D. Air Quality

This section discusses both the construction and operational impacts of the proposed project on the local and regional air quality. The *Environmental Setting* section provides an overview of the regulatory context, plans, policies, and regulations, followed by regional information about climate and topography and existing baseline air quality conditions. The air pollutants of concern in the San Francisco Bay Area are ozone, carbon monoxide, and particulate matter. In addition, this section describes 1) the level of knowledge currently available regarding potential primary and secondary impacts of greenhouse gas (GHG) emissions, including climate change (and its secondary effects); and 2) presents a qualitative analysis of the proposed project's sources of GHG emissions and of project design features that would avoid or minimize those sources.

Environmental Setting

Regulatory Context for Air Quality

The U.S. Environmental Protection Agency (US EPA) is responsible for implementing the programs established under the federal Clean Air Act, such as establishing and reviewing the federal ambient air quality standards and judging the adequacy of State Implementation Plans (SIP). However, the EPA 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. In California, the California Air Resources Board (CARB) is responsible for establishing and reviewing the state ambient air quality standards, developing and managing the California SIP, securing approval of this plan from US EPA, and identifying toxic air contaminants (TACs). CARB 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. Air quality management districts are primarily responsible for regulating stationary emissions sources at facilities within its geographic areas and for preparing the air quality plans that are required under the federal Clean Air Act and California Clean Air Act (see *Air Quality Plans*, below). The Bay Area Air Quality Management District (BAAQMD) is the regional agency with regulatory authority over emissions sources in the Bay Area, which includes all of San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Marin, and Napa counties, the southern half of Sonoma County, and the southwestern half of Solano County.

Criteria Air Pollutants

As required by the federal Clean Air Act passed in 1970, US EPA has identified six criteria air pollutants that are pervasive in urban environments and for which state and national health-based ambient air quality standards have been established. US EPA calls these pollutants *criteria air pollutants* because the agency has regulated them by developing specific public health- and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead are the six criteria air pollutants.

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. 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_x). ROG and NO_x 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 a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NO_x under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds, like ozone. Ground level ozone in conjunction with suspended particulate matter in the atmosphere leads to hazy conditions generally termed as "smog."

Carbon Monoxide

Carbon monoxide, a colorless and odorless gas is a non-reactive pollutant that is a product of incomplete combustion and is mostly associated with motor vehicles. High carbon monoxide concentrations develop primarily during winter when periods of light wind combine with the formation of ground level temperature inversions (typically from the evening through early morning). These 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.

Nitrogen Dioxide

Nitrogen dioxide is an air quality concern because it acts a respiratory irritant and is a precursor of ozone. Nitrogen dioxide is produced by fuel combustion in motor vehicles, industrial stationary sources (such as industrial activities), ships, aircraft, and rail transit.

Sulfur Dioxide

Sulfur dioxide is a combustion product of sulfur or sulfur-containing fuels such as coal and oil, which are restricted in the Bay Area. Its health effects include breathing problems and it may cause permanent damage to lungs. SO_2 is an ingredient in acid rain (acid aerosols), which can damage trees, lakes, and property. Acid aerosols can also reduce visibility.

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, or less than one-25,000th of an inch. For comparison, human hair is 50 microns or larger in diameter. PM-10

and PM-2.5 represent particulate matter of sizes 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 aerosol-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 (PM-2.5) of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed[1] 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.

Lead

Leaded gasoline (currently phased out), paint (houses, cars), smelters (metal refineries), and manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects for which children are at special risk. Some lead-containing chemicals cause cancer in animals.

Some criteria air pollutants are considered regional in nature, some are considered local, and some have characteristics that are both regional and local. Air pollutants are also characterized as "primary" and "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 formed through chemical reactions in the atmosphere; these chemical reactions usually involve primary pollutants, normal constituents of the atmosphere, and other secondary pollutants. O_3 is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving ROG and NO_x. ROG and NO_x are known as precursor compounds for O_3. O_3 is a regional air pollutant because its precursors are transported and diffused by wind concurrently with O_3 production.

