3.14 Air Quality

3.14.1 Physical Setting

Methodology

This section includes a summary of existing air quality conditions and applicable regulations. The method of analysis for short-term construction, long-term regional (operational), local mobile source, odor, and toxic air contaminant (TAC) emissions is based on the recommendations of the Bay Area Air Quality Management District (BAAQMD) (BAAQMD 1999).

Regional Setting

The SBSP Restoration Project Area is located in the South Bay (*i.e.*, Alameda, San Mateo, and Santa Clara counties), within the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB also comprises all of Contra Costa, Marin, Napa, and San Francisco counties, and the southeast portion of Sonoma County and the southwest portion of Solano County. The ambient concentrations of air pollutant emissions in the SFBAAB are determined by the amount of emissions released by pollutant sources and the atmosphere's ability to transport and dilute such emissions. Natural factors which affect transport and dilution include terrain, wind, atmospheric stability, and the presence of sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed below.

Topography, Meteorology, and Climate

The SFBAAB covers an area of approximately 5,540 square miles and is characterized by complex terrain consisting of coastal mountain ranges, inland valleys, and San Francisco Bay. The SFBAAB is generally bounded on the west by the Pacific Ocean, on the north by the Coast Ranges, and on the east and south by the Diablo Range.

The climate is dominated by the strength and location of a semi-permanent, subtropical high-pressure cell over the northeastern Pacific Ocean. The climate is also affected by the moderating effects of the adjacent oceanic heat reservoir. Mild summers and winters, moderate rainfall, daytime onshore breezes, and moderate humidity characterize regional climatic conditions. In summer, when the high-pressure cell is strongest and farthest north, fog forms in the morning and temperatures are mild. In winter, when the high-pressure cell is weakest and farthest south, occasional rainstorms occur.

Regional flow patterns affect air quality patterns by directing pollutants downwind of sources. Localized meteorological conditions, such as moderate winds, disperse pollutants and reduce pollutant concentrations. When a warm layer of air traps cooler air close to the ground, an inversion layer is produced. Such temperature inversions hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground. During summer mornings and afternoons, these inversions are present in the SBSP Restoration Project Area. During summer's longer daylight hours, plentiful sunshine provides the energy needed to fuel photochemical reactions between nitrogen oxides (NO_x) and reactive organic gases (ROG), which result in ozone formation.

In the winter, temperature inversions dominate during the night and early morning hours but frequently dissipate by afternoon. At this time, the greatest pollution problems are from carbon monoxide (CO) and NO_x. High CO concentrations occur on winter days with strong surface inversions and light winds. CO transport is extremely limited.

Criteria Air Pollutants

Concentrations of ozone, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead are used as indicators of ambient air quality conditions. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, they are commonly referred to as “criteria air pollutants.”

A brief description of each criteria air pollutant including source types and health effects is provided below along with the most current attainment designations and monitoring data for the SBSP Restoration Project Area.

Ozone. Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of reactive organic gases and nitrogen oxides in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_x are a group of gaseous compounds of nitrogen and oxygen that results from the combustion of fuels.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 1991).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 parts per million (ppm) for one to two hours has been found to substantially alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to symptomatic responses that include such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to the above adverse health effects, evidence also exists relating ozone exposure to an increase in the permeability of respiratory epithelia; such increased permeability leads to an increase in responsiveness of the respiratory system to challenges, and the interference or inhibition of the immune system's ability to defend against infection (Godish 1991).

Carbon Monoxide. CO is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources. In fact, 77 percent of the nationwide CO emissions are from mobile sources. The other 23 percent consists of CO emissions from wood-burning stoves, incinerators, and industrial sources.

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (US Environmental Protection Agency 2006).

The highest concentrations are generally associated with cold stagnant weather conditions that occur during the winter. In contrast to ozone, which tends to be a regional pollutant, CO problems tend to be localized.

Nitrogen Dioxide. NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (US Environmental Protection Agency 2006). The combined emissions of NO and NO_2 are referred to as NO_x, which are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_x emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation during or shortly after exposure. After a period of approximately four to 12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment with such symptoms as chronic bronchitis and decreased lung functions.

Sulfur Dioxide. SO_2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO_2 at five ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Particulate Matter. Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere by condensation and/or transformation of SO_2 and ROG (US Environmental Protection Agency 2006). Fine particulate matter ($PM_{2.5}$) includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less (California Air Resources Board 2006a).

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons (PAH), and other toxic substances adsorbed onto fine particulate matter, which is referred to as the piggybacking effect, or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (US Environmental Protection Agency 2006). $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and may contain substances that are particularly harmful to human health.

Lead. Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, as discussed in detail below, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, USEPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The USEPA banned the use of leaded gasoline in highway vehicles in December 1995 (US Environmental Protection Agency 2006).

As a result of USEPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (95 percent between 1980 and 1999), and levels of lead in the air decreased by 94 percent between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13 percent of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78 percent decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded (US Environmental Protection Agency 2006).

The decrease in lead emissions and ambient lead concentrations over the past 25 years is California's most dramatic air quality success story. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent California Air Resources Board (CARB) regulations have virtually eliminated all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (USEPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose “hot spot” problems in some areas. As a result, CARB identified lead as a TAC.

Emissions Inventory. The most current emissions inventory for the SFBAAB is shown in Table 3.14-1 (California Air Resources Board 2006b). An emissions inventory is a database that lists, by source, the amount of air pollutants discharged into the atmosphere of a community (*e.g.,* air basin) during a given time period. According to the SFBAAB’s emissions inventory, mobile sources are the largest contributors to the estimated annual average air pollutant levels accounting for approximately 45 percent of the total ROG, 89 percent of the total CO, 84 percent of the total NO_x, 17 percent of the total SO_x, and 11 percent of the total PM_{10} emissions.

Table 3.14-1 SFBAAB 2005 Emissions Inventory

SOURCE TYPE / CATEGORY	ESTIMATED ANNUAL AVERAGE EMISSIONS (TONS PER DAY)				
	ROG	CO	NO_X	SO_X	PM_{10}
Stationary Sources					
Fuel Combustion	3.8	37.7	50.3	11.0	5.7
Waste Disposal	2.8	0.0	0.2	0.0	0.0
Cleaning and Surface Coating	33.8	0.0	0.0	–	0.0
Petroleum Production and Marketing	26.7	12.5	0.8	25.2	0.9
Industrial Processes	11.4	2.5	3.9	7.7	10.0
Subtotal (Stationary Sources)	78.5	52.7	55.3	44.0	16.6
Area-Wide Sources					
Solvent Evaporation	75.2	–	–	–	–
Miscellaneous Processes	17.3	177.7	19.5	0.6	175.3
Subtotal (Area-wide Sources)	92.5	177.7	19.5	0.6	175.3
Mobile Sources					
On-road Motor Vehicles	151.7	1495.8	285.8	2.3	9.6
Other Mobile Sources	63.9	486.5	186.3	7.1	12.1
Subtotal (Mobile Sources)	**215.6**	**1982.3**	**472.1**	**9.4**	**21.6**
Grand Total for Air Basin	**386.6**	**2212.7**	**546.9**	**54.0**	**213.5**

Notes:
The grand total includes emissions associated with natural sources, which are not shown above. Due to rounding, the subtotals/totals may not add up exactly.

Source: CARB 2006b

Monitoring Station Data and Attainment Area Designations. Criteria air pollutant concentrations are measured at several monitoring stations in the SFBAAB. Table 3.14-2 summarizes the air quality data for the SFBAAB for the most recent three years, 2003 through 2005.

Both CARB and USEPA use this type of monitoring data to designate areas according to attainment status for criteria air pollutants established by the agencies. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are nonattainment, attainment, and unclassified. Unclassified is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called nonattainment-transitional. The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. The most current attainment designations for the SFBAAB are shown in Table 3.14-3 for each criteria air pollutant.

Table 3.14-2 Summary of Annual Ambient Air Quality Data (2003–2005) – SFBAAB

	2003	2004	2005
Ozone			
Maximum concentration (1-hr/8-hr, ppm)	0.128/0.101	0.113/0.084	0.120/0.090
Number of days state standard exceeded (1-hr) [1]	19	7	9
Number of days national standard exceeded (1-hr/8-hr) [1]	1/7	0/0	0/1
PM_{10}			
Highest 24-hour average (national/state) (mg/m^3)	58.3/59.5	62.8/65	78.1/80.8
Number of days exceeding standards (national/state)	0/18.3	0/24.5	0/23.3
Annual Average (national/state) (ug/m^3)	24.2/24.8	25.3/26	23.5/24.2
Nitrogen Dioxide (NO_2)			
Maximum concentration (1-hr, ppm)	0.081	0.073	0.074
Number of days state standard exceeded (1-hr) [1]	0	0	0
Annual Average (ppm)	0.014	0.013	0.013

Notes:
ppm = parts per million
[1] Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

Source: California Air Resources Board 2006c

Table 3.14-3 Ambient Air Quality Standards and Designations

POLLUTANT	AVERAGING TIME	CALIFORNIA		NATIONAL STANDARDS[1]		
		STANDARDS[2,3]	ATTAINMENT STATUS[4]	PRIMARY[5]	SECONDARY[5]	ATTAINMENT STATUS[4]
Ozone	1-hour	0.09 ppm (180 µg/m³)	N (Serious)	-[7]	-[7]	-[7]
	8-hour	0.070 ppm[6] (137 µg/m³)	–	0.08 ppm (157 µg/m³)	Same as Primary Standard	N (Marginal)
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m³)	A	35 ppm (40 mg/m³)	–	U/A
	8-hour	9 ppm (10 mg/m³)		9 ppm (10 mg/m³)		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	–	–	0.053 ppm (100 µg/m³)	Same as Primary Standard	U/A
	1-hour	0.25 ppm (470 µg/m³)	A	–		–
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 µg/m³)	–	U/A
	24-hour	0.04 ppm (105 µg/m³)	A	0.14 ppm (365 µg/m³)	–	
	3-hour	–	–	–	0.5 ppm (1300 µg/m³)	
	1-hour	0.25 ppm (655 µg/m³)	A	–	–	–
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m³	N	–	Same as Primary Standard	U/A
	24-hour	50 µg/m³		150 µg/m³		
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m³	N	15 µg/m³	Same as Primary Standard	U/A
	24-hour	No Separate State Standard	–	35 µg/m³		
Lead[8]	30-day Average	1.5 µg/m³	A	–	–	–
	Calendar Quarter	–	–	1.5 µg/m³	Same as Primary Standard	A

Table 3.14-3 Ambient Air Quality Standards and Designations (Continued)

POLLUTANT	AVERAGING TIME	CALIFORNIA		NATIONAL STANDARDS[1]		
		STANDARDS[2,3]	ATTAINMENT STATUS [4]	PRIMARY[5]	SECONDARY[5]	ATTAINMENT STATUS[4]
Sulfates	24-hour	25 $\mu g/m^3$	A	**No National Standards**		
Hydrogen Sulfide	1-hour	0.03 ppm (42 $\mu g/m^3$)	U			
Vinyl Chloride[8]	24-hour	0.01 ppm (26 $\mu g/m^3$)	U/A			
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer – visibility of 10 miles or more (0.07 – 30 miles or more for Lake Tahoe) due to particles when the relative humidity is less than 70%.	U			

Notes:

[1] National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration about 15 ug/m3 is equal to or less than one. For $PM_{2.5}$, 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact USEPA for further clarification and current federal policies.

