4.2 AIR QUALITY

This section describes existing air quality conditions for the proposed project, including the area's climate, regulatory framework, and ambient air quality levels.

No comments regarding the proposed project's potential impacts to air quality were received during the public scoping period.

Given the fluid nature of air quality, the air quality study area for this EIR is defined as the San Francisco Bay Area Air Basin for regional pollutants such as ozone and nitrogen dioxide, and the immediate area for acute/localized pollutants such as carbon monoxide. These different types of pollutants are described in detail below.

4.2.1 Environmental Setting

4.2.1.1 Regulatory Background

Air pollution sources can be grouped into three general categories: mobile sources, area-wide sources, and stationary sources.

- Mobile sources include on-road vehicles as well as off-road mobile equipment such as construction equipment. Exhaust emissions from on-road motor vehicles are the primary source of reactive organic gases (ROGs), nitrogen oxides (NO_X), and carbon monoxide (CO) in the San Francisco Bay Area. Road dust sent airborne by traveling vehicles is a primary source of particulate matter.
- Area-wide sources are sources that are best represented as emissions that occur over broad, developed areas. These sources include consumer products such as fertilizers, household paints, and aerosol spray products, as well as fuel combustion at residences (e.g., lawn mowers, furnaces, water heaters, and gas stoves).
- Stationary sources include specific industrial and commercial facilities with individual point emissions sources such as fuel-burning steam boilers or process heaters.

The project area is subject to major air quality planning programs required by the federal Clean Air Act, which was last amended in 1990, and the California Clean Air Act of 1988. Ambient air quality standards to protect public health and welfare have been established under both statutes, including timetables for achieving and maintaining ambient standards. These statutes also require the development of rigorous master plans to guide the air quality improvement efforts of state and local agencies. The federal plan, known as the State Implementation Plan (SIP), requires the implementation of emission control strategies that will demonstrate attainment of national ambient air quality standards by deadlines established in the federal Clean Air Act. The state plan is called the Clean Air Plan (CAP). The CAP requires progress in attaining state ambient air quality standards as expeditiously as practicable. The CAP must include a 5 percent per year reduction in emissions or a demonstration that all feasible measures have been proposed for implementation. However, deadlines are not fixed for attaining state standards. The SIP and CAP overlap and contain many of the same emissions control measures.

Both the SIP and the CAP rely on the combined emission control programs of the EPA, the California Air Resources Board (CARB), and the BAAQMD. The role of each agency in controlling emissions in the project area is described below.

Regulatory Agencies

Federal. The EPA oversees state and local implementation of federal Clean Air Act requirements. In addition, the EPA sets federal major stationary emission standards and emission standards for many mobile sources that are sold outside California, such as new on-road motor vehicles including trucks. The EPA also sets emission standards for various classes of new off-road mobile sources that are sold throughout the country.

State and Local. Under California law, the responsibility to carry out air pollution control programs is split between the CARB and local or regional air pollution control agencies. In the project area, the BAAQMD regulates stationary sources. The BAAQMD requires almost all stationary sources to obtain permits (except for very small, inconsequential sources that are exempt from permit requirements) and can impose emission standards, fuel or material specifications, and operational limits to reduce air emissions in accordance with its adopted prohibitory rules and new source review program. The BAAQMD also has enforcement authority, including fines for violations of emission limits, and, in extreme cases, issuance of abatement orders in response to severe emission exceedances or confirmed localized nuisance and public health or safety concerns.

The CARB shares the regulation of mobile sources with the EPA. The CARB has the authority to set emission standards for on-road motor vehicles and for some classes of off-road mobile sources that are sold in California. The emission standards with the largest effect in the project area are those set for automobiles, light- and medium-duty trucks, and California heavy-duty truck engines. The CARB also regulates vehicle fuels to reduce emissions. The CARB has set emission reduction performance requirements for gasoline (California reformulated gasoline) and has limited the sulfur and aromatic content of diesel fuel to make it burn cleaner. The CARB also sets the standards used to pass or fail vehicles in the smog check and heavy-duty truck inspection programs.

