessible urban trails throughout the city to provide access to the natural environment and facilitate non-motorized transportation options.

TABLE 4.2-5 **RELEVANT PROPOSED DRAFT 2030 GENERAL PLAN POLICIES SUPPORTING CLEAN AIR PLAN TCMS** (CONTINUED)

Transportation Control Measures	Relevant General Plan Programs and Policies
TCM #20 Promote Traffic Calming	Circulation Policy 10 – The City may consider traffic calming devices to reduce speeds and to discourage thru traffic in residential neighborhoods. Impacts of diverting traffic to adjacent neighborhoods, bicycle and pedestrian access and safety, noise, emergency response time, aesthetics and maintenance should be reviewed prior to allowing traffic calming devices. Action EM-11.2 – Implement traffic calming devices to increase roadway safety for bicycles and pedestrians.

highest measured levels of carbon monoxide measured at the ambient air quality station in Redwood City are well below State and federal standards.

Carbon monoxide emissions from traffic along major roadway segments in San Carlos with high traffic volumes and poor level of service (LOS) were evaluated. This included the busiest city roadway segments operating at LOS of E or F. The traffic-generated emissions of carbon monoxide were predicted using a screening version of the Caline4 line source dispersion model developed by the BAAQMD. The model requires inputs of geometry, traffic volumes, emission factors and meteorology. Existing traffic volumes for selected roadway segments were used. Emission factors used were calculated using the EMFAC2007 model, developed by the California Air Resources Board, with default assumptions for San Mateo County during winter when carbon monoxide levels are highest. Meteorological conditions indicative of elevated carbon monoxide levels in the Bay Area were used, which include a low wind speed of 1 meter per second, worst-case wind angle, F stability, and a temperature of 45°F. Slow speeds of 5 miles per hour for roadways (depending on LOS) and 25 miles per hour for the freeway segments were used to develop the emission factors. The screening assessment is a worst-case

analysis, designed to over-predict carbon monoxide levels. A refined approach that involves use of a dispersion model is used where screening results indicate high concentrations that may result in adverse impacts.

The worst study roadway links in San Carlos, which include highest traffic volumes and high levels of congestion, were modeled to assess roadside carbon monoxide concentrations. These intersections along with the modeled concentrations are shown in Table 4.2-6. Eight-hour concentrations were modeled since they represent the most prohibitive standard. Exceedance of the 1-hour NAAQS or CAAQS would result in an exceedance of the 8-hour standard.

Although levels may differ slightly along these roadways, the overall concentrations would be well below health-based ambient air quality standards for 8-hour exposures. Since modeled concentrations would not exceed the 8-hour standard, they would not exceed the 1-hour standard. The city's worst intersection, in terms of roadside air pollutant concentrations, has levels that are currently below ambient air quality standards. The concentrations are anticipated to decrease substantially in the future with improvements to exhaust systems and reformulated fuels. As a result, the impact on local air quality resulting from the project is considered to be *less than significant*.

d. Expose Sensitive Receptors to Substantial Pollutant Concentrations

According to the BAAQMD Guidelines, for a general plan to have a less than significant impact with respect to toxic air contaminants (TACs), buffer zones should be established in existing and proposed land uses that would emit these air pollutants. Buffer zones to avoid exposure to substantial levels or air pollution (in the form of TACs) should be reflected in local plan policies, land use maps, and implementing ordinances.

The primary source of TAC emissions in San Carlos is Highway 101 traffic, industrial uses (including their truck traffic generation), and the San Carlos Airport. All of these sources are located east of Old Country Road and primarily east of Industrial Road. Planned residences associated with the

TABLE 4.2-6 **PROJECTED 8-HOUR CARBON MONOXIDE LEVELS**

Location	Existing	2030 Projected Buildout of Draft 2030 General Plan
El Camino Real and Holly Street	5.6 ppm	3.1 ppm
Industrial Road and Holly Street	5.9 ppm	3.2 ppm
El Camino Real and Brittan Avenue	5.1 ppm	3.0 ppm
Industrial Road and Brittan Avenue	4.2 ppm	3.0 ppm

Note: California ambient air quality standard for 8-hour carbon monoxide levels is 9.0 ppm. Modeled levels are added to an 8-hour background concentration of 2.4 ppm.
Source: Illingworth & Rodkin, June 2008.

