4.3 AIR QUALITY

This section includes a summary of applicable regulations, existing air quality conditions, and an analysis of potential short-term and long-term air quality impacts of the proposed project. The methods of analysis for short-term construction, long-term operational (regional), local mobile sources, and toxic air contaminants (TACs) are consistent with the recommendations of the Sacramento Metropolitan Air Quality Management District (SMAQMD). In addition, mitigation measures are recommended, as necessary, to reduce significant air quality impacts.

4.3.1 EXISTING SETTING

The proposed project site is located in the southern portion of Sacramento County, California, which is under the local jurisdiction of SMAQMD. The City of Elk Grove is within the Sacramento Valley Air Basin (SVAB), which comprises all of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo and Yuba counties, the western portion of Placer County, and the eastern portion of Solano County.

The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by pollutant sources and the atmosphere's ability to transport and dilute such emissions. Natural factors that 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 separately below.

TOPOGRAPHY, CLIMATE, AND METEOROLOGY

The SVAB is relatively flat, bordered by the North Coast Ranges to the west and the Northern Sierra Nevada Mountains to the east. Air flows into the SVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento–San Joaquin River Delta from the San Francisco Bay area.

The Mediterranean climate type of the SVAB is characterized by hot, dry summers and cool, rainy winters. During the summer, daily temperatures range from 50°F to more than 100°F. The inland location and surrounding mountains shelter the area from much of the ocean breezes that keep the coastal regions moderate in temperature.

Most precipitation in the area results from air masses that move in from the Pacific Ocean, usually from the west or northwest during the winter months. More than half the total annual precipitation falls during the winter rainy season (November through February); the average winter temperature is a moderate 49°F. Characteristic of SVAB winters are also periods of dense and persistent low-level fog, which are most prevalent between storms. The prevailing winds are moderate in speed and vary from moisture laden breezes from the south to dry land flows from the north.

The mountains surrounding the SVAB create a barrier to airflow, which leads to the entrapment of air pollutants when meteorological conditions are unfavorable for transport and dilution. The highest frequency of poor air movement occurs in the fall and winter when high-pressure cells are present over the SVAB. The lack of surface wind during these periods combined with the reduced vertical flow because of less surface heating reduces the influx of air and leads to the concentration of air pollutants under stable metrological conditions. Surface concentrations of air pollutant emissions are highest when these conditions occur in combination with agricultural burning activities or temperature inversions which hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground.

May through October is ozone season in the SVAB. This period is characterized by poor air movement in the mornings with the arrival of the delta sea breeze from the southwest in the afternoons. In addition, longer daylight hours provide a plentiful amount of sunlight to fuel photochemical reactions between reactive organic gases (ROG) and nitrogen oxides (NO_X), which result in ozone formation. Typically, the delta breeze transports air pollutants northward out of the SVAB; however, a phenomenon known as the Schultz Eddy prevents this from occurring during approximately half of the time from July to September. The Schultz Eddy phenomenon causes the wind pattern to shift southward resulting in air pollutants being blown back into the SVAB. This phenomenon exacerbates the concentration of air pollutant emissions in the area and contributes to violations of the ambient air quality standards.

EXISTING AIR QUALITY–CRITERIA AIR POLLUTANTS

Concentrations of the following air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$, respectively), 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, health effects, and future trends is provided below along with the current attainment area designations and monitoring data for the 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 ROG and NO_X 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 is 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 (ground level) 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 2004).

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 1 to 2 hours has been found to significantly 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 2004).

Emissions of ozone precursors ROG and NO_X have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. Consequently, peak 1-hour and 8-hour ozone concentrations in the SVAB have declined overall by about 15% since 1988. However, peak ozone values in the SVAB have not declined as rapidly over the last several years as they have in other urban areas. This can be attributed to influx of pollutants into the SVAB from other urbanized areas, making the region both a transport contributor and a receptor of pollutants (ARB 2009a).

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% of the nationwide CO emissions are from mobile sources. The other 23% 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 (EPA 2009a).

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 (EPA 2009a). 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 4 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 5 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 (EPA 2009a). $PM_{2.5}$ includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less (ARB 2009a).

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 (EPA 2009a). $PM_{2.5}$ 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.

Direct emissions of both PM_{10} and $PM_{2.5}$ have increased in the SVAB between 1975 and 2000 and are projected to increase through at least 2020. These emissions are dominated by area-wide sources, primarily because of development (ARB 2009a).

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, the U.S. Environmental Protection Agency (EPA) set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (EPA 2009a).

As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (95% between 1980 and 1999), and levels of lead in the air decreased by 94% between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13% of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78% 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 gasoline (EPA 2009a).

AMBIENT AIR QUALITY–MONITORING STATION DATA AND ATTAINMENT DESIGNATIONS

Criteria air pollutant concentrations are measured at several monitoring stations in the SVAB. The Elk Grove-Bruceville air quality monitoring station, located approximately 6.5 miles to the southwest at 12490 Bruceville Road, is the closest station to the project sites. The Elk Grove-Bruceville air quality monitoring station monitors ambient concentrations of ozone and nitrogen dioxide. Concentrations of carbon monoxide and airborne particulate matter were obtained from the nearest monitoring stations located in Sacramento (i.e., Sacramento - 3801 Airport Road and Sacramento - T Street air monitoring stations). Ambient emission concentrations will vary due to localized variations in emission sources and climate and should be considered "generally" representative of ambient concentrations within the area of the project sites. Table 4.3-1 summarizes the air quality data from the most recent 3 years.

Both California Air Resources Board (ARB) and EPA 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 Sacramento portion of the SVAB are shown in Table 4.3-2 for each criteria air pollutant.

