5. AIR QUALITY

This EIR chapter describes the potential impacts of the Middle Green Valley Specific Plan on local and regional air quality. The chapter was prepared using methodologies and assumptions recommended within the air quality impact assessment guidelines of the Bay Area Air Quality Management District (BAAQMD).[1] In keeping with these guidelines, the chapter describes existing air quality, potential short-term construction-related impacts, potential direct and indirect long-term emissions associated with buildout of the Specific Plan, the impacts of these emissions on both the local and regional scale, and mitigation measures warranted to reduce or eliminate any identified significant impacts.

5.1 SETTING

5.1.1 Air Basin Characteristics

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

The Specific Plan area is located within the Carquinez Strait subregion of the Bay Area. Generally, the climate in the Bay Area is characterized by warm dry summers with abundant sunshine and cool moist winters with variable cloudiness. The proximity of the Pacific Ocean and San Francisco Bay has a moderating influence on the area's climate. High pressure offshore along with low pressure in the Central Valley causes marine air to move eastward through the Carquinez Strait.

The major large-scale weather feature controlling the local 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 vary seasonally. It is strongest and located off the west coast during summer. 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 (amsl), depending on the warmth of the air column, 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. Summer mean maximum temperatures reach about 90 degrees Fahrenheit (F) in this region.

As winter approaches, the Pacific High becomes weaker and shifts south, allowing both low and high pressure systems associated with the polar jet stream to affect the region. Mean minimum temperatures in the winter are approximately 38 degrees F. Low pressure systems are usually accompanied by frontal systems that produce periods of cloudiness, strong shifting winds, and

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

precipitation. The number of days with precipitation can vary greatly from year to year, resulting in a wide range of annual precipitation totals.

High pressure systems are also common in winter and can produce cool stagnant conditions. Radiation fog and haze are common during extended winter periods where high pressure systems influence the weather.

5.1.2 Air Pollution Potential

Numerous industrial facilities with significant air pollutant emissions (e.g., chemical plants and refineries) are located within the Carquinez Strait subregion. The resulting pollution potential is often moderated by high wind speeds. However, upsets at one or more of these industrial facilities can lead to short-term pollution emissions. People downwind of these facilities could suffer more long-term exposure to air contaminants than individuals elsewhere.

In addition, the clear skies with relatively warm conditions that are typical of this area in summer combine with localized air pollutant emissions to elevate ozone (O_3) levels. Air quality standards for ozone are typically exceeded when relatively stagnant conditions occur for periods of several days during the warmer months of the year. Weak wind flow patterns combined with strong inversions substantially reduce normal atmospheric mixing. Key components of ground-level ozone formation are sunlight and heat; therefore, significant ozone formation only occurs during the months from late spring through early fall. Pollution potential in the area could be high if there were sufficient sources of air contaminants nearby.

Prevailing winds during the summer and fall can transport and trap ozone precursors from the more urbanized portions of the Bay Area. Upslope and downslope flows from the surrounding mountains may also re-circulate pollutants already present, contributing to the buildup of air pollution. Light winds and stable conditions during the late fall and winter contribute to the build-up of particulate matter from motor vehicles, agriculture, and wood burning in fireplaces and stoves.

5.1.3 Air Pollutants and Ambient Standards

(a) "Criteria" Pollutants. Both the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) have established ambient air quality standards for common pollutants. Individuals vary as to their sensitivity to air pollutants, so the national and state standards have been set at levels that protect groups that are more sensitive (e.g., asthmatics).

National ambient air quality standards (NAAQS) were established by the federal Clean Air Act of 1970 (amended in 1977 and 1990) for six "criteria" pollutants. These criteria pollutants are carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), particulates (since changed to inhalable and fine particulate matter--PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). These are considered the most prevalent air pollutants known to be hazardous to human health.

A summary description of these six criteria pollutants and their potential health effects is presented in Table 5.1. Table 5.2 summarizes the federal and California state ambient air quality standards for important pollutants.