[2] California standards for ozone, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California Ambient Air Quality Standards (CAAQS) are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

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

[4] Nonattainment (N): any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.
Attainment (A): any area that meets the national primary or secondary ambient air quality standard for the pollutant.
Unclassifiable (U): any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[6] This concentration was approved by CARB on April 28, 2005 and is expected to become effective in early 2006.

[7] The 1-hour ozone NAAQS was revoked on June 15, 2005.

[8] CARB has identified lead and vinyl chloride as TACs with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Sources: California Air Resources Board 2006d, 2006c, US Environmental Protection Agency 2006

Toxic Air Contaminants

Concentrations of TACs are also used as indicators of ambient-air-quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

According to the 2006 edition of the California Almanac of Emissions and Air Quality (California Air Resources Board 2006a), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines (diesel particulate matter or diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Unlike the other TACs, diesel PM does not have ambient monitoring data because an accepted measurement method does not currently exist. However, CARB has made preliminary concentration estimates for the state and its 15 air basins using a PM-based exposure method. The method uses the CARB emission inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies on chemical speciation of ambient data. These data were used, along with receptor modeling techniques, to estimate outdoor concentrations of diesel PM. Ten compounds pose the greatest known ambient risk based on air quality data, or concentration estimates in the case of diesel PM: acetaldehyde, benzene, 1,3-butadiene, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and diesel PM.

In general, for those TACs that may cause cancer, there is no concentration that does not present some risk (California Air Resources Board 2006a). In other words, there is no threshold level below which adverse health impacts may not be expected to occur.

Odors

Typically odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (*e.g.*, irritation, anger, or anxiety) to physiological (*e.g.*, circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor and in fact an odor that is offensive to one person may be perfectly acceptable to another (*e.g.*, fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Sources of existing odor in the SBSP Restoration Project Area include the ponds themselves. When algae and other biomass (which grow in the ponds) naturally decompose, hydrogen sulfide gas can be produced, which generates odors. In addition, odors are generated when the ponds dry and the mud bottoms are exposed to air (exposure of algae or brine shrimp). No odor complaints have been received in the Alviso and Ravenswood pond complexes since USFWS took over management of the ponds. There were limited odor complaints in 2005 from initial operation of the Pond 2C system in the Eden Landing pond complex, which has since been resolved. CDFG has not received any odor complaints.

Project Setting

BAAQMD operates a regional air quality monitoring network that regularly measures the concentrations of the major criteria air pollutants. The three nearest air quality monitoring stations to the SBSP Restoration Project Area are Central San Jose (Alviso pond complex), Fremont (Eden Landing pond complex), and Redwood City (Ravenswood pond complex). The ambient air quality concentrations taken at these monitoring stations are the best representations of air quality at the individual pond complexes. Local air quality conditions (*e.g.*, ambient air quality data from the nearest monitoring station, climate, topography, meteorology), and nearby sensitive receptors are discussed separately below for the three SBSP Restoration Project pond complexes.

Land uses such as schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because infants and children, the elderly, and people with health afflictions, especially respiratory ailments, are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential areas are also considered to be sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Sensitive receptors are identified for each of the three SBSP Restoration Project pond complexes below.

Eden Landing

The Eden Landing pond complex is in the southwestern Alameda County subregion of the SFBAAB, which encompasses the southeast side of San Francisco Bay from Dublin Canyon to the Alameda County/Santa Clara County border (BAAQMD 1999). The subregion is bordered on the east by the steep flank of the East Bay hills and on the west by San Francisco Bay. During the summer months, average maximum temperatures in the subregion are in the mid-70s. Average maximum winter temperatures are in the high-50s to low-60s.

The pollution potential is considered relatively high in this subregion during the summer and fall (BAAQMD 1999). The nearest air quality monitoring station that provides the most representative ambient air quality at the Eden Landing pond complex is the Fremont-Chapel Way Station. Based on the monitoring data shown in Table 3.14-4, pollutant concentrations exceeded ambient air quality standards in the year 2005 for state ozone and PM_{10}. CO emissions have consistently been below ambient air quality standards since 2000, although data was not available in 2005.

There are no sensitive receptors within the Eden Landing pond complex and limited sensitive receptors adjacent to the pond complex. The nearest sensitive receptors are residences within the Eden Shores development (off Eden Shores Drive in the City of Hayward) approximately 300 ft (91 m) north of Pond E6A. Sensitive residences are also located near the pond complex at Pond E4C (off Carmel Way in Union City), approximately 1,000 ft (305 m) east of the pond. Several schools are located east of the pond complex, including Alvarado Elementary School (approximately 4,000 ft [1,219 m] east of Pond E6, in Union City), Alvarado Middle School (approximately 4,000 ft [1,219 m] east of Pond E6, in Union City), Refugio M. Cabello Elementary School (4,000 ft [1,219 m] east of Pond E6C, in Union City), Delaine Eastin Elementary School (more than 4,000 ft [1,219 m] southeast of Pond E4C, in Union City), and Pioneer Elementary School (more than 4,000 ft [1,219 m] southeast of Pond E4C, in Union City). Schools are also located in the City of Hayward, more than 5,000 ft (1,524 m) east of the site, on the east side of the railroad tracks.

Ponds E8A, E8X and E9. Ponds E8A, E8X and E9 are located in the central portion of the Eden Landing pond complex, and are surrounded by existing ponds to the north, west, and east, and the Old Alameda Creek to the south. The air quality characteristics of these ponds are similar to those described for the entire pond complex, due to the regional nature of air quality effects. Sensitive land uses are approximately 4,000 ft (1,219 m) east of the eastern boundary of Pond E8X. Schools are located even further to the northeast.

Ponds E12 and E13. Ponds E12 and E13 are located in the north-central portion of the Eden Landing pond complex, and are surrounded by existing ponds to the north, west, and south. The ELER Restoration Project is located to the east. The air quality characteristics of these ponds are similar to those described for the entire pond complex, due to the regional nature of air quality effects. The nearest sensitive land uses are located approximately 6,000 ft (1,829 m) from the eastern boundary of Pond E13. The nearest schools are located even further to the northeast.

Alviso

The Alviso pond complex is located in the Santa Clara Valley subregion of the SFBAAB, which is bounded by San Francisco Bay to the north and by mountains to the east, south, and west (BAAQMD 1999). The pollution potential is considered high in this subregion (BAAQMD 1999). In this subregion, temperatures are warm on summer days and cool on summer nights, and winter temperatures are fairly mild; mean maximum temperatures within the pond complex are in the low-80s during the summer and the high-50s during the winter.

Table 3.14-4 Summary of Ambient Air Quality in the Vicinity of the SBSP Restoration Project Area, 2000 to 2006 – Days Above Standard

POLLUTANT	TIME STANDARD	MONITORING STATION	DAYS ABOVE STANDARD						
			2000	2001	2002	2003	2004	2005	2006
Ozone	Federal 1-hour	Fremont	0	0	0	0	0	0	0
		San Jose Central	0	0	0	0	0	0	0
		Redwood City	0	0	0	0	0	0	0
	State 1-hour	Fremont	2	3	3	4	0	1	4
		San Jose Central	0	2	0	4	0	1	5
		Redwood City	0	1	0	1	1	0	0
	Federal 8-hour	Fremont	0	0	0	1	0	0	0
		San Jose Central	0	0	0	0	0	0	0
		Redwood City	0	0	0	0	0	0	0
CO	Federal 8-hour	Fremont	0	0	0	0	0	NA	0
		San Jose Central	0	0	0	0	0	0	1
		Redwood City	0	0	0	0	0	0	0
$PM_{2.5}$	Federal 24-hour	Fremont	0	0	0	0	0	0	0
		San Jose Central	0	0	0	0	0	0	0
		Redwood City	0	1	0	0	0	0	1
PM_{10}	State 24-hour	Fremont	2	3	1	0	0	1	1
		San Jose Central	7	4	2	3	4	2	2
		Redwood City	1	3	1	0	1	2	2
	Federal 24-hour	Fremont	0	0	0	0	0	0	0
		San Jose Central	0	0	0	0	0	0	0
		Redwood City	0	0	0	0	0	0	0

Notes: PM_{10} = particulate matter under 10 micrometers in diameter. Pollutant standards listed as follows (state, federal): Ozone 1 hour peak (9 pphm, 12 pphm); CO 8 hour (20 ppm, 35 ppm); PM_{10} annual geometric mean (30 ppm) 24 hour (50 ppm, 150 ppm).
San Jose Central: 2000–2001 data from the San Jose – 4th Street Station. 2002–2006 data from San Jose – Jackson Street Station.
NA = Not Available

Sources: 2000–2002 data from Initial Stewardship Plan, 2003; updates to 2001–2002 from CARB Internet Air Quality Data Summaries, accessed July 15, 2004. 2004 data from CARB Internet Air Quality Data Summaries, accessed August 30, 2005. 2005 data from CARB Internet Air Quality Data Summaries, accessed August 10, 2006 (CARB 2006c).

