

## C. AIR QUALITY

### SETTING

Air quality is a function of both the rate and location of pollutant emissions under the influence of meteorological conditions and topographic features that influence pollutant movement.

Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants, and consequently affect air quality. This setting section provides region-specific information related to climate and topography; followed by an overview of the regulatory context, plans, policies, and regulations; and existing air quality conditions. The air pollutants of primary concern in the Bay Area are ozone and particulate matter. Because vehicle emission systems now generate less carbon monoxide than in the past, there is reduced concern for carbon monoxide.

### *AIR QUALITY TERMINOLOGY*

The subject of air quality relates to ambient concentrations of pollutants in the atmosphere. This section translates the expected changes within the project area into the language of air quality assessment, namely “emissions” and “concentrations.” Most pollutant emissions data are presented as “emission rates” that refer to the amount of pollutants emitted during a specified increment of time or during a specified increment of emission source activity. Typically, emission rates are reported in units of grams per second, pounds per day or tons per year.

“Concentration” estimates present information in terms of quantities of a given pollutant in a given volume of air. The term “ambient air quality” refers to the atmospheric concentration of a specific compound (amount of a pollutant in a specified volume of air) experienced at a geographic location some distance from the source of the emissions. Wind patterns, precipitation patterns, and chemical reactions affect pollutants emitted into the atmosphere and thus affect ambient air quality measurements. Typically, concentrations are reported in parts per million by volume (ppm) or micrograms per cubic meter. Emissions estimates themselves cannot be directly compared to ambient air quality standards but rather provide only a rough indication of the relative contribution of a source to ambient concentrations. Concentration estimates, on the other hand, can be directly compared to ambient air quality standards. Ambient air quality standards represent concentrations of air pollutants below which public health and welfare are protected.

Air pollutants are often characterized as being “primary” or “secondary” pollutants. Primary pollutants are those emitted directly into the atmosphere (such as carbon monoxide, sulfur dioxide, lead particulates, and hydrogen sulfide). Secondary pollutants are those (such as ozone, nitrogen dioxide, and sulfate particles) formed through chemical reactions in the atmosphere; these chemical reactions usually involve primary pollutants, normal constituents of the atmosphere, and other secondary pollutants.

## ***CLIMATE AND METEOROLOGY***

The project site is located in the city of Oakland and is within the boundaries of the San Francisco Bay Area Air Basin (Bay Area), which encompasses all of Alameda, Contra Costa, Santa Clara, San Francisco, San Mateo, Marin and Napa counties, and the southern portions of Solano and Sonoma counties. The climate of the Bay Area is determined largely by a high-pressure system that is almost always present over the eastern Pacific Ocean off the west coast of North America. High-pressure systems are characterized by an upper layer of dry air that warms as it descends, restricting the mobility of cooler marine-influenced air near the ground surface, and resulting in the formation of subsidence inversions. In winter, the Pacific high pressure system shifts southward, allowing storms to pass through the region. During summer and fall, emissions generated within the Bay Area can combine with abundant sunshine under the restraining influences of topography and subsidence inversions to create conditions that are conducive to the formation of photochemical pollutants, such as ozone.

Specifically, the project site is within the Northern Alameda and Western Contra Costa Counties climatological subregion of the Bay Area Air Basin. This subregion stretches from Richmond to San Leandro with the San Francisco Bay as its western boundary and its eastern boundary defined by the Oakland-Berkeley Hills. In this area, marine air traveling through the Golden Gate, as well as across San Francisco and the San Bruno Gap, is a dominant weather factor. The Oakland-Berkeley Hills cause the westerly flow of air to split off to the north and south of Oakland, which causes diminished wind speeds. The prevailing winds for most of this subregion are from the west.

Temperature in Oakland averages 58° Fahrenheit (F) annually, ranging from an average of 40° F on winter mornings to mid-70s in the late summer afternoons. Daily and seasonal oscillations of temperature are small because of the moderating effects of the nearby ocean. In contrast to the steady temperature regime, rainfall is highly variable and predominantly confined to the “rainy” period from early November to mid-April. Oakland averages 18 inches of precipitation annually; however, a shift in the annual storm track of a few hundred miles can mean the difference between a very wet year and near drought conditions. Winds in the Oakland area are typically from the west, west-northwest and northwest (about 50 percent of the time). All other wind directions occur no more than seven percent of the time, individually and calm conditions occur during eight percent of annual observations. Annual average wind speeds are approximately nine miles per hour at the Oakland International Airport (CARB, 1984).

## ***REGULATORY CONTEXT***

### **Criteria Air Pollutants**

Regulation of air pollution is achieved through both federal and state ambient air quality standards and emissions limits for individual sources of air pollutants. As required by the federal Clean Air Act, the U.S. Environmental Protection Agency (EPA) has identified criteria pollutants and established National Ambient Air Quality Standards to protect public health and welfare. Federal standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur

dioxide, particulate matter, and lead. These pollutants are called “criteria” air pollutants because standards have been established for each of them to meet specific public health and welfare criteria. California has adopted more stringent ambient air quality standards for most of the criteria air pollutants (referred to as State Ambient Air Quality Standards or State standards). Because of the unique meteorological conditions in California, there is considerable diversity between state and federal air quality standards currently in effect in California. Table IV.C-1 presents both sets of ambient air quality standards (i.e., federal and state) and provides a brief discussion of the related health effects and principal sources for each pollutant.