Table 4.3-1 Summary of Annual Ambient Air Quality Data[1]			
	2006	2007	2008
Elk Grove-Bruceville Road Monitoring Station			
- Ozone			
Maximum concentration (1-hr/8-hr, ppm)	0.143/0.112	0.102/0.088	0.111/0.093
Number of days state standard exceeded (1-hr/8-hr)	10/32	1/13	5/13
Number of days national standard exceeded (8-hr)	17	5	7
- Nitrogen Dioxide (NO_2)			
Maximum concentration (1-hr, ppm)	0.052	0.051	0.050
Number of days state standard exceeded (1-hr)	0	0	0
Annual Average (ppm)	0.009	0.009	0.008
- Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration (National/State, $\mu g/m^3$)	54.0/54.0	58.0/58.0	66.1/78.9
Number of days national standard exceeded (measured[2,3])	14	19	5
- Respirable Particulate Matter (PM_{10})			
Maximum concentration (National/State, $\mu g/m^3$)	109.0/111.0	53.4/57.4	73.7/70.9
Number of days state standard exceeded	8	5	3
Number of days national standard exceeded	0	0	0
Sacramento-3801 Airport Road Monitoring Station			
- Carbon Monoxide (CO)			
Maximum concentration (1-hr/8-hr, ppm)	4.7/3.15	6.3/5.58	2.7/1.83
Number of days state standard exceeded (1hr/8-hr)	0/0	0/0	0/0
Number of days national standard exceeded (1-hr/8-hr)	0/0	0/0	0/0

1 Where, $\mu g/m^3$ = micrograms per cubic meter and ppm = parts per million.
2 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.
3 Number of days the 2006 national 24-hour $PM_{2.5}$ standard was exceeded.
Sources: ARB 2009b, EPA 2009b

Table 4.3-2
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards [1]		
		Standards [2,3]	Attainment Status [4]	Primary [3,5]	Secondary [3,6]	Attainment Status [7]
Ozone	1-hour	0.09 ppm (180 μg/m^3)	N(Serious) [10]	–[8]	Same as Primary Standard	–[8]
	8-hour	0.070 ppm (137 μg/m^3)	–	0.075 ppm (157 μg/m^3)		N(Serious)
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	–	A
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)	–	0.053 ppm (100 μg/m^3)	Same as Primary Standard	A
	1-hour	0.18 ppm (339 μg/m^3)	A	–		–
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 μg/m^3)	–	A
	24-hour	0.04 ppm (105 μg/m^3)	A	0.14 ppm (365 μg/m^3)	–	
	3-hour	–	–	–	0.5 ppm (1300 μg/m^3)	
	1-hour	0.25 ppm (655 μg/m^3)	A	–	–	–
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 μg/m^3	N	–[8]	Same as Primary Standard	N (Moderate)
	24-hour	50 μg/m^3		150 μg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 μg/m^3	N	15 μg/m^3	Same as Primary Standard	N[11]
	24-hour	–	–	35 μg/m^3		
Lead[10]	30-day Average	1.5 μg/m^3	A	–	–	A
	Calendar Quarter	–	–	1.5 μg/m^3	Same as Primary Standard	

Table 4.3-2
Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California		National Standards[1]		
		Standards[2,3]	Attainment Status[4]	Primary[3,5]	Secondary[3,6]	Attainment Status[7]
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[9]	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) because of particles when the relative humidity is less than 70%.	U			

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. The PM_{10} 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact EPA 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. 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 [i.e., parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$)]. 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 Unclassified (U): a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.
Attainment (A): a pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.
Nonattainment (N): a pollutant is designated nonattainment if there was a least one violation of a state standard for that pollutant in the area.
Nonattainment/Transitional (NT): is a subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.
5 National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
6 National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7 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.
8 The 1-hour ozone NAAQS was revoked on June 15, 2005. The annual PM_{10} NAAQS was revoked in October 2006.
9 ARB has identified lead and vinyl chloride as toxic air contaminants 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.
10 N(serious) = Nonattainment area (serious), defined as an area in nonattainment with an ozone design value of 0.160 up to 0.180 ppm.
11 EPA proposed area for federal $PM_{2.5}$ nonattainment, which became final in December 2008.
Source: ARB 2009c, EPA 2009c

EXISTING AIR QUALITY–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 California Almanac of Emissions and Air Quality (ARB 2009a), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines (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, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists.

However, ARB has made preliminary concentration estimates based on a particulate matter (PM) exposure method. This method uses ARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, *para*-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene pose the greatest existing ambient risk, for which data are available, in California.

Diesel PM poses the greatest health risk among these ten TACs mentioned. Based on receptor modeling techniques, ARB estimated its health risk to be 360 excess cancer cases per million people in the SVAB. Since 1990, the diesel PM's health risk has been reduced by 52%. Overall, levels of most TACs have gone down since 1990 except for *para*-dichlorobenzene and formaldehyde (ARB 2009a).

4.3.2 REGULATORY SETTING

Air quality within Sacramento County is regulated by such agencies as EPA, ARB, and SMAQMD. Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

At the federal level, EPA has been charged with implementing national air quality programs. EPA'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 EPA to establish national ambient air quality standards (NAAQS). As shown in Table 4.3-2, EPA 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 the 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. 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. EPA has responsibility to review all state SIPs to determine conformation to the mandates of the CAA, and the amendments thereof, and determine if implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control 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.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

ARB 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 ARB to establish California ambient air quality standards (CAAQS) (Table 4.3-2). ARB 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 ARB 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 EPA, 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 PLANS, POLICIES, REGULATIONS, AND LAWS

Sacramento Metropolitan Air Quality Management District

SMAQMD, in coordination with the air quality management districts and air pollution control districts of El Dorado, Placer, Solano, Sutter, and Yolo counties, prepared and submitted the *1991 Air Quality Attainment Plan* (AQAP) in compliance with the requirements set forth in the CCAA, which specifically addressed the nonattainment status for ozone and to a lesser extent, CO and PM_{10}. The CCAA also requires a triennial assessment of the extent of air quality improvements and emission reductions achieved through the use of control measures. As part of the assessment, the attainment plan must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections. The requirement of the CCAA for a first triennial progress report and revision of the 1991 AQAP was fulfilled with the preparation and adoption of the *1994 Ozone Attainment Plan* (OAP). The OAP stresses attainment of ozone standards and focuses on strategies for reducing ozone precursor emissions of ROG and NO_X. It promotes active public involvement, enforcement of compliance with SMAQMD rules and regulations, public education in both the public and private sectors, development and promotion of transportation and land use programs designed to reduce vehicle miles traveled (VMT) within the region, and implementation of stationary and mobile source control measures. The OAP became part of the SIP in accordance with the requirements of the CAAA and amended the 1991 AQAP. However, at that time, the region could not show that the national ozone (1-hour) standard would be met by 1999. In exchange for moving the deadline to 2005, the region accepted a designation of “severe nonattainment” coupled with additional emission requirements on stationary sources. Additional triennial reports were also prepared in 1997, 2000, and 2003 in compliance with the CCAA that act as incremental updates (SMAQMD 2009).