The nearest air quality monitoring station that provides the most representative ambient air quality at the complex is the San Jose – Jackson Street Station (prior to 2002, the nearest station was the San Jose – 4th Street Station). Monitoring data from these stations show that PM_{10} levels have exceeded ambient air quality standards consistently from 2000 through 2005. State ozone standards were not exceeded in 2004 in the vicinity of the monitoring station, although exceedances occurred in other years. CO emissions have consistently been below ambient air quality standards since 2000, but was exceeded in 2006.

There are no sensitive receptors within the pond complex and limited sensitive receptors are present near the pond complex. The nearest sensitive receptors are residences in the community of Alviso, about 600 ft (183 m) east of Pond A8. One school (George Mayne Elementary School) is located in the community of Alviso, located more than 3,000 ft (about 914 m) east of Pond A8.

Pond A6. Pond A6, on the bayward side of the Alviso pond complex, is surrounded by water on three sides (the Bay to the north and Guadalupe and Alviso sloughs to the west and east, respectively). Pond A6 is surrounded by other ponds to the south. The air quality characteristics of this pond are similar to those described for the entire pond complex, due to the regional nature of air quality effects. The closest sensitive land uses (community of Alviso and the George Mayne Elementary School) are located approximately 13,000 ft (3,962 m) to the southeast.

Pond A8. Pond A8 is located on the southeastern portion of the pond complex, surrounded to the north, south, and west by other ponds, and to the east by the community of Alviso. The Guadalupe River separates the pond from the community. The air quality characteristics of these ponds are similar to those described for the entire pond complex, due to the regional nature of air quality effects. The closest sensitive uses are in the community of Alviso (residences and George Mayne Elementary School), which are approximately 600 ft (183 m) to the east.

Pond A16. Pond A16, at the eastern edge of the pond complex, is surrounded by ponds to the north, east, and west. The New Chicago Marsh and the Refuge EEC are located to the south. The air quality characteristics of this pond are similar to those described for the entire pond complex, due to the regional nature of air quality effects. The nearest sensitive land use is in the community of Alviso (residences and George Mayne Elementary School, located approximately 2,000 ft (610 m) to the south.

Ravenswood

The Ravenswood pond complex is located in the peninsula subregion of the SFBAAB, which encompasses an area from northwest of San Jose to the Golden Gate Bridge. The Santa Cruz Mountains extend up the center of the peninsula. Elevations exceed 2,000 ft (610 m) at the southern end of the peninsula and decrease to 500 ft (152 m) in South San Francisco.

In the southeastern portion of the peninsula subregion, air pollutant emissions are relatively high (BAAQMD 1999). The nearest monitoring station that provides the most representative ambient air quality at the pond complex is the Redwood City Station. Monitoring data from the station show that PM_{10} concentrations exceeded ambient air quality standards for all years except 2003, as well as previous years. However, CO emissions have consistently been below ambient air quality standards since 2000.

There are no sensitive receptors within the Ravenswood pond complex and limited sensitive receptors to the south. The nearest residences are less than 500 ft (152 m) south of Pond SF2. The nearest school is located within this housing neighborhood (Costano Elementary School, in East Palo Alto).

Pond SF2. Pond SF2 is in the western portion of the Ravenswood pond complex, surrounded by the Bay to the east and other ponds to the north and west. The PG&E substation and SR 84 are also located to the north. The Ravenswood Open Space Preserve is located to the south of the pond. The nearest sensitive land uses are less than 500 ft (152 m) to the south.

3.14.2 Regulatory Setting

Air quality in the South Bay is regulated by USEPA, CARB, and BAAQMD. Each of these agencies develops rules, regulations, policies, and/or goals to attain the directives imposed through legislation. Although USEPA regulations may not be superseded, both state and local regulations may be more stringent.

Federal Laws and Regulations

At the federal level, USEPA has been charged with implementing national air quality programs. USEPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required USEPA to establish national ambient air quality standards (NAAQS). As shown in Table 3.14-3, USEPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The primary standards protect public health and the secondary standards protect public welfare. The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution[1]. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. USEPA has responsibility to review all state SIPs to determine conformity to the mandates of the CAA, and the amendments thereof, and determine if implementation will achieve air quality goals. All reasonably foreseeable emissions, both direct and indirect, predicted to result from the action are taken into consideration and must be identified as to location and quantity. If it is found that the action would create emissions above de minimis threshold levels (*e.g.*, restricting NO_x emissions from federal actions to 100 tons per year in ozone nonattainment areas) specified in USEPA regulations, or if the activity is considered regionally significant because its emissions exceed 10 percent of an area's total emissions, the action cannot proceed unless mitigation measures are specified that would bring the project into conformance. If USEPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control

[1] General conformity requirements were adopted by Congress as part of the CAAA and were implemented by USEPA regulations in 1993. General conformity requires that all federal actions conform with the SIP as approved or promulgated by USEPA. The purpose of the general conformity program is to ensure that actions taken by the federal government do not undermine state or local efforts to achieve and maintain NAAQS.

measures. Failure to submit an approvable SIP or to implement the plan within the mandated timeframe may result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

General conformity applies in both federal nonattainment and maintenance areas. Within these areas, it applies to any federal action not specifically exempted by the CAA or USEPA regulations. Emissions from construction activities are also included. General conformity does not apply to projects or actions that are covered by the transportation conformity rule. If a federal action falls under the general conformity rule, the federal agency responsible for the action is responsible for making the conformity determination. The applicability analyses to determine conformity would be required to quantify short- and long-term emissions of air pollutants from implementation of the proposed Project and to determine whether the Project would cause or contribute to any new violation of any standard, interfere with maintenance of any standard, increase the frequency or severity of any existing violation of any standard, or delay timely attainment of any standard. The applicability of Phase 1 actions to conformity is addressed in Section 3.14.3, Environmental Impacts and Mitigation Measures. General conformity applicability analyses for subsequent phases would be conducted when specific details of each phase are developed, and would be included with the subsequent environmental document prepared for each phase.

State Laws and Regulations

CARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required CARB to establish California ambient air quality standards (CAAQS) (Table 3.14-3). CARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and area-wide emission sources, and provides districts with the authority to regulate indirect sources.

Other CARB responsibilities include, but are not limited to, overseeing local air district compliance with California and federal laws, approving local air quality plans, submitting SIPs to USEPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

Local Laws and Regulations

Bay Area Air Quality Management District

BAAQMD attains and maintains air quality conditions in Alameda, Santa Clara, and San Mateo counties through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of BAAQMD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. BAAQMD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the CAA, CAAA, and the CCAA.

In 1999, BAAQMD released the BAAQMD CEQA Guidelines (BAAQMD 1999). This is an advisory document that provides lead agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The handbook contains the following applicable components:

- Criteria and thresholds for determining whether a project may have a significant adverse air quality impact;
- Specific procedures and modeling protocols for quantifying and analyzing air quality impacts;
- Methods available to mitigate air quality impacts; and
- Information for use in air quality assessments and environmental documents that will be updated more frequently such as air quality data, regulatory setting, climate, and topography.

Air Quality Plans

As stated above, BAAQMD prepares plans to attain ambient air quality standards in the SFBAAB. BAAQMD prepares ozone attainment plans (OAP) for the national ozone standard and CAPs for the California standard both in coordination with the Metropolitan Transportation Commission (MTC) and ABAG. Past plans include the 2001 OAP and the 2000 CAP. The 2001 OAP is a revision to the Bay Area part of the SIP and was prepared in response to USEPA's partial disapproval of the 1999 OAP. The 2001 OAP for the national one-hour ozone standard includes two commitments for further planning: (1) conduct a mid-course review of progress toward attaining the national one-hour ozone standard by December 2003; and (2) provide a revised ozone attainment strategy to USEPA by April 2004.

The 2000 CAP was adopted by BAAQMD on December 20th, 2000, and was then submitted to CARB. The CCAA requires BAAQMD to update the CAP for attaining the state one-hour ozone standard every three years. The 2000 CAP is the third triennial update of BAAQMD's original 1991 CAP. The 2000 CAP includes a control strategy review to ensure that the CAP includes all feasible measures to reduce ozone, updates to the emissions inventory, estimates of emission reductions, and assessments of air quality trends.

In July 2003, USEPA proposed an interim final determination that the 2001 OAP corrected the deficiencies of the 1999 Plan and proposed approval of the 2001 OAP. Following three years of low ozone levels (2001, 2002 and 2003), in October 2003, USEPA proposed a finding that the SFBAAB had attained the national one-hour standard and that certain elements of the 2001 OAP (attainment demonstration, contingency measures and reasonable further progress) were no longer required. In April 2004, USEPA made final the finding that the SFBAAB had attained the one-hour standard and approved the remaining applicable elements of the 2001 Plan: emission inventory; control measure commitments; motor vehicle emission budgets; reasonably available control measures; and commitments to further study measures. However, as part of a transition from the national one-hour standard to an eight-hour standard, the one-hour standard was revoked on June 15, 2005 and is no longer applicable (BAAQMD 2006).

The eight-hour standard took effect in June 2004. In April 2004, USEPA designated regions for the new national eight-hour standard and these designations took effect on June 15, 2004. USEPA formally designated the Basin as a nonattainment area for the national eight-hour ozone standard, and classified the region as “marginal” according to five classes of nonattainment areas for ozone, which range from marginal to extreme. Compliance with the standard is determined at each monitoring station using an average of the fourth highest ozone reading for three years. A violation at any monitoring station results in a nonattainment designation for the entire region because ozone is a regional pollutant. Monitoring data for the San Martin station for the years 2001, 2002 and 2003 show an average of the fourth highest ozone values of 86 parts per billion (one part per billion above the standard), hence the Bay Area's "marginal" nonattainment classification. Marginal, nonattainment areas must attain the national eight-hour ozone standard by June 15, 2007.

While certain elements of Phase 1 of the eight-hour implementation rule are still undergoing legal challenge, USEPA signed Phase 2 of the eight-hour implementation rule on November 9, 2005. It is not currently anticipated that marginal areas will be required to prepare attainment demonstrations for the eight-hour standard. (BAAQMD 2006).