National and State Ambient Air Quality Standards. National and state ambient air quality standards for criteria air pollutants have been established for CO, ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter less than 10 micrometers (µm) and 2.5 µm in aerodynamic diameter (PM_{10} and $PM_{2.5}$, respectively.) Other pollutants (e.g., lead) also have federal and state ambient air quality standards, but they are not discussed in this document because the project will not emit such pollutants~~emissions of these pollutants from the proposed project would be minimal~~. Ambient air quality standards specify the concentration of pollutants in the outside air that the public can be exposed to without adverse health effects. Individuals vary widely in their sensitivity to air pollutants, so standards are designed to protect more sensitive populations such as children and the elderly. National and state standards are reviewed and updated periodically based on new health effects studies. California ambient air quality standards are generally more stringent than the national standards. National and state ambient air quality standards are listed in **Table 4.2-1**. Criteria air pollutants and associated adverse health effects are summarized below.

Table 4.2-1
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]	
		Concentration	Attainment Status	Concentration[3]	Attainment Status
Ozone	8 Hour	0.070 ppm (137µg/m^3)	N[9]	0.075 ppm	N[4]
	1 Hour	0.09 ppm (180 µg/m^3)	N		See footnote 5
Carbon Monoxide	8 Hour	9.0 ppm (10 mg/m^3)	A	9 ppm (10 mg/m^3)	A[6]
	1 Hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	A
Nitrogen Dioxide	1 Hour	0.18 ppm (338 µg/m^3)	A		
	Annual Arithmetic Mean	0.030 ppm (56 µg/m^3)		0.053 ppm (100 µg/m^3)	A
Sulfur Dioxide	24 Hour	0.04 ppm (105 µg/m^3)	A	0.14 ppm (365 µg/m^3)	A
	1 Hour	0.25 ppm (655 µg/m^3)	A		
	Annual Arithmetic Mean			0.030 ppm (80 µg/m^3)	A
Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N[7]		
	24 Hour	50 µg/m^3	N	150 µg/m^3	U
Particulate Matter—Fine ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	N[7]	15 µg/m^3	A
	24 Hour			35 µg/m^3 See footnote 10	U
Sulfates	24 Hour	25 µg/m^3	A		
Lead	Calendar Quarter			1.5 µg/m^3)	A
	30 Day Average	1.5 µg/m^3)	A		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3	U		
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 µg/m^3	No information available		
Visibility Reducing particles	8 Hour (1000 to 1800 PST)	See Footnote 8	U		

Source: BAAQMD 2008 (updated May 29, 2008).

Notes: A=Attainment; N=Nonattainment; U=Unclassified; mg/m^3=milligrams per cubic meter; ppm=parts per million; µg/m^3=micrograms per cubic meter

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter— PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 ppm, a level one-half the national standard and two-thirds the state standard.
2. National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.075 ppm (75 ppb) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m^3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m^3.
3. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially averaged across officially designed clusters of sites falls below the standard.
4. National air quality standards are set by the EPA at levels determined to be protective of public health with an adequate margin of safety.
5. In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard. The EPA lowered the national 8-hour ozone standard from 0.80 to 0.75 ppm (i.e. 75 ppb) effective May 27, 2008. The EPA will issue final designations based upon the new 0.75 ppm ozone standard by March 2010.
6. The EPA revoked the national 1-hour ozone standard on June 15, 2005.
7. In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.
8. In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.
9. State standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70%. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.
10. The 8-hour state ozone standard was approved by CARB on April 28, 2005 and became effective on May 17, 2006.
11. The EPA lowered the 24-hour $PM_{2.5}$ standard from 65 µg/m^3 to 35 µg/m^3 in 2006. The EPA is required to designate the attainment status of BAAQMD for the new standard by December 2009.

For planning purposes, all regions of the state, including the San Francisco Bay Area, are assigned an ambient air quality status designation on a pollutant-by-pollutant basis by the federal and state regulatory agencies based on whether ambient air quality standards are being met. Areas with monitored pollutant concentrations that are lower than ambient air quality standards are designated "attainment areas." When monitored concentrations exceed ambient standards, areas are designated "nonattainment areas." An area that previously exceeded ambient standards but is now in attainment is designated as a "maintenance area." Nonattainment areas are further classified based on the severity and persistence of the air quality problem as "moderate," "severe," or "serious." Classifications determine the stringency of new source review regulations and pollution control requirements. In general, areas with more serious air quality classifications require regional air quality plans with more stringent new source review regulations and emission control requirements.