As a nonattainment area, the region is also required to submit rate-of-progress milestone evaluations in accordance with the CAAA. Milestone reports were prepared for 1996, 1999, and 2002. These milestone reports include compliance demonstrations that the requirements have been met for the Sacramento nonattainment area. The air quality attainment plans and reports present comprehensive strategies to reduce ROG, NO_X, and PM_{10} emissions from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations; enhancement of CEQA participation; implementation of a new and modified indirect source review program; adoption of local air quality plans; and stationary-, mobile-, and indirect-source control measures (SMAQMD 2009).

EPA recently promulgated a new 8-hour ozone standard. This change lowered the standard for ambient ozone from 0.08 ppm averaged over 8 hours to 0.075 ppm. The newer 8-hour standard replaces the previous 1-hour standard. In general, the 8-hour standard is more protective of public health and more stringent than the 1-hour standard. The promulgation of this standard prompted new designations and nonattainment classifications in June 2004 and resulted in the revocation of the 1-hour standard in June 2005. The region has been designated as a nonattainment (serious) area for the national (8-hour) ozone standard with an attainment deadline of June 2013. SMAQMD has recently completed the *Federal 8-Hour Ozone Reasonable Further Progress Plan for the Sacramento Federal Ozone Nonattainment Area (2008)*. This plan proposes to use updated emissions inventories, existing control strategies, and approved control measure commitments to achieve emission reductions necessary for compliance with the Clean Air Act. This plan is currently under review and is anticipated to be adopted in late 2008 (SMAQMD 2009).

On September 6, 2007, SMAQMD provided a guidance letter regarding the inclusion of a climate change analysis in CEQA documents. This letter, *Addressing Climate Change in CEQA Documents,* recommend that CEQA environmental documents include a discussion of greenhouse gas (GHG) emissions during both the construction and operational phases of projects. The letter also provides a number of mitigation measures that will help to reduce the GHG emissions a project may produce. However, it must be noted at this time that SMAQMD does not have any standards of significance, thresholds, or regulations regarding the production of GHG emissions. GHG emissions are evaluated in Chapter 5, Cumulative Impacts.

As mentioned above, SMAQMD has also adopted various rules and regulations pertaining to the control of emissions from area and stationary sources. All projects are subject to SMAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the proposed project may include, but are not limited to:

- ***Rule 201-General Permit Requirements.*** Any project that includes the use of equipment capable of releasing emissions to the atmosphere may require permit(s) from SMAQMD prior to equipment operation. Portable construction equipment (e.g., generators, compressors, pile drivers, lighting equipment, etc.) with an internal combustion engine over 50 horsepower are required to have a SMAQMD permit or ARB portable equipment registration.

- ***Rule 402-Nuisances.*** The purpose of this rule is to limit emissions which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause or have natural tendency to cause injury or damage to business or property.

- ***Rule 403-Fugitive Dust.*** The purpose of this rule is to require that reasonable precautions be taken so as not to cause or allow the emissions of fugitive dust from non-combustion sources from being airborne beyond the property line from which the emission originates.

- ***Rule 442- Architectural Coatings.*** The developer or contractor is required to use coatings that comply with the volatile organic compound (VOC) content limits specified in the rule.

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 4.3-2). Instead, EPA and ARB 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, in conjunction with additional rules set forth by SMAQMD, establish the regulatory framework for TACs.

Federal Hazardous Air Pollutant Programs

EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed EPA 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), EPA 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), EPA 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 EPA 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 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 (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB can designate a substance as a TAC. To date, ARB has identified over 21 TACs, and adopted the EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB 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.

ARB 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, ARB 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. Additional 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. Thus, with the turnover of vehicle fleets, TAC emissions will substantially decrease in the future in comparison to current conditions. Mobile-source emissions of TACs (i.e., benzene, 1-3-butadiene, diesel PM) have been reduced significantly 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 ARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be reduced by 75% in 2010 and 85% 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.

ARB published the Air Quality and Land Use Handbook: A Community Health Perspective, which provides guidance concerning land use compatibility with TAC sources (ARB 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 ARB by air districts, other agencies, real estate representatives, and others. The comments included concern over whether ARB 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 ARB control measures. Permits may be granted to operations if they are constructed and operated in accordance with applicable regulations, including new source review standards and air toxics control measures. SMAQMD limits emissions and public exposure to TACs through a number of programs. SMAQMD 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 SMAQMD (e.g., health risk assessment) based on their potential to emit toxics. If it is determined that the project will emit toxics in excess of SMAQMD's threshold of significant 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, SMAQMD 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 the air quality permitting process applies to stationary sources; and properties, which may be exposed to elevated levels of non-stationary type sources of TACs, and the non-stationary type sources themselves (e.g., on-road mobile) are not subject to this process or any requirements of T-BACT implementation. Rather, emissions controls on such sources (e.g., vehicles) are subject to regulations implemented on the state and federal level.

EXISTING AIR QUALITY–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 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; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. It is also important to 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.

Neither the state nor the federal governments have adopted any applicable rules or regulations for the control of odor sources nor is there a reliable means of measuring odors. SMAQMD does not have an individual rule or regulation that specifically addresses odors; however, odors would be applicable to SMAQMD's Rule 204, Nuisance. Odors from the proposed transfer station operations would also be subject to the nuisance provisions of *14 CCR §17408.5*. Any actions related to odors would be based on citizen complaints to local governments and SMAQMD.

