Chapter 11

Air Quality

11.1 Environmental Setting

11.1.1 Introduction and Sources of Information

This chapter describes air quality in the San Francisco Bay area in general and in the project area specifically. It includes regulatory, regional, and project settings to provide a context for analyzing the effects of the project.

Air quality in the immediate project area and surrounding regional environment of the San Francisco Bay Area Air Basin (SFBAAB) would be affected by emissions from sources associated with the proposed construction activities and long-term operating activities in the project area.

The regulatory information described below focuses on regulations pertaining to mobile sources. Mobile sources are divided into four general categories:

- light duty on-road sources (passenger vehicles including cars and pickup trucks),
- heavy-duty on-road vehicles (trucks and buses),
- off-road vehicles (construction equipment), and
- marine vessels (all sizes).

The information presented in this section was compiled largely from information provided by the BAAQMD. References to other documents are provided as appropriate.

11.1.2 Regulatory Setting

The project area is subject to major air quality planning programs required by both the federal Clean Air Act (CAA), which was last amended in 1990, and the California Clean Air Act of 1988. Both the federal and state statutes provide for ambient air quality standards to protect public health, timetables for progressing toward achieving and maintaining ambient standards, and the development of plans to guide the air quality improvement efforts of state and local agencies. The CAA requires states to submit a State Implementation Plan (SIP) for review and approval by EPA. The SIP must contain control strategies that demonstrate attainment with national ambient air quality standards (NAAQS) by deadlines established in the CAA. States that fail to submit a plan or to secure approval may be denied federal funding and/or be required to increase emission offsets for industrial expansion.

The state plan is called the Clean Air Plan (CAP) (BAAQMD 1997a). The CAP must show satisfactory progress in attaining state ambient air quality standards.

Because of the inability of the SFBAAB to attain the national ozone (O_3) standard, BAAQMD, ABAG, and the Metropolitan Transportation Commission (MTC) have developed the *Revised San Francisco Bay Area Ozone Attainment Plan for the 1-Hour National Ozone Standard* (O_3 Attainment Plan) (BAAQMD, ABAG, and MTC 2001). This plan provides measures that will reduce O_3 precursor emissions and bring the region into attainment of the 1-hour national O_3 standard within the next few years. The O_3 Attainment Plan has been adopted by BAAQMD, ABAG, and MTC and is presently being reviewed by the California Air Resources Board (CARB) before submittal to EPA. Once approved by EPA, the O_3 Attainment Plan will become part of the SIP.

The SIP and CAP overlap and generally contain the same emissions control measures. While state law requires the planning processes to be coordinated to the extent possible, updates for the federal and state plans are out of phase. The SIP control strategy is updated periodically at the direction of EPA, while the CAP is updated every 3 years as mandated by state law. Both the SIP and the CAP rely on the combined emission control programs of EPA, CARB, and BAAQMD.

Much of the strategy for reducing air pollution from mobile sources involves reducing emissions at the source. The EPA- and California-promulgated rules that have been implemented over several decades have effectively reduced emissions from gasoline-powered automobiles. EPA has recently begun this approach for diesel engines. Regulations requiring cleaner diesel engines in trucks and other heavy-duty equipment went~~will go~~ into effect in late 2002. Regulation of marine engines has lagged; standards for several classes of marine engines will come into effect in 2007. The role of each agency in controlling emissions in the project area is described below.

11.1.2.1 Federal Requirements

EPA oversees state and local implementation of CAA requirements. It sets NAAQS for criteria air pollutants (NAAQS are discussed in more detail below). EPA also sets emission standards for mobile sources, which include on-road motor vehicles, off-road vehicles, and marine engines. Finally, EPA sets nationwide fuel standards.

The conformity provisions of the CAA are designed to ensure that federal agencies contribute to efforts to achieve the NAAQS. EPA has issued two regulations implementing these provisions. The general conformity regulation addresses actions of federal agencies other than the Federal Highway Administration and the Federal Transit Administration. General conformity applies to a wide range of actions or approvals by federal agencies. Projects are subject to general conformity if they exceed emissions thresholds set in the rule and are not specifically exempted by the regulation. Such projects are required to fully offset or mitigate the emissions caused by the activity, including both direct emissions and indirect emissions over which the federal agency has some control.

A conformity analysis may be required for the Napa River Salt Marsh Restoration Project if emissions of reactive organic gases (ROG) and oxides of nitrogen (NO_x) are above the conformity thresholds of 50 tons of ROG and 100 tons of NO_x per year.

The federal-control programs described above are directed primarily toward criteria pollutants. There are also programs in place to reduce public exposure to other pollutants, such as those that increase the public's risk of developing cancer. These pollutants are called *hazardous air pollutants* (HAPs) in federal law and *toxic air contaminants* (TACs) in California law.

In response to public health concerns, Congress instructed EPA in 1990 to address emissions of HAPs from motor vehicles and their fuels. These instructions, contained in Section 202(1) of the CAA, consisted of two parts. First, EPA was instructed to study the need for and feasibility of controlling emissions of toxic air pollutants associated with motor vehicles and their fuels. Second, EPA was instructed to set standards for HAPs from motor vehicles and their fuels, or both.

EPA identified 21 compounds that should be considered Mobile Source Air Toxics (MSATs). The effectiveness of current controls in reducing highway emissions of these MSATs was evaluated. The analysis showed that the programs already in place to reduce O_3 and particulate matter inventories (including reformulated gasoline, national low-emission-vehicle emission standards for passenger vehicles, gasoline sulfur control requirements [Tier 2], 2007 heavy-duty vehicle standards, and highway diesel fuel sulfur control requirements) would yield significant reductions of MSATs. EPA also evaluated whether there were any additional controls that could be put in place to reduce highway MSAT emissions even more.

With regard to fuel-based controls, new gasoline toxic emission performance standards were set to ensure that refiners maintain their average 1998–2000 gasoline toxic emission performance levels. With regard to vehicle-based controls, EPA concluded that the Tier 2 and 2007 heavy-duty standards are the most stringent controls feasible at this time to reduce MSATs from highway vehicles and engines.

11.1.2.2 State and Local Requirements

Under California law, the responsibility to carry out air pollution control programs is split between CARB, EPA, and BAAQMD.

- BAAQMD can require stationary sources to obtain permits, and can impose emission standards, set fuel or material specifications, and establish operational limits to reduce air emissions.
- CARB shares the regulation of mobile sources with EPA and sets the California Ambient Air Quality Standards (CAAQS) (see below). 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. CARB also regulates vehicle fuels; it has set emission reduction performance requirements for gasoline (referred to as *California reformulated gasoline*) and has limited the sulfur and aromatic content of diesel fuel to make it burn cleaner (this is referred to as *California diesel* or *California red-dyed diesel*).

The emission standards with the largest effect on the Napa River Salt Marsh Restoration Project are those set for marine and excavating equipment. Existing air quality in the project area is most strongly affected by on-road vehicle regulations.

TACs are pollutants "...which may cause or contribute to an increase in mortality or serious illness, or which may pose a present or potential hazard to human health" (BAAQMD 1997b). The California program for TACs involves two phases:

- the *identification phase*, in which chemical substances are formally identified as TACs based on their potential to harm the public; and
- the *control phase*, in which TAC emissions are reduced from selected sources when they are shown to cause significant levels of public exposure.

More than 240 chemical substances have been identified as TACs, and the list is updated periodically as more information is gathered about airborne chemicals and their potential health effects. Unlike criteria pollutants, there are no ambient standards for TACs. ~~TACs are pollutants "...which may cause or contribute to an increase in mortality or serious illness, or which may pose a present or potential hazard to human health" (BAAQMD 1997b).~~

The state program collects data on TAC emissions and ambient levels. When data show that public exposure is significant, CARB develops air toxic control measures (ATCMs) to reduce public exposure. The ATCMs can apply to stationary or mobile sources. BAAQMD adopts and enforces ATCMs and also uses its air permit program to evaluate and control the risk posed by TACs. BAAQMD requires sources to reduce TAC emissions to eliminate "hot spots" of public exposure from existing sources and prevent increases in TAC exposure from new or expanding stationary sources.