The main criteria pollutants, including major emission sources and associated principal health effects, are discussed briefly below.

Carbon Monoxide

Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood, which can cause dizziness and fatigue, impair central nervous system functions, and induce angina in persons with serious heart disease. The most important sources of high CO levels in the ambient air are passenger cars, light-duty trucks, and residential wood burning.

Ozone

While O_3 serves a beneficial purpose in the upper atmosphere (stratosphere) by reducing ultraviolet radiation potentially harmful to humans, it can harm the human respiratory system and sensitive plant species when it reaches elevated concentrations in the lower atmosphere. O_3 concentrations build to peak levels during periods of light winds, bright sunshine, and high temperatures. Short-term O_3 exposure can reduce lung function in children, make people susceptible to respiratory infection, and produce symptoms that cause people to seek medical treatment for respiratory distress. Long-term exposure can impair lung defense mechanisms and lead to emphysema and chronic bronchitis. Sensitivity to O_3 varies among individuals, with infants and exercising children being particularly vulnerable. O_3 is formed in the atmosphere by a complex series of photochemical reactions that involve "ozone precursors," which are two large families of pollutants: NO_x and ROGs. Nitrogen oxides and ROGs are emitted from a variety of stationary and mobile sources. Although NO_x is a criteria pollutant (measured as NO_2) and ROG is not, both are included in this discussion as O_3 precursors.

Nitrogen Dioxide

The major health effect from exposure to high levels of NO_2 is the risk of acute and chronic respiratory disease. Nitrogen dioxide is a combustion by-product, but it can also form in the atmosphere by chemical reaction. This reddish-brown gas, a precursor to O_3, is often observed during the same conditions that produce high levels of O_3.

Sulfur Dioxide

The major health effect from exposure to SO_2 is acute and chronic respiratory disease. Asthmatics are particularly sensitive. SO_2 can also react with water in the atmosphere to form acids (or so-called acid rain), which can cause damage to vegetation and man-made materials. The main source of SO_2 is the combustion of fuels containing sulfur, chiefly coal and fuel oil. California has very low levels of SO_2 because most large combustion sources burn natural gas, which contains only trace quantities of sulfur. California regulations also limit the sulfur content of gasoline and diesel fuel.

Particulate Matter

The regulated portion of particulate matter is that with an aerodynamic diameter of less than 10 µm (PM_{10}). ~~Recently, p~~Particulate matter ~~was subdivided into~~is measured in coarse and fine fractions, with $PM_{2.5}$ constituting the fine fraction. The health effects from long-term exposure to high concentrations of particulate matter are increased risk of chronic respiratory diseases such as asthma and altered lung function in children. Short-term exposure to high levels of particulate matter has been shown to increase the number of people seeking medical treatment for respiratory distress and to increase mortality among those with severe respiratory problems. Particulate matter also results in reduced visibility.

Ambient particulate matter has many sources. It is emitted directly by combustion sources such as motor vehicles, industrial facilities, and residential wood burning, and in the form of dust from ground-disturbing activities such as vehicle traffic, construction, and farming. It also forms in the atmosphere from the chemical reaction of precursor gases.

4.2.1.2 New O_3 and $PM_{2.5}$ Air Quality Standards

~~In July 1997, the EPA adopted a number of changes to national ambient air quality standards for O_3 and particulate matter (EPA 1997a,b). The new O_3 and $PM_{2.5}$ standards are shown in **Table 4.2-1**. These new standards are discussed separately because, from a regulatory standpoint, they have a different status than previously adopted standards. None of the new standards are fully effective at this time because the data and information needed to develop control programs will require several years to collect. The EPA has not yet designated any areas of the country as attainment or nonattainment for the new O_3 and $PM_{2.5}$ standards. Planning requirements and control programs will be phased in with a full set of supporting regulations scheduled for completion by 2008. As part of this program, the national 1-hour O_3 standard was revoked in June 2006.~~The 8-hour ozone and $PM_{2.5}$ standards listed in **Table 4.2-1** were promulgated in 1997 but challenged in the courts. In 2002, the courts upheld the standards. The EPA made final designations for the 8-hour ozone standards in April 2004 and for the new federal $PM_{2.5}$ standards in December 2004. Now the EPA and the states are working together to develop air quality plans to achieve compliance with the standards, where needed.