4.3.3 IMPACTS AND MITIGATION MEASURES

METHOD OF ANALYSIS

SMAQMD recommends that construction-generated emissions of ROG and NO_X be quantified and presented as part of the analysis of project-generated emissions. However, because construction equipment emits relatively low levels of ROG and because ROG emissions from other construction processes (e.g., asphalt paving, architectural coatings) are typically regulated by SMAQMD, SMAQMD has not adopted a construction emissions threshold for ROG. SMAQMD has, however, adopted a construction emissions threshold of 85 pounds per day (lb/day) for NO_X. In addition, if daily emissions of NO_X from heavy-duty mobile equipment do not exceed the 85 lb/day threshold, then SMAQMD considers exhaust emissions of other pollutants to also be less than significant (SMAQMD 2004).

Short-term construction emissions of ROG and NO_X were estimated using the URBEMIS 2007 Version 9.2.4 computer program, as recommended by SMAQMD. The URBEMIS 2007 report is included in Appendix C of this EIR. The URBEMIS 2007 program is designed to model construction emissions for land use development projects and allows for the input of project-specific information. Maximum daily emissions anticipated to occur during the grading phase were calculated based on the total Project area of approximately 20 acres and assuming that 25% of the project site (i.e., 5 acres) could be actively disturbed on any given day. Maximum daily construction emissions were calculated assuming an overall construction period of approximately one year. Construction schedules and equipment usage requirements were also based on URBEMIS model defaults.

Emissions of airborne particulate matter were evaluated in accordance with SMAQMD recommended screening criteria found in Appendix B of the 2004 *Guide to Air Quality Assessment in Sacramento County* (Table 4.3-3). In accordance with these criteria, areas of disturbance in excess of SMAQMD's screening criteria would be considered potentially significant. These screening levels are based on the maximum actively disturbed areas. For example, assuming a maximum daily disturbance of less than 12 acres, implementation of recommended "Level Two Mitigation" would typically be considered sufficient to reduce fugitive dust-related impacts to a less-than-significant level. If the maximum daily area of disturbance would exceed the screening criteria or if the project cannot undertake the mitigation measures that would be required, a more detailed analysis, involving dispersion modeling, may be required (SMAQMD 2004).Other operational air quality impacts (i.e., regional emissions of ozone precursors and PM, localized mobile-source CO and odor) were assessed in accordance with ARB and SMAQMD-recommended methodologies. Such methodologies include the use of a screening level procedure for local mobile-source CO concentrations.

Table 4.3-3 SMAQMD PM Screening Criteria for Construction Projects	
Maximum Daily Area of Disturbance	Recommended Mitigation
5 Acres and Below	No Mitigation Required
5.1–8 Acres	Level One Mitigation Required: – Water exposed soil twice daily. – Maintain two feet of freeboard space on haul trucks.
8.1–12 Acres	Level Two Mitigation Required: – Water exposed soil three times daily. – Water soil piles three times daily. – Maintain two feet of freeboard space on haul trucks.
12.1–15 Acres	Level Three Mitigation Required: – Keep soil moist at all times. – Maintain two feet of freeboard space on haul trucks. – Use emulsified diesel or diesel catalysts on applicable heavy-duty diesel construction equipment.
Source: SMAQMD 2004.	

For TAC emissions, the proximity of the potential project sites to sensitive receptors was evaluated to determine the likelihood of TAC exposure.

The net increase in GHG emissions generated by the project is addressed in Chapter 5.

THRESHOLDS OF SIGNIFICANCE

Per Appendix G of the CEQA Guidelines and SMAQMD recommendations, air quality impacts are considered significant if implementation of the proposed project under consideration would do any of the following:

- Conflict with adopted environmental plans, policies, or regulations for air pollutants;
- Conflict with or obstruct implementation of any applicable air quality plans;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Expose sensitive receptors to substantial pollutant concentrations;
- Create objectionable odors affecting a substantial number of people; or
- Result in a cumulatively considerable net increase of any criteria pollutant for which the region is designated nonattainment under an applicable national or State ambient air quality standard.

IMPACTS AND MITIGATION MEASURES

IMPACT 4.3-1 **Short-Term Construction-Generated Criteria Air Pollutant and Precursor Emissions.** *Short-term construction-generated emissions of the ozone precursor NO_X, associated with construction of the Site 2 alternative, would exceed SMAQMD's significance threshold. Therefore, the project could result in or contribute substantially to a violation of air quality standards. This would be considered a* ***significant*** *impact.*

Construction emissions are described as "short-term" or temporary in duration and have the potential to represent a significant impact with respect to air quality, especially fugitive PM_{10} dust emissions. Fugitive PM_{10} dust emissions are associated primarily with ground disturbance activities during site preparation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and VMT on- and offsite. Exhaust emissions from employee commute trips and construction equipment also contribute to short-term increases in PM_{10} emissions but to a much lesser extent. Emissions of ozone precursors (ROG and NO_X) are primarily associated with exhaust emissions from employee commute trips and construction equipment, application of architectural coatings, and asphalt paving.

With respect to the proposed project, the initial site preparation and building phases of construction would result in the temporary generation of ROG, NO_X, and PM_{10}, emissions from ground disturbance activities, use of off-road equipment, employee commute trips, and other miscellaneous activities (e.g., asphalt paving and the application of architectural coatings).

ROG and NO_X

Short-term construction emissions of ROG and NO_X were modeled using the ARB-approved URBEMIS 2007 Version 9.2.4 computer program as recommended by SMAQMD. URBEMIS is designed to model construction emissions for land use development projects and allows for the input of project-specific information. Input parameters were based on default model settings and information provided in the project description. The modeled maximum daily construction emissions are summarized in Table 4.3-4 and described in more detail below and in Appendix C.