Under amendments to the federal Clean Air Act, the EPA has classified air basins or portions thereof, as either “attainment” or “nonattainment” for each criteria air pollutant, based on whether or not the federal standards have been achieved. In 1988, the State Legislature passed the California Clean Air Act, which is patterned after the federal Clean Air Act to the extent that areas are required to be designated as “attainment” or “nonattainment” for the state standards. Thus, areas in California have two sets of attainment / nonattainment designations: one set with respect to the federal standards and one set with respect to the state standards.

The federal Clean Air Act also requires nonattainment areas to prepare air quality plans that include strategies for achieving attainment. Air quality plans developed to meet federal requirements are referred to as State Implementation Plans (SIPs). The California Clean Air Act also requires plans for nonattainment areas with respect to the state standards. Thus, just as areas in California have two sets of designations, many also have two sets of air quality plans: one to meet federal requirements relative to the federal standards and one to meet state requirements relative to the state standards.

The project site is located in an area currently designated “nonattainment” for state and federal ozone standards and for the state PM-10 standard (Air Resources Board, 2003). The Bay Area is “attainment” or “unclassified” with respect to the other ambient air quality standards. Table IV.C-2 shows the attainment status of the Bay Area with respect to the federal and state ambient air quality standards for different criteria pollutants.

In April 2004, the U.S. EPA issued the first phase of its rules for implementation of a new eight-hour ozone standard, effective June 15, 2004. EPA had issued an eight-hour ozone standard in July 1997, based on information demonstrating that the existing one-hour standard was inadequate for protecting public health. The eight -hour standard was challenged in court and upheld, albeit with some court-required adjustments to its implementation. The eight-hour standard will replace the existing one-hour standard.<sup>1</sup> EPA also issued a list of areas designated nonattainment for the new standard (U.S. EPA, 2004). The Bay Area is designated as nonattainment for the new eight-hour standard and classified as “marginal,” meaning the region must develop a new attainment plan that demonstrates how the Bay Area can meet the new

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<sup>1</sup> The one-hour standard will be revoked within one year of the June 15, 2004, effective date of the new regulations.

**TABLE IV.C-1  
STATE AND FEDERAL CRITERIA AIR POLLUTANT  
STANDARDS, EFFECTS, AND SOURCES**

<b>Pollutant</b>	<b>Averaging Time</b>	<b>State Standard</b>	<b>Federal Standard</b>	<b>Pollutant Health and Atmospheric Effects</b>	<b>Major Pollutant Sources</b>
<b>Ozone</b>	1 hour 8 hours	0.09 ppm ---	0.12 ppm 0.08 ppm	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NO <sub>x</sub> ) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
<b>Carbon Monoxide</b>	1 hour 8 hours	20 ppm 9 ppm	35 ppm 9 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
<b>Nitrogen Dioxide</b>	1 hour Annual Avg.	0.25 ppm ---	--- 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
<b>Sulfur Dioxide</b>	1 hour 3 hours 24 hours Annual Avg.	0.25 ppm --- 0.04 ppm ---	--- 0.5 ppm 0.14 ppm 0.03 ppm	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
<b>Respirable Particulate Matter (PM-10)</b>	24 hours Annual Avg.	50 ug/m <sup>3</sup> 20 ug/m <sup>3</sup>	150 ug/m <sup>3</sup> 50 ug/m <sup>3</sup>	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. wind-raised dust and ocean sprays).
<b>Fine Particulate Matter (PM-2.5)</b>	24 hours Annual Avg.	--- 12 ug/m <sup>3</sup>	65 ug/m <sup>3</sup> 15 ug/m <sup>3</sup>	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NO <sub>x</sub> , sulfur oxides, and organics.
<b>Lead</b>	Monthly Quarterly	1.5 ug/m <sup>3</sup> ---	--- 1.5 ug/m <sup>3</sup>	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurologic dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.

NOTE: ppm = parts per million; ug/m<sup>3</sup> = micrograms per cubic meter.

SOURCES: South Coast Air Quality Management District. 1997. Air Quality Management Plan. November 1996.

<http://www.arb.ca.gov/health/heath.htm>.

California Air Resources Board, 2003. <http://www.arb.ca.gov/aqs/aaqs2.pdf>

**TABLE IV.C-2**  
**ATTAINMENT STATUS OF THE PROJECT AREA FOR STATE AND FEDERAL**  
**AMBIENT AIR QUALITY STANDARDS**

Pollutant	Averaging Time	Attainment Status	
		State Standards <sup>1</sup>	Federal Standards <sup>2</sup>
Ozone	8-Hour	---	Nonattainment
	1-Hour	Nonattainment	Nonattainment
Carbon Monoxide	8-Hour	Attainment	Attainment <sup>3</sup>
	1-Hour	Attainment	Attainment
Nitrogen Dioxide	Annual Average	---	Attainment
	1-Hour	Attainment	---
Sulfur Dioxide Attainment	Annual Average	---	Attainment
	24-Hour	Attainment	Attainment
	1-Hour	Attainment	---
Respirable Particulate Matter (PM-10)	Annual Arithmetic mean	Nonattainment	Attainment
	24-Hour	Nonattainment	Unclassified <sup>4</sup>
Fine Particulate Matter (PM-2.5)	Annual Arithmetic Mean	Nonattainment	Unclassified <sup>4</sup>
	24-Hour	---	Unclassified <sup>4</sup>
Lead	Calendar Quarter	---	Attainment
	30 Day Average	Attainment	---

<sup>1</sup> California Standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, and PM-10 are values that are not to be exceeded.