4.2.1.3 Current Status of Bay Area Air Quality

The EPA has classified the Bay Area as a moderate nonattainment area for ozone and an attainment/maintenance area for carbon monoxide until at least ~~2008~~ 2018~~(40 Code of Federal~~

~~Regulations 81.305)~~. The CARB has given the area state-level nonattainment status for O_3, PM_{10} and $PM_{2.5}$.

The 1999 Ozone Attainment Plan was adopted by the BAAQMD, the Metropolitan Transportation Commission, and the Association of Bay Area Governments (ABAG) and submitted to CARB in June 1999. This plan was prepared to respond to exceedances of the federal ozone standard during the mid to late 1990s. However, EPA partially disapproved this plan. In response, BAAQMD, Metropolitan Transportation Commission, and ABAG prepared the Bay Area 2001 Ozone Attainment Plan.

The Bay Area 2001 Ozone Attainment Plan for the national 1-hour ozone standard (adopted October 24, 2001) included two commitments for further planning: (1) a commitment to conduct a mid-course review of progress toward attaining the national 1-hour ozone standard by December 2003, and (2) a commitment to provide a revised ozone attainment strategy to the EPA by April 2004.

In April 2004, the EPA made a final finding that the Bay Area has attained the national 1-hour ozone standard. Because of this finding, the previous planning commitments in the 2001 Ozone Attainment Plan are no longer required. The finding of attainment does not mean the Bay Area has been reclassified as an attainment area for the 1-hour standard. The region must submit a redesignation request to EPA in order to be reclassified as an attainment area. Therefore, the portion of the 2005~~4~~ Ozone Strategy addressing national ozone planning requirements will include: (1) a redesignation request, and (2) a maintenance plan to show how the region will continue to meet the 1-hour ozone standard. The 2005 Ozone Strategy does not address the federal requirements, other than to mention that planning requirements have yet to be finalized due to the adoption of new standards (including the revocation of the 1-hour standard) and that the Bay Area will take action once final planning requirements have been established.

The CAP is a state-level requirement of the California Clean Air Act that specifies additional measures of emission control to achieve the more stringent state ambient air quality standards for ozone; the SIP required by the federal Clean Air Act is partially based on control measures from the CAP. The BAAQMD's 2000 CAP (adopted December 20, 2000) is the most recent version of the CAP for ozone (BAAQMD 2000).

The CAP is updated and reevaluated every three years. Updating the CAP allows the most up-to-date population, travel activity, and energy use forecasts from the Metropolitan Transportation Commission and ABAG to be incorporated. The 2000 CAP is based on ABAG's *Projections '98*.

The state PM_{10} standards are also exceeded in the region. However, no state plan is required to meet state PM_{10} standards.

On August 27, 1998, the CARB amended the state Toxic Air Contaminant (TAC) list by formally identifying particulate matter emissions from diesel-fueled engines as a TAC. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by the EPA as Hazardous Air Pollutants and by the CARB as TACs. Since the vast majority of diesel exhaust particles are very small by weight (approximately 94 percent of their combined mass consists of particles less than 2.5 µm in diameter), both the particles and their coating of TACs can be inhaled into the lungs. While the gaseous portion of diesel exhaust also contains TACs, the CARB's action was specific to diesel particulate emissions that, according to supporting

CARB studies, represent 50 percent to 90 percent of the mutagenicity (i.e., the capacity to produce genetic mutations) of diesel exhaust (CARB 1998). This action will lead to additional control of diesel engine emissions by CARB in the coming years. The EPA also conducted an extensive evaluation of the cancer and noncancer health effects of diesel exhaust and issued final rules to tighten emission standards for diesel heavy-duty truck engines on January 18, 2001. The new EPA standards went into effect in 2007.