11.1.2.3 National and State Ambient Air Quality Standards

NAAQS and CAAQS have been established for O_3, carbon monoxide (CO), NO_x, sulfur oxides (SO_x), and particulate matter less than 10 micrometers in diameter (PM10). There are also ambient standards for several other pollutants (e.g., lead), but they are not discussed in this document because emissions of these pollutants from the project would be minimal. Ambient standards specify the concentration of pollutants to which the public can be exposed without adverse health effects. Individuals vary widely in their sensitivity to air pollutants, so standards are set to protect more sensitive populations (e.g., children and the elderly). The NAAQS and CAAQS are reviewed and updated periodically based on new health studies. CAAQS tend to be at least as protective as NAAQS and are often more stringent. The NAAQS and CAAQS are listed in Table 11-1.

Table 11-1. National and California Ambient Air Quality Standards

			National Standards[b]	
Pollutant	Averaging Time	California Standards[a]	Primary[c]	Secondary[d]
Ozone (O_3)	1-Hour	0.09 ppm (180 μg/m^3)	0.12 ppm (235 μg/m^3)	Same as Primary Standard
Carbon Monoxide (CO)	8-Hour	9 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 (NO_2)	Annual	—	0.053 ppm (100 μg/m^3)	Same as Primary Standard
	1-Hour	0.25 ppm (470 μg/m^3)	—	—
Sulfur Dioxide (SO_2)	Annual	—	0.03 ppm (80 μg/m^3)	—
	24-Hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)	—
	3-Hour	—	—	0.5 ppm (1,300 μg/m^3)
	1-Hour	0.25 ppm (655 μg/m^3)	—	—
Suspended Particulate Matter (PM10)	Annual (geometric)	30 μg/m^3	—	—
	Annual (arithmetic)	—	50 μg/m^3	Same as Primary Standard
	24-Hour	50 μg/m^3	150 μg/m^3	Same as Primary Standard

Notes:
ppm = parts per million; μg/m^3 = micrograms per cubic meter; mg/ m^3 = milligrams per cubic meter

[a] California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM10, and visibility-reducing particles are not to be exceeded. ~~The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.~~

[b] National standards other than 1-hour O_3 and 24-hour PM10 and those based on annual averages are not to be exceeded more than once a year. The 1-hour O_3 standard is attained when the expected number of days per calendar year with a maximum hourly average concentration above the standard is equal to or less than one. The 24-hour PM10 standard is attained when the 3-year average of the 99^{th} percentile 24-hour concentrations is below 150 μg/m^3.

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

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

11.1.2.4 Toxic Air Contaminants

As noted above, there are no ambient air quality standards for TACs. When TACs are identified, health effects data are evaluated on a case-by-case basis.

For TACs that are known or suspected carcinogens, CARB has consistently found that there are no levels or thresholds below which exposure is risk free. *Cancer risk* is defined as the lifetime probability (chance) of developing cancer as a result of exposure to one or a combination of cancer-inducing factors, including exposure to cancer-causing substances in the environment. The risk to any exposed individual is typically expressed in terms of chances in a million of contracting cancer (e.g., 1×10^{-6}). Cancer risk is estimated using conservative assumptions to minimize the chance of underestimating actual risk.

Individual TACs vary greatly in the risk they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. To account for this difference in potency, health data pertaining to each TAC are evaluated. Where data are sufficient to do so, a "unit risk factor" is developed for cancer risk. The unit risk factor is expressed as the estimated number of individuals in a million who may develop cancer as the result of lifetime exposure to 1 $\mu g/m^3$ of the TAC.

For noncancer health effects of TACs, such as neurological damage, a similar factor called a *hazard index* is developed. The hazard index is based on values of acceptable ambient concentration levels (AACLs) that are specific to individual TACs and exposure periods.

11.1.2.5 New Standards and Recent State Action on Diesel Particulate Matter

New Standards

In July 1997, EPA adopted a number of changes to the NAAQS for O_3 and particulate matter (U.S. Environmental Protection Agency 1997a, 1997b, 1997c). These new standards are discussed separately because, from a regulatory standpoint, they have a different status from previously adopted standards. None of the new standards is effective because a 1999 federal court ruling blocked implementation. EPA is appealing this decision.

For O_3, EPA adopted a new 8-hour standard that was intended to replace the existing 1-hour standard. For particulate matter less than 10 micrometers in diameter (PM10), EPA adopted a 24-hour standard and an annual average standard. EPA retained the existing PM10 standards, but slightly changed the form of the 24-hour standard (U.S. Environmental Protection Agency 1997a, 1997b, 1997c).

The new O_3 standard was adopted after EPA found that the previous national 1-hour standard of 0.12 ppm did not adequately protect the public from adverse health effects. Of particular concern is evidence that exposure to O_3 levels below 0.12 ppm is associated with increased hospital admissions for people with respiratory ailments, including asthma, and with reductions in lung function in children and adults who are active outdoors (U.S. Environmental Protection Agency 1997c). There also is evidence that long-term exposure can cause repeated inflammation of the lung, impairment of lung defense mechanisms, and irreversible damage to lung structure, leading to premature aging of the lungs and chronic respiratory illnesses (U.S. Environmental Protection Agency 1997c).

EPA's review of its particulate standard showed "coarse" respirable particles (PM10~~2.5~~) can be inhaled and aggravate health problems such as asthma. Therefore, EPA chose to retain the federal ~~PM2.5~~ PM10 standards. EPA also reviewed studies providing epidemiological evidence that exposure to particulate matter at levels well below the existing PM10 standards was associated with increased hospital admissions and premature mortality (U.S. Environmental Protection Agency 1997d). EPA found that finer particles (less than 2.5 micrometers in diameter) can penetrate more deeply into lungs, and are more likely than coarser particles to contribute to severe health effects (U.S. Environmental Protection Agency 1997d). Therefore, EPA established new standards for PM2.5.

Recent State Action on Diesel Particulate Matter

On August 27, 1998, CARB formally identified particulate matter emitted by diesel-fueled engines as a TAC. Diesel engines emit TACs in both gaseous and particulate forms. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by EPA as HAPs, and by CARB as TACs. Diesel engines emit particulate matter at a rate about 20 times greater than comparable gasoline engines. Because by weight the vast majority of diesel exhaust particles are very small (92%–94% of their combined mass consists of particles less than 2.5 micrometers in diameter), both the particles and their coating of TACs are inhaled into the lung. Like other particles of this size, a portion will eventually become trapped within the small airways and alveolar regions of the lung. While the gaseous portion of diesel exhaust also contains TACs, CARB's August 1998 action was specific to diesel particulate emissions that, according to supporting CARB studies, represent 50%–90% of the mutagenicity of diesel exhaust (California Air Resources Board 1998). *Mutagenicity* is the capacity to induce mutation of cells. Mutagenicity is one indication of the cancer-causing potential of a chemical.

The California State Scientific Review Panel has identified a unit risk factor of 300 excess cancer cases per million persons exposed to a diesel particulate matter concentration of 1 $\mu g/m^3$. EPA currently designates diesel exhaust as a likely human carcinogen, but has stopped short of establishing a unit risk factor. EPA's Clean Air Scientific Advisory Committee (CASAC) has suggested that an annual NAAQS for PM2.5 would be adequately protective for long-term exposure to ambient diesel particulate matter (CASAC 2000).

The CARB action was taken at the end of a lengthy process that considered dozens of health studies, extensive analysis of health effects and exposure data, and public input collected over the last 9 years. The International Agency for Research on Cancer (IARC) had previously concluded that diesel exhaust was a "probable" human carcinogen. Based on the IARC's action, California listed diesel exhaust in 1990 as a chemical "known to the State to cause cancer" under its "Proposition 65" program. Proposition 65, the California Safe Drinking Water and Toxic Enforcement Act, was passed by the voters in 1986. The act is therefore commonly known as the *Proposition 65 program*. Finally, EPA's evaluation of diesel exhaust (approved by CASAC) indicates that diesel exhaust is "likely to be carcinogenic" (DieselNet 2000).