Ambient CO concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Wind speed and atmospheric mixing also influence CO concentrations. Under inversion conditions, CO concentrations may be distributed more uniformly over an area out to some distance from vehicular sources.

Ambient Air Quality Standards

Regulation of criteria air pollutants is achieved through both national and state ambient air quality standards and emissions limits for individual sources. Regulations implementing the federal Clean Air Act and its subsequent amendments established national ambient air quality standards (national standards) for the six criteria pollutants. California has adopted more stringent state

[1] "Adsorption" is a process that occurs when a gas or liquid accumulates on the surface of a solid and forms a film.

ambient air quality standards for most of the criteria air pollutants. In addition, California has established state ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Because of the unique meteorological problems in the state, there is considerable diversity between state and federal standards currently in effect in California, as shown in **Table IV.D-1**. The table also summarizes the related health effects and principal sources for each pollutant.

The ambient air quality standards are intended to protect the public health and welfare, and they incorporate an adequate margin of safety. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

Attainment Status

Under amendments to the federal Clean Air Act, US EPA has classified air basins or portions thereof, as either "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the national standards have been achieved. The California Clean Air Act, which is patterned after the federal Clean Air Act, also requires areas 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 national standards and one set with respect to the state standards.

The Bay Area is currently designated "nonattainment" for state and national (1 hour and 8 hour) ozone standards and for the state PM-10 and PM-2.5 standards. The Bay Area is designated "attainment" or "unclassified" with respect to the other ambient air quality standards. **Table IV.D-1** also shows the attainment status of the Bay Area with respect to the national and state ambient air quality standards for different criteria pollutants.

Air Quality Plans

The 1977 Clean Air Act Amendments require that regional planning and air pollution control agencies prepare a regional Air Quality Plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled in order to achieve all standards specified in the Clean Air Act. The 1988 California Clean Air Act also requires development of air quality plans and strategies to meet state air quality standards in areas designated as nonattainment (with the exception of areas designated as nonattainment for the state PM standards). Maintenance plans are required for attainment areas that had previously been designated nonattainment in order to ensure continued attainment of the standards. Air quality plans developed to meet federal requirements are referred to as State Implementation Plans.

TABLE IV.D-1
AMBIENT AIR QUALITY STANDARDS AND BAY AREA ATTAINMENT STATUS

Pollutant	Averaging Time	State Standard	Bay Area Attainment Status for California Standard	Federal Primary Standard	Bay Area Attainment Status for Federal Standard	Major Pollutant Sources
Ozone	8 hour	0.07 ppm	Unclassified	0.08 ppm	Non-Attainment	Motor vehicles, Other mobile sources, combustion, industrial and commercial processes
	1 hour	0.09 ppm	Non-Attainment	---	---	
Carbon Monoxide	8 hour	9.0 ppm	Attainment	9 ppm	Attainment	Internal combustion engines, primarily gasoline-powered motor vehicles
	1 Hour	20 ppm	Attainment	35 ppm	Attainment	
Nitrogen Dioxide	Annual Average	0.03 ppm	---	0.053 ppm	Attainment	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads
	1 Hour	0.18 ppm	Attainment	---	---	
Sulfur Dioxide	Annual Average	---	---	0.03 ppm	Attainment	Fuel combustion, chemical plants, sulfur recovery plants and metal processing
	24 Hour	0.04 ppm	Attainment	0.14 ppm	Attainment	
	1 Hour	0.25 ppm	Attainment	---	---	
Particulate Matter (PM-10)	Annual Arithmetic Mean	20 $\mu g/m^3$	Non-Attainment	---	---	Dust- and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays)
	24 hour	50 $\mu g/m^3$	Non-Attainment	150 $\mu g/m^3$	Unclassified	
Particulate Matter (PM2.5)	Annual Arithmetic Mean	12 $\mu g/m^3$	Non-Attainment	15 $\mu g/m^3$	Attainment	Same as above
	24 hour	---	---	35 $\mu g/m^3$	Unclassified	
Lead	Calendar Quarter	---	---	1.5 $\mu g/m^3$	Attainment	Lead smelters, battery manufacturing & recycling facilities
	30 Day Average	1.5 $\mu g/m^3$	Attainment	---	---	

ppm = parts per million; and $\mu g/m^3$ = micrograms per cubic meter

SOURCE: BAAQMD, 2007, CARB, 2007b.