Table 5.1
MAJOR CRITERIA AIR POLLUTANTS AND HEALTH EFFECTS SUMMARY

Pollutant	Characteristics	Health Effects	Major Sources
Ozone (O_3)	A highly reactive photochemical pollutant created by the action of sunshine on ozone precursors (primarily reactive organic gases and oxides of nitrogen). Often called photochemical smog.	▪ Eye irritation ▪ Respiratory function impairment	The major sources of ozone precursors are combustion sources such as factories and automobiles, and evaporation of solvents and fuels.
Carbon Monoxide (CO)	An odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels.	▪ Impairment of oxygen transport in the bloodstream ▪ Aggravation of cardiovascular disease ▪ Fatigue, headache, confusion, dizziness ▪ Can be fatal in the case of very high concentrations	Automobile exhaust, combustion of fuels, combustion of wood in woodstoves and fireplaces.
Nitrogen Dioxide (NO_2)	Reddish-brown gas that discolors the air, formed during combustion.	▪ Increased risk of acute and chronic respiratory disease	Automobile and diesel truck exhaust, industrial processes, fossil-fueled power plants.
Sulfur Dioxide (SO_2)	A colorless gas with a pungent, irritating odor.	▪ Aggravation of chronic obstruction lung disease ▪ Increased risk of acute and chronic respiratory disease	Diesel vehicle exhaust, oil-powered power plants, industrial processes.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Solid and liquid particles of dust, soot, aerosols, and other matter that are small enough to remain suspended in the air for a long period of time.	▪ Aggravation of chronic disease and heart/lung disease symptoms	Combustion, automobiles, field burning, factories and unpaved roads. Also a result of photochemical processes.
Lead (Pb)	Component of particulate matter. Levels have dropped 98 percent in last 30 years due to elimination of lead from gasoline.	▪ Learning disabilities ▪ Brain and kidney damage ▪ Children particularly susceptible	Leaded gasoline (no longer allowed), smelters, resource recovery.

SOURCE: Wagstaff and Associates, Donald Ballanti, 2009.

Table 5.2
FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Federal Primary Standard[1]	State Standard[2]
Ozone (O_3)	1-Hour	---	0.09 PPM
	8-Hour	0.075 PPM	0.070 PPM
Carbon Monoxide (CO)	8-Hour	9.0 PPM	9.0 PPM
	1-Hour	35.0 PPM	20.0 PPM
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053 PPM	0.030 PPM
	1-Hour	---	0.18 PPM
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	0.03 PPM	---
	24-Hour	0.14 PPM	0.04 PPM
	1-Hour	---	0.25 PPM
Particulates (PM_{10})	Annual Arithmetic Mean	---	20 ug/m^3
	24-Hour	150 ug/m^3	50 ug/m^3
Particulates ($PM_{2.5}$)	Annual Arithmetic Mean	15 ug/m^3	12 ug/m^3
	24-Hour	35 ug/m^3	---
Lead (Pb)	Calendar Quarter	1.5 ug/m^3	---
	30-Day	---	1.5 ug/m^3

SOURCE: California Air Resources Board, Ambient Air Quality Standards (11/17/08) (http://www.arb.ca.gov/research/aaqs/aaqs2.pdf).

PPM = Parts Per Million, ug/m^3 = Micrograms Per Cubic Meter

[1] National standards other than for ozone, particulate matter, and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year.

[2] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, and suspended particulate matter (PM_{10}, $PM_{2.5}$, and visibly reducing particles) are values that are not to be exceeded. The standards for lead are not to be equaled or exceeded.

(b) Toxic Air Contaminants. In addition to the six "criteria" pollutants, toxic air contaminants (TACs) are another class of pollutants that are of concern. TACs are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer or serious illness) 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., benzene near a freeway). Because chronic exposure to TACs can result in adverse health effects, TACs are regulated at the regional, state, and federal level. The identification, regulation, and monitoring of TACs is relatively new compared to that for criteria air pollutants. Unlike criteria pollutants, there are no established ambient standards for TACs. TACs are regulated on the basis of risk rather than specification of safe levels of contamination.

The major source of TACs contributing to ambient risk in the Bay Area is motor vehicles (45 percent of all sources). Diesel exhaust remains as a predominant TAC source in the urban area in general. According to the CARB, 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 programs. California has adopted a comprehensive diesel risk reduction program. The EPA and CARB have adopted low sulfur diesel fuel standards that will reduce diesel particulate matter substantially. These standards went into effect in June 2006.

5.1.4 Current Air Quality

The Specific Plan area is located within the San Francisco Bay Area Air Basin, which is managed by the Bay Area Air Quality Management District (BAAQMD). The BAAQMD operates a network of monitoring sites throughout the Bay Area. The closest monitoring sites to the plan area are located in Fairfield and Vallejo. Table 5.3 summarizes air quality data from these monitoring sites during the period 2006-2008 and shows the number of days that the state or federal standard was exceeded for three major pollutants. As shown in the table, the state and federal ambient air quality standards were met in the plan area vicinity during this three-year period with the exception of the state 1- and 8-hour ozone standard (in 2006 and 2008), the federal 8-hour ozone standard (in Fairfield only, 2006 and 2008), the state 24-hour PM_{10} standard (in 2007), and the federal 24-hour $PM_{2.5}$ standard (in all three years).

5.1.5 Existing Pollutant Sources and Sensitive Receptors in the Vicinity

The most substantive existing source of pollutants in the plan area vicinity is vehicular traffic on the local roadway network. In addition, industrial activities, other businesses, and houses within the area contribute air pollutants through fume-producing industrial and agricultural operations, and combustion of fuels for industrial operations, space heating, and water heating.