CARB is in the process of developing regulations governing additional PM emission reductions. The Diesel Risk Reduction Plan was adopted by CARB on September 28, 2000. The plan focuses on particulate matter reductions as a means of achieving reductions in diesel exhaust risk. The goal is to reduce diesel particulate matter emissions by about 90% overall from current levels, using retrofit technology and requiring new engines to meet very low (0.01 gram/brake horsepower–hour) emission standards for particulate matter. New regulations will be developed to achieve these emission reduction goals for particulate matter.

11.1.3 Regional Setting

All construction and operating areas associated with the project and options are located in the SFBAAB. The SFBAAB is composed of the counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara, along with the southeast portion of Sonoma County and the southwest portion of Solano County. The SFBAAB covers an area of approximately 5,540 square miles.

All construction and operating areas associated with the project and options are located in the SFBAAB. Air quality in the immediate project area and surrounding regional environment of the SFBAAB would be affected by emissions from sources associated with the proposed construction activities required to restore the ponds, as well as any long-term maintenance and recreational use of the project area.

11.1.3.1 Federal Attainment Status

Regions like the San Francisco Bay Area are given an air quality status designation by the federal and state regulatory agencies. Areas with monitored pollutant concentrations that are lower than ambient air quality standards are designated as *attainment areas* on a pollutant-by-pollutant basis. When monitored concentrations exceed ambient standards, areas are designated as *nonattainment areas*. An area that recently exceeded ambient standards, but is now in attainment, is designated as a *maintenance area*. Areas are often designated as *unclassified* when data are insufficient to have a basis for determining the area's attainment status. Nonattainment areas are further classified based on the severity and persistence of the air quality problem as *moderate, serious*, or *severe*. Classifications determine the minimum pollution control requirements. In general, the more serious the air quality classification, the more stringent the control requirements that must be contained in the regional air quality plans (see discussion above of the SIP and CAP).

The SFBAAB is currently in attainment of the federal standards for NO_x and SO_x, in nonattainment for O_3 and CO (urbanized areas only), and unclassified for PM10 (California Air Resources Board 2001a). The urbanized areas of the SFBAAB are moderate nonattainment areas for CO.

11.1.3.2 State Attainment Status

CARB designates areas of the state as either in attainment or in nonattainment of the CAAQS. An area is in nonattainment if the CAAQS have been exceeded more than once in 3 years. At the present time, the SFBAAB is in nonattainment of the CAAQS for O_3 and PM10 and in attainment of the CAAQS for CO, NO_2, and SO_2 (California Air Resources Board 2001a). The SFBAAB is designated as a serious nonattainment area for O_3.

11.1.3.3 San Francisco Bay Area Air Basin Emissions

Table 11-2 displays the estimated annual average air emissions for the SFBAAB in 2000 (California Air Resources Board 2001b). Mobile sources are one of the largest contributors to air pollutants in the SFBAAB. Mobile sources account for approximately 60% of the reactive organic gases (ROG), 93% of the CO, 81% of the NO_x, 39% of the SO_2, and 12% of the PM10 emitted in the SFBAAB.

Table 11-2. 2000 Estimated Annual Average Emissions for the San Francisco Bay Area Air Basin (tons/day)

Source Type/Category	ROG	CO	NO_x	SO_2	PM10
Stationary Sources					
Fuel Combustion	2.8	33.4	77.4	10.7	3.9
Waste Disposal	7.1	0.1	0.1	0.0	0.0
Cleaning and Surface Coating	71.0	0.0	0.0	--	0.0
Petroleum Production and Marketing	33.3	1.2	8.7	36.5	1.2
Industrial Processes	11.0	0.7	3.0	7.5	12.2
Subtotal	**125.2**	**35.4**	**89.2**	**54.7**	**17.3**
Areawide Sources					
Solvent Evaporation	74.6	--	--	--	--
Miscellaneous Processes	15.6	169.0	17.1	1.4	130.1
Subtotal	**90.2**	**169.0**	**17.1**	**1.4**	**130.1**
Mobile Sources					
On-Road Motor Vehicles	255.1	2,149.6	273.6	4.9	8.5
Other Mobile Sources	63.7	513.3	178.1	31.4	12.4
Subtotal	**318.8**	**2,662.9**	**451.7**	**36.3**	**20.9**
Total for the Air Basin	**534.2**	**2,867.3**	**558.0**	**92.4**	**168.3**

Source: California Air Resources Board 2001b.

11.1.4 Project Setting

This section provides information on the physical setting and the available air quality information for the project area.

11.1.4.1 Topography and Meteorology

Atmospheric conditions such as wind speed and direction, air temperature gradients, and local and regional topography influence air quality. The SFBAAB, of which Napa and Marin Counties and the southeast portion of Sonoma County are a part, ~~is affected by~~ has a Mediterranean climate of warm, dry summers and cool, damp winters. During the summer, maximum temperatures are about 64°F along the coast, and about 88°F farther inland. In winter, average minimum temperatures are in the low to mid-40s along the coast and in the low to mid-30s inland.

Topographical features, the location of the Pacific high pressure system, and varying circulation patterns resulting from temperature gradients affect the speed and direction of local winds. The winds play a major role in the dispersion of pollutants. Strong winds can carry pollutants far from their source; a lack of wind will allow pollutants to concentrate in an area. Wind patterns in Napa, Sonoma, and Marin Counties are affected by the Bolinas Ridge along the coast, Big Rock Ridge south of Novato, and the Sonoma Mountains to the north.

Air dispersion also affects pollutant concentrations. As altitude increases, air temperature normally decreases. Inversions occur when colder air becomes trapped below warmer air, restricting the air masses' ability to mix. Pollutants also become trapped, which promotes the production of secondary pollutants. Subsidence inversions, which can occur during the summer in the SFBAAB, result from high-pressure cells that cause the local air mass to sink, compress, and become warmer than the air closer to the earth. Pollutants accumulate as this stagnating air mass remains in place for 1 or more days.

11.1.4.2 Existing Air Quality Conditions

Based on data from three monitoring stations in the vicinity of the project area, e~~E~~xisting air quality in the project area is excellent, with only a few exceedances of state air quality standards between 1998 and 2000. Existing air quality conditions for criteria pollutants O_3, CO, NO_2, SO_2, and PM10 are shown in Table 11-3. No exceedances of the state or federal air quality standards were recorded for CO, NO_X, or SO_2. PM10 state standards were exceeded at ~~both~~ the Napa, San Rafael, and Vallejo stations. At the Napa station, there was one exceedance of the annual geometric mean concentration in 1998, two exceedances in 1999, and no exceedances in the year 2000.

Table 11-3. Summary of Ambient Air Quality in the Vicinity of the Napa River Unit

Pollutant	Monitoring Station	Time/Standard	1998	1999	2000
Ozone (0_3)	Napa	Peak 1-hour concentration (ppm)	0.13	0.12	0.08
		Days above federal standard	1	0	0
		Days above state standard	3	4	0
	Vallejo	Peak 1-hour concentration (ppm)	0.12	0.11	0.08
		Days above federal standard	0	0	0
		Days above state standard	3	4	0
	San Rafael	Peak 1-hour concentration (ppm)	0.06	0.08	0.07
		Days above federal standard	0	0	0
		Days above state standard	0	0	0
Carbon Monoxide (CO)	Napa	Peak 8-hour concentration (ppm)	3.9	4.2	2.8
		Days above federal standard	0	0	0
		Days above state standard	0	0	0
	Vallejo	Peak 8-hour concentration (ppm)	5.3	2.9	5.1
		Days above federal standard	0	0	0
		Days above state standard	0	0	0
	San Rafael	Peak 8-hour concentration (ppm)	3.3	2.9	2.3
		Days above federal standard	0	0	0
		Days above state standard	0	0	0
Nitrogen Dioxide (NO_2)	Napa	Peak 1-hour concentration (ppm)	0.06	0.09	0.05
		Days above federal standard	0	0	0
		Days above state standard	0	0	0
	Vallejo	Peak 1-hour concentration (ppm)	0.06	0.08	0.06
		Days above federal standard	0	0	0
		Days above state standard	0	0	0
	San Rafael	Peak 1-hour concentration (ppm)	0.06	0.09	0.06
		Days above federal standard	0	0	0
		Days above state standard	0	0	0
Sulfur Dioxide (SO_2)	Napa	Peak 24-hour concentration (ppm)	-	-	-
		Days above federal standard	-	-	-
		Days above state standard	-	-	-
	Vallejo	Peak 24-hour concentration (ppm)	0.006	0.007	0.005
		Days above federal standard	0	0	0
		Days above state standard	0	0	0
	San Rafael	Peak 24-hour concentration (ppm)	-	-	-
		Days above federal standard	-	-	-
		Days above state standard	-	-	-