Bay Area plans are prepared with the cooperation of the Metropolitan Transportation Commission (MTC), and the Association of Bay Area Governments (ABAG). Currently, there are three plans for the Bay Area, These are:

- The *Ozone Attainment Plan for the 1-Hour National Ozone Standard* (ABAG, 2001) developed to meet federal ozone air quality planning requirements

- The recently adopted *Bay Area 2005 Ozone Strategy* (BAAQMD, 2006) developed to meet planning requirements related to the state ozone standard; and

- The *1996 Carbon Monoxide Redesignation Request and Maintenance Plan for Ten Federal Planning Areas*, developed by the air districts with jurisdiction over the ten planning areas including the BAAQMD to ensure continued attainment of the federal carbon monoxide standard. In June 1998, the EPA approved this plan and designated the ten areas as attainment. The maintenance plan was revised most recently in 2004.

The Bay Area 2001 Ozone Attainment Plan was prepared as a proposed revision to the Bay Area part of California's plan to achieve the national ozone standard. The plan was prepared in response to US EPA's partial approval and partial disapproval of the Bay Area's 1999 Ozone Attainment Plan and finding of failure to attain the national ambient air quality standard for ozone. The Revised Plan was adopted by the Boards of the co-lead agencies at a public meeting and approved by the CARB in 2001. In July 2003, US EPA approved the Plan. US EPA also made an interim final determination that the Plan corrects deficiencies identified in the 1999 Plan. Following three years of low ozone levels (2001, 2002 and 2003), in October 2003, EPA proposed a finding that the Bay Area had attained the national one-hour standard and that certain elements of the 2001 Plan (attainment demonstration, contingency measures and reasonable further progress) were no longer required. In April 2004, US EPA made final the finding that the Bay Area had attained the one-hour standard and approved the remaining applicable elements of the 2001 Plan: emissions inventory; control measure commitments; motor vehicle emission budgets; reasonably available control measures; and commitments to further study measures.

US EPA recently transitioned from the national one-hour standard to a more health protective 8-hour standard. Defined as "concentration-based," the new national ozone standard is set at 85 parts per billion averaged over eight hours. The new national 8-hour standard is considered to be more health protective because it protects against health effects that occur with longer exposure to lower ozone concentrations. In April 2004, US EPA designated regions as attainment and nonattainment areas for the 8-hour standard. These designations took effect on June 15, 2004. US EPA formally designated the Bay Area as a nonattainment area for the national 8-hour ozone standard, and classified the region as "marginal" according to five classes of nonattainment areas for ozone, which range from marginal to extreme. Marginal nonattainment areas must attain the national 8-hour ozone standard by June 15, 2007. While certain elements of Phase 1 of the 8-hour implementation rule are still undergoing legal challenge, US EPA signed Phase 2 of the 8-hour implementation rule on November 9, 2005. It is not currently anticipated that marginal areas will be required to prepare attainment demonstrations for the 8-hour standard. Other planning elements may be required. The Bay Area plans to address all requirements of the national 8-hour standard in subsequent documents.

For state air quality planning purposes, the Bay Area is classified as a serious non-attainment area for ozone. The "serious" classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that the Bay Area update the Clean Air Plan (CAP) every three years to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data. The Bay Area's record of progress in implementing previous measures must also be reviewed. On January 4, 2006, the BAAQMD adopted the most recent revision to the CAP - the Bay Area 2005 Ozone Strategy. The control strategy for the 2005 Ozone Strategy is to implement all feasible measures on an expeditious schedule in order to reduce emissions of ozone precursors and consequently reduce ozone levels in the Bay Area and reduce transport to downwind regions.