However, there is still a need for continued improvement to meet the state one-hour ozone standard. Accordingly, BAAQMD prepared the Bay Area 2005 Ozone Strategy, which is a roadmap showing how the Basin will achieve compliance with the state one-hour air quality standard for ozone as expeditiously as practicable and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The 2005 Ozone Strategy, which was adopted by BAAQMD’s Board of Directors on January 4, 2006, describes how the Basin will fulfill the CCAA planning requirements for the state one-hour ozone standard and transport mitigation requirements through the proposed control strategy. The control strategy includes stationary source control measures to be implemented through BAAQMD regulations; mobile source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with MTC, local governments, transit agencies and others. BAAQMD will continue to adopt regulations, implement programs and work cooperatively with other agencies, organizations and the public on a wide variety of strategies to improve air quality in the region and reduce transport to neighboring air basins.

The 2005 Ozone Strategy explains how the SFBAAB plans to achieve these goals with regard to ozone, and also discusses related air quality issues of interest including our public involvement process, climate change, fine particulate matter, BAAQMD’s Community Air Risk Evaluation (CARE) program, local benefits of ozone control measures, the environmental review process, national ozone standards and photochemical modeling.

Overall, the 2005 Ozone Strategy is a comprehensive document that describes the Basin’s strategy for compliance with state one-hour ozone standard planning requirements, and is a significant component of our region's commitment to achieving clean air to protect the public's health and the environment (BAAQMD 2006).

Toxic Air Contaminants

Air quality regulations also focus on TACs, or in federal parlance hazardous air pollutants (HAPs). In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. This contrasts with the criteria air pollutants for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 3.14-3). Instead, USEPA and CARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology for toxics (MACT and BACT) to limit emissions. These technologies, in conjunction with additional rules set forth by BAAQMD, establish the regulatory framework for TACs.

Federal Hazardous Air Pollutant Programs

USEPA has programs for identifying and regulating HAPs. Title III of the CAAA directed USEPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP may differ for major sources than for area sources of HAPs. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (tpy) of any HAP or more than 25 tpy of any combination of HAPs; all other sources are considered area sources. The emissions standards are to be promulgated in two phases. In the first phase (1992–2000), USEPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), USEPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAAA also required USEPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum to benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the CAAA required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State and Local Toxic Air Contaminant Programs

TACs in California are primarily regulated through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. This includes research, public participation, and scientific peer review before CARB can designate a substance as a TAC. To date, CARB has identified over 21 TACs, and adopted USEPA's list of HAPs as TACs. Most recently, diesel PM was added to the CARB list of TACs.

Once a TAC is identified, CARB then adopts an Airborne Toxics Control Measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

CARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses, and off-road diesel equipment (*e.g.*, tractors, generators). In February 2000, CARB adopted a new public transit bus fleet rule and emission standards for new urban buses. These new rules and standards provide for 1) more stringent emission standards for some new urban bus engines beginning with 2002 model year engines; 2) zero-emission bus demonstration and purchase requirements applicable to transit agencies; and 3) reporting requirements with which transit agencies must demonstrate compliance with the urban transit bus fleet rule. Upcoming milestones include the low sulfur diesel fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide. Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially less TACs than under current conditions. Mobile-source emissions of TACs (*e.g.*, benzene, 1-3-butadiene, diesel PM) have been reduced substantially over the last decade, and will be reduced further in California through a progression of regulatory measures (*e.g.*, Low Emission Vehicle (LEV)/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of CARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be reduced by 75 percent in 2010 and 85 percent in 2020 from the estimated year 2000 level. Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

CARB recently published the Air Quality and Land Use Handbook: A Community Health Perspective, which provides guidance concerning land use compatibility with TAC sources (California Air Resources Board 2005). While not a law or adopted policy, the handbook offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries dry cleaners, gasoline stations, and industrial facilities to help keep children and other sensitive populations out of harm’s way. A number of comments on the Handbook were provided to CARB by air districts, other agencies, real estate representatives, and others. The comments included concern over whether CARB was playing a role in local land use planning, the validity of relying on static air quality conditions over the next several decades in light of technological improvements, and support for providing information that can be used in local decision making.

At the local level, air pollution control or management districts may adopt and enforce CARB control measures. Under BAAQMD regulations, all sources that possess the potential to emit TACs are required to obtain permits from the district. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new source review standards and air toxics control measures. BAAQMD limits emissions and public exposure to TACs through a number of programs. BAAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

Sources that require a permit are analyzed by BAAQMD (*e.g.*, health risk assessment) based on their potential to emit toxics. If it is determined that a project would emit toxics in excess of BAAQMD's threshold of significance for TACs, as identified below, sources have to implement the best available control technology for TACs (T-BACT) in order to reduce emissions. If a source cannot reduce the risk below the threshold of significance even after T-BACT has been implemented, BAAQMD will deny the permit required by the source. This helps to prevent new problems and reduces emissions from existing older sources by requiring them to apply new technology when retrofitting with respect to TACs. It is important to note that BAAQMD's air quality permitting process applies to stationary sources; and properties which are exposed to elevated levels of non-stationary type sources of TACs, and the non-stationary type sources themselves (*e.g.*, on-road vehicles) are not subject to air quality permits. Further, due to feasibility and practicality reasons, mobile sources (*e.g.,* cars, trucks) are not required to implement T-BACT, even if they do have the potential to expose adjacent properties to elevated levels of TACs. Rather, emissions controls on such sources (*e.g.*, vehicles) are subject to regulations implemented on the state and federal level.

Odors

Because offensive odors rarely cause any physical harm, neither the state nor the federal government has adopted any rules or regulations. However, BAAQMD has adopted Rule 7 (Odorous Substances) that specifically addresses citizen complaints. As described by the rule, the limitations of this Regulation shall not be applicable until odor complaints from ten or more complainants within a 90-day period are received, alleging that a person has caused odors perceived at or beyond the property line of such person and deemed to be objectionable by the complainants in the normal course of their work, travel or residence. When the limits of this regulation become effective as a result of citizen complaints described above, the limits shall remain effective until such time as no citizen complaints have been received by the Air Pollution Control Officer (APCO) for 1 year. The limits of this Regulation shall become applicable again when the APCO receives odor complaints from five or more complainants within a 90-day period.

3.14.3 Environmental Impacts and Mitigation Measures

Approach to Analysis

The assumptions presented in Section 3.13, Noise, regarding the type of construction equipment that would be used, the pumps that would be operated and the distances of the pumps from sensitive receptors, also apply to this air quality impact analysis.

Significance Criteria

For the purpose of this analysis, the Project would result in a significant air quality impact if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number or people.

As stated in Appendix G of the CEQA Guidelines, the significance standards established by the applicable air quality management or air pollution control district may be used to evaluate impacts. Thus, as specified by BAAQMD (BAAQMD 1999), implementation of the Project would result in significant air quality impacts if:

- All control measures in compliance with the recommendations of BAAQMD are not incorporated into project design or implemented during project construction;
- Long-term operational (regional) emissions of ROG, NO_x, or PM_{10} exceed the BAAQMD-recommended mass emissions thresholds of 80 pounds per day (lbs/day) or 15 tpy;
- Long-term operational local mobile-source emissions of CO results in or substantially contribute to emissions concentrations that exceed the one-hour ambient air quality standard of 20 ppm or the eight-hour standard of 9 ppm; or
- Exposure of sensitive receptors to TAC emissions that exceed 10 in 1 million for the carcinogenic risk (*i.e.*, the risk of contracting cancer) and/or a noncarcinogenic Hazard Index of 1 for the Maximally Exposed Individual (MEI).

As explained in Section 3.1.2, while both CEQ Regulations for Implementing NEPA and the CEQA Guidelines were considered during the impact analysis, impacts identified in this EIS/R are characterized using CEQA terminology. Please refer to Section 3.1.2 for a description of the terminology used to explain the severity of the impacts.

Program-Level Evaluation

SBSP Long-Term Alternatives

***SBSP Impact 3.14-1:* Short-term construction-generated air pollutant emissions.**

Alternative A No Action. Under this alternative, no construction activities would occur within the SBSP Restoration Project Area. While limited O&M activities would be ongoing, they are considered part of Project operation and not construction. As such, no construction-generated emissions would occur.

Long-term operational air pollutant emissions are evaluated in SBSP Impact 3.14-2 below.

Alternative A Level of Significance: No Impact

Alternative B Managed Pond Emphasis. The implementation of Alternative B would occur in phases over the 50-year planning period. The timing and duration of these construction phases has not been determined at this time beyond Phase 1. In general, construction activities are considered short-term or temporary, and would not occur continuously throughout the entire 50-year planning horizon. In addition, construction activities would be scattered throughout the three pond complexes.

Construction emissions are short-term or temporary in duration and have the potential to represent a significant impact with respect to air quality. ROG and NO_x emissions are primarily associated with gas and diesel equipment exhaust and the application of architectural coatings. Fugitive PM_{10} (including $PM_{2.5}$)[2] dust emissions are primarily associated with earthmoving activities (*e.g.*, site preparation, excavation) and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and VMT by construction vehicles on- and off-site (*e.g.*, delivering imported fill, equipment, and material).

Alternative B would involve construction and modification of levees (including breaching and lowering, and improvements for flood protection), excavation of pilot channels, construction/installation of water control structures, creation of nesting islands, creation of tidal habitat, and construction of recreational facilities (trails, interpretative stations, viewing platforms, staging areas, and amenities). The method of construction (using land- or water-based equipment) has not been determined and would likely be selected by the construction contractor[3]. If land-based equipment is used, the site may be drained prior to and during construction, and light, low-pressure equipment or equipment on mats would be employed. Construction activities would result in the temporary generation of emissions from earthmoving activities; off-road equipment, material delivery, and worker commute exhaust emissions; vehicle travel on unpaved roads, and other miscellaneous activities.