"Sensitive receptors" are defined as land uses where sensitive population groups (children, the elderly, the acutely ill, and the chronically ill) are likely to be located. Such uses include schools, playgrounds, child care centers, retirement homes, convalescent homes, hospitals, and

Table 5.3
SUMMARY OF AIR QUALITY DATA FOR FAIRFIELD AND VALLEJO, 2006-2008

Pollutant	Standard	Days Exceeding Ambient Standards in: 2006	2007	2008
Fairfield:				
Ozone (O_3)	State 1-Hour	3	0	2
Ozone (O_3)	Federal 8-Hour	3	0	1
Ozone (O_3)	State 8-Hour	8	0	2
Vallejo:				
Ozone (O_3)	State 1-Hour	0	0	1
Ozone (O_3)	Federal 8-Hour	0	0	0
Ozone (O_3)	State 8-Hour	0	0	3
Particulate Matter (PM_{10})	Federal 24-Hour	0	0	0
Particulate Matter (PM_{10})	State 24-Hour	0	2	0
Particulate Matter ($PM_{2.5}$)	Federal 24-Hour			
	Measured	2	4	7
	Estimated	6	12	7
Carbon Monoxide (CO)	State/Federal 8-Hour	0	0	0
Nitrogen Dioxide (NO_x)	State 1-Hour	0	0	0

SOURCE: California Air Resources Board, Aerometric Data Analysis and Management (ADAM), 2009 (http://www.arb.ca.gov/adam/cgi-bin/db2www/adamtop4b.d2w/start).

Note: Fairfield station monitors ozone only.

medical clinics. There are numerous such "receptors" in the plan area/Fairfield vicinity that could be affected by air pollution.

5.2 PERTINENT PLANS AND POLICIES

5.2.1 National and State Legislation

National ambient air quality standards (NAAQS) were established by the federal Clean Air Act of 1970 (amended 1977 and 1990) for the six “criteria” pollutants described in subsection 5.1.3 and Table 5.1, above. In addition, the California Clean Air Act of 1988 (amended in 1992) requires attainment of the California ambient air quality standards (CAAQS), which are often more stringent than federal standards. These federal and state standards are summarized in Table 5.2 and in subsection 5.1.3, above.

The federal Clean Air Act and the California Clean Air Act require that the State Air Resources Board, based on air quality monitoring data, designate portions of the state where the federal or state ambient air quality standards are not met as "nonattainment areas." Because of the differences between the national and state standards, the designation of nonattainment areas is different under the federal and state legislation.

5.2.2 Attainment Status

Areas that do not violate ambient air quality standards are considered to have attained the standards. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. The Bay Area as a whole does not meet state or federal ambient air quality standards for ground level ozone and state standards for PM_{10} and $PM_{2.5}$.

Under the federal Clean Air Act, the EPA has classified the region as *marginally nonattainment* for the 1997 8-hour ozone standard. The EPA required the region to attain the standard by 2007. The EPA determined that the Bay Area has met this standard, but a formal redesignation request and maintenance plan would have to be submitted before formal redesignation could be made.

In May 2008, the EPA lowered the 8-hour ozone 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 Bay Area has met the CO standards for over a decade, and is classified *attainment maintenance* by the EPA.

The EPA grades the region *unclassified* for all other air pollutants, which include PM_{10} and $PM_{2.5}$. In December 2008, the EPA designated the entire Bay Area as *nonattainment* for the 24-hour $PM_{2.5}$ NAAQS. Violations of the NAAQS at the Vallejo and San Jose stations prompted this action. The final EPA order formally designating the Bay Area as *nonattainment* with the federal $PM_{2.5}$ standard was scheduled to become effective in April 2009. However, President Obama has put a freeze on new federal regulations enacted by the previous administration, so the effective date for this designation is unknown. Assuming the designation takes place soon, the Bay Area will then have until April 2012 to develop a plan for meeting the standard and will have until April 2014 to achieve compliance with the standard.

At the state level, the region is considered *serious nonattainment* for ground level O_3 and *nonattainment* for PM_{10} and $PM_{2.5}$. As noted earlier, California ambient air quality standards are more stringent than the national ambient air quality standards. The region is required to adopt plans on a triennial basis that show progress towards meeting the state O_3 standard.

The Bay Area is considered *attainment* or *unclassified* for all other pollutants.

5.2.3 Applicable Regional Air Quality Plan

The California Clean Air Act requires regional air pollution control districts to prepare air quality attainment plans. These plans must provide for district-wide emission reductions of five percent per year averaged over consecutive three-year periods or, if not, provide for adoption of "all feasible measures on an expeditious schedule."