4.2.1.4 Regional Climatology

The climate of the San Francisco Bay Area is classified as Mediterranean, with mild, wet winters and warm, dry summers. The regional climate is controlled primarily by the Pacific high-pressure system over the eastern Pacific Ocean and by local topography. Local climate is strongly influenced by topography and proximity to the Pacific Ocean and San Francisco Bay. The resulting overall airflow patterns are complex, exhibiting much local variation. Large-scale winds, which are the wind patterns influenced by general geographical and topographical features of the San Francisco Bay Area on a roughly 50-mile scale, are predominantly from the northwest.

Marin County, where the project is located, is bordered on the west by the Pacific Ocean, on the east by the San Rafael Bay, on the south by the Golden Gate, and on the north by the Petaluma Gap. The county is mostly hilly. Areas along the west coast of Marin County are usually subject to cool marine air. In the summer months, the marine air is cooled as it passes over the offshore upwelling region and forms a fog layer along the coast. In the winter, proximity to the ocean keeps the coastal regions relatively warm. Temperatures do not vary much over the year at these coastal areas: high 50s in the winter and low 60s in the summer. (All temperatures listed in this section are in degrees Fahrenheit.) The warmest months are September and October, which have temperatures in the mid to high 60s.

The eastern side of Marin County has warmer weather and less fog. This is due more to its distance from the ocean than to the blocking effect of the hilly terrain to the west. Although a few mountains are above 1,500 feet in elevation, most of the terrain is only 800 to 1,000 feet high. Much of the time, this is not high enough to block the marine layer, which averages 1,700 feet in depth. Because of the wedge shape of the county, areas to the north are farther from the ocean. This extra distance from the ocean allows the marine air mass to be heated before it arrives at eastern Marin County cities. In southern Marin County, the distance from the ocean is shorter and the elevations are lower, so there is a higher incidence of cool, unmodified, maritime air.

Cities next to San Francisco Bay have moderate temperatures. For example, San Rafael experiences average maximum winter temperatures in the high 50s to low 60s, and average maximum summer temperatures in the high 70s to low 80s. Average minimum temperatures in San Rafael are in the low 40s in the winter and low 50s in the summer. Inland areas such as Kentfield experience average maximum temperatures 2 degrees cooler in the winter and 2 degrees warmer in the summer. Minimum temperatures in Kentfield are 2 degrees cooler all year.

Wind speeds are highest along the west coast of Marin, about 8 to 10 miles per hour (mph). Although most of the terrain throughout central Marin County is not high enough to act as a barrier to the marine airflow, the complex terrain creates sufficient friction to slow the airflow.

Downwind, at former Hamilton Air Force Base in east Marin County, the annual average wind speeds are only 5 mph. The prevailing wind directions throughout Marin County show less variation and are generally from the northwest.

The mountainous terrain in Marin County receives higher rainfall amounts than most parts of the Bay Area, except for the southern Santa Cruz Mountains. Near Mount Tamalpais, rainfall amounts are twice as high as the rest of the Bay Area, with San Rafael reporting an average of 37.5 inches per year and Kentfield reporting 79 inches per year. Farther north, Hamilton Air Force Base and Petaluma report 26 and 24 inches, respectively. Consistent with the Bay Area Mediterranean climate, 85 percent of the annual rainfall in Marin occurs from November through March.

Air pollution potential is highest on the eastern side of Marin County. This is where the semi-sheltered valleys and largest population centers are located. Currently, most of the development has been along the Bay, particularly in southern Marin. In the south, where distances to the ocean are short, the influence of the marine air keeps the pollution levels low. As development moves farther north where the valleys are more sheltered from the sea breeze, it will encounter greater pollution potential.

Summaries of temperature and precipitation data (30-year normals) from a station in San Rafael are presented in **Table 4.2-2**.

Table 4.2-2
Average Monthly Temperature and Precipitation Data,
San Rafael Station

Month	Normal Temperatures		Precipitation (inches)
	Maximum (°F)	Minimum (°F)	
January	56.9	40.6	7.89
February	62.0	43.7	5.82
March	64.4	44.7	4.95
April	68.6	45.9	1.96
May	73.2	48.9	0.32
June	78.1	52.6	0.21
July	81.6	53.7	0.07
August	81.5	54.2	0.09
September	80.3	53.6	0.37
October	75.1	50.7	2.15
November	64.0	46.0	5.6
December	56.7	41.4	6.31
Annual Average	70.2	48.0	35.74

Source: Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1961-1990, NCDC, January 1992.