<sup>2</sup> Federal standards other than for ozone and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year.

<sup>3</sup> In June 1998, the Bay Area was redesignated to attainment for the federal carbon monoxide standard. Previously the area was designated "nonattainment."

<sup>4</sup> EPA is expected to issue final designations with respect to the federal PM-2.5 standards by December 2004. ARB staff anticipates that the Bay Area will be in attainment for the federal PM-2.5 standards (CARB, 2004).

SOURCE: Bay Area Air Quality Management District, Bay Area Attainment Status. 2003. <http://www.baaqmd.gov/pln/ambientairquality.asp>

standard by June 2007. (As shown in Table IV.C-1, the eight -hour ozone standard is 0.08 parts per million (ppm), averaged over eight hours. The one- hour standard is 0.12 ppm, measured in hourly readings.)

### **REGULATORY AGENCIES**

The EPA is responsible for implementing the programs established under the federal Clean Air Act, such as establishing and reviewing the National Ambient Air Quality Standards and judging the adequacy of SIPs, but has delegated the authority to implement many of the federal programs

to the states while retaining an oversight role to ensure that the programs continue to be implemented. The California Air Resources Board is responsible for establishing and reviewing the state ambient air quality standards, compiling the California State Implementation Plan and securing approval of that plan from the EPA, and identifying toxic air contaminants. The Air Resources Board also regulates mobile emissions sources in California, such as construction equipment, trucks, and automobiles, and oversees the activities of air quality management districts, which are organized at the county or regional level. The county or regional air quality management districts are primarily responsible for regulating stationary emissions sources at industrial and commercial facilities within their geographic area and for preparing the air quality plans that are required under the federal Clean Air Act and California Clean Air Act.

### ***AIR QUALITY PLANS, POLICIES AND REGULATIONS***

#### **Plans and Policies**

As noted earlier, the federal Clean Air Act and the California Clean Air Act require plans to be developed for areas designated as nonattainment (with the exception of areas designated as nonattainment for the state PM-10 and PM-2.5 standards). Plans are also required under federal law for areas designated as “maintenance” for federal standards. Such plans are to include strategies for attaining the standards. Currently, there are three plans for the Bay Area including the Ozone Attainment Plan for the 1-Hour National Ozone Standard (Association of Bay Area Governments (ABAG), 2001) developed to meet federal ozone air quality planning requirements; the Bay Area 2000 Clean Air Plan (BAAQMD, 2000a) developed to meet planning requirements related to the state ozone standard; and the Carbon Monoxide Maintenance Plan (ABAG, 1994) developed to ensure continued attainment of the federal carbon monoxide standard.

The Bay Area 2001 Ozone Attainment Plan has been prepared by the Bay Area Air Quality Management District (BAAQMD), the Metropolitan Transportation Commission, and the Association of Bay Area Governments as a proposed revision to the Bay Area part of California’s plan to achieve the federal ozone standard. The plan was prepared in response to the EPA’s partial approval and partial disapproval of the Bay Area’s 1999 Ozone Attainment Plan and finding of failure to attain the federal standard for ozone. The Revised Plan was adopted by the Boards of the co-lead agencies at a public meeting on October 24, 2001, and approved by the ARB at its November 1, 2001 hearing. The Plan is now pending approval from the EPA as a revision to the California State Implementation Plan. This Plan amends and supplements the 1999 Plan and predicts attainment of the federal ozone standard by 2006.

#### **Rules and Regulations**

The regional agency primarily responsible for developing air quality plans for the Bay Area is BAAQMD, the agency with permit authority over most types of stationary emission sources of air pollutants in the Bay Area. BAAQMD exercises permit authority through its *Rules and Regulations*. Both federal and state ozone plans rely heavily upon stationary source control measures set forth in BAAQMD’s *Rules and Regulations*. In contrast to the ozone plans, the *Carbon Monoxide Maintenance Plan* relies heavily on mobile source control measures. There are

no stationary air emission sources proposed as part of the project, with the exception of minimal emissions that would be generated by space heating. Area source emissions are emissions resulting from sources that individually emit fairly small quantities of air pollutants but which cumulatively represent significant quantities of air emissions (BAAQMD, 1999). Area source emissions include water heaters, fireplaces, and lawn maintenance equipment (BAAQMD, 1999). No wood-burning fireplaces are proposed. However, with respect to the construction phase of the project, applicable BAAQMD regulations would relate to portable equipment (e.g., Portland concrete batch plants, and gasoline- or diesel-powered engines used for power generation, pumps, compressors, pile drivers, and cranes), architectural coatings, and paving materials. Equipment used during project construction would be subject to the requirements of BAAQMD Regulation 2 (Permits), Rule 1 (General Requirements) with respect to portable equipment unless exempt under Rule 2-1-105 (Exemption, Registered Statewide Portable Equipment); BAAQMD Regulation 8 (Organic Compounds), Rule 3 (Architectural Coatings); and BAAQMD Regulation 8 (Organic Compounds), Rule 15 (Emulsified and Liquid Asphalts). Emissions resulting from construction truck traffic are regulated by the state Air Resources Board.

### **City of Oakland General Plan**

The Open Space, Conservation, and Recreation Element of the *Oakland General Plan* contains the following Air Quality objective and policies that would apply to the proposed project.