The Bay Area Air Quality Management District (BAAQMD) is the regional agency responsible for devising and implementing such plans in the Bay region. While BAAQMD air quality plans exist for ozone, none exists (or is currently required) for PM_{10}. The Revised San Francisco Bay Area Ozone Attainment Plan for the 1-Hour National Ozone Standard[1] is the current federally mandated ozone air quality plan. The state-mandated regional air quality plan is the Bay Area 2005 Ozone Strategy.[2] These federal- and state-mandated plans contain mobile source controls, stationary source controls, and transportation control measures to be implemented within the Bay Area Air Basin to attain the state and federal ozone standards.

5.2.4 Solano County General Plan

The Solano County General Plan contains the following policies and implementation programs relevant to the air quality impacts of the proposed Specific Plan:

- *Promote land use and design standards that create cleaner air and water and safer streets.* (Policy LU.P-35)

- *When reviewing development proposals, work with applicants to achieve project and street designs that create cleaner air and water and safer streets, reducing injuries to pedestrians, bicyclists, and motorists from crashes.* (Implementation Program LU.I-12)

- *Promote natural carbon sequestration to offset carbon emissions by supporting sustainable farming methods (such as no-till farming, crop rotation, cover cropping, and residue farming), encouraging the use of appropriate vegetation within urban-agricultural buffer areas, and protecting grasslands from conversion to non-agricultural uses.* (Policy AG.P-21)

- *Support land use, transportation management, infrastructure and environmental planning programs that reduce vehicle emissions and improve air quality.* (Policy HS.P-43)

[1]Bay Area Air Quality Management District, Revised San Francisco Bay Area Ozone Attainment Plan for the 1-Hour National Ozone Standard, October 24, 2001.

[2]Bay Area Air Quality Management District, Bay Area 2005 Ozone Strategy, January 4, 2006.

- *Minimize health impacts from sources of toxic air contaminants, both stationary (e.g., refineries, manufacturing plants) as well as mobile sources (e.g., freeways, rail yards, commercial trucking operations).* (Policy HS.P-44)

- *Coordinate with and provide incentives to agricultural producers to minimize the impacts of operations on air quality.* (Policy HS.P-46)

- *Promote GHG emission reductions by supporting carbon-efficient farming methods (e.g., methane capture systems, no-till farming, crop rotation, cover cropping, residue farming); installation of renewable energy technologies; protection of grasslands, open space, and farmlands from conversion to other uses; and encouraging development of energy-efficient structures.* (Policy HS.P-47)

- *Require that when development proposals introduce new significant sources of toxic air pollutants, they prepare a health risk assessment as required under the Air Toxics "Hot Spots" Act (AB 2588, 1987) and, based on the results of the assessment, establish appropriate land use buffer zones around those areas posing substantial health risks.* (Implementation Program HS.I-54)

- *Encourage agricultural best management practices regarding herbicide and pesticide use, odor control, fugitive dust control, and agricultural equipment emissions to minimize air quality impacts.* (Implementation Program HS.I-58)

- *Require the implementation of best management practices to reduce air pollutant emissions associated with the construction of all development and infrastructure projects.* (Implementation Program HS.I-59)

- *Use the guidelines presented in the California Air Resources Board's Air Quality and Land Use Handbook: A Community Health Perspective, or the applicable Air Quality Management District guidelines and recommendations available at the time, when establishing buffers around sources of toxic air contaminants or odorous emissions.* (Implementation Program HS.I-63)

- *Assess air quality impacts using the latest version of the California Environmental Quality Act Guidelines and guidelines prepared by the applicable Air Quality Management District.* (Implementation Program HS.I-64)

- *Require all off-road diesel powered vehicles used for construction to be newer model, low-emission vehicles, or use retrofit emission control devices, such as diesel oxidation catalyst and diesel particulate filters verified by the California Air Resources Board.* (Implementation Program RS.I-49)

See also chapter 7 of this EIR, Climate Change, for Solano County General Plan policies regarding reduction of greenhouse gas emissions.

5.3 IMPACTS AND MITIGATION MEASURES

5.3.1 Significance Criteria

Based on the CEQA Guidelines,[1] the proposed Specific Plan would have a significant air quality impact if it 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;

(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);

(d) expose sensitive receptors to substantial pollutant concentrations; or

(e) create objectionable odors affecting a substantial number of people.