4.2.1.5 Existing Ambient Air Quality

The BAAQMD operates a regional air quality monitoring network for criteria pollutants, including O_3, CO, NO_2, SO_2, and PM_{10}. The closest monitoring station to the project area is located in San Rafael. A three-year summary of ambient air quality measured at this station is presented in **Table 4.2-3**.

The EPA and CARB use monitoring data from the BAAQMD network to designate the attainment status of the area and to classify the severity of nonattainment problems. The high number of "attainment" designations shown in **Table 4.2-1** indicates the Bay Area experiences low concentrations of most pollutants except O_3 and particulate matter, for which standards are exceeded periodically. This is generally reflected in the air quality data presented in **Table 4.2-3**.

Table 4.2-3
Summary of Criteria Air Pollutant Monitoring at San Rafael

Air Pollutant	2005~~3~~	2006~~4~~	2007~~5~~
Ozone (O_3)			
Peak 1-hour concentration (ppm)	0.081~~7~~	0.089~~91~~	0.072~~81~~
Days above federal standard	0	0	0
Days above state standard	0	0	0
Peak 8-hour concentration (ppm)	0.059~~67~~	0.058~~63~~	0.058~~9~~
Days above federal standard	0	0	0
Carbon Monoxide (CO)			
Peak 8-hour concentration (ppm)	1.66~~2.03~~	1.49~~96~~	1.34~~66~~
Days above federal standard	0	0	0
Days above state standard	0	0	0
PM_{10}			
Peak 24-hour concentration ($\mu g/m^3$)	39.1~~40.5~~	68.2~~52.3~~	55.6~~39.1~~
Days above federal	0	0	0
Days above state standard	0	1	1~~0~~
Annual arithmetic mean ($\mu g/m^3$)	17~~20~~	1~~8~~9	1~~8~~7
Nitrogen Dioxide (NO_2)			
Peak 1-hour concentration ($\mu g/m^3$)	0.054~~66~~	0.054~~7~~	0.057~~4~~
Days above federal standard	--	--	--
Days above state standard	0	0	0
Annual average ($\mu g/m^3$)	0.013~~6~~	0.014~~5~~	0.014~~3~~

Source: CARB 2005~~3~~, 2006~~4~~, and 2007~~5~~, Internet Air Quality Data Summaries.

4.2.1.6 Greenhouse Gas Emissions

The proposed project would directly generate little greenhouse gas (GHG) emissions on-site. Those emissions would consist of vehicle exhaust generated by the facility's small workforce. The project would indirectly generate a larger volume of GHG emissions associated with the generation of electricity used by the plant. GHG emissions generated indirectly from offsite electricity generation to power the proposed desalination plant are discussed in Section 7.4, Cumulative Impacts.

4.2.2 Impacts and Mitigation Measures

4.2.2.1 Standards of Significance

The following standards of significance are based on the BAAQMD CEQA Guidelines for Assessing the Air Quality Impacts of Projects and Plans (December 1999).

- For the purposes of this EIR, an impact is considered significant if the implementation of the proposed project would exceed a threshold of significance described by the BAAQMD CEQA Guidelines.

According to the BAAQMD CEQA Guidelines, the following would have a significant impact:

- Emissions of NO_x, ROG, or PM_{10} in excess of 80 pounds per day; or
- Emissions of CO in excess of 550 pounds a day.

In addition, frequent exposure of members of the public to objectionable odors or potential exposure of sensitive receptors or the general public to substantial levels of TACs would result in significant impacts. The BAAQMD CEQA Guidelines emphasize the implementation of control measures rather than detailed quantification of emissions from project construction.

4.2.2.2 Impacts and Mitigation Measures

Impact 4.2-1: Construction activities would directly emit both fugitive dust (PM_{10}) and exhaust pollutants (NO_x, CO, PM_{10}, SO_2, and ROG) from diesel-fueled construction equipment and construction workforce related traffic. In addition, construction activities may cause indirect emissions associated with generation of electricity supplied for construction.