#### ***OBJECTIVE***

1. To improve air quality in Oakland and the surrounding Bay Region.

#### ***POLICIES***

- CO-12.1. Promote land use patterns and densities which help improve regional air quality conditions. The City supports efforts of the responsible public agencies to reduce air pollution.
- CO-12.4. Require that development projects be designed in a manner which reduces potential adverse air quality impacts.

Locating a mixed use project such as the proposed project near major transportation corridors and mass transit facilities is consistent with the above objective and policies of the general plan.

#### ***EXISTING AIR QUALITY***

The BAAQMD operates a regional monitoring network that measures the ambient concentrations of the six criteria pollutants. Existing and probable future levels of air quality in Oakland can generally be inferred from ambient air quality measurements conducted by the BAAQMD at its monitoring stations. The major pollutants of concern in the Bay Area, ozone and particulate matter, are monitored at a number of locations. The monitoring station closest to the project site is on Alice Street in Oakland, approximately 1 mile from the project site. The station monitors ozone, as well as carbon monoxide. Currently, the nearest station to the project site that monitors

particulate matter (PM-10 and PM-2.5) is the Chapel Way station in Fremont, located approximately 22 miles southeast of the project site. The Port of Oakland (Port) initiated an air quality and meteorological monitoring program in West Oakland in 1997. The program was designed to collect baseline data on particulate air pollution in the West Oakland region prior to and during construction and operation of the Port maritime development projects (Port of Oakland, 2003). There are two monitoring stations: one in the vicinity of Port facilities and construction activities, and location is in the West Oakland residential neighborhood east (downwind) of the Port facilities (Port of Oakland, 2003). Table IV.C-3 shows a five-year summary of ozone and carbon monoxide monitoring data from the Alice Street station and PM-10 concentrations at the Port of Oakland monitoring stations. The table also compares measured pollutant concentrations with state and federal ambient air quality standards.

### ***OZONE***

Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NO<sub>x</sub>). ROG and NO<sub>x</sub> are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is, therefore, considered a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NO<sub>x</sub> under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of ozone.

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and that can cause substantial damage to vegetation and other materials.

On-road motor vehicles emit approximately 48 percent and 49 percent of the regional inventory of ROG and NO<sub>x</sub> respectively that contribute to ozone formation (CARB, 1999). Peak ozone values in the Bay area have declined approximately one percent per year, on average, since the 1986-88 base period. From 1990 through 1994, the Bay Area experienced a five-year period with ozone concentrations that met the federal 1-hour ozone standard, but during the summer of 1995, the Bay Area experienced its worst ozone season in a decade, with 11 days over the federal standard and 28 days over the state standard. The next year, 1996 was somewhat cleaner with 8 days over the federal ozone standard and 34 days over the state standard. Based on the data shown in Table IV.C-3, there have been no exceedances of the state and the federal one-hour ozone standards recorded at the Alice Street station in the project vicinity over the last five years. Region-wide ROG and NO<sub>x</sub> emissions are expected to decrease by approximately 26 and 28 percent respectively from 2001 to 2010 (CARB, 2002).

**TABLE IV.C-3  
AIR QUALITY DATA SUMMARY (1999-2003) FOR THE PROJECT AREA**

Pollutant	Standard <sup>b</sup>	Monitoring Data by Year <sup>a</sup>				
		1999	2000	2001	2002	2003
<b>Ozone:</b>						
Highest 1 Hour Average (ppm) <sup>c</sup>		0.08	0.07	0.07	0.05	0.08
Days over State Standard	0.09	0	0	0	0	0
Days over Federal Standard	0.12	0	0	0	0	0
Highest 8 Hour Average (ppm) <sup>c</sup>	0.08	0.06	0.05	0.04	0.04	0.05
Days over Federal Standard		0	0	0	0	0
<b>Carbon Monoxide:</b>						
Highest 8 Hour Average (ppm) <sup>c</sup>	9.0	5.2	3.4	4.0	3.3	2.8
Days over State Standard		0	0	0	0	0
<b>Particulate Matter (PM-10) (September 2002 – August 2003)<sup>d</sup>:</b>						
<i>Port Site</i>						
Annual Average ( $\mu\text{g}/\text{m}^3$ )						
State Standard	20	34.6	30.6	33.4	27.1	16.2
Federal Standard	50					
<i>Residential Site</i>						
Annual Average ( $\mu\text{g}/\text{m}^3$ )						
State Standard	20	25.5	25	26.8	25.6	22.3
Federal Standard	50					
<b>Particulate Matter (PM-2.5) (September 2002 – August 2003)<sup>d</sup>:</b>						
<i>Port Site</i>						
Annual Average ( $\mu\text{g}/\text{m}^3$ )						
State Standard	12	12.6	11.0	11.6	10.6	12.5
Federal Standard	15					
<i>Residential Site</i>						
Annual Average ( $\mu\text{g}/\text{m}^3$ )						
State Standard	12	11.8	11.2	10.6	11.0	9.9
Federal Standard	15					

<sup>a</sup> Data are from the Alice Street station in Oakland.

<sup>b</sup> Generally, state standards are not to be exceeded and federal standards are not to be exceeded more than once per year.

<sup>c</sup> ppm = parts per million;  $\mu\text{g}/\text{m}^3$  = micrograms per cubic meter.

<sup>d</sup> Source: Port of Oakland. 2003a. Annual period varies. Years 1999 and 2000 include January to December. Annual period in 2001 is from January to August, continuing to September 2001 to August 2002, and from September 2002 to September 2003.