On-site construction equipment would likely include an excavator, front-end loader, bulldozer, forklift, vibratory roller, dump truck, and water truck. A crane and piledriver may also be used during construction activities. Water-based equipment may include small barges, and hydraulic or bucket dredges. For the purposes of this impact analysis, any of the construction equipment may be operated simultaneously. In addition, truck trips associated with the hauling of imported fill, equipment, and material and worker trips would occur. As discussed in Section 3.12, Traffic, and Section 3.13, Noise, as much as 15 million cy of fill may be imported to the site for grading activities over the 50-year planning horizon. The material may be brought to the Project site by trucks and/or barges. This analysis assumes the fill would be transported by trucks only (with storage capacity of 20 cy per truck). Approximately 750,000 two-way truck trips would be generated overall, or approximately 136 one-way truck trips per day (if they are spread out evenly on working days over the 50-year planning horizon). The actual number of daily, one-way, construction-related truck trips delivering fill could be more or less than 136 depending on whether portions of the fill would be delivered by barge and the actual number of days such deliveries would occur. Realistically, the delivery of fill would be spread out both geographically and over time. The phasing of projects and actual amount of imported fill required at each phase have not yet been determined and will be subject to subsequent environmental review that will be required for each phase of restoration.

[2] Because $PM_{2.5}$ is a subset of PM_{10}, the evaluation of short-term construction-generated PM_{10} would be similar for $PM_{2.5}$.
[3] Land-based equipment would likely be used for pond perimeter construction near levees and berms. Floating equipment would likely be used for pond interior construction.

According to BAAQMD, PM_{10} is the pollutant of greatest concern with respect to construction-generated emissions. While construction activities including operation of off-road equipment, material delivery, and worker commute would result in CO and ozone precursor emissions (*e.g.*, ROG and NO_x), these are included in the emissions inventory, which serves as the basis for regional air quality plans, and thus they are not expected to impede attainment of ozone or maintenance of CO standards in the SFBAAB. This is why BAAQMD has no mass emission thresholds for construction emissions of ROG and NO_x and bases its determination of significance for construction emissions on consideration of the dust control measures to be implemented (BAAQMD 1999).

Consequently, BAAQMD's approach to CEQA analyses of construction-generated fugitive PM_{10} dust emissions is to require implementation of effective and comprehensive control measures rather than a detailed quantification of construction emissions. BAAQMD requires that all feasible control measures, which are dependent on the size of the construction area and the nature of the construction activities involved, shall be incorporated into Project design or implemented during Project construction. Consequently, because BAAQMD's required control measures are not currently incorporated into the Project, construction-generated emissions would contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations including fugitive dust (sensitive receptors are located 300 to 600 ft (91 to 183 m) away from the edge of pond complexes). As a result, this impact would be potentially significant.

SBSP Mitigation Measure 3.14-1: Short-Term Construction-Generated Emissions.

The following Basic Control Measures shall be implemented at all construction sites within the Project Area, regardless of size:

- Water all active construction areas at least twice daily, and more often during times of high wind;
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 ft (0.6 m) 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; and
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

The following Enhanced Measures shall be implemented at construction sites larger than four acres:

- 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 (*e.g.,* dirt, sand);
- To the extent practicable, 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; and
- Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.

These additional "Optional Measures" shall be implemented if further emission reductions are deemed necessary by USFWS, CDFG, or BAAQMD:

- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph; and
- Limit the area subject to excavation, grading and other construction activity at any one time.

According to BAAQMD, if the required mitigation measures are implemented during project construction, short-term generated emissions would be reduced to a less-than-significant level.

Alternative B Level of Significance: Less than Significant with Mitigation

Alternative C Tidal Habitat Emphasis. Alternative C would result in similar construction activities as those described under Alternative B, and as such, would generate the same type of air pollutants emissions. Impacts would be potentially significant and SBSP Mitigation Measure 3.14-1, above, would be required to reduce impacts to a less-than-significant level.

Alternative C Level of Significance: Less than Significant with Mitigation

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SBSP Impact 3.14-2: **Potential long-term operational air pollutant emissions.**

Alternative A No Action. Under this alternative, limited O&M activities, such as levee repair and replacement of water control structures, would occur; these activities would occur intermittently over the 50-year planning period. The nearest sensitive receptors would be approximately 1,000 ft (305 m) east of Pond A8 (see Table 3.13-4, column 2 in Section 3.13, Noise). O&M activities would generate fugitive dust and other air emissions associated with the use of vehicles and other equipment. However, due to the limited extent and temporary nature of O&M activities, potential effects associated with the long-term operational emissions would be less than significant.

Alternative A Level of Significance: Less than Significant

Alternative B Managed Pond Emphasis. As described in Section 3.12, Traffic, the long-term operation of the Alternative B is assumed to require approximately one maintenance staff person that would travel to the pond complexes for maintenance activities on a weekly basis (one or two times per week), as well as consultants/staff who would travel to the site for Adaptive Management Plan monitoring activities. The number of trips associated with Adaptive Management Plan monitoring activities have not yet been determined, and would likely depend on the season. The addition of O&M and Adaptive Management Plan monitoring vehicle trips would result in a less-than-significant increase in long-term traffic (see

Section 3.12, Traffic) and as such would not be expected to result in an increase in regional ROG, NO_x, and PM_{10} above BAAQMD-recommended thresholds nor contribute substantially to local CO emissions concentrations.

As described in Section 3.13, Noise, long-term operation of Alternative B would also require the use of portable pumps that may be employed at any of the water control structure locations. The portable pump would be diesel and have a capacity of 20,000 gpm. The frequency of use of the portable pump has not yet been determined, but may be operated continuously for periods of one to two days several times per year. The pump is assumed to be located anywhere within the pond complexes. According to BAAQMD, stationary sources of air-pollutant emissions that comply with applicable regulations pertaining to BACT and offset requirements are not considered to have significant air quality impacts (BAAQMD 1999). BAAQMD does not require the inclusion of such emissions in CEQA analyses unless the operation of a stationary source results in surplus emissions in excess of BACT and offsets (BAAQMD 1999). The portable pump proposed for use under Alternative B would be subject to BAAQMD permitting and BACT requirements; the portable pumps are not anticipated to result in surplus emissions in excess of BACT requirements. As such, potential impacts would be less than significant.

As described in Section 3.12, Traffic, implementation of this alternative would also result in an increase in overall vehicle miles traveled (VMT) associated with the expected increase in vehicle trips by visitors of the new recreational facilities in the pond complexes. The increase would likely rise gradually over the 50-year planning horizon as new recreational facilities are built. Increased use of these facilities resulting from natural growth in the South Bay over the next 50 years is not directly attributable to the SBSP Restoration Project, although it needs to be acknowledged. Depending on the increase in VMT, operation of Alternative B has the potential to result in a significant increase in long-term regional ROG, NO_x, and PM_{10} above BAAQMD-recommended thresholds or contribute substantially to local CO emissions concentrations associated with increases in mobile sources. The anticipated VMT cannot be determined at this time; however, long-term operational emissions are not expected to be substantial, as traffic volume increases are not expected to result in a significant impact (see Section 3.12, Traffic) and given that the proposed recreational facilities would encourage alternative transportation and attract use by existing recreation users (bicyclists, walkers, human-powered boaters). As such, potential impacts associated with long-term operational emissions would be less than significant.

Long-term operational emissions associated with O&M activities (vehicular traffic associated with inspection of the pond complexes), Adaptive Management Plan monitoring, operation of the pumps, and increased VMT would not result in any long-term operational emissions. Subsequent phases of the SBSP Restoration Project would require additional environmental review to confirm that potential effects associated with the increases in long-term regional ROG, NO_x, PM_{10}, and CO would be less than significant.

Alternative B Level of Significance: Less than Significant

Alternative C Tidal Habitat Emphasis. Alternative C would result in similar operational vehicular traffic, including daily inspections, Adaptive Management Plan monitoring, and an undetermined number of visitors to the pond complexes' new recreational facilities. In addition, Alternative C would require operation of portable diesel-powered pumps. The conclusions of Alternative B above would also apply to Alternative C due to the similarity in operation of the two alternatives. Potential impacts would be less than significant.

Alternative C Level of Significance: Less than Significant

SBSP Impact 3.14-3: **Potential exposure of sensitive receptors to TAC emissions.**

Alternative A No Action. Under this alternative, no construction activities would occur within the pond complexes. O&M activities would require the use of diesel-powered equipment and vehicles that have the potential to generate TAC emissions. However, the use of this equipment would be limited in extent and occur intermittently over the 50-year planning period. As such, the potential for exposure of sensitive receptors to TAC emissions from use of equipment would be less than significant.

Alternative A Level of Significance: Less than Significant

Alternative B Managed Pond Emphasis. *Short-Term Construction Equipment.* Construction activities associated with Alternative B would result in short-term diesel exhaust emissions from on-site heavy duty equipment. Diesel PM were identified as a TAC by CARB in 1998. Construction of this alternative would result in the generation of diesel PM emissions from the use of off-road diesel-powered equipment required for site excavation and other construction activities. According to CARB, the potential cancer risk from the inhalation of diesel PM, as discussed below, outweighs the potential non-cancer health impacts (CARB 2003).

Construction equipment emissions will be reduced over the period of Project development. In January 2001, USEPA promulgated a Final Rule to reduce emission standards for 2007 and subsequent model year heavy-duty diesel engines. These emission standards represent a 90 percent reduction in NO_x, a 72 percent reduction of non-methane hydrocarbon (NMHC) emissions, and a 90 percent reduction of PM emissions in comparison to the 2004 model year emission standards. In December 2004, CARB adopted a fourth phase of emission standards (Tier 4) in the Clean Air Non-road Diesel Rule that are nearly identical to those finalized by USEPA on May 11, 2004. As such, engine manufacturers are now required to meet after treatment-based exhaust standards NO_x and PM starting in 2011 that are over 90 percent lower than current levels, putting emissions from off-road engines virtually on par with those from on-road heavy-duty diesel engines.

More specifically, the dose to which receptors are exposed is the primary factor used to determine health risk (*i.e.*, potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the MEI. Thus, the risks estimated for a MEI are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the Project (Salinas, pers. comm., 2004).