Table 4.3-4
Summary of Modeled Maximum Daily Short-term Construction-Generated Emissions[1]

	Site 4			Site 2		
Source	ROG (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)	ROG (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)
Year 2009						
Demolition	-	-	-	1.37	9.82	2.44
Site Preparation	3.21	26.51	101.34	3.21	26.51	101.34
Paving	4.78	24.29	1.89	4.78	24.29	1.89
Worst-case 2009 Daily Emissions	7.99	50.80	103.23	9.36	60.62	105.67
Exceed SMAQMD Threshold?[2]	No	No	No	No	No	No
Year 2010						
Demolition	-	-	-	1.37	9.82	2.44
Site Preparation	3.03	25.03	101.26	3.03	25.03	101.26
Building Construction	5.26	32.34	2.01	5.26	32.34	2.01
Architectural Coatings	168.88	0.09	0.01	168.88	0.09	0.01
Paving	4.56	22.84	1.80	4.56	22.84	1.80
Worst-case 2010 Daily Emissions	181.73	80.30	105.08	183.10	90.12	107.52
Exceed SMAQMD Threshold?[2]	No	No	No	No	**Yes**	No
Year 2011						
Building Construction	4.86	29.82	1.89	4.86	29.82	1.89
Worst-case 2011 Daily Emissions	4.86	29.82	1.89	4.86	29.82	1.89
Exceed SMAQMD Threshold?[2]	No	No	No	No	No	No

1 Emissions modeled using the Urbemis2007 (v9.2.4) computer model, based on the proposed land uses and phasing information identified in the project description, default model settings.
2 SMAQMD does not have a threshold for construction-generated ROG emissions; NOX threshold: 85 lb/day, PM10 screening-level threshold: less than 5 acres actively disturbed on any given day.

Refer to Appendix C for detailed assumptions and modeling output files.
Source: Data modeled by EDAW 2009.

Based on the modeling conducted, project construction at Site 2 would result in worst-case maximum unmitigated daily emissions of approximately 183 lb/day of ROG and 90 lb/day of NO_X. Daily unmitigated construction-generated emissions of NO_X would exceed SMAQMD's significance thresholds of 85 lb/day during construction for Site 2 only. SMAQMD's significance threshold would not be exceeded during construction for Site 4. The difference between alternatives can be explained by the fact that Site 2 would involve demolition of existing structures, whereas Site 4 would not. SMAQMD does not have an established threshold for ROG but assumes that Regulation 442, Architectural Coatings would be sufficient to control emissions of ROG during short-term construction activities.

PM_{10}

To assist in the evaluation of fugitive dust-related impacts, SMAQMD staff has developed screening criteria for construction projects (Table 4.3-3). As previously discussed, these screening levels are based on the maximum actively disturbed area of the project site. The total land use area to be developed would be approximately 20 acres.

Assuming that 25% of the project area would be disturbed on any given day, the maximum daily area of disturbance would be approximately 5 acres. In comparison to SMAQMD screening-level criteria, uncontrolled emissions of fugitive dust associated with the development of the proposed project would not exceed the level requiring mitigation. Thus, PM_{10} emissions would not be anticipated to violate an air quality standard or contribute substantially to an existing or projected air quality violation. It is important to note that the proposed project would be required to comply with SMAQMD's Rule 403, Fugitive Dust. As previously discussed, Rule 403 requires implementation of reasonable precautions so as not to cause or allow emissions of fugitive dust to become airborne beyond the property line of the project site. Because the project would not exceed the screening criteria identified by SMAQMD, it is not expected that air quality standards for PM_{10} or $PM_{2.5}$ would be violated during construction.

Short-term construction-generated emissions would result in a **significant** impact for NO_X emissions associated with the Site 2 alternative only. NO_X emissions would be **less than significant** for Site 4. Due to the nonattainment status of the project area, to prevent significant cumulative impacts, the project shall incorporate the following standard dust control measures.

Mitigation Measure 4.3-1 Short-Term Construction-Generated Criteria Air Pollutant and Precursor Emissions.

In accordance with SMAQMD recommendations, the following mitigation measures shall be implemented during construction of the proposed project for Site 2 only, if selected.

- The contractor shall develop a plan, in consultation with SMAQMD, demonstrating that the heavy-duty (>50 horsepower [hp]), off-road vehicles to be used in the construction project (including owned, leased, and subcontractor vehicles) shall achieve a project-wide fleet-average 20% NO_X reduction and 45% particulate reduction compared to the most recent ARB fleet average at the time of construction. Acceptable options for reducing emissions include the use of late-model engines, low-emission diesel products, alternative fuels, particulate-matter traps, engine retrofit technology, after-treatment products, and/or such other options as become available.

- A comprehensive inventory of all off-road construction equipment equal to or greater than 50 hp that will be used for an aggregate of 40 or more hours during any portion of project construction shall be submitted to SMAQMD. The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction operations occur. At least 48 hours before heavy-duty off-road equipment is used, the City shall provide SMAQMD with the anticipated construction timeline, including the start date, and the name and phone number of the contractor's project manager and on-site foreman.

- In accordance with SMAQMD recommendations, the following mitigation measures shall be implemented at either site during construction of the proposed project to minimize cumulative impacts from PM_{10}. The ground-disturbing activities (i.e., grading, trenching) shall not exceed a total actively disturbed area of 5 acres per day.

- Construction activities shall comply with SMAQMD's Rule 403, Fugitive Dust. Rule 403 requires implementation of reasonable precautions so as not to cause or allow emissions of fugitive dust from being airborne beyond the property line of the project site. In accordance with SMAQMD-recommended mitigation measures for the control of fugitive dust, reasonable precautions shall include, but shall not necessarily be limited to, the following (SMAQMD 2004):

  - Apply water, chemical stabilizer/suppressant, or vegetative cover to disturbed areas, including storage piles that are not being actively used for construction purposes, as well as any portions of the construction site that remain inactive for longer than 3 months.

  - Water exposed surfaces sufficient to control fugitive dust emissions during demolition, clearing, grading, earth-moving, or excavation operations. Actively disturbed areas should be kept moist at all times.