NOTE: Values in **bold** are in excess of applicable standard. NA = Not Available.

SOURCE: California Air Resources Board, *Summaries of Air Quality Data*, 1998, 1999, 2000, 2001, 2002, 2003; <http://www.arb.ca.gov/adam>.

### ***CARBON MONOXIDE***

Carbon monoxide is a non-reactive pollutant that is a product of incomplete combustion and is mostly associated with motor vehicle traffic. Elevated carbon monoxide concentrations develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions (typically from the evening through early morning). These stable atmospheric conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased carbon monoxide emission rates at low air temperatures.

When inhaled at high concentrations, carbon monoxide combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia.

The project site is located in an area designated as an “attainment” area for carbon monoxide standards (Table IV.C-2). Further, according to the Table IV.C-3, there have been no exceedances of state and federal ambient carbon monoxide standards at the Alice Street station in the last five years. Based on BAAQMD carbon monoxide isopleth maps, existing background carbon monoxide concentrations in the project vicinity are approximately 6.0 and 4.0 parts per million, one-hour and eight-hour average respectively (BAAQMD, 1999). On-road motor vehicles are responsible for approximately 75 percent of the carbon monoxide emitted within the San Francisco Bay Area and 80 percent of the emissions in Alameda County (CARB, 1999). Carbon monoxide emissions are expected to decrease within the county by approximately 40 percent between 2001 and 2010 (CARB, 2002).

### ***PARTICULATE MATTER***

PM-10 and PM-2.5 consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. (A micron is one-millionth of a meter). PM-10 and PM-2.5 represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility.

PM-10 emissions in the project area are mainly from urban sources, dust suspended by vehicle traffic and secondary aerosols formed by reactions in the atmosphere. Particulate concentrations near residential sources generally are higher during the winter, when more fireplaces are in use and meteorological conditions prevent the dispersion of directly emitted contaminants. Direct PM-10 emissions in Alameda County are expected to increase by approximately 10 percent between 2001 and 2010. This increase would be primarily from stationary sources (such as

industrial activities) and area sources (such as construction and demolition, road dust and other miscellaneous processes).

In 1997, U.S. EPA announced new ambient air quality standards for fine particulate matter. The new standards were intended to provide greater protection of public health. EPA proposed a new standard for the smaller particles, PM-2.5 that included an annual standard and a 24-hour standard. Following the announcement of the new national standards, the BAAQMD began collecting monitoring data to determine the region's attainment status with respect to the new standards. Industry groups challenged the new standards in court, but as of December 1999 the status of the new standards was uncertain (BAAQMD, 1999).

### ***OTHER CRITERIA POLLUTANTS***

The standards for nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), and lead are being met in the Bay Area, and the latest pollutant trends suggest that these standards will not be exceeded in the foreseeable future (ABAG, 1999a). Ambient levels of airborne lead in the Bay Area are well below the state and federal standard and are expected to continue to decline. Because no sources of lead emissions exist on the project site or are proposed by the project, lead emissions are not required to be quantified by the BAAQMD and are not further evaluated in this analysis.

### ***SENSITIVE RECEPTORS***

Some receptors are considered more sensitive than others to air pollutants. Reasons for increased sensitivity include pre-existing health problems, proximity to emissions source, or duration of exposure to air pollutants. Schools, hospitals and convalescent homes are considered to be relatively sensitive to poor air quality because children, elderly people and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because people usually stay home for extended periods of time, with associated greater exposure to ambient air quality. Recreational uses are also considered sensitive due to the greater exposure to ambient air quality conditions because vigorous exercise associated with recreation places a high demand on the human respiratory system.

Sensitive receptors in the project area include the residential units interspersed throughout the area, particularly across Valley Street from the project site, the child care center on West Grand Avenue, immediately west of the site, and the YMCA on Broadway, due to its indoor recreational uses. The project site includes an apartment complex (Casa Blanca Apartments) with 16 residential units that would be demolished as part of the project and, therefore, would not be considered a sensitive receptor, assuming the units are vacated by the start of construction.

## IMPACTS AND MITIGATION MEASURES

### *SIGNIFICANCE THRESHOLDS*

Generally, the City of Oakland considers a project would have a significant effect on the environment 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;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations;
- Create frequent, substantial, objectionable odors affecting a substantial number of people;
- Contribute to CO concentrations exceeding the State ambient air quality standard of 9 parts per million (ppm) averaged over 8 hours and 20 ppm for 1 hour;
- Result in total emissions of ROG, NO<sub>x</sub>, or PM-10 of 15 tons per year or greater, or 80 pounds (36 kilograms) per day or greater;
- Result in potential to expose persons to substantial levels of TACs, such that the probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million;
- Result in ground level concentrations of non-carcinogenic toxic air contaminants such that the Hazard Index would be greater than 1 for the MEI; or
- Result in a fundamental conflict with the local general plan, when the general plan is consistent with the regional air quality plan.

The following air quality analysis addresses all of these general criteria except the fifth criterion regarding odors. Because any sources of odor proposed as part of the project, such as restaurants, would be subject to the requirements of BAAQMD Regulation 7 – Odorous Substances, any odor impacts would be mitigated by this regulation.