Based on these general criteria, the proposed Specific Plan would be considered to have a significant air quality impact if it would:

(f) be inconsistent with the most recently adopted Clean Air Plan (currently the 2005 Bay Area Ozone Strategy), as assessed through the following criteria:

1. Specific Plan-facilitated development would cause population and vehicle trips or miles traveled to increase at a rate greater than assumed in the Clean Air Plan (CAP); or

2. The Specific Plan does not incorporate current CAP control measures that are appropriate to the area;

(g) contribute to carbon monoxide (CO) concentrations exceeding the State Ambient Air Quality Standard of 9 parts per million (ppm) averaged over 8 hours or 20 PPM for one hour; or

(h) lack appropriate buffers to prevent the potential for (1) exposure of sensitive receptors or the general public to substantial levels of toxic air contaminants, or (2) frequent exposure of members of the public to objectionable odors.

For construction-period air emissions impacts, the BAAQMD significance threshold for construction dust impacts is based on the appropriateness of construction dust controls. The BAAQMD guidelines provide "feasible control measures for construction emission of PM_{10}." If the appropriate construction controls are to be implemented, then air pollutant emissions for construction activities would be considered less-than-significant.

[1] CEQA Guidelines, Appendix G, Items III(a) through III(e).

5.3.2 Relevant Project Characteristics

As described in chapter 2, Project Description, of this EIR, the Specific Plan proposes development of housing, community/public services uses, "agricultural tourism" uses, and neighborhood commercial uses clustered in four neighborhoods. The remaining approximately 78 percent of land in the plan area would be preserved as open land. As discussed in chapter 14, Population and Housing, of this EIR, Specific Plan-facilitated development is expected to produce approximately 1,485 new residents and 136 new jobs within the Specific Plan area.

Development in accordance with the Specific Plan may include an onsite wastewater collection and treatment system. The Specific Plan also includes a designated 10-acre site in the northwestern corner of Nightingale Neighborhood for future accommodation of an elementary school. (See further discussion in chapter 2, Project Description, and chapter 16, Public Services and Utilities, of this EIR.)

As described in chapter 9, Energy, of this EIR, the Specific Plan proposes that development within the plan area be subject to various guidelines for energy efficiency. These guidelines would help to reduce air emissions.

5.3.3 Impacts and Mitigation Measures

Impact 5-1: Construction-Related Air Quality Impacts. Construction or demolition activities permitted and/or facilitated by the proposed Specific Plan may generate construction-period exhaust emissions and fugitive dust that could temporarily but noticeably affect local air quality. This would represent a ***potentially significant impact*** (see criteria [c], [d], and [e] in subsection 5.3.1, "Significance Criteria," above).

Construction activities associated with Specific Plan-facilitated public and private development in the plan area may include building demolition, building renovation or modification, grading, new building construction, and paving. Such construction would generate pollutants intermittently.

Generally, the most substantial air pollutant emissions would be dust generated from building demolition or site grading. The physical demolition of existing structures and other infrastructure can generate substantial dust. The amount of dust generated would be highly variable and would depend on the size of the area disturbed, the amount of activity, soil conditions, and meteorological conditions. In addition to the dust created during demolition, substantial dust emissions could be created as debris is loaded into trucks for disposal. Without adequate dust control measures, visible dust clouds extending beyond the construction or demolition site could occur. Wind erosion and disturbance to exposed (graded) ground areas would also be sources of dust emissions. Dust can continue to affect local air quality during construction and can contribute to regional PM_{10} and $PM_{2.5}$ emissions.

Construction activities can also generate exhaust emissions from vehicles/equipment and fugitive particulate matter emissions that would affect local air quality. Exhaust from construction equipment and associated heavy-duty truck traffic emits diesel particulate matter, which is an identified toxic air contaminant. Off-road construction equipment is also a source of NOx emissions, which can contribute to ground-level ozone in the region. The BAAQMD

does not have thresholds to evaluate impacts of construction period exhaust, particulate matter, and NOx emissions during construction. However, the BAAQMD does recommend that these emissions be minimized.

Construction activities are also a source of organic gas emissions. Solvents in adhesives, non-water-based paints, thinners, some insulating materials, and caulking materials can evaporate into the atmosphere and participate in the photochemical reaction that creates urban ozone. Asphalt used in paving is also a source of organic gases for a short time after its application.

Existing land uses in and around the Specific Plan area, including residential areas, could be adversely affected by construction emissions. If uncontrolled, such emissions could lead to both health and nuisance impacts. Although temporary, such effects would represent a *potentially significant adverse impact* on local air quality.

Mitigation 5-1. The County shall require construction contractors to comply with Solano County General Plan Implementation Program HS.I-59 (best management practices) and Implementation Program RS.I-49 (requirements for diesel vehicles). In addition, for all discretionary grading, demolition, or construction activity in the Specific Plan area, the County shall require implementation of the following measures by construction contractors, where applicable:

Dust (PM_{10}) control measures that apply to all construction activities:

- Water all active construction areas that have ground disturbances at least twice daily and more often during windy periods.
- Cover all hauling trucks or maintain at least two feet of freeboard.
- Pave, apply water at least twice daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas, and sweep streets daily (with water sweepers) if visible soil material is deposited onto the adjacent roads.