Pollutant	Monitoring Station	Time/Standard	1998	1999	2000
PM10	Napa	Annual geometric mean (µg/m³)	15.6	16.3	14.7
		Days above federal standard	0	0	0
		Days above state standard	1	2	0
		Peak 24-hour concentration (µg/m³)	-	66	45
		Days above federal standard	-	0	0
		Days above state standard	-	2	0
	Vallejo	Annual geometric mean (µg/m³)	15.0	16.4	13.0
		Days above federal standard	0	0	0
		Days above state standard	1	3	1
		Peak 24-hour concentration (µg/m³)	-	84	53
		Days above federal standard	-	0	0
		Days above state standard	-	3	1
	San Rafael	Annual geometric mean (µg/m³)	18.7	19.5	18.2
		Days above federal standard	0	0	0
		Days above state standard	0	0	0
		Peak 24-hour concentration (µg/m³)	52	76	40
		Days above federal standard	-	0	0
		Days above state standard	-	1	0

Source: BAAQMD 1998, 1999, 2000 Internet Air Quality Data Summaries

Notes: ppm = parts per million; µg/m³ = micrograms per cubic meter; pphm = parts per hundred million, ppb = parts per billion

PM10 = particulate matter under 10 micrometers in diameter

Pollutant standards listed as follows (state, federal): Ozone 1 hour peak (9pphm, 12 pphm); CO 8 hour (20 ppm, 35 ppm); NO2 1 hour (25 pphm, na) annual (na, 5.3 pphm); SO2 24 hour (40 ppb, 140 ppb); PM10 annual geometric mean (30 ppm, na) 24 hour (50 ppm, 150 ppm).

Monitoring of the peak 24-hour concentrations at the Napa station began in 1999. That year there were two exceedances of the peak 24-hour concentrations at the Napa station; no exceedances were recorded in the year 2000. The data for the Vallejo station follow a similar pattern, with one exceedance of the annual standard in 1998, three exceedances of the annual standard in 1999, and one exceedance of the annual standard in the year 2000. Monitoring of the 24-hour peak concentration also began in 1999 at the Vallejo station; the number of exceedances of the peak 24-hour standard are the same as for the annual standard. The only PM10 exceedance at the San Rafael station was for the 24-hour peak concentration (one exceedance in 1999).

O_3 was the only constituent that exceeded federal as well as state standards. The 1998 O_3 data for Napa show one day when the peak 1-hour O_3 concentration exceeded the federal standard. There were no exceedances of the federal standard at the Vallejo station, nor at the Napa station in 1999 or 2000. There were 3 exceedances of the state peak 1-hour standard at both Napa and Vallejo in

1998, and 4 exceedances at both stations in 1999. The state O_3 standard was not exceeded in 2000.

Sampling data from the Napa and Vallejo regional air monitoring stations were obtained from BAAQMD and evaluated for seasonal trends. In general, higher concentrations of NO, CO, and particulate matter were detected between January and March as well as between October and December. The SO_2 concentrations remained at a nearly constant level throughout the entire year.

11.1.4.3 Current Emissions

Napa River Unit

As described in Chapter 2, DFG is currently conducting limited maintenance ~~activity~~ activities in the Napa River Unit. This activity includes monitoring pond conditions, managing water control structures, pumping water ~~into the ponds when possible~~from Pond 1 to Pond 2, and inspecting levees. These activities generate air emissions, primarily associated with levee maintenance, as well as transportation (by pickup truck or small boat) around the project area. ~~The pump providing Napa River water to the project area is electrically powered, and thus does not generate emissions~~. The only other current source of emissions is limited recreational traffic (i.e., personal vehicle traffic and small boat traffic).

Water Deliver Project and Program Component Areas

The routes of the pipelines proposed under the Project Component of the Water Delivery Option are generally undeveloped or rural, and there are no major air pollutant emitters in the local area. The Sonoma Pipeline is proposed along a route that is bordered by a wildlife refuge to the south and vineyards and pasture to the north. The routes of the proposed Napa and CAC Pipelines are bordered largely by pasture, undeveloped open space, vineyard, and rural residential development. Vehicle traffic on Green Island Road, along which a portion of the CAC Pipeline would extend, is not considered to be a major source of air pollutant emissions. The Napa County Airport is just north of the CAC Pipeline alignment. Given the relatively small size and nature of the airport, operation of the facility is not considered to be a major source of air pollutant emissions.

Portions of the routes of the other future pipelines considered under the Program Component of the Water Delivery Option extend through developed areas that likely include various sources of emissions, particularly in industrial areas. Additionally, vehicle traffic along U.S. 101, a major transportation corridor, is considered to be a notable source of air pollutant emissions in the local area. Sears Point Raceway is another notable source of vehicular emissions (when race events occur).

There are relatively few sensitive receptors (i.e., land uses that are particularly sensitive to air pollutant emissions such as residential development, schools, hospitals, child care centers, etc.) in proximity to the currently proposed pipeline routes. There are scattered homes close to the Sonoma Pipeline (Figure 11-1), pockets of rural residential development located along the Green Island Road segment of the CAC Pipeline (Figure 11-2), and scattered homes along Buchli Station Road, Las Amigas Road, and Stanly Lane along the Napa Pipeline. Along the routes of the potential future pipelines, there is a mix of urban and rural uses that include sensitive receptors mainly in the form of existing residential development along Lakeville Road in Sonoma County as well as a public elementary school in proximity to U.S. 101 in Novato.

11.2 Environmental Impacts and Mitigation Measures

11.2.1 Methodology and Significance Criteria

This section describes the significance criteria and methodology used to evaluate the air quality impacts that could occur with implementation of each option. Impacts were analyzed for project-related emissions affecting the SFBAAB.

Air quality at a given location can be described by the concentrations of various pollutants in the atmosphere. The significance of a pollutant concentration was determined by comparing the concentration to an appropriate federal and/or state ambient air quality standard. The standards represent the allowable atmospheric concentrations at which the public health and welfare are protected and include a reasonable margin of safety to protect the more sensitive receptors in the population. Units of concentration are generally expressed in ppm or $\mu g/m^3$.

Criteria based on the CEQA Guidelines and federal, state, and local air pollution standards and regulations, as well as professional judgment, were used to determine the significance of air quality impacts. The project would have a significant impact on air quality if it would

- conflict with or obstruct implementation of applicable air quality plans;
- increase ambient pollutant levels from below to above the NAAQS or CAAQS;
- substantially contribute to an existing or projected air quality standard violation;
- exceed the following thresholds that BAAQMD defines as significant under CEQA for project operation activities: total emissions greater than 80 pounds per day or 15 tons per year of ROG, NO_x, PM10, or PM10 precursors, such as SO_x (BAAQMD 1996);
- expose sensitive receptors to substantial pollutant concentrations; or
- create objectionable odors affecting a substantial number of people.

Source: Camp Dresser & McKee

01396.01

Jones & Stokes

Figure 11-1
Sensitive Receptors Adjacent to the Sonoma Pipeline

Source: Camp Dresser & McKee

01396.01

Jones & Stokes

Figure 11-2
Sensitive Receptors Adjacent to the CAC Pipeline

BAAQMD has not identified thresholds of significance for emissions from construction activities. Construction-related emissions are generally short-term in duration, but still may cause adverse air quality impacts. PM10 is generally the pollutant of greatest concern with respect to construction activities that disturb the ground surface (e.g., during installation of water conveyance features or levee repairs). Construction equipment emits CO and O_3 precursors; however, these emissions are included in the emission inventory that is the basis for regional air quality plans. These pollutants are therefore not expected to impede attainment or maintenance of the O_3 and CO standards in the Bay Area (BAAQMD 1996).