Because the use of off-road construction equipment would be temporary in combination with the highly dispersive properties of diesel PM (Zhu and Hinds 2002), future reductions in exhaust emissions, and construction-related activities would not be typical in comparison to similar development-type projects (*i.e.*, no excessive material transport or associated truck travel would be expected during each phase of construction), short-term construction activities are not expected to expose sensitive receptors to substantial TAC emissions given the distances of most sensitive receptors. However, due to the proximity of some of the sensitive receptors, as close as approximately 300 ft (91 m) north of Pond E6A, potentially significant impacts may occur, resulting in the need for implementation of SBSP Mitigation Measure 3.14-3a below for all construction activities that are within 500 ft (152 m) of sensitive receptors.

In addition to TAC generated from diesel PM, soil disturbance during construction activities (including mass grading and excavation) may result in airborne entrainment of contaminants (*e.g.*, mercury) in fugitive dust. The entrainment of mercury has the potential to expose workers and nearby sensitive receptors to health hazards, although the concentrations of these contaminants in fugitive dust emissions are not anticipated to reach levels that may present significant risks. This would be a potentially significant effect. Implementation of dust control BMPs described above (SBSP Mitigation Measure 3.14-1) and implementation of air quality monitoring (SBSP Mitigation Measure 3.14-3b) would ensure and confirm that fugitive dust would not present unacceptable health risks to workers and nearby residents. Implementation of these measures would reduce the exposure potential for workers and nearby residents to TACs to a less-than-significant level.

Stationary Sources. Construction of Alternative B would not result in the operation of any major stationary sources of TAC emissions; however, minor sources associated with long-term operation of the proposed portable pumps would occur. These types of stationary sources would be subject to BAAQMD rules and regulations, including BAAQMD rules on General Permit Requirements, New Source Review, Air Toxics Control Measures, and Federal Operating Permit Program, and T-BACT requirements. BAAQMD would analyze such sources (*e.g.*, health risk assessment) based on their potential to emit TACs. If it is determined that the sources would emit TACs in excess of BAAQMD's applicable threshold of significance, T-BACT would be implemented to reduce emissions. If the implementation of T-BACT would not reduce the risk below the applicable threshold, BAAQMD would deny the required permit. As a result, given compliance with applicable rules and regulations, operation of the proposed pumps would not result in the exposure of sensitive receptors to TACs at levels exceeding BAAQMD's significance threshold. This would be a less-than-significant impact.

SBSP Mitigation Measure 3.14-3a: TAC emissions from construction within 500 ft (152 m) of sensitive receptors will require the following:

- Pursuant to BAAQMD Rule 6, the Project shall ensure that emissions from all off-road diesel-powered equipment used on the Project site do not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately, and USFWS, CDFG, and BAAQMD shall be notified within 48 hours of identification of noncompliant equipment. A visual survey of all in-operation equipment shall be made at least weekly, and a monthly summary of the visual survey results shall be submitted throughout the duration of the Project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey. BAAQMD and/or other officials may conduct periodic site inspections to determine compliance.

- USFWS and CDFG shall provide a plan for approval by BAAQMD demonstrating that the heavy-duty (more than 50 horsepower) off-road vehicles to be used in the construction Project, including owned, leased, and subcontractor vehicles, would achieve a Project-wide fleet average 45 percent particulate reduction compared to the most recent CARB fleet average. Acceptable options for reducing emissions may include use of late-model engines, low-emission diesel products, alternative fuels (*e.g.*, Lubrizol, Puri NO_x, biodiesel fuel) in all heavy duty off-road equipment.
- USFWS and CDFG shall require in construction plans and specifications that the model year of all off-road construction moving equipment shall not be older than 1996.
- USFWS and CDFG shall require in construction plans and specifications a provision that prohibits contractors from operating pre-1996 heavy-duty diesel equipment on forecast Spare-the-Air Days or on days when air quality advisories are issued because of special circumstances (*e.g.*, wildfires, industrial fires).
- USFWS and CDFG shall minimize idling time to 10 minutes for all heavy-duty equipment when not engaged in work activities, including on-road haul trucks while being loaded or unloaded on-site.
- Staging areas and equipment maintenance activities shall be located as far from sensitive receptors as possible.

In addition, where feasible and applicable, USFWS and CDFG shall do the following:

- Establish an activity schedule designed to minimize traffic congestion around the construction site.
- Periodically inspect construction sites to ensure construction equipment is properly maintained at all times.
- Require the use of low sulfur fuel (diesel with 15 parts per million or less).
- Utilize EPA-registered particulate traps and other appropriate controls to reduce emissions of diesel particulate matter and other pollutants at the construction site.

SBSP Mitigation Measure 3.14-3b: Health and Safety Plan.

The landowners and/or its contractors shall prepare a Health and Safety Plan that includes Project-specific monitoring procedures and action levels for dust. The portion of the plan that relates to the control of toxic contaminants contained in fugitive dust shall be prepared in coordination with BAAQMD. The recommendations of BAAQMD to prevent the exposure of sensitive receptors to levels above applicable thresholds (probability of contracting cancer for MEI that exceeds 10 in one million or if ground level concentrations of non-carcinogenic contaminants result in hazard index greater than one for the MEI) shall be implemented. The Health and Safety Plan, applicable to all excavation activities, shall establish policies and procedures to protect workers and the public from potential hazards posed by hazardous materials (including notification procedures to nearby sensitive receptors within 1,000 ft informing them of construction activities that may generate dust containing toxic contaminants). The plan shall be prepared according to federal and California OSHA regulations. The landowners and/or its contractors shall maintain a copy of the Plan on-site during construction activities.

Alternative B Level of Significance: Less than Significant with Mitigation

Alternative C Tidal Habitat Emphasis. Construction and operation of Alternative C would be similar to that described for Alternative B. Based on the above analysis, short-term construction activities or long-term temporary operation of the pumps would not expose sensitive receptors to substantial TAC emissions and impacts would be less than significant with implementation of SBSP Mitigation Measures 3.14-4a and 3.14-3b.

Alternative C Level of Significance: Less than Significant with Mitigation

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SBSP Impact 3.14-4: **Potential odor emissions.**

Odor in the existing ponds can occur in two ways. First, algae and other biomass that naturally grow in the ponds can accumulate in certain areas of the ponds. As the algae naturally decompose, hydrogen sulfide gas can be produced, generating odors. Warm weather and little wind, similar to the Bay Area indian summer condition, can accelerate the decomposition in the ponds and aggravate the odor condition. Second, odors can develop as the ponds dry and the mud bottoms are exposed to air, especially in hot weather. These odors are caused by the exposure of algae or brine shrimp.

The occurrence of the odor depends to a large part on the number of degree-cooling days that occur in summer months. The potential for odor impacts is also dependant on prevailing winds and the proximity and location of downwind receptors. Although offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies.

Alternative A No Action. Under this alternative, no restoration activities would occur and O&M activities would be limited (associated with levee improvements or replacement of water control structures). Alternative A would be a continuation of existing conditions – that is, continued operations of the ponds (unplanned tidal breaching, flooding, and conversion of managed ponds to seasonal ponds would be expected). Unmanaged wetting and drying cycles as the ponds accumulate rainwater and dry through natural evaporation may result in exposure of biomass produced while the pond contained water, which would subsequently generate odors. As such, the potential for odors is expected to continue with this alternative, but it would be less than significant since odor effects would not be substantially different from existing conditions.

Alternative A Level of Significance: Less than Significant

Alternative B Managed Pond Emphasis. Construction of the SBSP Restoration Project would result in odorous diesel emissions from the exhaust of on-site equipment. Such emissions would be intermittent and would dissipate rapidly from the source. In addition, mobile diesel-powered equipment would only be present on site temporarily during construction activities. As such, construction of the SBSP Restoration Project would not create objectionable odors affecting a substantial number or people. This impact would be less than significant.

Alternative B would involve the excavation, stockpiling, and drying of fill. In addition, the Project would use dredged material to raise the elevation on some ponds (for the nesting islands). The placement of dredged material has the potential to create unpleasant odors due to the presence of decaying organic material in the mud. The odor is not expected to differ substantially from a low tide event in the area which also exposes sediments containing decaying organic material. Although odors could affect downwind sensitive receptors, the duration would be temporary (lasting the duration of construction activities or until the soils are dried).

Alternative B would result in an equal ratio of managed (reconfigured) ponds to tidal habitat. As ponds are reconfigured, they would be more intensively managed than those under Alternative A. This management would include increasing circulation of flows within the ponds throughout the seasons, such that stagnation and drying of the ponds would not occur and the potential for odors would be expected to decrease over time. As other portions of the pond complexes are establish with vegetation during the tidal habitat restoration process, the net air quality is expected to improve. Typically, in tidal habitats, odors occur during regular low tide events; such odors would be localized and are not expected to be carried downwind of the local area.

The potential odor impacts associated with the construction and operation of this alternative (exposure of sensitive receptors to odor emissions) would be better than Alternative A and would be less than significant.

Alternative B Level of Significance: Less than Significant

Alternative C Tidal Habitat Emphasis. Alternative C is similar to Alternative B in terms of odor effects. The difference is that Alternative C would have a greater ratio of tidal habitat to managed ponds. As discussed above, as the pond complexes are established with vegetation during the tidal habitat restoration process, the net air quality is expected to improve and localized odors would be expected during low tide events. Impacts associated with odors would be less than significant.

Alternative C Level of Significance: Less than Significant

Project-Level Evaluation

Overview

As described in Section 3.14.2, Regulatory Setting, the applicability of Phase 1 actions to conformity was evaluated for the Phase 1 actions. This applicability was conducted for the first phase of the SBSP Restoration Project rather than the long-term alternatives (Alternative B or C) because sufficient information has been developed for modeling the expected emissions generated from Phase 1 actions. General conformity applicability analyses for subsequent phases would be conducted when specific details of each phase are developed, and would be included with the subsequent environmental document prepared for each phase.

The General Conformity Rule, which addresses whether a project conforms to the SIP approved and promulgated under Section 110 of the CAA, applies to federal actions that would generate emissions of criteria air pollutant or precursor emissions in nonattainment or maintenance areas. As shown in Table 3.14-3, the SFBAAB is currently designated as a marginal nonattainment area with respect to the national 8-hour ozone standard. In addition, portions of the SFBAAB are designated as maintenance areas for the national CO standard. General conformity requirements would not apply to actions where the total project-generated direct or indirect emissions would not be equal to or exceed the applicable emissions levels, known as the *de minimis* thresholds, and would be less than 10 percent of the area's annual emissions budget, known as regionally significant thresholds. The *de minimis* thresholds applicable to the SFBAAB are 100 tpy for volatile organic gases (*e.g.*, ROGs), NO_x, and CO (Tholen, pers. comm., 2007).