Enhanced dust (PM_{10}) control measures (for construction sites that are greater than four acres, are located adjacent to sensitive receptors, or otherwise warrant additional control measures):

- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (i.e., previously graded areas that are inactive for 10 days or more).

(continued)

Mitigation 5-1 (continued):

- Enclose, cover, water twice daily, or apply (non-toxic) soil binders to exposed stockpiles.
- Limit traffic speeds on any unpaved roads to 15 miles per hour.
- Replant vegetation in disturbed areas as quickly as possible.
- Suspend construction activities that cause visible dust plumes to extend beyond the construction site.

Measures to reduce diesel particulate matter and $PM_{2.5}$:

- Post clear signage at all construction sites indicating that diesel equipment standing idle for more than five minutes shall be turned off. This would include trucks waiting to deliver or receive soil, aggregate, or other bulk materials. Rotating drum concrete trucks could keep their engines running continuously as long as they were onsite or adjacent to the construction site.
- Prevent the use of construction equipment with high particulate emissions. Opacity is an indicator of exhaust particulate emissions from off-road diesel powered equipment. The project shall ensure that emissions from all construction diesel-powered equipment used on the project site do not exceed 40-percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40-percent opacity (or Ringelmann 2.0) shall be repaired or replaced immediately.
- Ensure that contractors install temporary electrical service whenever possible to avoid the need for independently powered equipment (e.g. compressors).
- Properly tune and maintain equipment for low emissions.

The above measures are BAAQMD-identified "feasible control measures for construction emissions of PM_{10}." Implementation of these measures would reduce the construction-related air quality impact to a ***less-than-significant level***.

Long-Term Changes in Local Carbon Monoxide Levels. Development facilitated by the proposed Specific Plan would generate new vehicle trips. Along local streets, these new trips would affect concentrations of carbon monoxide. Within the regional air basin, these new trips would add to the pollution burden. Nevertheless, future local carbon monoxide levels near worst-case intersections in the vicinity of the Specific Plan area under the "with project" year 2030 growth scenario would be within state and federal air quality standards. This impact would therefore be considered ***less-than-significant.***

At the local level, the pollutant of greatest concern is carbon monoxide. Local concentrations of carbon monoxide are greatest near intersections and roadways with congested traffic. Such carbon monoxide emissions can be a problem in wintertime when stagnant meteorological conditions occur (i.e., very little vertical or horizontal mixing of air in the lower atmosphere).

Carbon monoxide concentrations measured over a three-year period in Vallejo indicate a maximum concentration of 2.6 parts per million over an 8-hour averaging period. Concentrations in the Middle Green Valley Specific Plan area are likely lower due to the more rural nature of the setting. The contribution of Specific Plan-related traffic to these levels was predicted following the screening guidance recommended by the BAAQMD. A review of project-affected intersections that have the highest level of traffic and congestions was conducted to identify intersections with the potential for highest carbon monoxide levels. The intersection with a combination of poor level of service (LOS) and high traffic volume was evaluated for potential high carbon monoxide levels; the intersection of Green Valley Road and Business Center Drive would have such a combination of high traffic levels and congestion. Future carbon monoxide levels were predicted near this intersection for existing conditions and future “with project” conditions using traffic projections described in chapter 17, Transportation and Circulation, of this EIR. Emission factors used were calculated using the EMFAC2007 model, developed by the CARB, with default assumptions for Bay Area during the winter, including a temperature of 40 degrees F. A slow speed of 5 miles per hour was used in the computations, which results in higher emission rates. The screening analysis included the number of through lanes in the intersection configuration with a receptor located at the edge of the roadway. Table 5.4 summarizes the highest predicted carbon monoxide concentrations.

As shown in Table 5.4, the modeling indicates that existing 8-hour carbon monoxide levels are currently below national and California ambient air quality standards. The 8-hour carbon monoxide levels with implementation of the Middle Green Valley Specific Plan (in 2030) are predicted to remain below ambient air quality standards. This is the result of decreases in emission rates due to newer automobiles with much improved exhaust emission control replacing older vehicles. The overall regional decline in carbon monoxide emissions rates began two decades ago, and this trend is reflected in the air quality monitoring data (e.g., see previous Table 5.3); carbon monoxide concentrations in the Bay Area have not exceeded the national or California standard since about 1991.

In summary, existing and future carbon monoxide levels under the year 2030 "with project" scenario would be below the national and California air quality standards, and the Specific Plan's impact on local carbon monoxide levels is considered ***less-than-significant***.

Mitigation for Long-Term Changes in Local Carbon Monoxide Levels. No significant local carbon monoxide impact has been identified; no mitigation is required.