Draft 2030 General Plan are located to the west of Highway 101. CARB recommends that lead agencies provide setbacks of 500 feet for freeways (or busy arterial roadways with average daily trips of 100,000 or more). CARB also recommends setbacks for other uses that do not apply to San Carlos. These include large truck distribution centers, rail yards, and seaports. The Draft 2030 General Plan does not propose locating sensitive land uses (e.g. residences) near Highway 101 or any identified source of TAC emissions that would result in adverse impacts.

CARB does not provide recommendations for setbacks from railroad lines. Caltrain includes about 100 daily train passbys. Modeling studies of DPM exposure from these train passbys have not been conducted; however, the emissions associated with the Caltrain line would be much less than the emissions from truck traffic on Highway 101, so the buffer would be considerably less. Mixed-use residential development is proposed in the El Camino Real/UPRR Railroad corridor. DPM emitted from railroad trains passing through San Carlos could expose new residences to DPM. Significant exposures of DPM are not expected at locations closer than 100 feet to the railroad. This is similar to the screening distance used for avoiding significant

vibration impacts. The proposed locations of residential buildings are not known at this time.

Proposed projects that would emit TACs would require review under the BAAQMD rules and regulations or CEQA review. However, projects with sensitive receptors may be placed near localized sources of TAC emissions (e.g. residences near Highway 101 or Caltrain). Sensitive land uses such as child day care centers or nursing homes could be proposed in the East Side area which could expose sensitive populations to DPM. As previously noted, exposure to DPM contributes to elevated health risks. The BAAQMD recommends that buffers to avoid the exposure of sensitive receptors to TAC sources be reflected in local plan policies (e.g. General Plans), land use maps, and implementing ordinances. As discussed in the Mitigation Measures section below, the addition of Policies EM-6.4 and EM-6.5 to the Environmental Management Element would require minimum screening or buffer distances between emissions sources and sensitive receptors and require that potential impacts be considered when locating air pollution sources near sensitive receptors. As a result, exposure of sensitive receptors to substantial pollutant concentrations resulting from the Draft 2030 General Plan is considered to be *less than significant*.

e. Objectionable Odors

Implementation of the Draft 2030 General Plan may involve the placement of sensitive receptors (e.g. new residences) near localized sources of odors that could include painting/coating operations or restaurants, including fast-food restaurants.

The BAAQMD CEQA Guidelines provide project screening trigger levels for potential odor sources. To avoid significant impacts, the BAAMQD CEQA Guidelines recommend that buffer zones to avoid adverse impacts from odors should be reflected in local plan policies, land use maps, and implementing ordinances. As discussed in the Mitigation Measures section below, the addition of Policy EM 6.4 to the Environmental Management Element would require minimum screening or buffer distances between emissions sources and

sensitive receptors. As a result, exposure to objectionable odors resulting from the Draft 2030 General Plan is considered to be *less than significant*.

f. Construction Dust Emissions

Development allowed under the proposed Draft 2030 General Plan would generate dust that could affect local and regional air quality. Dust is generated from a variety of project construction activities including grading, import/export of fill material, and vehicle travel on unpaved surfaces. Soil can also be tracked out onto paved roads where it is entrained in the air by passing cars and trucks. The rate of dust emissions is related to the type and size of the disturbance, meteorological conditions, and soil conditions.

Similar to construction dust, exhaust emissions are difficult to predict. Exhaust from diesel powered construction equipment affects regional ozone levels as well as localized particulate levels. Diesel particulate matter is considered a toxic air contaminant. Construction equipment will be replaced or retrofitted over the next several years leading to an overall decrease in emissions of exhaust particulate matter and ozone precursor emissions.