In April 2005, CARB established a new eight-hour average ozone standard of 0.070 ppm, which became effective on May 17, 2006. CARB is currently working on designations and implementation guidance for the new standard. The one-hour state standard has been retained. The San Francisco Bay Area has not attained the state eight-hour standards and will be taking action as necessary to address those standards once the planning requirements have been established.

Toxic Air Contaminants

The Health and Safety Code defines TACs as air pollutants which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. TACs are less pervasive in the urban atmosphere than criteria air pollutants, but are linked to short-term (acute) or long-term (chronic and/or carcinogenic) adverse human health effects. There are hundreds of different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and motor vehicle exhaust. The current list of TACs includes approximately 200 compounds, including all of the toxics identified under federal law plus additional compounds, such as particulate emissions from diesel-fueled engines, which was added in 1998. Unlike regulations concerning criteria air pollutants, there are no ambient air quality standards for evaluating TACs. Instead, TAC emissions are evaluated based on the degree of health risk that could result from exposure to these pollutants. According to the BAAQMD, the local agency governing air quality issues in the Bay Area, diesel exhaust emissions pose the greatest degree of health risk to residents in the Bay Area.

Regulation of TACs is achieved through federal and state controls on individual sources.[2]

TACs have been regulated under federal air quality law since the 1977 federal Clean Air Act Amendments. The most recent federal Clean Air Act Amendments (1990) reflect a technology-based approach for reducing TACs. The first phase involves requiring facilities to install Maximum Achievable Control Technology (MACT). The MACT standards vary depending on

[2] Federal environmental laws refer to "hazardous air pollutants," while California environmental laws refer to "toxic air contaminants." Both of these terms basically encompass the same constituent toxic compounds.

the type of emitting source. US EPA has established MACT standards for over 20 facilities or activities, such as perchloroethylene dry cleaning and petroleum refineries. The second phase of control involves determining the residual health risk represented by air toxics emissions sources after implementation of MACT standards.

Two principal laws provide the foundation for state regulation of TACs from stationary sources. In 1983, the State Legislature adopted Assembly Bill 1807, which established a process for identifying TACs and provided the authority for developing retrofit air toxics control measures on a statewide basis. Air toxics from stationary sources in California are also regulated under Assembly Bill 2588, the Air Toxics "Hot Spots" Information and Assessment Act of 1987. Under Assembly Bill 2588, TAC emissions from individual facilities are quantified and prioritized by the regional air quality management district or county air pollution control district. High priority facilities are required to perform a health risk assessment, and if specific thresholds are violated, they are required to communicate the results to the public in the form of notices and public meetings. Depending on the risk level, emitting facilities can be required to implement varying levels of risk reduction measures.

Locally, the BAAQMD administers the Bay Area's Toxic Air Contaminant Control Program, which is intended to reduce public exposure to TACs from stationary sources in the Bay Area. BAAQMD is currently working to control TAC impacts at local "hot spots" and to reduce TAC background concentrations. The control strategy involves reviewing new stationary sources to ensure compliance with required emissions controls and limits, maintaining an inventory of existing stationary sources of TACs, and developing new rules and regulations to reduce TAC emissions.

Regulation of TACs from mobile sources has traditionally been implemented through emissions standards for on-road motor vehicles (imposed on vehicle manufacturers) and through specifications for gasoline and diesel fuel sold in California (imposed on fuel refineries and retailers), rather than through land use decisions, air quality permits, or regulations addressing how motor vehicles are used by the general public.

Local Standards for Air Quality

BAAQMD Rules and Regulations

The BAAQMD is the regional agency responsible for rulemaking, permitting and enforcement activities affecting stationary sources in the Bay Area. Specific rules and regulations adopted by the BAAQMD limit the emissions that can be generated by various uses and/or activities, and identify specific pollution reduction measures that must be implemented in association with various uses and activities. These rules regulate not only emissions of the six criteria air pollutants, but also toxic emissions and acutely hazardous non-radioactive materials emissions.