Significance: Potentially significant

Mitigation 4.2-1(a): Implement the following Basic Control Measures, as described in the BAAQMD CEQA Guidelines, at all construction sites:

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials *or* require all trucks to maintain at least 2 feet of freeboard.
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

Mitigation 4.2-1(b): Implement the following Enhanced Control Measures, as described in the BAAQMD CEQA Guidelines, at construction sites greater than 4 acres in area:

- All Basic Control Measures listed above.
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
- Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.)

- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

Residual Significance: Less than significant

Discussion:

Construction activities for the desalination plant would include site clearing and grading; installation of underground piping and utilities; civil work, including pile-driving and placement of foundations, walls, roofs; installation of major desalination process components; piping, pump, and electrical installation; testing and commissioning; and finish work such as paving and landscaping.

Construction activities for onshore pipelines associated with the desalination plant, including the raw water line to the plant, brine to CMSA, and product water to the proposed pumping stations and the San Quentin Ridge tanks and Ridgecrest tank, would involve clearing and grading, trenching, pipe installation, backfilling and compaction, hydrostatic testing, and cleanup and restoration.

Construction activities would emit both fugitive dust (PM_{10}) and exhaust pollutants (NO_x, CO, PM_{10}, SO_2, and ROG) from diesel-fueled construction equipment. These construction activities and the associated air quality impacts would be temporary. Emissions would vary from day to day depending on the level of activity, the specific operations, and the prevailing weather.

The BAAQMD CEQA Guidelines (BAAQMD 1999) do not provide a numerical threshold of significance for these emissions, nor is quantification of such emissions required. A number of feasible control measures can be implemented to significantly reduce fugitive dust emissions from construction. Additional measures can reduce exhaust pollutants from construction equipment. According to BAAQMD guidelines, implementation of the mitigation measures listed above is considered sufficient to mitigate construction-related air quality impacts to a less-than-significant level.

* * *

Impact 4.2-2: Operation of the desalination plant would not have any direct emitting sources, with the exception of minor amounts of organic materials that may be used for maintenance and painting. The facility would also generate some vehicular traffic for employees, material deliveries, and sludge disposal.

Significance: Less than significant

Mitigation: No mitigation required

Discussion:

The proposed project would result in emissions associated with employee vehicular traffic and periodic delivery and pickup of materials to and from the project site. These emissions would not be substantial and would be a small fraction of the emissions thresholds described in the BAAQMD CEQA Guidelines. As described in Section 3.4.4.2, operation of the proposed project would require four employees. Truck deliveries for equipment and supplies would average five

per week. As shown in Table 3-4, the disposal of sludge and other wastes generated from the operations of a 5 MGD facility would result in an average of one truck trip every six days during summer months and two truck trips every three days during winter months. At 10 MGD capacity, waste disposal would require one truck trip every three days during summer months and two truck trips every three days during winter months. At 15 MGD capacity, waste disposal would require one truck trip every two days during summer months and three truck trips every two days during winter months. With a conservative, worst-case estimate that in a single day, eight employees would access the plant, each driving a total of 100 miles, and disposal activity would require two truck trips between the plant site and a landfill 50 miles away, a total of 1,000 vehicle miles would be driven. Based on the guidance in Table 10 (Average Exhaust Emission Rates) of the BAAQMD CEQA Guidelines, under the emission rates listed for Year 2005, the following emissions could be expected in a worst-case scenario:

- 2.3 pounds of ROGs
- 6.2 pounds of NO_x
- 29.6 pounds of CO
- 2.8 pounds of PM_{10}

These emission amounts would be:

- 2.9 percent of the daily significant threshold for ROGs
- 7.8 percent of the daily significant threshold for NO_x
- 5.4 percent of the daily significant threshold for CO
- 3.5 percent of the daily significant threshold for PM_{10}

Under normal operations, fewer employees would access the plant daily, the number of truck trips for disposal activities would be lower, and the emission levels of the pollutants described above would be substantially lower. Therefore, vehicular emissions generated by employees driving to and from work and by periodic delivery and pickup of materials to and from the project site during desalination plant operations would result in a less-than-significant impact to air quality.