The BAAQMD CEQA Guidelines suggest that the significance of construction period emissions should be based on the application of control measures. The BAAQMD recommends a set of feasible control measures to reduce PM_{10} near construction sites. The BAAQMD also recommends that control measures for equipment exhaust emissions also be included. The BAAQMD qualitative approach requires all construction projects to implement some level of control measures to reduce impacts. Policy 6.3 of the Environmental Management Element Policy supports the reduction of emissions of particulates from construction activity. The significance of air quality impacts near construction sites is dependent mostly on the size of the site, level of activity and proximity of sensitive receptors. As discussed in the Mitigation Measures section below, the addition of Policy EM-6.6 to the Environmental Management Element would ensure appropriate measures to control PM_{10} and exhaust emissions. Therefore, the impacts from construction activities would be *less than significant*.

2. Climate Action Plan Project Impacts

The CAP includes measures that would improve air quality in San Carlos, such as supporting renewable energy sources, increasing energy efficiency and reducing energy use. Other measures in the CAP would have no effect on air quality in San Carlos. Therefore, the proposed CAP would have *no impact* to air quality in San Carlos.

3. Cumulative Impacts

Cumulative air quality impacts are considered as part of the project-levels analysis since the air quality analysis is based on the amount of build out and traffic model data compared with regional projections where input included planned and approved projects in the City (Future Conditions) plus traffic anticipated by the Draft 2030 General Plan buildout projections. Therefore, cumulative impacts would be the same as project level impacts.

F. Impacts and Mitigation Measures

While policies and other BAAQMD regulations or programs would reduce impacts to air quality to the extent feasible, one significant and unavoidable impacts would occur in regards to air quality impacts under the proposed 2030 General Plan. The addition of new policies to the Draft 2030 General Plan has reduced Impacts AIR-2 and AIR-3 to *less than significant*.

Impact AIR-1: The 2030 General Plan would be inconsistent with applicable clean air planning efforts of the BAAQMD, since projected vehicle miles traveled that could occur under the proposed 2030 General Plan would increase at a greater rate than population growth. The projected growth in vehicle travel could lead to an increase in regional vehicle miles traveled, beyond that anticipated in the BAAQMD's clean air planning efforts. As a result, development in San Carlos would contribute to the on-going air quality issues of attaining ozone ambient air quality standards in the San Francisco Bay Area.

Mitigation Measure AIR-1: There are no feasible measures to reduce this impact.

Significance After Mitigation: *Significant and unavoidable.*

Impact AIR-2: The proposed 2030 General Plan does not provide adequate buffers between new or existing sources of toxic air contaminants and odors and new or existing residences or sensitive receptors.

Mitigation Measure AIR-2: Policies EM-6.4 and EM-6.5 should be added to the Environmental Management Element as follows:

> Policy EM-6.4: Implement Bay Area Air Quality Management District (BAAQMD) guidelines that establish minimum screening or buffer distances between emissions sources and sensitive receptors. Exceptions may be made for projects that do not meet the distance requirements, but can be determined compatible with adjacent uses through a project-specific study that determines potential health risk. Mitigation measures shall be required to reduce these risks to acceptable levels.
>
> Policy EM-6.5. Consider potential impacts from land uses that may emit pollution and/or odors when locating air pollution sources near sensitive receptors. Air pollution sources could include freeways, industrial uses, hazardous materials storage, waste disposal/transfer stations and other similar uses.

Significance After Mitigation: *Less than significant.*

Impact AIR-3: Construction associated with the proposed 2030 General Plan build out would result in emissions of dust and equipment exhaust that may contribute to violations of ambient air quality standards or expose sensitive receptors to substantial air pollutant concentrations.

Mitigation Measure AIR-3: Policy EM-6.6 should be added to the Environmental Management Element as follows:

> Policy EM-6.6. BAAQMD recommended measures to reduce PM_{10} and exhaust emissions associated with construction shall be applied to new development in San Carlos.

Significance After Mitigation: *Less than significant.*