For project-level impact analysis, the BAAQMD provides various thresholds and tests of significance. For ROG, NO<sub>x</sub> and PM-10, a net increase of 80 pounds per day (lbs./day) is considered significant, while for CO, an increase of 550 lbs./day would be considered significant if it leads to a possible local violation of the carbon monoxide standards (i.e. if it creates a “hot

spot”). Generally, if a project results in an increase in ROG, NO<sub>x</sub>, or PM-10, of more than 80 pounds per day, then it would also be considered to contribute substantially to a significant cumulative effect. For projects that would not lead to a significant increase of ROG, NO<sub>x</sub>, or PM-10 emissions, the cumulative effect is evaluated based on a determination of the consistency of the project with the regional Clean Air Plan. Generally, a project that is consistent with the applicable General Plan, such as the proposed project, would not contribute in a significant manner to the cumulative regional effect if the applicable General Plan itself is consistent with the Clean Air Plan. To be consistent with the Clean Air Plan, a General Plan must be based on population projections that are consistent with those used in developing the Clean Air Plan and must provide for a rate of increase in vehicle miles traveled (VMT) that does not exceed the rate of increase in population. The growth projections for Oakland in the Clean Air Plan are based on the City’s General Plan in effect at the time the CAP was approved;<sup>2</sup> therefore, the current City of Oakland General Plan is consistent with the 2000 Clean Air Plan.

Furthermore, the General Plan is consistent with a number of the Clean Air Plan’s Transportation Control Measures (TCMs), developed for implementation by local governments to assist in attaining air quality objectives. The General Plan Land Use and Transportation Element encourages growth in proximity to public transit (along transit corridors or in transit villages), which is consistent with TCM 13 (provision of incentives for transit use) and TCM 15 (include policies and programs beneficial to air quality in local planning and development activities). In general, higher density development, such as that proposed by the project, tends to encourage the use of public transit, as well as bicycling and walking. Such compact development strategies can also further TCM 1 (support for employer-based trip reduction programs), because such programs are generally most effective where alternative forms of travel, such as transit or walking, are viable, as well as TCM 19 (support for pedestrian travel).

## ***METHODOLOGY***

Project-related air quality impacts fall into two categories: short-term impacts due to construction, and long-term impacts due to project operation. First, during project construction, the project would affect local particulate concentrations primarily due to fugitive dust sources. Over the long term, the project would result in an increase in emissions primarily due to related motor vehicle trips. On-site stationary sources and area sources would result in lesser quantities of pollutant emissions.

For construction phase impacts, BAAQMD does not require quantification of construction emissions, but recommends that significance be based on a consideration of the control measures to be implemented (BAAQMD, 1999). Construction impacts are discussed qualitatively and the applicable BAAQMD recommended dust abatement measures are identified.

Operational-phase emissions were estimated using the URBEMIS 2002 model (CARB, 2003) for analysis year 2005 and compared to BAAQMD significance thresholds. Lastly, cumulative

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<sup>2</sup> The 2000 CAP is based on the City’s General Plan in effect in 1999, at the time the 2000 CAP was drafted.

impacts of the project were evaluated based on the *BAAQMD CEQA Guidelines* as discussed under the significance thresholds.

### ***PROJECT CONSTRUCTION IMPACTS***

#### **Impact C.1: Activities associated with demolition, site preparation and construction would generate short-term emissions of criteria pollutants, including suspended and inhalable particulate matter and equipment exhaust emissions. (Significant)**

Construction related emissions would be short term, but may still cause adverse effects on the local air quality. The proposed project would involve construction of approximately 40,000 square feet of commercial space, 475 residential units and 675 parking spaces. To accomplish this, the project would demolish a total of approximately 110,000 square feet of existing buildings – 20,000 on Parcel A and 90,000 on Parcel B (See Figure 2).

A project's most common construction activities include site preparation, earthmoving and general construction. Site preparation includes activities such as general land clearing and grubbing. Earthmoving activities include cut and fill operations, trenching, soil compaction and grading. General construction includes adding improvements such as roadway surfaces, structures and facilities. Emissions generated from these construction activities include:

- Dust (including PM-10 and PM-2.5) primarily from “fugitive” sources (i.e., emissions released through means other than through a stack or tailpipe) such as soil disturbance;
- Combustion emissions of criteria air pollutants (ROG, NO<sub>x</sub>, CO, SO<sub>x</sub>, PM-10) primarily from operation of heavy equipment construction machinery (primarily diesel operated), portable auxiliary equipment and construction worker automobile trips (primarily gasoline operated); and
- Evaporative emissions (ROG) from asphalt paving and architectural coating applications.

Some structural components of the buildings to be demolished may contain hazardous materials such as asbestos used in insulation, fire retardants, or building materials (floor tile, roofing, etc.) and lead-based paint (see Chapter IV.F, Hazards and Hazardous Materials). As noted therein, if asbestos were present in building materials to be removed, demolition and disposal would be required to be conducted in accordance with standard procedures as specified by the BAAQMD.

Construction-related fugitive dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. In the absence of mitigation, construction activities may result in significant quantities of dust, and as a result, local visibility and PM-10 concentrations may be adversely affected on a temporary and intermittent basis during the construction period. In addition, the fugitive dust generated by construction would include not only PM-10, but also larger particles, which would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts. The BAAQMD's approach to analyses of fugitive dust emissions from construction is to emphasize implementation

of effective and comprehensive dust control measures rather than detailed quantification of emissions. The District considers any project's construction related impacts to be less than significant if the required dust-control measures are implemented. Without these measures, the impact is generally considered to be significant, particularly if sensitive land uses are located in the project vicinity. In the case of the project, in addition to residential units on Valley Street and elsewhere in the project vicinity, there is a child care center on West Grand Avenue and a YMCA on Broadway. Therefore, without mitigation this impact would be considered significant.