  - Cover all vehicles hauling dirt, sand, soil or other loose material or maintain at least two feet of freeboard in accordance with the requirements of California Vehicle Code Section 23114.

  - Limit or expeditiously remove the accumulation of project-generated mud or dirt from adjacent public streets at least once every 24 hours when construction operations are occurring.

  - Limit onsite vehicle speeds on unpaved surfaces to 15 miles per hour, or less.

Level of Significance After Mitigation:

Implementation of SMAQMD-recommended measures is expected to achieve a 20% reduction in NO_X emissions from construction equipment and would reduce worst-case fugitive PM_{10} dust emissions by a minimum of 50 to 75%, consistent with SMAQMD requirements (SMAQMD 2004).

Implementation of the mitigation measures described above would reduce project-generated construction-related emissions in Sacramento County to below 85 lb/day and to a less-than-significant level for NO_X and would reduce short-term construction-generated cumulative impacts from PM_{10} to a less-than-significant level.

IMPACT 4.3-2 **Long-Term Operational (Regional) Criteria Air Pollutant and Precursor Emissions.** *The proposed project would generate criteria air pollutant and precursor emissions in the region associated with new area and mobile sources. However, these emissions would be more than offset by the reduction in vehicle miles driven by waste-haul vehicles that currently deliver waste to Sacramento. Therefore, this impact would be considered less than significant.*

Emissions of ozone precursor pollutants (i.e., ROG and NO_X) attributable to the proposed project would be primarily associated with the use of on-site mobile equipment used to handle the waste, inbound and outbound waste-hauling vehicles, employee vehicle trips, as well as emissions generated by onsite stationary equipment.

Regional area- and mobile-source emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with implementation of the proposed project were estimated using URBEMIS 2007 Version 9.2.4 computer program, which is designed to model emissions for land use development projects. URBEMIS allows land use selections that include project location specifics and trip generation rates. Operational (regional) area- and mobile- source emissions were estimated based on proposed land uses identified in the project description and trip generation data identified in Section 4.2 Traffic and Circulation of this document. Project implementation would not include the construction or operation of any major stationary sources of emissions.

In the case of the proposed project, a net reduction of approximately 1,703,000 VMT/year would result with project implementation. Table 4.3-5 identifies the estimated VMT for the proposed project and the assumptions used to calculate the anticipated VMT reduction.

Table 4.3-5
Estimate of Vehicle Miles Traveled

	Total Vehicle/day	Ave VMT w/o T.S.	Ave VMT w/ T.S.	VMT Change/Day
Residential Garbage, Recycling/Green Waste [1]	99	18	4	-1,386
Commercial Garbage and Recycling [1]	199	18	4	-2,786
Commercial Self Haul (5 ton trucks) [2]	44	18	4.4	-598
Residential Self Haul (pickup trucks) [2]	144	18	4.4	-1,958
Private Self Haul HHW (cars and pickup trucks) [2]	60	20	4.4	-936
Employee Cars and Pickups Trucks [3]	100	0	8	800
Buy-Back (cars and pickup trucks) [3]	40	0	4	160
Outbound Transfer Trucks/Trailers (18 Wheelers) [4]	91	36	36	0
Outbound MRF Transfer Trucks/Trailers (18 Wheelers) [5]	23	0	25	575
Outbound HHW Vans and Flatbeds (Up to 18 Wheelers) [5]	1	0	25	25
Daily VMT Subtotal	**801**	**128**	**119.2**	**-6,105**
Total Annual VMT Change Excluding HHW [6]				**-1,607,497**
Total Annual HHW VMT Change [7]				**-95,472**
TOTAL ANNUAL VMT CHANGE				**-1,702,969**

1. Assumes City MSW and recyclables are transported to the Elk Grove TS and that multiple franchise haulers are use by the City.
2. Assumes 4 miles round trip plus 10% increase with Elk Grove TS to account for easier customer access.
3. Assumes all employee trips and buy-back trips are new. Some employees are assumed to come from out of the region.
4. Assumes outbound transfer trucks would replace Elder Creek transfer trucks and distance to Kiefer Landfill would be the same.
5. Assumes outbound MRF trucks and HHW vehicles would be new trips.
6. Assumes operations occur 311 days per year.
7. Assumes the HHW facility operates 102 days per year.

The net change in regional emissions was modeled using URBEMIS, which resulted in the increase in area-source emissions from the proposed land uses being more than offset by the reduction in mobile-source emissions (Table 4.3-6).

Table 4.3-6
Summary of Modeled Maximum Daily Long-term Operational (Regional) Emissions[1]

Source	ROG (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Area	1.15	0.82	0.01	0.01
Mobile	-6.55	-4.75	-7.81	-1.51
Worst-case Daily Emissions	-5.40	-3.93	-7.80	-1.50
Exceed SMAQMD Threshold?[2]	No	No	No	No

1 Emissions modeled using the Urbemis2007 (v9.2.4) computer model, based on the proposed land uses and information identified in the project description, and default model settings.
2 SMAQMD does not have a threshold for operational PM_{10} or $PM_{2.5}$ emissions.
Refer to Appendix C for detailed assumptions and modeling output files.
Source: Data modeled by EDAW 2009.

The majority of the municipal solid waste generated by the residents and businesses in Elk Grove is currently transported by franchised, commercial haulers and private self-haul vehicles to the privately-owned and operated (by Allied Waste) Elder Creek transfer station located in south Sacramento. Residents of Elk Grove are allowed one self-haul trip each year to this facility. Residents are also allowed to self-haul household hazardous wastes to collection facilities owned by the County and by the City of Sacramento.

The driving distance from Elk Grove's city center to these facilities is approximately 18 miles round trip. In addition, the recyclable materials collected at the curbside in the City are shipped more than 100 miles to a sorting facility in San Jose. With implementation of the proposed project, the distance from the city center to the transfer station would be approximately 2 miles. Therefore, the average trip lengths for the redirected trips, which represent the vast majority of the vehicle trips generated from the facility, would be reduced by 89%. This reduction in VMT for waste haul vehicles accessing the site would substantially offset the new area- and mobile-source emissions generated by the proposed project. SMAQMD's operational emissions thresholds for ROG and NO_X of 65 lb/day would not be exceeded as a result of the proposed project. Instead, the proposed project would present a net benefit to regional air quality. As a result, this impact is considered **less than significant**.