Emissions sources subject to these rules are regulated through the BAAQMD's permitting process and standards of operation. Through this permitting process, including an annual permit review, the BAAQMD monitors generation of stationary emissions and uses this information in developing its air quality plans. Any sources of stationary emissions constructed as part of the

proposed project would be subject to the BAAQMD *Rules and Regulations*. Both federal and state ozone plans rely heavily upon stationary source control measures set forth in BAAQMD's *Rules and Regulations.*

City of Oakland General Plan

The Open Space, Conservation, and Recreation Element (OSCAR) of the *Oakland General Plan* (Oakland, 1996) contains the following Air Quality objective and policies that would apply to the proposed project.

- To improve air quality in Oakland and the surrounding Bay Region. *(Objective 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. *(Policy CO-12.1)*
- Require that development projects be designed in a manner which reduces potential adverse air quality impacts. *(Policy CO-12.4)*

Oakland Zoning Regulations

The Oakland Zoning Regulations contain no provisions specific to air quality.

Regulatory Context for GHG Emissions and Climate Change

International and Federal

Kyoto Protocol

The United States participates in the United Nations Framework Convention on Climate Change (UNFCCC) (signed on March 21, 1994). The Kyoto Protocol is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions could be reduced by an estimated 5 percent from 1990 levels during the first commitment period of 2008–2012. It should be noted that although the United States is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol and the United States is not bound by the Protocol's commitments.

Climate Change Technology Program

The United States has opted for a voluntary and incentive-based approach toward emissions reductions in lieu of the Kyoto Protocol's mandatory framework. The Climate Change Technology Program (CCTP) is a multi-agency research and development coordination effort (which is led by the Secretaries of Energy and Commerce) that is charged with carrying out the President's National Climate Change Technology Initiative. (CCTP, 2006)

U.S. Environmental Protection Agency (US EPA)

To date, the US EPA has not regulated GHGs under the Clean Air Act (discussed above) based on the assertion that the "Clean Air Act does not authorize it to issue mandatory regulations to address global climate change and that it would be unwise to regulate GHG emissions because a causal link between GHGes and the increase in global surface air temperatures has not been unequivocally established." However, the U.S. Supreme Court in *Massachusetts v. EPA* (April 2, 2007) recently held that the US EPA can, and should, consider regulating motor-vehicle GHG emissions.

State of California

Assembly Bill (AB) 1493

On July 1, 2002, the California Assembly passed Assembly Bill (AB) 1493 (signed into law on July 22, 2002), requiring the CARB to "adopt regulations that achieve the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." The regulations were to be adopted by January 1, 2005, and apply to 2009 and later model-year vehicles. In September 2004, CARB responded by adopting "CO_2-equivalent fleet average emission" standards. The standards will be phased in from 2009 to 2016, reducing emissions by 22% in the "near term" (2009–2012) and 30 percent in the "mid term" (2013–2016), as compared to 2002 fleets.

Executive Order (EO) S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order (EO) S-3-05, establishing statewide GHG emissions reduction targets. This EO provides that by 2010, emissions shall be reduced to 2000 levels; by 2020, emissions shall be reduced to 1990 levels; and by 2050, emissions shall be reduced to 80 percent of 1990 levels. The Secretary of the California Environmental Protection Agency (CalEPA) is charged with coordinating oversight of efforts to meet these targets and formed the Climate Action Team (CAT) to carry out the EO. Several of the programs developed by the CAT to meet the emission targets are relevant to residential construction and are outlined in a March 2006 report.(CalEPA 2006a) These include anti-idling of certain classes of construction vehicles; provision of recycling facilities within residential buildings and communities; compliance with the Energy Commission's building and appliance energy efficiency standards; compliance with California's Green Buildings and Solar initiatives; and implementation of water-saving technologies and features.