Also, nominal use of solvents and paints may be associated with periodic facility maintenance. These emissions are expected to be small and are considered less than significant.

* * *

Impact 4.2-3: Operation of the desalination plant would require electrical energy, which could indirectly increase emissions from fossil-fueled power plants.

Significance: Less than significant

Mitigation: No mitigation required

Discussion:

As discussed in Section 5.1, the electricity required to operate the desalination plant would range from about 10 million kilowatt-hours per year (kWh/yr) for a 5 MGD facility operating during average conditions to about 76.7 million kWh/yr for a 15 MGD facility operating during drought

conditions. In 2005, PG&E delivered 81,626 gigawatt-hours (GWh) of electricity. Of the total delivered, customers purchased 72,727 GWh, or 89 percent of the total electricity delivered. At its highest predicted energy use, the proposed desalination plant would consume less than 1 percent of the electricity available to PG&E customers in 2005 that was not purchased by those customers. Based on this supply and demand for electricity, it is unlikely that operation of the desalination plant at any capacity would result in increased production at any of the fossil-fueled power plants that serve the electrical grid for Northern California. Therefore, the project would not result in an indirect increase in pollutant emissions.

The amount of criteria pollutant emissions associated with the electricity required to operate the desalination plant was estimated for purposes of a worst-case analysis. Table 4.2-4 provides the CO, PM_{10}, ROG, and NO_x emissions for the production of the electricity required to operate a 5, 10, or 15 MGD desalination plant during average and drought conditions. A comparison of these estimates with the BAAQMD significance criteria indicate that pollutant emissions would be below those criteria for all pollutants and under all desalination plant operating conditions except for ~~one case:~~ NO_x emissions for electricity generated to operate the potential expansion to a 10 MGD or 15 MGD desalination plant under drought conditions. The BAAQMD significance criteria were developed to evaluate a single emission source within the Bay Area airshed. Because the electricity used at any given source in Northern California comes from a common electrical grid fed by many power plants throughout the western United States, the emission estimates provided in Table 4.2-4 represent a total for all fossil-fueled power plants in the grid. Therefore, emissions of all criteria pollutants from any single plant would be substantially below the BAAQMD significance criteria regardless of the size and operating conditions of the desalination plant.

Table 4.2-4
Criteria Pollutant Emissions from Amount of Electricity Required for Desalination Plant Operation

Plant Operating Conditions		Carbon Monoxide	Particulate Matter less than 10 microns	Reactive Organic Gases	Nitrogen Oxides
	Emission Factor (pound/kWh)[1]	**0.00046528**	**0.00004**	**0.00003245**	**0.000759**
	Electricity (million kWh)	**Electricity Production Emissions (pounds/day)**			
5 MGD Average Conditions	10.0375	13	1	1	21
5 MGD Drought Conditions	25.55	33	3	2	53
10 MGD Average Conditions	18.615	24	2	2	39
10 MGD Drought Conditions	51.1	65	6	5	106
15 MGD Average Conditions	28.47	36	3	3	59
15 MGD Drought Conditions	76.65	98	8	7	159

[1]CO, PM_{10}, and ROG emission factors from California Air Resource Board 2004 California Grid Mix. NO_x emission factors from 2004 eGrid CAMX WECC California Subgrid Region.

Impact 4.2-4: The proposed project would not create objectionable odors affecting a substantial number of people.

Significance: Less than significant

Mitigation: No mitigation required

Discussion:

The proposed project would involve the generation of sludge. This sludge would be composed of Bay Mud and coagulant materials and would have an odor similar to the Bay Mud adjacent to the plant site that is often exposed during low tide. The odor of Bay Mud is considered part of the baseline of odors existing along the Bay shoreline. This odor is not considered objectionable. The production of sludge material may increase the frequency that the odor of Bay Mud at the project site could be encountered by receptors. Since this odor is not objectionable and would not be a new odor in the project vicinity, the proposed project would not result in a significant impact from objectionable odor generation. This would be a less-than-significant impact.