Mitigation Measure 4.3-2 Long-Term Operational (Regional) Criteria Air Pollutant and Precursor Emissions.

No mitigation is necessary.

IMPACT 4.3-3 **Exposure of Sensitive Receptors to Toxic Air Contaminant Emissions.** *The waste-haul trucks associated with the proposed transfer station operations would generate diesel PM emissions, which are categorized as a TAC. However, these emissions would not be generated near sensitive receptors. Therefore, this impact would be considered a* ***less-than-significant*** *impact.*

The exposure of sensitive receptors to emissions of TACs can occur during both the construction and operational phases of the project. Health-related impacts associated with short-term construction and long-term stationary and mobile-source operational emissions are discussed separately, as follows:

Short-Term Construction

Construction of the project and associated infrastructure would result in short-term diesel exhaust emissions from on-site heavy duty equipment used in site grading and excavation, paving, and other construction activities. These emissions would be intermittent, vary through the site area, and be of a relatively short duration considering the estimated one-year total construction period if the project is built out in a single phase. Diesel PM was identified as a TAC by ARB in 1998. According to ARB, the potential cancer risk from the inhalation of diesel PM, as discussed below, is a more serious risk than the potential non-cancer health impacts (ARB 2003).

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. The concentration of the substance is directly related to the proximity of the receptor to the emission source. The nearest sensitive receptors to Site 4 are the residences located within the Hampton Villages subdivision located approximately 1,000 feet to the northwest (Exhibit 4.4-2). The nearest sensitive receptor to Site 2 is a farm residence located approximately 1,500 feet to the east (Exhibit 4.4-2).

Dose is also positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. 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). Thus, because the use of mobilized equipment would be temporary (i.e., less than 1.5% of the total exposure period for which risk is based upon) in combination with the dispersive properties of diesel PM (Zhu and Hinds 2002) and the fact that project construction activities would not be atypical in comparison to similar development-type projects (i.e., no excessive material transport or associated truck travel), short-term construction activities would not result in the exposure of sensitive receptors to substantial TAC concentrations. This impact is considered **less than significant**.

On-site Mobile Sources

Operational activities that require the use of diesel-fueled vehicles for extended periods, such as the transfer station operations, would generate diesel PM emissions that could expose sensitive receptors to TACs. The diesel PM emissions generated by these uses would primarily be generated near the waste tipping area inside the transfer station building and along the truck routes accessing the sites. Diesel PM disperses quickly with distance. Due to the distance of the existing residences to the potential project sites, approximately 1,000 northwest of Site 4 and 1,500 feet east of Site 2, and dispersive properties of diesel PM (Zhu and Hinds 2002), the diesel PM emission levels at these residences would be negligible. No sensitive receptors are located along the truck routes that access the two potential project sites. Therefore, the operational activities would not result in the exposure of sensitive receptors to substantial TAC concentrations. This impact is considered **less than significant**.

Mitigation Measure 4.3-3 Exposure of Sensitive Receptors to Toxic Air Contaminant Emissions.

No mitigation measures would be necessary.

IMPACT 4.3-4 Long-Term Operational (Local) Mobile-Source Carbon Monoxide Emissions. *The proposed project would increase mobile-source CO emissions in the local area. However, this increase would not cause local mobile-source CO emissions to exceed applicable standards. Therefore, this impact would be considered* ***less than significant****.*

CO concentration is a direct function of motor vehicle activity (e.g., idling time and traffic flow conditions); particularly during peak commute hours, and meteorological conditions. Under specific meteorological conditions, CO concentrations may reach unhealthy levels with respect to local sensitive land-uses such as residential areas, schools, and hospitals. As a result, CO emissions are evaluated at a local level.

Local mobile-source CO concentrations were assessed using a screening-level procedure provided by SMAQMD, which is applicable to the project area. This screening-level analysis conservatively estimates the background CO concentration in the project area and the project-generated pollutant concentration to anticipate the combined concentration level. Based on the regional background maps for CO included in Appendix B of the *Guide to Air Quality Assessment in Sacramento County* (SMAQMD 2004), the 1- and 8-hour background CO concentrations for the City of Elk Grove were conservatively estimated to be 2.64 ppm and 1.32 ppm, respectively. Project-generated 1- and 8-hour CO emissions from peak hour daily trips were calculated to be 0.40 ppm and 0.28 ppm, respectively, which results in total (existing plus project) concentrations of 3.04 ppm and 1.60 pm. Thus, the proposed project is not anticipated to result in or contribute to local CO concentrations that exceed the California 1-hour or 8-hour ambient air quality standards of 20 ppm or 9 ppm, respectively. As a result, the impact of long-term operational emissions of local CO associated with the proposed project would be considered **less than significant**.

Mitigation Measure 4.3-4 Long-Term Operational (Local) Mobile-Source Carbon Monoxide Emissions.

No mitigation is required.

IMPACT 4.3-5 **Exposure of Sensitive Receptor to Odorous Emissions.** *The proposed project would introduce new odor sources into the area, which could expose sensitive receptors to odorous emissions on an intermittent basis. The exposure of sensitive receptors to this new odor source would be considered a* ***significant*** *impact.*

The occurrence and severity of odor impacts depends on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and regulatory agencies. Projects with the potential to frequently expose a substantial number of members of the public to objectionable odors would be deemed to have a significant impact.

Construction Odors

The construction of the proposed project would result in diesel exhaust emissions from on-site construction equipment, which is sometimes considered a source of offensive odor. The diesel exhaust emissions would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance. It is not anticipated that diesel exhaust odors would not be perceptible at the nearest receptors approximately 1,000 feet from the project site. Consequently, the construction of the proposed project would not be expected to create objectionable odors that would affect a substantial number of people. This temporary construction impact would be considered **less than significant**.