Phase 1 No Action

The Phase 1 No Action would not require construction activities within the ponds. As such, the Phase 1 No Action would not result in any construction-generated emissions of ROG, NO_x, or CO.

With respect to long-term operational emissions of ROG, NO_x, and CO, the Phase 1 No Action would involve limited O&M activities including the replacement and/or repairs of water control structures, and limited maintenance of existing levees. Certain O&M activities would require the use of piledrivers. O&M activities would occur periodically. As shown in Table 3.14-5, long-term annual operational emissions of ROG, NO_x, and CO would not exceed the applicable *de minimis* or regionally significant thresholds. Refer to Table 3.14-5 and Appendix N for modeling input assumptions and output results.

Phase 1 Actions

As discussed above, implementation of Phase 1 actions at all the pond complexes in the SBSP Restoration Project Area would involve modification of levees (breaching and lowering), excavation of pilot channels, construction/installation of water control structures, creation of nesting islands, and construction of recreational facilities (trails, interpretative stations, viewing platforms, staging areas, and amenities). Construction activities at each pond, or set of ponds, would last up to five months. No fill material would be imported onsite.

Table 3.14-5 Summary of Modeled Project-Generated Annual Emissions

	ROG (TPY)	NO_X (TPY)	CO (TPY)
2007 (Phase 1 No Action-Operational Activities)			
O&M Activity-Related Exhaust[1]	0.03	0.21	0.15
Total	0.03	0.21	0.15
De Minimis Threshold	100	100	100
Regionally Significant Threshold[2]	14,111	19,962	80,764
2008 (Phase 1 Actions-Construction Activities)			
On-Site Heavy-Duty Construction Equipment Exhaust[3]	4.22	42.88	17.09
Worker Commute Vehicle Exhaust[4]	0.08	0.09	1.12
Material Transport Vehicle Exhaust[5]	0.00	0.05	0.02
Total	4.30	43.02	18.23
De Minimis Threshold	100	100	100
Regionally Significant Threshold[2]	14,111	19,962	80,764
2009 (Phase 1 Actions-Construction Activities)			
On-Site Heavy-Duty Construction Equipment Exhaust[3]	3.99	40.66	16.04
Worker Commute Vehicle Exhaust[4]	0.08	0.09	1.12
Material Transport Vehicle Exhaust[5]	0.0	0.05	0.01
Total	4.07	40.80	17.17
De Minimis Threshold	100	100	100
Regionally Significant Threshold[2]	14,111	19,962	80,764
2010 (Phase 1 Actions-Operational Activities)			
O&M Activity-Related Exhaust[6]	0.00	0.00	0.02
Refuge and CDFG Staff Activity-Related Exhaust[7]	0.21	1.93	0.97
Adaptive Management Plan Activity-Related Exhaust[8]	0.01	0.01	0.09
Pump Activity-Related Exhaust[9]	0.03	0.17	0.10
Total	0.25	2.11	1.18
***De Minimis* Threshold**	**100**	**100**	**100**
Regionally Significant Threshold[2]	**14,111**	**19,962**	**80,764**

Notes:

1 Modeled using Emfac2007 V 2.3 and OFFROAD2007 emission factors as contained in Urbemis V 9.2.2 assuming the operation of one 53 horsepower piece of equipment (*i.e.*, pile driver) 8 hrs/day everyday for 5 months and 208 one-way vehicle trips/year (104 round trips/year) for inspection activities of 15 miles in length (3,120 vehicle miles traveled/year which averages out as 8.55 vehicle miles traveled/day).

2 As shown in Table 3.14-1, the 2005 emissions inventory for the SFBAAB reports 386.6, 546.9, and 2212.7 tons/day for ROG, NOx, and CO, respectively. This is equivalent to 141,109, 199,618.5, and 807,635.5 tons/year. The regionally significant

Table 3.14-5 Summary of Modeled Project-Generated Annual Emissions

threshold constitutes 10 percent of SFBAAB's yearly emissions inventory.

3 Modeled using OFFROAD2007 emission factors as contained in Urbemis V 9.2.2 assuming the operation of 3 cranes, 3 excavators, 3 forklifts, 9 diesel engines (barges and generators), 3 off-highway trucks, 3 other equipment, 3 other general industrial equipment, 3 compactors, 3 pumps, 3 rollers, 3 dozers, 6 loaders/backhoes, and 3 water trucks 12 hours/day for 110 days/year (22 working days/month for 5 months).

4 Modeled using Emfac2007 V 2.3 emission factors as contained in Urbemis V 9.2.2 assuming 3 crews of 10 employees each (30 total) traveling 2.5 trips/day for 110 days/year (22 working days/month for 5 months) (8,250 yearly trips) of 20 miles in length (165,000 total vehicles miles traveled/year which averages out as 452 vehicles miles travel/day).

5 Modeled using Emfac2007 V 2.3 emission factors as contained in Urbemis V 9.2.2 assuming 75 round trips/construction period of 110 days (22 working days/month for 5 months) of 40 miles in length (3,000 total vehicle miles traveled/construction period which averages out as 27.3 miles/day.

6 Modeled using Emfac2007 V 2.3 emission factors as contained in Urbemis V 9.2.2 assuming 208 one-way vehicle trips/year (104 round trips/year) for inspection activities of 15 miles in length (3,120 vehicle miles traveled/year which averages out as 8.55 vehicle miles traveled/day).

7 Modeled using OFFROAD2007 emission factors as contained in Urbemis V 9.2.2 assuming the operation of three pieces of equipment with the worst-case horsepower (*i.e.*, 1 dozer, 1 off-highway truck, and 1 other general industrial equipment 8 hours/day for 110 days/year (22 working days/month for 5 months).

8 Modeled using Emfac2007 V 2.3 emission factors as contained in Urbemis V 9.2.2 assuming 3 employees traveling 2 trips/day for 48 days/year (3 days/week for 4 months) (288 yearly trips) of 55 miles in length (15,840 total vehicles miles traveled/year which averages out as 43.4 vehicles miles travel/day).

9 Modeled using OFFROAD2007 emission factors as contained in Urbemis V 9.2.2 assuming the operation of 3 pumps 10 days/year, 24 hours/day.

Refer to Appendix N for modeling input assumptions and output results.

Source: Data Modeled by EDAW in 2007

With respect to long-term operations, O&M activities for the Phase 1 actions would be performed periodically for the reconfigured managed pond restorations, and less frequently for the tidal habitat restorations. Activities within the reconfigured managed ponds include: periodic inspection and maintenance of restoration infrastructure (*e.g.*, water control structures, managed pond levees and berms, canals, and islands), and habitat conditions (*e.g.*, water levels and quality). Activities within tidal habitat areas include: periodic inspection and maintenance of restoration features (*e.g.*, ditch blocks) and non-native Spartina growth. Long-term operation of Phase 1 actions would involve periodic maintenance activities that are assumed to require approximately one maintenance staff person who would travel to the pond complexes one or two times per week.

Refuge and CDFG staff would use trucks to access the Phase 1 action restoration sites via existing maintenance roads on the levees to perform O&M activities. Boats may be used to access the canals, water control structures, and nesting islands in the reconfigured managed ponds and tidal habitat restoration features. Maintenance may require the use of land-based and/or water-based construction equipment.

Operation of Phase 1 actions would include the Adaptive Management Plan monitoring activities, which would require additional workers (*e.g.*, staff, consultants) to access the site for monitoring activities. The frequency of traffic trips assessing the site would depend on the monitoring activities involved, and would vary by season (*e.g.*, during the bird breeding season there may be more trips to the site than during the non-breeding season).

Phase 1 actions may also require the operation of portable diesel pumps anywhere within the pond complex and electric pumps at specific locations within specific ponds. The portable pumps would be diesel and have a capacity of 20,000 gpm. The frequency of use of the portable pumps has not yet been determined, but may be operated continuously for periods of one to two days several times per year.

The number of new users accessing the site via passenger vehicles is not known; however, according to Section 12, Traffic, implementation of the Project would not result in a substantial increase in recreation traffic for Phase 1.

As shown in Table 3.14-5, neither construction-generated nor long-term annual operational emissions of ROG, NO_x, and CO would exceed the applicable *de minimis* or regionally significant thresholds. Therefore, the Phase 1 actions would conform to the applicable air quality standards.

Please refer to Table 3.14-5 and Appendix N for modeling input assumptions and output results.

Phase 1 Impact 3.14-1: **Short-term construction-generated air pollutant emissions.**

Phase 1 No Action

The following discussion addresses the No Action Alternative (Alternative A) at the project level.

As discussed in Alternative A for SBSP Impact 3.14-1 above, the Phase 1 No Action would not require construction activities within the ponds. As such, no impacts would occur. Long-term operational air-quality effects are evaluated in SBSP Impact 3.14-2 below.

Phase 1 No Action Level of Significance: No Impact

Phase 1 Actions

The following discussion addresses the Phase 1 actions (the first phase of Alternatives B and C) at the project level.

Implementation of Phase 1 actions at all the pond complexes would involve modification of levees (breaching and lowering), excavation of pilot channels, construction/installation of water control structures, creation of nesting islands, and construction of recreational facilities (trails, interpretative stations, viewing platforms, staging areas, and amenities). Construction activities at each pond, or set of ponds, would last from two to five months. No fill material would be imported onsite.

As described in SBSP Impact 3.14-1, earthmoving activities would result in temporary construction emissions that have the potential to represent a significant impact with respect to air quality. Emissions would be localized in the area where construction activities would occur, and are not expected to expose sensitive receptors to substantial pollutant concentrations due to the distance from sensitive receptors (sensitive receptors would be located 500 ft to 13,000 ft [152 to 3,962 m] from the construction work sites). However, because BAAQMD's-required control measures are not currently incorporated into the Project, construction-generated emissions may violate an air quality standard or contribute substantially to an existing or projected air quality violation. As a result, this impact would be potentially significant. Implementation of SBSP Mitigation 3.14-1 would reduce potential air quality impacts associated with short-term construction-generation emissions to less-than-significant levels.