The primary issues addressed for air quality for this project are construction impacts and project conformity analysis. The construction impacts were determined by generating complete inventories of project emissions expected under each option. Included in the inventories are

- combustion emissions from equipment used in the installation of water conveyance equipment and its supporting equipment and levee repairs and upgrades,
- combustion emissions from all support and transport vessels (much of the equipment would have to be brought in by barge),
- combustion emissions from landside vehicles used for worker commute trips and material delivery trips, and
- fugitive dust emissions from ~~any~~ ground disturbance or stockpiling activities.

Most air emissions are assumed to cease at the end of the construction phase. There may be limited vehicular activity in the project area associated with maintenance and monitoring of the project, as well as with limited recreational use. Levee maintenance would be required for ponds that are retained as ponds. Under the No-Project Alternative, there could be fugitive dust generation as the ponds continue to dry out.

The evaluation of construction phase emissions considers the following factors:

- types and sizes of mobile equipment, vessels, and vehicles used;
- daily hours of operation;
- load factors of the engines;
- type(s) of fuel used;
- vessel and vehicle miles traveled;
- area of disturbed land surface; and
- schedule of activities (when the various activities would occur).

To the extent possible, these data were obtained from the Corps' preliminary engineering estimates for the project and options. Recreational user data and current maintenance activities are based on logs maintained by DFG and described in Chapter 15, “Recreation, Public Access, Visual Resources, and Public Health.” Future recreational use was projected based on the projected population increase in the Bay Area (Association of Bay Area Governments 2000). Where presently unknown or unavailable, data assumptions were developed to allow a reasonable worst-case analysis of potential impacts.

Emissions from construction equipment and vehicles were estimated using emission factors contained in EPA’s *Compilation of Air Pollutant Emission Factors, Volumes I and II* (AP-42) (U.S. Environmental Protection Agency 1985 and 1996), EPA’s *Nonroad Engine and Vehicle Emission Study-Report* (U.S. Environmental Protection Agency 1991), and the South Coast Air Quality Management District *CEQA Air Quality Handbook* (SCAQMD 1993). Vessel emission factors are from the document *Marine Vessel Emissions Inventory and Control Strategies* (Accurex Environmental Corporation 1996) and default marine engine emission factors used by the Carl Moyer Program (California Air Resources Board 2000). Motor vehicle emission factors were obtained from the CARB EMFAC7G emission factor program (California Air Resources Board 1997). Emission estimates are presented for the baseline (current levels), the various options, and the No-Project Alternative.

Section 176(c) of the CAA requires “applicable” federal projects to prepare a conformity determination to demonstrate that project activities would conform to the SIP’s purpose of eliminating or reducing NAAQS violations and achieving attainment of such standards. The determination of whether the project falls into the category of an applicable project was performed as part of the ~~EIR~~EIS analysis. A conformity determination is not required if the applicability analysis determines that the project’s direct and indirect emissions (1) do not exceed the conformity *de minimis* threshold levels, and (2) are less than 10% of the nonattainment/maintenance area’s emissions for that pollutant. The conformity *de minimis* threshold level for a serious nonattainment area for O_3 precursors is 50 tons/year. Ten percent of the BAAQMD’s emissions inventory for O_3 precursors for off-road equipment is approximately 12 tons/day (California Air Resources Board 2002).

Conformity thresholds are the levels of emissions that have been established by EPA for pollutants in nonattainment and maintenance areas. Emissions less than the conformity thresholds are assumed to conform to the SIP’s purpose of eliminating or reducing the severity and number of NAAQS violations and achieving expeditious attainment of such standards. Projects with emissions greater than the thresholds have to demonstrate conformity by some other method as outlined in the final conformity rules developed by EPA in November 1993 (58 FR 63214). The total annual changes in future emissions, compared to baseline emissions, are used to determine the potential for exceeding the federal conformity thresholds.

Estimated project operating emissions were compared to the BAAQMD emission thresholds to determine whether significant impacts would occur. Where impacts from project activities were shown to be significant, appropriate mitigation measures have been identified to reduce the impacts, where feasible. However, given the low intensity of use of the project site during the operations phase, emissions are correspondingly low.

Project-related emissions would be primarily direct impacts from construction. Emissions include exhaust from construction equipment, fugitive dust from construction activities, and exhaust from worker vehicle trips to and from the site.

To determine the exhaust emissions related to off-road construction equipment, the construction equipment was inventoried; total hours necessary for each piece of equipment for project completion were determined; and total hours were multiplied by the average horsepower and the load and emission factors for each piece of equipment to determine the total pollutants per year (California Air Resources Board 2001a).

11.2.1.1 Air Emissions Associated with Use of Explosives

There are hundreds of different explosives, with no universally accepted system for classifying them. The classification used in Table 11-4 is based on the chemical composition of the explosives, without regard to other properties, such as rate of detonation, that relate to the applications of explosives but not to their specific end products. Most explosives are used in two-, three-, or four-step trains. A simple removal of a tree stump might be completed using a two-step train made up of an electric blasting cap and a stick of dynamite. To make a large hole in the earth, an inexpensive explosive such as ammonium nitrate with 5.3–8% fuel oil (ANFO) might be used.

CO is the pollutant produced in greatest quantity from explosives detonation. Trinitrotoluene (TNT), an oxygen-deficient explosive, produces more CO than most dynamites, which are oxygen-balanced; however, all explosives produce measurable amounts of CO. Particulates are produced as well, but such large quantities of particulates are generated in the shattering of rock and earth by the explosive that the quantity of particulates from the explosives charge itself cannot be distinguished. Nitrogen oxides (both nitric oxide [NO] and NO_2) are formed, but only limited data are available on these emissions. Oxygen-deficient explosives are said to produce little or no nitrogen oxides, but there is only a small body of data to confirm this.

Emissions from explosives detonation are influenced by many factors such as explosive composition, product expansion, method of priming, length of charge, and confinement. These factors are difficult to measure and control in the field and almost impossible to duplicate in a laboratory test facility. Any estimates of emissions from explosive use must be regarded as approximations and cannot be made more precise because explosives are not used in a precise, reproducible manner.

Table 11-4. Composition, Uses, and Emission Factors of Various Explosives

			Emission Factor (lb/ton)*				
Explosive	Composition	Uses	Carbon Monoxide (CO)	Nitrogen Oxides[a] (NO_x)	Methane[b]	Hydrogen sulfide (H_2S)	Sulfur Dioxide (SO_2)
Black Powder	75/15/10: Potassium (sodium) nitrate/ charcoal/sulfur	Delay fuses	170 (76–240)	ND	4.2 (0.6–9.7)	24 (0–73)	NA
Smokeless powder	Nitrocellulose (sometimes with other materials)	Small arms, propellant	77 (68–84)	ND	1.1 (0.7–1.5)	21 (20–21)	NA
Dynamite, straight	20–60% sodium nitrate/wood pulp/calcium carbonate	Rarely used	281 (87–524)	ND	2.5 (0.6–5.6)	6 (0–15)	NA
Dynamite, ammonia	20–60% Nitroglycerine/ ammonium nitrate/sodium nitrate/wood pulp	Quarry work, stump blasting	63 (46–128)	ND	1.3 (0.6–2.1)	31 (19–37)	NA
Dynamite, gelatin	20–100% Nitroglycerine	Demolition, construction work, blasting in mines	104 (26–220)	53 (8–119)	0.7 (0.3–1.7)	4 (0–6)	1 (1–16)
ANFO	Ammonium nitrate with 5.8–8% fuel oil	Construction work, blasting in mines	67	17	ND	NA	2 (1–3)
TNT	Trinitrotoluene	Main charge in artillery projectiles, mortar rounds, etc.	796 (647–944)	ND	14.3 (13.2–15.4)	NA	NA
RDX	$(CH_2)_3N_3(NO_2)_3$ Cyclotrimethylene-tetranitrate	Booster	196[c] (5.6–554)	ND	ND	NA	NA
PETN	$C(CH_2ONO_2)_4$ Pentaerythritol tetranitrate	Booster	297 (276–319)	ND	ND	NA	NA

*Units are in pounds per ton of explosive used.
ND = No data; NA = Not applicable; 1b/ton = pounds per ton
[a]Based on experiments carried out prior to 1930 except in the cases of ANFO, TNT, and PETN.
[b]The factors apply to the chemical species, methane. They do not represent total volatile organic compounds expressed as methane. Studies were carried out more than 40 years ago.
[c]These factors are derived from theoretical calculations, not from experimental data.