Table 5.4
PREDICTED 8-HOUR WORST-CASE CARBON MONOXIDE LEVELS

Intersection	Daily Emissions (in ppm) Existing (2009)	Background (2012)	Background + Project (2012)	Cumulative + Project (2030)
Green Valley Road and Business Center Drive	4.7	4.8	5.0	3.6
BAAQMD Project-Level Thresholds	*9.0 ppm for the CAAQS and 9 ppm for the NAAQS*			

SOURCE: Illingworth & Rodkin, Inc., 2009, using URBEMIS2007.

ppm = parts per million; CAAQS = California ambient air quality standard; NAAQS = national ambient air quality standard

Impact 5-2: Odor Impacts on "Sensitive Receptors." Specific Plan-facilitated development in the plan area may expose sensitive receptors, such as housing and potentially a school, to odors. This effect is considered to be a ***potentially significant project and cumulative impact*** (see criteria [d] and [e] in subsection 5.3.1, "Significance Criteria," above).

The Specific Plan would encourage development in the plan area that, in some locations, could place odor-sensitive land uses near odor-generating land uses. For example, in some parts of the Specific Plan area, odors from existing or future agricultural activities, or from the potential future onsite wastewater treatment plant, could create a nuisance for Specific Plan-facilitated new sensitive receptors such as housing or potentially a school. See further discussion of potential land use conflicts in chapter 12, Land Use and Open Space, of this EIR. For further discussion of conflicts associated with agricultural activities and the potential onsite wastewater treatment plant, see chapter 15, Public Health and Safety, of this EIR.

According to the *BAAQMD CEQA Guidelines*, for a plan to have a less-than-significant impact with respect to odors and/or toxic air contaminants, buffer zones must be established around existing and proposed land uses that would emit these air pollutants. Buffer zones to avoid odors and toxics impacts must be reflected in local plan policies, land use maps, or implementing ordinances. The Solano County General Plan includes Implementation Program HS.I-63 (see subsection 5.2.4, Solano County General Plan, of this EIR chapter), which provides for establishment of such buffers.

Subsequent CEQA documentation prepared for individual projects would have site- and project-specific data and would recommend (as necessary) specific odor-control measures, such as additional land use siting measures and/or setback requirements.

Mitigation 5-2. In reviewing projects proposed in accordance with the Specific Plan, the County shall implement Solano County General Plan policies and implementation programs to reduce the potential for odor impacts on sensitive receptors, including Implementation Program HS.I-58 (encouraging agricultural best management practices) and Implementation Program HS.I-63 (establishing buffers). Implementation of these measures would be expected to reduce odor impacts on sensitive receptors to a ***less-than-significant level***.

Impact 5-3: Long-Term Regional Air Emissions Increases. Specific Plan-facilitated development is not reflected in the latest applicable Clean Air Plan (CAP). In addition, future traffic increases associated with Specific Plan-facilitated development would generate regional emissions increases that would exceed the latest proposed BAAQMD emission-based threshold of significance for reactive organic gases (ROG). The effect of long-term regional emissions associated with Specific Plan-facilitated development is therefore considered to be a ***significant project and cumulative impact*** (see criteria [a] through [d] in subsection 5.3.1, "Significance Criteria," above).

The proposed Specific Plan would allow residential, limited commercial, and other development within the plan area, as described in chapter 2, Project Description, of this EIR. The Specific Plan area currently contains mostly residential uses in a mainly rural setting. The Specific Plan proposes a mix of housing and localized commercial, agricultural/industrial, cultural, and institutional uses that would mostly serve the plan area and vicinity. The area has been, and continues to be, a rural area that is not served directly by transit. The proposed Specific Plan would not interfere with the implementation of CAP transportation control measures (TCMs) and includes agricultural and open space uses that would result in lower operational emissions than development of the site strictly for residential, commercial, or industrial uses. Nevertheless, resultant additional vehicle trips to and from the Specific Plan area would generate new mobile air pollutant emissions increases affecting the overall San Francisco Bay air basin.

Conflict with Latest Applicable Clean Air Plan (CAP). 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 1991 CAP was updated (to produce the Bay Area 2005 Ozone Strategy), it used the most recent projections (i.e., Projections 2003) developed by the Association of Bay Area Governments (ABAG) and vehicle activity projected by the Metropolitan Transportation Commission. These projections were based on the then-most recent data using land use designations developed by cities and counties through the General Plan process. Subsequently, the updated Solano County General Plan was adopted (in 2008) and the draft Middle Green Valley Specific Plan was prepared to implement General Plan provisions for Middle Green Valley. The latest CAP, developed in 2005, therefore does not reflect the adopted 2008 General Plan land use projections nor the proposed Specific Plan land use provisions. The BAAQMD is currently preparing the 2009 CAP, which can be expected to reflect the latest General Plan projections, including the proposed Specific Plan land use assumptions.