Operational Odors

The odors generated by solid waste are attributable to both the inherent odor of the material and to odors generated by decomposition. The inherent odors of solid waste are dependent on the materials which comprise the waste stream. For instance, commercial wastes consist primarily of paper products, metal, and plastics. These materials have a very low inherent odor generation potential. Of the material found in residential waste, food and yard wastes have the highest inherent odor characteristics.

As decomposition of organic material progresses, gases are produced, many of which are odorous. Aerobic decomposition, which is the most prevalent form of decomposition at solid waste transfer stations, indicates bacterial and other reactions are occurring in the presence of oxygen. The majority of by-products of aerobic decomposition (i.e., carbon dioxide, water, and NO_X) are odorless. However, sulfur oxides are also produced which have a slight odor described as being somewhat pungent. Additional odors may be generated by partially decomposed organic material which volatilize or evaporate. Anaerobic decomposition of waste material occurs under conditions where there is a lack of free oxygen molecules. This type of decomposition is less prevalent within waste transfer stations and typically occurs after the waste has been buried in the landfill.

For sources that involve the emission of multiple odorous pollutants, such as a waste transfer station, there is an increased potential for interactions where various odorants may mask or enhance a perceived odor. In addition, facilities such as the proposed project may have multiple emission sources, including open doorways, and roof vents, which can further complicate the prediction of odor impacts. For such sources, a dilution to threshold (D/T) approach to quantifying odors is most often conducted. The D/T is a measure of how many volumes of odor-free air must be added to a sample of contaminated air in order to reduce its odor level to the threshold of detection. This threshold is reached when 50% of a sample panel of people can just detect the odor. Although odors are considered subjective, a D/T threshold of 5 is typically considered the level at which people become consciously aware of the presence of an odor. Odors of between 5 and 10 D/T are typically strong enough to evoke registered complaints (City of Sacramento 1998).

Odor Assessment

Odor intensities typically are diluted with distance as odoriferous substances mix with air and, as a result, receptors further downwind would be less subject to odor impacts than those closer to the facility. Predicted maximum one-hour D/T of odorants can be estimated using Gaussian dispersion models, such as the EPA-approved Industrial Source Complex Short Term or Screen3 computer models. However, use of computerized models may not provide an accurate estimation of intermittent peak or short-term odor impacts that most often occur for short durations of time (i.e., seconds or minutes).

A D/T odor analysis was conducted as part of the environmental impact report prepared for the City of Sacramento's existing recycling and transfer station using the Screen3 computer model, based on worst-case meteorological conditions. The City of Sacramento's facility is considered representative of the proposed facility due to the similarity and quantity of waste materials that would be present at the proposed Elk Grove transfer station. In addition, meteorological conditions (i.e., winds, temperature) at the Sacramento facility would also be representative of those experienced at proposed project site due to the proximity of these two sites. Thus, the odor analysis completed for the City of Sacramento's facility is relevant for comparison of the proposed facility.

The analysis evaluated both open-door and roof-top vent releases assuming a facility design which is similar to the proposed project. Modeling was conducted assuming a range of indoor odor intensity of 24 to 70 D/T. Based on the modeling conducted, the maximum calculated average odor concentration at 200 feet downwind of an open-door release was estimated to be 2.5 D/T. For the roof-top vent release, the maximum calculated average odor concentration was estimated to be approximately 1 D/T at 200 feet downwind. These levels are below the D/T threshold of 5 at which people typically become consciously aware of the presence of an odor. However, intermittent odors could potentially exceed these predicted average odor concentrations for brief periods of time due to the variability in odor intensity of waste loads received and atmospheric conditions (City of Sacramento 1998).

Impacts to Nearby Sensitive Receptors

Odor impacts associated with transfer stations typically occur as a result of poor management, if waste is maintained onsite for extended periods of time (i.e., greater than 48 hours), or if waste is processed in exterior areas. Compliance with existing regulatory requirements (i.e., 14 CCR § 17408.5) would require maintenance and operational practices that would ensure that the proposed facility would not have a nuisance odor-related impact to nearby receptors.

In addition, to control odorous emissions from the proposed facility, all materials would be unloaded, processed, and loaded onto transport vehicles completely inside the main building. Interior operations would include a water vapor misting system to reduce air-borne dust. In addition, passive air exhaust systems would be used to maintain a negative pressure at the exterior openings of the building to minimize fugitive dust and odors. All wastes would be required to be removed from the facility within 48 hours of receipt.

Given that sensitive receptors would not be located within approximately 200 feet of the facility, odors emitted by the proposed facility would not be anticipated to result in a significant reoccurring impact to nearby sensitive receptors. However, on occasion, intermittent emissions of odors may be detectable at the nearest residences for brief periods of time. As a result, this impact is considered significant.

Mitigation Measure 4.3-5 Exposure of Sensitive Receptor to Odorous Emissions.

The following measures shall be implemented to reduce the project's potential odor impacts:

- Building doors shall be closed when not receiving waste materials;
- Loaded transfer vehicles shall be covered and properly maintained to ensure that both liquid and solid waste materials are contained entirely within the vehicle for the duration of its transport;
- Routine cleaning of floors, walls, and equipment shall be conducted per the requirements of CCR Title 27; and

- Odor complaints received by the City or SMAQMD shall be responded to within 24 hours. This response shall include an inquiry into the source of the odor and identification of the measures necessary to eliminate the odor source. If excessive complaints are received, as defined by the City, additional measures shall be implemented to control odors. Additional measures may include, but are not limited to: (a) install plastic curtains on entrances and exits to contain odors when doors are opened to allow vehicles to enter and exit, (b) use of deodorants to mask or neutralize odors as needed, and (c) daily removal of waste from tipping floor to allow for daily washing/cleaning.

Level of Significance After Mitigation:

With implementation of the above mitigation measures, the proposed project's odor impacts would be reduced to a less-than-significant level.