The primary constituent of concern associated with the use of explosives for levee breaching would be particulate matter (i.e., the dust that is generated when the explosives are detonated). There is no effective way of quantifying the amount of dust generated.

11.2.2 No-Project Alternative

Air emissions would occur under the No-Project Alternative as a result of ongoing levee maintenance and water control structure repair (Table 11-5). The air emissions under the No-Project Alternative are associated with levee maintenance (approximately 64% of total emissions), the repair of water control structures (approximately 20% of total emissions), and other activities (approximately 16% of total emissions). Levee maintenance is assumed to be an ongoing activity, with an average of 2.6 days of levee maintenance per year for the 50-year project life. Although these emissions would occur as a part of ongoing DFG activities, they are construction-related emissions that would be subject to BAAQMD dust control measures. These measures are described in Chapter 2, "Site Description and Options."

Table 11-5. Criteria Pollutants for the Project Area Projected by Alternative

	Total Tons Over 50 Years [1]					
Alternative	NO_x	ROG	CO	SO_x	PM	PM10
No-Project Alternative [2]	11.4	0.8	6.1	3.7	0.40	0.39
Salinity Reduction Option 1A	14.3	0.8	4.7	3.0	0.53	0.51
Salinity Reduction Option 1B	10.8	0.6	3.8	2.5	0.38	0.37
Salinity Reduction Option 1C	9.9	0.5	3.6	2.4	0.34	0.33
Salinity Reduction Option 2	13.3	0.7	4.5	2.8	0.5	0.48
Water Delivery Option [3]						
Project Component	-	-	-	-	-	-
Program Component	-	-	-	-	-	-
Habitat Restoration Option 1	43.5	2.5	15.6	9.2	1.7	1.6
Habitat Restoration Option 2	37.1	2.2	13.8	8.5	1.4	1.3
Habitat Restoration Option 3	44.8	2.6	16	9.5	1.8	1.7
Habitat Restoration Option 4	48.9	2.6	16.3	10.3	1.8	1.7

	Total Tons per Year [1]					
Alternative	NO_x	ROG	CO	SO_x	PM	PM10
No-Project Alternative [2]	0.23	0.02	0.12	0.07	0.01	0.01
Salinity Reduction Option 1A	0.29	0.02	0.09	0.06	0.01	0.01
Salinity Reduction Option 1B	0.22	0.01	0.05	0.05	0.01	0.01
Salinity Reduction Option 1C	0.20	0.01	0.07	0.05	0.01	0.01
Salinity Reduction Option 2	0.27	0.01	0.09	0.06	0.01	0.01

Alternative	Total Tons per Year [1]					
	NO_x	ROG	CO	SO_x	PM	PM10
Water Delivery Option [4]						
Project Component	32.94	4.08	13.88	NA	NA	1.33
Program Component [5]	NA	NA	NA	NA	NA	NA
Habitat Restoration Option 1	0.87	0.05	0.31	0.18	0.03	0.03
Habitat Restoration Option 2	0.74	0.04	0.28	0.17	0.03	0.03
Habitat Restoration Option 3	0.90	0.05	0.32	0.19	0.04	0.03
Habitat Restoration Option 4	0.98	0.05	0.33	0.21	0.04	0.03

Notes:
[1] Tons of emissions are total emissions over the life of the option—annual emissions are a fraction of the total emissions.
[2] No-Project and baseline emissions are assumed to be the same.
[3] All impacts happen in first year and do not occur over 50 years.
[4] Combined emissions from Sonoma, CAC, and Napa segments.
[5] Pollutant emissions for the Program Component would be construction-related only. Exact alignments have not been chosen; therefore, at this time construction emissions are unknown.

Project-related emissions would be well below the conformity thresholds, would not conflict with air quality plans, and would not exceed BAAQMD thresholds. Thus, potential impacts under the No-Project Alternative are limited to those resulting from the desiccation of the ponds.

11.2.2.1 Impact AQ-1: Increase in Fugitive Dust Emissions Resulting from Increased Desiccation of the Ponds

Under the No-Project Alternative, because of the limited availability of water and deteriorating water conveyance infrastructure, Ponds 3, 4, 5, 6, 6A, and 7A would eventually become dry salt flats during a portion of the year. Pond 7, the bittern pond, is hygroscopic and thus unlikely ever to dry out completely. Existing water control structures for Ponds 1, 1A, 2, and 8 will help limit salinity increases in these ponds and prevent them from drying out. Observations of ponds that have dried out in the past indicate that the salts in the ponds form a hard crust that is resistant to windborne dispersion. Unless this crust is disturbed by significant human activity, such as construction, it is unlikely that desiccation of the ponds would result in the generation of irritant dust. Construction activities under the No-Project Alternative would be limited to minimum maintenance of levees and maintenance of water control structures, and would generally not affect any salt crusts. Construction activities would not typically affect the salt crusts; therefore, this impact is considered less than significant. For this reason, and because this alternative would result in no project being implemented, no mitigation is required.

11.2.3 Salinity Reduction Option 1A: Napa River and Napa Slough Discharge

The potential air quality impacts associated with the project are similar for all salinity reduction, water delivery, and habitat restoration options, with the main differences being the intensity of each impact for each option. The impacts are generally associated with

- construction activities (all construction activities would generate emissions through vehicle emissions and fugitive dust generation);
- levee breaching (explosives would be used); and
- maintenance activities (which would be similar to, but generally less intensive than, the initial construction efforts).

11.2.3.1 Impact AQ-2: Increase in Ambient Pollutant Levels

Construction activities associated with Salinity Reduction Option 1A would include improvements to existing water conveyance structures, installation of new water conveyance and control structures, repairs and upgrades to existing levees, and long-term maintenance of levees and water conveyance/control structures for the upper ponds (i.e., the ponds with a long desalination period). Construction activities would also include breaching of interior levees with explosives. The exact type and quantity of explosive to be used is not known at this time, but it is likely that a material developed specifically for use in water would be selected.

Conventional construction activities would include the use of a variety of gasoline- and diesel-powered construction equipment. Estimated criteria pollutant emissions associated with Salinity Reduction Option 1A are shown in Table 11-5. Detailed calculations are provided in Appendix E. Because the BAAQMD dust control measures would be implemented as part of the project (see Chapter 2, “Site Description and Options”), emissions associated with construction are considered less than significant under CEQA. As can be seen from Table 11-5, total quantifiable emissions associated with Salinity Reduction Option 1A are also well below the federal conformity thresholds. This impact is considered less than significant. No mitigation is required.

11.2.3.2 Impact AQ-3: Potential Releases of Irritant Dust as a Result of Construction Activities

At ponds with existing salt crusts, construction activities may result in some of the salt crusts being pulverized by construction equipment. As a result, both on-site construction workers and nearby residents could be exposed to high levels of irritant dust. This impact is considered significant. Implementation of Mitigation Measure AQ-1 would reduce this impact to a less-than-significant level. In addition, implementation of Mitigation Measures Haz-3, "Develop and Implement a Health and Safety Plan," and Haz-4, "Monitor Perimeter Dust Concentrations during Work on and in the Vicinity of Pond 8," would further reduce this impact. These measures are described in Chapter 9, "Hazards and Hazardous Materials."

Mitigation Measure AQ-1: Minimize Dust Generation in and Implement Dust Control Measures for Work Areas with Salt Crusts

To minimize the potential for disturbance of salt crusts, the contractor will be instructed to avoid disturbing the salt crusts, where possible. When work has to occur in areas with salt crusts, the contractor will conduct dust monitoring. If dust levels exceed the regulatory standard for nuisance dust, the contractor will implement dust control measures such as watering the work area and installing wind breaks. Specific acceptable dust control measures for salt crusts will be included in the contract specifications.