Exceedance of Proposed BAAQMD Emission-Based ROG Threshold. Another way to assess the impact of Specific Plan-facilitated development is to evaluate the total direct and indirect emissions from buildout of the Specific Plan. The effect of the projected Specific Plan development on long-term regional air pollutant emissions was evaluated by Illingworth & Rodkin, Inc., EIR air quality and climate change consultants, using the URBEMIS2007 model (version 9.2.4). This model provides daily and annual emissions from area and mobile sources for various land uses. Area sources include emissions from natural gas combustion (e.g., space and water heating and cooking), use of landscape equipment, and use of consumer products. Daily trip generation information for the Specific Plan was combined in URBEMIS2007 with emission factors computed by CARB's EMFAC2007 model. The modeling results are summarized in Table 5.5.

Guidelines for the evaluation of project impacts issued by the BAAQMD consider emission increases of ozone precursors and PM_{10} to be significant if they exceed 80 pounds per day. The BAAQMD has recently proposed changes to these guidelines, which would include revised emission-based thresholds for ozone precursors and PM_{10} and new thresholds for $PM_{2.5}$.[1] These draft thresholds are listed in Table 5.5.

As shown in Table 5.5. Specific Plan-related emissions would be below the current project-based thresholds. With adoption of the proposed new thresholds, however, Specific Plan-related emissions would exceed the new ROG threshold while remaining below the other new thresholds. A majority of the ROG emissions would result from use of consumer products, such as solvents and paints.

Mitigation 5-3. In addition to the energy-efficiency and other emissions-reducing measures already included in the Specific Plan (e.g., provisions of sidewalks, bicycle lanes, etc.), the County shall require that the Specific Plan include the following requirements:

- Wire each housing unit to allow use of emerging electronic metering communication technology.
- Restrict the number of fireplaces in residences to one per household and/or require residential use of EPA-certified wood stoves, pellet stoves, or fireplace inserts. EPA-certified fireplaces and fireplace inserts are 70- to 90-percent effective in reducing emissions from this source. Also encourage the use of natural gas-fired fireplaces.
- Require outdoor outlets at residences to allow use of electrical lawn and landscape maintenance equipment.
- Make natural gas available in residential backyards to allow use of natural gas-fired barbecues.

(continued)

[1]BAAQMD, *California Environmental Quality Act Air Quality Guidelines*, November 2009. (Guidelines pending public hearing and adoption by the BAAQMD Board of Directors).

Table 5.5
FUTURE INCREMENTAL EMISSIONS FROM DEVELOPMENT IN THE SPECIFIC PLAN AREA

Specific Plan Buildout (assuming year 2015)	Daily Emissions (in pounds per day) ROG	NOx	PM_{10}	$PM_{2.5}$
Area Source Emissions	36.5	11.6	0.1	0.1
Vehicle Travel Emissions	33.5	34.0	43.7	9.3
Total	**70**	**46**	**44**	**9**
BAAQMD Project-Level Thresholds	*80*	*80*	*80*	*--*
BAAQMD Draft thresholds proposed September 2009	*54*	*54*	*82*	*54*

SOURCE: Illingworth & Rodkin, Inc.. 2009, using URBEMIS2007.

ROG = reactive organic gases; NOx = nitrogen dioxide; PM_{10} and $PM_{2.5}$ = particulate matter

Mitigation 5-3 (continued):

- Require that any community services operation in the plan area use electrical or alternatively fueled equipment for maintenance of the areas under its jurisdiction.

These strategies can be expected to reduce Specific Plan-related regional emissions assumed in the air quality analysis by perhaps 5 percent. This amount would fall short of the 23-percent reduction needed for emissions to fall below the proposed BAAQMD significance threshold for ROG.

The finding of a significant impact is based primarily on inconsistencies among the land use projections used in various plans (i.e., the proposed Specific Plan, the recently adopted Solano County General Plan, and the 2005 Bay Area Ozone Strategy). As a result, the Specific Plan's inconsistency with the CAP is primarily an administrative effect, in that the CAP is out-of-date and does not reflect current planning projections. The BAAQMD is likely to adopt an updated CAP that would include the latest County projections, including proposed development in the Specific Plan area. Until the current CAP is updated to reflect changed assumptions regarding the County General Plan and Specific Plan projections, adoption and implementation of the Specific Plan would remain technically inconsistent with the current CAP.

In addition, however, Specific Plan-facilitated development would likely exceed the proposed BAAQMD significance threshold for ROG, should that threshold be adopted. Since no additional feasible full mitigation has been identified, the Specific Plan's effect on long-term regional emissions increases, as reflected in these administrative provisions, would therefore represent a ***significant and unavoidable impact***.