Construction activities would also result in the emission of ROG, NO<sub>x</sub>, CO, SO<sub>x</sub> and PM-10 from equipment exhaust, construction-related vehicular activity and construction worker automobile trips. Emission levels for construction activities would vary depending on the volume and type of equipment, duration of use, operation schedules, and the number of construction workers. Criteria pollutant emissions of ROG and NO<sub>x</sub> from these emission sources would incrementally add to the regional atmospheric loading of ozone precursors during project construction. *BAAQMD CEQA Guidelines* recognize that construction equipment emits ozone precursors, but indicate that such emissions are included in the emission inventory that is the basis for regional air quality plans. Therefore construction emissions of ROG and NO<sub>x</sub> are not expected to impede attainment or maintenance of ozone standards in the Bay Area (BAAQMD, 1999), and those emissions, therefore, would result in a less-than-significant effect.

**Mitigation Measure C.1a: During construction, the project sponsor shall require the construction contractor to implement the following measures required as part of BAAQMD's basic procedures required for sites of less than four acres.<sup>3</sup> These include:**

Basic Control Measures

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

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<sup>3</sup> Although, together, Parcels A and B comprise approximately 5 acres, the project sponsor intends to complete construction on Parcel A prior to the start of construction on Parcel B. Therefore, there would be no soil disturbance of more than four acres at any given time. Furthermore, the BAAQMD's Enhanced Dust Control Measures would, in general not apply to the proposed project, in that the project would not involve "inactive" areas once graded; would not require stockpiles of dirt, sand, etc.; would not include unpaved roads; and would not involve disturbance of currently vegetated areas.

**Mitigation Measure C.1b: In accordance with standard City practices, to minimize water quality impacts, the project sponsor shall be required to comply with applicable standards and regulations of the City of Oakland. In addition, the following standard measures shall be implemented to avoid impacts related to stormwater or water quality: grading of unpaved areas shall be done in such a manner as to control surface drainage and redirect surface water away from areas of activity during excavation and construction, and the project shall be required to comply with provisions of the Clean Water Act, if applicable, with regard to preparing a storm water discharge plan.**

Implementation of the above water quality control measure (already included in the project for water quality; see Section VIII, Hydrology and Water Quality of the Initial Study, Appendix A of the DEIR), would be consistent with the BAAQMD's Enhanced Control Measure calling for installation of sandbags or other erosion control measures to prevent silt runoff to public roadways, and would further reduce construction-generated dust.

In addition, the project sponsor proposes to install a wheel wash system for all exiting trucks, or to wash off the tires or tracks of all trucks and equipment leaving the site, consistent with one of the BAAQMD's Optional Control Measures. This, too, would contribute to reduction of construction-generated dust.

**Significance after Mitigation:** Less than Significant.

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### ***PROJECT OPERATIONAL IMPACTS***

**Impact C.2: The project would result in an increase in ROG, NOx and PM emissions due to project-related traffic and on-site area sources. (Less than Significant)**

Over the long-term, the project would result in an increase in emissions primarily due to project-related motor vehicle trips. On-site stationary sources (such as natural gas fuel combustion for space and water heating) and area sources (such as landscaping equipment and use of consumer products such as household cleaners, insect repellants, hair sprays and other cosmetic items, etc.) would result in lesser quantities of pollutant emissions.

Emissions have been estimated for 2005 (the earliest that project uses could be occupied) using emission inventory model URBEMIS 2002 (version 7.4.2) and information from the traffic analysis prepared for this EIR (see Chapter IV.B). The results are shown in Table IV.C-4, where it is indicated that project-generated emissions would not exceed the significance thresholds specified by the BAAQMD for ROG, NOx and PM-10 in the analysis year 2005. Therefore, this impact would be less than significant.

The primary source of PM-2.5 emissions from project operation would be diesel trucks making deliveries to retail stores and other commercial uses on the project site. However, inasmuch as the project would include no large retail spaces and only about 40,000 square feet of commercial

space in total, the number of truck trips associated with the project is not anticipated to be significant (fewer than 10 per day,<sup>4</sup> not all of which would necessarily be diesel-powered). Additionally, the number of truck trips would be distributed throughout the day and distributed spatially at various locations on the site. Therefore, no single sensitive receptor would be exposed to emissions from all the truck trips during the day. Given the minimal number of truck trips generated by the project, concentration of PM-2.5 emissions from the activity of project-generated truck trips would not exceed the ambient air quality standards. Therefore, impact of PM-2.5 emissions from the project would be less than significant.

**Mitigation:** None required.

**TABLE IV.C-4  
OPERATIONAL EMISSIONS 2005<sup>a</sup> (pounds per day)**

Pollutant	Total Emissions	BAAQMD Thresholds
ROG	56.25	80
NO <sub>x</sub>	58.43	80
PM-10	48.51	80
CO	624.26	550 <sup>b</sup>

<sup>a</sup> 2005 Estimated Project Emissions. Emissions estimates were generated using the Air Resources Board’s URBEMIS 2002 model for the San Francisco Bay Air Basin, and assume a default vehicle mix with 3,968 net new vehicle trips per day. Input assumptions include a summertime ambient temperature of 85 degrees, a wintertime ambient temperature of 40 degrees and year 2005 EMFAC 2002 composite emission factors. Architectural coating factor was not considered as a factor. All daily estimates are for summertime conditions except for CO, which assumes wintertime conditions.