11.2.4 Salinity Reduction Option 1B: Napa River and Napa Slough Discharge and Breach of Pond 3

Impacts under Salinity Reduction Option 1B (Impacts AQ-2 and AQ-3) are similar to those under Salinity Reduction Option 1A, although quantifiable emissions of NOx and CO would be lower. Estimated quantifiable emissions associated with Salinity Reduction Option 1B are shown in Table 11-5. Impact AQ-2 "Increase in Ambient Pollutant Levels" is slightly different and is described below.

11.2.4.1 Impact AQ-2: Increase in Ambient Pollutant Levels

~~Construction activities associated with Salinity Reduction Option 1B would include improvements to existing water conveyance structures, installation of new water conveyance and control structures, repairs and upgrades to existing levees, and long-term maintenance of levees and water conveyance/control structures for the upper ponds (i.e., the ponds with a long desalination period), and breach of interior Pond 4/5 levees and~~Construction activities for Option 1B are very similar to Option 1A; the difference is that instead of water control structures being installed in Pond 3, the exterior levee of Pond 3 would be breached. Explosives used to breach ~~these~~this area~~s~~ would result in an instantaneous localized increase in PM10 that would dissipate shortly after the explosion.

~~Conventional construction activities would include the use of a variety of gasoline- and diesel-powered construction equipment. Estimated criteria~~Quantifiable estimated criteria pollutant emissions associated with Salinity Reduction Option 1B are shown in Table 11-5 and are slightly lower than for Option 1A. Detailed calculations are provided in Appendix E. ~~Because the BAAQMD dust control measures would be implemented as part of the project (see Chapter 2, "Site Description and Options"), emissions associated with construction are considered less than significant under CEQA.~~ As can be seen from Table 11-5, total quantifiable emissions associated with Salinity Reduction Option 1B are also below the federal conformity thresholds. PM10 emissions will not conflict with air quality plans, substantially contribute to an existing air quality standard violation, or expose sensitive receptors to substantial pollutant concentrations. This impact is considered less than significant. No mitigation is required.

11.2.5 Salinity Reduction Option 1C: Napa River and Napa Slough Discharge with Breaches of Ponds 3 and 4/5

Impacts under Salinity Reduction Option 1C (Impacts AQ-2 and AQ-3) are similar to those under Salinity Reduction Option 1A, although emissions of NO_x and CO would be lower. Estimated quantifiable emissions associated with Salinity Reduction Option 1C are shown in Table 11-5. Impact AQ-2 "Increase in Ambient Pollutant Levels" is slightly different and is described below.

11.2.4.1 Impact AQ-2: Increase in Ambient Pollutant Levels

~~Construction activities associated with Salinity Reduction Option 1C would include improvements to existing water conveyance structures, installation of new water conveyance and control structures, repairs and upgrades to existing levees, long-term maintenance of levees and water conveyance/control structures for the upper ponds (i.e., the ponds with a long desalination period), and breach of interior Pond 4/5 levees~~ Construction activities for Option 1C are similar to those for Option 1A. The difference is that instead of water control structures being installed in Ponds 3, 4, and 5, ~~and~~ the exterior levee of Ponds 3 and 4 would be breached. Explosives used to breach these areas would result in an instantaneous localized increase in PM10 that would dissipate shortly after the explosion.

~~Conventional construction activities would include the use of a variety of gasoline- and diesel-powered construction equipment.~~ Quatifiable e~~E~~stimated criteria pollutant emissions associated with Salinity Reduction Option 1C are shown in Table 11-5 and are slightly lower than for Salinity Reduction Option 1A. Detailed calculations are provided in Appendix E. ~~Because the BAAQMD dust control measures would be implemented as part of the project (see Chapter~~

~~2, "Site Description and Options"), emissions associated with construction are considered less than significant under CEQA.~~ As can be seen from Table 11-5, total quantifiable emissions associated with Salinity Reduction Option 1~~B~~C are also below the federal conformity thresholds. PM10 emissions will not conflict with air quality plans, substantially contribute to an existing air quality standard violation, or expose sensitive receptors to substantial pollutant concentrations. This impact is considered less than significant. No mitigation is required.

11.2.6 Salinity Reduction Option 2: Napa River and San Pablo Bay Discharge

Impacts under Salinity Reduction Option 2 (Impacts AQ-2 and AQ-3) are nearly the same as those under Salinity Reduction Option 1A, although emissions would be somewhat higher. Estimated quantifiable emissions associated with Salinity Reduction Option 2 are shown in Table 11-5, and are well below conformity thresholds.

11.2.7 Water Delivery Option

11.2.7.1 Impact AQ-2: Increase in Ambient Pollutant Levels

Water Delivery Project Component

The construction of the Sonoma, CAC, and Napa Pipelines could pose the potential for an increase in ambient pollutant levels. The operation of the pipelines would not increase ambient pollutant levels because operation would ~~require the addition of a~~ include a new electrically powered pump station; the indirect emissions associated with the electricity consumed by the pump motor~~s~~ is~~are~~ considered negligible.

Construction of the Sonoma, CAC, and Napa Pipelines is not expected to have any long-term effects on air quality. However, construction would result in two types of short-term effects on air quality. These direct effects are combustion emissions and dust emissions. The two main criteria pollutants that would be generated during construction are NO_x associated with diesel motor exhaust and PM10 associated with fugitive dust and diesel exhaust. A description of the impacts associated with generation of these air pollutants during construction follows.

The Sonoma Pipeline route includes construction of approximately 8~~6.5~~ miles of new pipeline and one~~two~~ new pump station~~s~~. Compactors, excavators, front-end loaders, cranes, and generators would be used to construct the pipeline. Paving equipment, including pavers and rollers, would also be used minimally to repave two roadways.

Under conformity guidelines, the project would have to produce more than 50 tons/year of NO_x to trigger a conformity determination. Construction-related emissions for the Sonoma Pipeline would produce a total of approximately 14.7 tons/year of NO_x, construction of the Napa Pipeline would produce a total of approximately 10.9 tons/year of NO_x, and construction of the CAC Pipeline would generate approximately 7.3 tons of NO_x per year. Even if all three pipeline segments are constructed in the same year, the total NO_x emissions would be substantially less than the *de minimis* standard. Table 11-5 shows the combined NO_x total from the construction of the Sonoma, CAC, and Napa Pipelines.

Dust emissions would be generated, especially during dry conditions, because of excavation, stockpiling, and transportation of soils. It is anticipated that, using an open-trench pipeline construction method, three crews working simultaneously would place pipeline in segments approximately 300–400 feet long. Assuming a construction corridor width of approximately 30 feet, this would produce a construction activity area of approximately 9,000–12,000 square feet, or approximately 0.21–0.28 acre. Based on a fugitive dust emission factor of 55 pounds per day of PM10 per graded acre per day (SCAQMD 1993), pipeline construction activities would produce approximately 12–15 pounds per day of PM10. Implementation of dust control measures would reduce fugitive dust emissions by approximately 50% and would be considered sufficient by BAAQMD to render the impact less than significant.

The CAC Pipeline route includes construction of 2.8 miles of new pipeline. Compactors, excavators, front-end loaders, cranes, and generators would be used to construct the pipeline. Paving equipment, including pavers and rollers, would also be used minimally to repave two roadways.

Under conformity guidelines, the project would have to produce less than 50 tons/year of NO_x to avoid triggering a conformity determination. Construction-related emissions for the CAC Pipeline would produce a total of 7.3 tons/year of NO_x, substantially less than the *de minimis* standard. Table 11-5 includes the combined NO_x total from the construction of the Sonoma, CAC, and Napa Pipelines.

As described above for the Sonoma Pipeline alignment, dust emissions would be generated during construction of the CAC Pipeline. It is anticipated that, using an open-trench pipeline construction method, two crews working simultaneously would place pipeline in segments approximately 200–300 feet long. Assuming a construction corridor width of approximately 30 feet, this would produce a construction activity area of approximately 6,000–9,000 square feet, or approximately 0.14–0.20 acre. Based on a fugitive dust emission factor of 55 pounds per day of PM10 per graded acre per day (SCAQMD 1993), p Pipeline construction activities would produce approximately 8–11 pounds per day of PM10. Assuming a -1-year construction period, this would be 2.9–4 tons. Implementation of dust control measures would reduce fugitive dust emissions by approximately 50%. Use of control measures is considered sufficient by BAAQMD standards to render the impact less than significant.