As shown in Table 3.14-5 above, construction-generated annual operational emissions of ROG, NO_x, and CO would not exceed the applicable *de minimis* or regionally significant thresholds. Please refer to Table 3.14-5 and Appendix N for modeling input assumptions and output results. As a result, this impact would be less than significant.

Phase 1 Actions Level of Significance: Less than Significant with Mitigation

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Phase 1 Impact 3.14-2: **Potential long-term operational air pollutant emissions.**

The use of the portable diesel-powered pump at all Phase 1 action sites is described under SBSP Impact 3.14-2 above. This discussion focuses on the long-term use of the electric pumps.

Phase 1 No Action

The following discussion addresses the No Action Alternative (Alternative A) at the project level.

Phase 1 No Action would require limited O&M activities, which would generate dust and other emissions associated with use of vehicles and other equipment. However, due to the limited extent and temporary nature of O&M activities, potential effects associated with long-term operational emissions would be less than significant.

As shown in Table 3.14-5, long-term annual operational emissions of ROG, NO_x, and CO would not exceed the applicable *de minimis* or regionally significant thresholds. Refer to Table 3.14-5 and Appendix N for modeling input assumptions and output results. As a result, this impact would be less than significant.

Phase 1 No Action Level of Significance: Less than Significant

Phase 1 Actions

The following discussion addresses the Phase 1 actions (the first phase of Alternatives B and C) at the project level. As shown in Table 3.14-5 above, long-term annual operational emissions of ROG, NO_x, and CO would not exceed the applicable *de minimis* or regionally significant thresholds. Refer to Table 3.14-5 and Appendix N for modeling input assumptions and output results. As a result, this impact would be less than significant.

Eden Landing. Operation of Ponds E8A, E9, and E8X as part of Phase 1 actions would not require the use of any pumps. The long-term operation of Ponds E12, and E13 would require the operation of an existing 10,000 gpm, electric pump. This pump is currently exercised once or twice per month for two hours at a time but would operate more frequently during the O&M phase and would be used to pump water, for a total cumulative duration of up to approximately 40 days per year (would vary by season). Because electrical generating facilities are permitted sources, pollutants emissions resulting from energy use would not be included in this assessment (BAAQMD 1999). Thus, long-term operational emissions would not violate air quality standards, contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with or obstruct implementation of the applicable air quality plan. No impact would result from the operation of the electric pumps. However, operation of the portable pumps would result in less-than-significant impacts as described in SBSP Impact 3.14-2.

Alviso. Operation of Ponds A6, A8, and A16 as part of the Phase 1 actions would not require the use of any electric pumps. As such, no impact would result from operation of the electric pumps. However, operation of the portable pumps (for Pond A16 only) would result in less-than-significant impacts as described in SBSP Impact 3.14-2.

Ravenswood. Operation of Pond SF2 as part of the Phase 1 actions would require the operation of new electric pumps with a combined capacity of 60,000 gpm. Operation of the pumps may occur continuously for week-long periods. Similar to the discussions above, the operation of electric pumps would not violate air quality standards, contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with or obstruct implementation of the applicable air quality plan. As a result, no impact would result from operation of the electric pumps. However, operation of the portable pumps would result in less-than-significant impacts as described in SBSP Impact 3.14-2.

Phase 1 Actions Level of Significance: Less than Significant

Phase 1 Impact 3.14-3: **Potential exposure of sensitive receptors to TAC emissions.**

Phase 1 No Action

The following discussion addresses the No Action Alternative (Alternative A) at the project level.

The Phase 1 No Action would not require construction activities within the ponds. O&M activities would require the use of diesel-powered equipment and vehicles that have the potential to generate TAC emissions. However, the use of this equipment would be limited in extent and occur intermittently over the 50-year planning horizon. As such, the potential for exposure of sensitive receptors to TAC emissions from use of diesel-powered equipment and vehicles would be less than significant.

Phase 1 No Action Level of Significance: Less than Significant

Phase 1 Actions

The following discussion addresses the Phase 1 actions (the first phase of Alternatives B and C) at the project level.

Eden Landing. Phase 1 construction within the Eden Landing pond complex would result in short-term diesel exhaust emissions from on-site heavy duty equipment. A discussion of TAC emissions is presented in SBSP Impact 3.14-3 above. Although construction impacts related to TAC emissions would be similar, the distance from sensitive receptors is different and the length of construction activities is known (temporary). Sensitive receptors are located approximately 4,000 to 6,000 ft (1,219 to 1,829 m) from Ponds E8X and E13. Because of the distance of the sensitive receptors, the highly dispersive properties of diesel PM (Zhu and Hinds 2002), the temporary use of off-road construction equipment (up to five months), and further reductions in exhaust emissions, short-term construction activities would not expose sensitive receptors to substantial TAC emissions. As such, impacts would be less than significant.

As discussed in SBSP Impact 3.14-3 above, soil disturbance during construction activities (including mass grading and excavation) would result in airborne entrainment of toxic contaminants (*i.e.*, mercury) in fugitive dust, and as such may expose workers and nearby sensitive receptors to potentially toxic air emissions, although the concentrations of these contaminants in fugitive dust emissions are not anticipated to reach levels that may present significant risks. Implementation of SBSP Mitigation Measures 3.14-1 and 3.14-3b would be necessary to reduce the potential for workers and nearby residents to be exposed to airborne TAC to a less-than-significant level.

Alviso. Phase 1 construction within the Alviso pond complex would result in similar short-term diesel exhaust emissions as described above for the Eden Landing pond complex. Sensitive receptors, however, are located approximately 600 ft (183 m) east of Pond A8, 2,000 ft (610 m) south of Pond A16, and 13,000 ft (approximately 3,962 m) southeast of Pond A6. Because of the distance of the sensitive receptors, the highly dispersive properties of diesel PM (Zhu and Hinds 2002), the temporary use of off-road construction equipment (up to five months), and further reductions in exhaust emissions, short-term construction activities would not expose sensitive receptors to substantial TAC emissions. As such, impacts would be less than significant.

Potential effects associated with exposure of airborne entrainment of toxic contaminants would be the same as those described in SBSP Impact 3.14-3 above.

Ravenswood. Phase 1 construction within the Ravenswood pond complex would result in short-term diesel exhaust emissions as described above for the Eden Landing and Alviso pond complexes. Sensitive receptors are located approximately 500 south of Pond SF2. Because of the distance of the sensitive receptors, the highly dispersive properties of diesel PM (Zhu and Hinds 2002), the temporary use of off-road construction equipment (up to five months), and further reductions in exhaust emissions, short-term construction activities would not expose sensitive receptors to substantial TAC emissions. As such, impacts would be less than significant.

Potential effects associated with exposure of airborne entrainment of toxic contaminants would be the same as those described in SBSP Impact 3.14-3 above.

Phase 1 Actions Level of Significance: Less than Significant with Mitigation

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Phase 1 Impact 3.14-4: **Potential odor emissions.**

Phase 1 No Action

The following discussion addresses the No Action Alternative (Alternative A) at the project level.

As discussed in Alternative A for SBSP Impact 3.14-4 above, the potential for odors is expected to continue under the No Action Alternative due to exposure of biomass from the unmanaged wetting and drying cycles within the ponds. Therefore, this impact would be less than significant under Phase 1 No Action since odor effects would not be substantially different from existing conditions.

Phase 1 No Action Level of Significance: Less than Significant

Phase 1 Actions

The following discussion addresses the Phase 1 actions (the first phase of Alternatives B and C) at the project level.

Eden Landing. Odor effects at the Eden Landing pond complex from implementation of Phase 1 actions would be similar to those described in SBSP Impact 3.14-4 for Alternative B, associated with the use of onsite equipment, the drying of dredged fill material (during excavation and stockpiling), and operation of reconfigured ponds and tidal habitat. Construction activities would last three to five months at Ponds E8A/E8X/E9 and E12/E13, and unpleasant odors from these activities (including dredging), although anticipated to be localized, may affect downwind sensitive receptors during the construction period. The odor would be similar to that which occurs during a low tide event in an area which also exposes sediments containing decaying organic material.

Phase 1 actions at the Eden Landing pond complex would include reconfigured ponds with islands, shallow habitat, as well as tidal habitat. The nesting islands in Ponds E12 and E13 would require the use of dredged fill material that would be exposed to the air. As discussed in SBSP Impact 3.14-4, as the fill is dried and/or vegetation is established on the nesting island, the nuisance odor would dissipate. In addition, the reconfigured ponds would be managed in a way that would be expected to decrease odor events (through increased circulation and reduction of drying). Tidal habitat would also result in limited, localized odors that would unlikely be carried, downwind to sensitive receptors (the nearest located approximately 4,000 ft (1,219 m) east of Pond E8).

Due to the short-term nature of nuisance odor associated with construction activities, the management of reconfigured ponds, and the limited odor effects from tidal habitat, potential impacts (expose sensitive receptors to odor emissions) would be less than significant.

Alviso. Odor effects at the Alviso pond complex from implementation of Phase 1 actions would be similar to those described for Eden Landing. Phase 1 actions at this pond complex would also include reconfigured ponds with islands and restored tidal habitat. Odors would be generated from the use of onsite equipment and the drying of excavated material. Construction activities would last approximately two to four months at Ponds A6 and A8, and three to five months at Pond A16.

Similar to the discussion for Eden Landing Phase 1 actions described above, potential impacts associated with the exposure of sensitive receptors (the nearest located approximately 600 ft [183 m] east of Pond A8) to odor emissions would be less than significant.

Ravenswood. Odor effects at the Ravenswood pond complex from implementation of Phase1 Actions would be similar to those described for Alviso. Phase 1 actions at this pond complex would also include reconfigured ponds with nesting islands and shallow water habitat. Odors would be generated from the use of onsite equipment and the drying of excavated material. Construction activities would last approximately three to five months at Pond SF2.

Similar to the discussion for Phase 1 actions described above, potential impacts associated with the exposure of sensitive receptors (the nearest located approximately 500 ft [152 m] south of Pond SF2) to odor emissions would be less than significant.

Phase 1 Actions Level of Significance: Less than Significant