<sup>b</sup> Projects for which mobile source CO emissions exceed 550 pounds per day do not necessarily have a significant air quality impact, but are required to estimate localized CO concentrations. Refer to Impact C.3 for analysis of project CO emissions.

SOURCE: Environmental Science Associates, 2004.

**Impact C.3: Project traffic would increase localized carbon monoxide concentrations at intersections in the project vicinity. (Less than Significant)**

In addition to the project’s regional contribution to the total pollution burden, project-related traffic may lead to localized “hot spots” or areas with high concentrations of carbon monoxide concentrations around stagnation points such as major intersections and heavily traveled and congested roadways. Project-related traffic could not only increase existing traffic volumes but also cause existing non-project traffic to travel at slower, more polluting speeds.

ESA used California Line Source Dispersion Model (CALINE 4) (Department of Transportation, 2003) to analyze localized carbon monoxide concentrations at three receptors at the roadway

<sup>4</sup> Truck trip estimate based on San Francisco Planning Department guidelines, which assume 0.22 truck trips per day for retail use.

segments and intersections that are expected to experience greater traffic volumes than others. The modeled results (included in Appendix A are presented in Table IV.C-5).

As shown in the table, the analysis demonstrated that no exceedances would occur in the vicinity of project site under all six scenarios. There is negligible or no impact of the implementation of the project when compared to the baseline CO concentrations. Therefore, the effect of the project on local carbon monoxide standards would be less than significant.

**Mitigation Measure C.3:** None required.

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**Impact C.4: Emissions generated by vehicular activity within the parking structures could result in a localized increase in carbon monoxide concentrations within the garage and adjacent areas and affect employees of the garage. (Less than Significant)**

The parking structures associated with the project would all be located at or above grade and would be vented to the outside via mechanical ventilation. Ventilation design of the parking structures would be subject to the standards in Section 311.9 of the California Building Code, enforced by the City of Oakland, which regulates for natural ventilation purposes, the size and distribution of the exterior openings of the structure. Because the project's parking structures would be built to these standards (or would be by California Building Code required to have mechanical ventilation designed by a registered engineer), there would be adequate ventilation within the parking structures that would disperse any buildup of pollutants. Furthermore, the CALINE 4 (see Impact C.3 and Table IV.C-5) modeling results for localized CO concentrations indicate no exceedance of CO standards at the receptors at worst intersections in the project vicinity, the intersections at Broadway and 24<sup>th</sup> Street and at Broadway and West Grand being located closest to any garage openings. Therefore, impacts to occupants of the parking structures or adjacent residents as the result of carbon monoxide hot spots or other concentrated emissions are considered less than significant.

**Mitigation Measure C.4:** None required.

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***CUMULATIVE IMPACTS***

**Impact C.5: The project, together with anticipated future cumulative development in Oakland and the Bay Area in general, would contribute to regional air pollution. (Less than Significant)**

**TABLE IV.C-5  
ESTIMATED CARBON MONOXIDE CONCENTRATIONS AT SELECTED  
INTERSECTIONS IN PROJECT VICINITY**

Receptor location	Averaging Time (hrs.)	Concentrations <sup>a</sup>					Cumulative (2025)
		State Standard	Existing (2004)	2004 plus Project	2010 Baseline	2010 plus Project	
Broadway and 24 <sup>th</sup> Street	1	20	6.1	6.1	5.6	5.6	5.0
	8	9	4.2	4.2	3.9	3.9	3.5
Broadway and W. Grand Ave.	1	20	6.5	6.5	6.0	6.0	5.2
	8	9	4.5	4.5	4.2	4.2	3.6
Telegraph Ave./ W. Grand Ave.	1	20	6.2	6.2	5.8	5.8	5.1
	8	9	4.3	4.3	4.0	4.0	3.5

<sup>a</sup> Concentrations relate to receptor locations at approximately 20 feet (6) meters from the edge of the roadways that form the intersection. The carbon monoxide analysis focuses on the weekday morning (a.m.) peak-hour because the project's effects on traffic congestion and related carbon monoxide concentrations are greater during that period. Carbon monoxide estimates shown above include background concentrations of 4.8 ppm, one-hour average.

SOURCE: Environmental Science Associates, 2004.

According to the *BAAQMD CEQA Guidelines*, any proposed project that would individually have a less-than-significant air quality impact and is consistent with the General Plan, where the General Plan is consistent with the Clean Air Plan, would be considered to have a less-than-significant cumulative air quality impact. Table IV.C-4 shows the operational emissions of ROG, NOx and PM-10 due to project-related traffic estimated based on the CARB model URBEMIS 2002. Because the project would not exceed the significance criteria of 80 pounds per day for ROG, NOx and PM-10 in 2005, the project's cumulative impact on air quality of the region would not be considered significant. As discussed earlier, and as discussed in the Initial Study (Section IX, Land Use and Planning; see Appendix A of the DEIR), the project would be generally consistent with the Oakland General Plan. Additionally, the project is consistent with the Clean Air Plan (2000), which encourages local governments to promote high density residential developments in proximity to transit.

**Mitigation Measure C.5:** Implement Mitigation Measure C.2.

**Significance after Mitigation:** Less-than-Significant

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