~~The Napa Pipeline route (both segments) includes construction of approximately 4.2 miles of new pipeline. Compactors, excavators, front-end loaders, cranes, and generators would be used to construct the pipeline. Paving equipment, including pavers and rollers, also would be used to repave the roadways.~~

~~Under conformity guidelines, the project would have to produce less than 50 tons/year of NOx to avoid triggering a conformity determination. Construction-related emissions for the Napa Pipeline would produce a total of approximately 10.9 tons/year of NOx, substantially less than the de minimis standard.~~

Dust emissions would be generated, especially during dry conditions, because of excavation, stockpiling, and transportation of soils. Pipeline construction would be similar to that described above for the CAC Pipeline. Given a similar construction corridor, construction activities for the Napa Pipeline would also produce 8–11 pounds per day of PM10.

Implementation of dust control measures would reduce fugitive dust emissions <u>from all pipeline segments </u>by approximately 50%. Use of control measures is considered sufficient by BAAQMD standards to render the impact less than significant.

In summary, construction of the Project Component of the Water Delivery Option would result in short-term increases in NO_x as well as other criteria pollutants. BAAQMD has incorporated construction emissions into its emissions inventory, which is the basis for the regional air quality plan. This impact is considered less than significant. No mitigation is required. Similarly, BAAQMD dust control measures would be implemented; therefore, although there would be a temporary increase in dust, this impact is also considered less than significant. No mitigation is required.

Water Delivery Program Component

Exact alignments and construction methods have not yet been determined for the pipelines associated with the Program Component of the Water Delivery Option. It is anticipated, however, that potential impacts on air quality would be comparable to those described above for the Project Component (i.e., construction of the pipelines that comprise the Program Component would likely use open-trench methods). Depending on the length of the pipeline construction and the availability of any existing pipelines, the amount of construction and therefore the amount of emissions may be slightly increased or decreased as compared to the Project Component. Impacts on air quality from implementation of the Program Component would be over several months and would also include the implementation of BAAQMD dust suppression methods. Therefore, this impact is considered less than significant. No mitigation is required.

11.2.7.2 Impact AQ-4: Public Exposure to Substantial Pollutant Concentrations

Water Delivery Project Component

The construction of the Sonoma Pipeline would have the potential to affect sensitive air receptors (especially schools, day care centers, hospitals, retirement homes, convalescence facilities, and residences) because of emissions, with the greatest impact resulting from dust emissions. The closest receptors are homes along Burndale Road and south of SR 12/121 near 8^{th} Street East, approximately 300 feet to 0.25 mile from the construction corridor. Fugitive dust generation associated with proposed construction activities is anticipated to be relatively minor (i.e., approximately 12–15 pounds per day). Assuming a 120-day construction period, this would be less than 1 ton of these emissions, not all of which would be adjacent to sensitive receptors. Additionally, fugitive dust impacts on nearby residents would be temporary and short-term. This impact is considered less than significant. No mitigation is required.

Dust generated from construction of the Napa and CAC Pipelines could affect sensitive air receptors located along the construction corridor. As stated above for the Sonoma Pipeline, fugitive dust generation associated with proposed construction activities is anticipated to be relatively minor and short-term. This impact is considered less than significant. No mitigation is required.

Water Delivery Program Component

Exact alignments and construction methods have not yet been determined for the pipelines associated with the Program Component of the Water Delivery Option. It is anticipated, however, that the daily construction-related air pollutant emissions associated with each of the potential future pipelines would be generally comparable to those described above for the Project Component. Based on preliminary alignment configurations, construction corridors would border commercial, agricultural, residential, and industrial areas. Depending on the exact alignment, there may be a lower or higher number of sensitive air receptors. Given the relatively low levels and temporary/transitory nature of the construction-related emissions, impacts on sensitive receptors are anticipated to be less than significant. No mitigation is required.

11.2.8 Habitat Restoration Option 1: Mixture of Tidal Marsh and Managed Ponds

The types of activities potentially generating emissions under the habitat restoration options are similar to those under the salinity reduction options. The impact under Habitat Restoration Option 1 is nearly the same as that under Salinity Reduction Option 1A for Impact AQ-3. Impact AQ-2 is slightly different and is described below.

Conventional construction activities associated with Habitat Restoration Option 1 would include repairs to water conveyance structures, removal of existing water conveyance and control structures, repairs of levees, and long-term maintenance of levees and water conveyance/control structures for the ponds that are retained as ponds. No new water control/conveyance structures are anticipated as part of the habitat restoration options (i.e., it is assumed that all necessary water control/conveyance structures would have been installed as part of the salinity reduction effort). Similarly, all levees would have been upgraded as necessary during the salinity reduction phase, so that only maintenance is required for those levees that are required for the long term. Breaching of exterior levees with explosives (for those ponds opened to substantial tidal action) is discussed below.

Levee breaches for habitat restoration would be more extensive than levee breaches required during desalination. Under Habitat Restoration Option 1, exterior levee breaches are required for Ponds 3 and 4/5, as well as potentially for Pond 6/6A. Some of these levee breaches would be along the Napa River; others would be in the less accessible sloughs. Except where removal of water control structures results in a sufficiently large levee breach for habitat restoration purposes, external levee breaches would most likely be accomplished using explosives. Detonation of the explosives would result in both fugitive dust generation and release of chemical byproducts from blasting.

The exact type and quantity of explosive to be used is not known at this time, but it is likely that a material developed specifically for use in water would be selected.

11.2.8.1 Impact AQ-2: Increase in Ambient Pollutant Levels

Conventional construction activities would include the use of a variety of gasoline- and diesel-powered construction equipment. Estimated criteria pollutant emissions associated with Habitat Restoration Option 1 are shown in Table 11-5. Detailed calculations are provided in Appendix E. Although these emissions would occur during the operational phase of the project, they are construction-related emissions. Because BAAQMD's dust control measures would be implemented as part of the project, these quantifiable emissions are not considered to be significant under CEQA. As can be seen from Table 11-5, total quantifiable emissions associated with Habitat Restoration Option 1 are also well below the federal conformity thresholds. Explosives used to create the habitat restoration levee breaches would result in an instantaneous localized increase in PM10 that would dissipate shortly after the explosion. PM10 emissions will not conflict with air quality plans, substantially contribute to an existing air quality standard violation, or expose sensitive receptors to substantial pollutant concentrations. This impact is considered less than significant. No mitigation is required.

11.2.9 Habitat Restoration Option 2: Tidal Marsh Emphasis

Impacts under Habitat Restoration Option 2 (Impacts AQ-2 and AQ-3) are nearly the same as those under Habitat Restoration Option 1, except that there would be more conventional construction and exterior levee breaching initially than under Habitat Restoration Option 1. Estimated quantifiable emissions of criteria pollutants associated with Habitat Restoration Option 2 are shown in Table 11-5, and are well below the federal conformity thresholds. Detailed calculations are provided in Appendix E.

11.2.10 Habitat Restoration Option 3: Pond Emphasis

Impacts under Habitat Restoration Option 3 (Impacts AQ-2 and AQ-3) are nearly the same as those under Habitat Restoration Option 1, except that there would be less conventional construction and fewer exterior levee breaches initially than under Habitat Restoration Option 1. Estimated quantifiable emissions of criteria pollutants associated with Habitat Restoration Option 3 are shown in Table 11-5, and are well below the federal conformity thresholds. Detailed calculations are provided in Appendix E.

11.2.11 Habitat Restoration Option 4: Accelerated Restoration

Impacts under Habitat Restoration Option 4 (Impacts AQ-2 and AQ-3) are nearly the same as those under Habitat Restoration Option 1, except that there would be substantially more conventional construction initially than under Habitat Restoration Option 1. Exterior levee breaching requirements would be the same as for Habitat Restoration Option 1. Estimated quantifiable emissions of criteria pollutants associated with Habitat Restoration Option 4 are shown in Table 11-5, and are well below the federal conformity thresholds. Detailed calculations are provided in Appendix E.