California Assembly Bill 32 (AB 32)

On August 31, 2006, the California Assembly passed Bill 32 (AB 32) (signed into law on September 27, 2006), the California Global Warming Solutions Act of 2006. AB 32 commits California to reduce GHG emissions to 1990 levels and establishes a multi-year regulatory process under the jurisdiction of the CARB to establish regulations to achieve these goals. CARB must adopt such regulations by January 1, 2008. The regulations shall required monitoring and annual reporting of GHG emissions from selected sectors or categories of emitters of GHGs. By January 1, 2008, CARB also is required to adopt, a statewide GHG emissions limit equivalent to the statewide GHG emissions levels in 1990, which must be achieved by 2020. By January 1,

2011, CARB is required to adopt rules and regulations, which shall become operative January 1, 2012) to achieve the maximum technologically feasible and cost-effective GHG emission reductions.

On April 20, 2007, CARB published *Proposed Early Actions to Mitigate Climate Change in California.*(CalEPA 2007) There are no early action measures specific to residential development included in the list of 36 measures identified for CARB to pursue during calendar years 2007, 2008, and 2009. Also, this publication indicated that the issue of GHG emissions in CEQA and General Plans was being deferred for later action, so the publication did not discuss any early action measures generally related to CEQA or to land use decisions. As noted in that report: "AB 32 requires that all GHG reduction measures adopted and implemented by the Air Resources Board be technologically feasible and cost effective."(CalEPA 2007) The law permits the use of market-based compliance mechanisms to achieve those reductions and also requires that GHG measures have neither negative impacts on conventional pollutant controls nor any disproportionate socioeconomic effects (among other criteria).

As of publication of this Draft EIR, there has been no guidance from CARB or other agencies on the relation between AB 32 and CEQA, or on whether or how GHG emissions should be evaluated in EIRs. AB 32 also requires CARB to monitor compliance with and enforce any rule, regulation, order, emission limitation, emissions reduction measure, or market-based compliance mechanism that it adopts.

California Senate Bill 1368 (SB 1368)

On August 31, 2006, the California Senate passed SB 1368 (signed into law on September 29, 2006), which requires the Public Utilities Commission (PUC) to develop and adopt a "greenhouse gases emission performance standard" by February 1, 2007, for the private electric utilities under its regulation. The PUC adopted an interim standard on January 25, 2007, but has formally requested a delay until September 30, 2007, for the local publicly-owned electric utilities under its regulation These standards apply to all long-term financial commitments entered into by electric utilities.(California SB 2006) The California Energy Commission (CEC) was required to adopt a consistent standard by June 30, 2007. However, this date was missed, and CEC will address the concerns of the Office of Administrative Law (OAL) and resubmit the rulemaking as soon as possible. The rulemaking then must be approved by the OAL before it can take effect (Collord, 2007).

As noted above, the California Urban Water Management Planning Act requires various water purveyors throughout the State of California to prepare UWMPs, which assess the purveyor's water supplies and demands over a 20-year horizon.(California Water Code, Section 10631 *et seq*.) As required by that statute, UWMPs are updated by the purveyors every five years.

City of Oakland Local Plan and Policies Relevant to GHG Emissions and Climate Change

City of Oakland General Plan

Land Use and Transportation Element (LUTE)

The LUTE (which includes the Pedestrian Master Plan and Bicycle Master Plan) of the Oakland General Plan contains the following policies that address issues related to GHG Emissions and Climate Change:

- Transit-oriented development should be encouraged at existing or proposed transit nodes, defined by the convergence of two or more modes of public transit such as BART, bus, shuttle service, light rail or electric trolley, ferry, and inter-city or commuter rail. *(Policy T.2.1)*

- Transit-oriented developments should be pedestrian oriented, encourage nigh and day time use, provide the neighborhood with needed goods and services, contain a mix of land uses, and be designed to be compatible with the character of surrounding neighborhoods. *(Policy T.2.2)*

- The City should include bikeways and pedestrian ways in the planning of new, reconstructed, or realigned streets, wherever possible. *(Policy T3.5)*

- The City should encourage and promote use of public transit in Oakland by expediting the movement of and access to transit vehicles on designated "transit street" as shown on the Transportation Plan. *(Policy T3.6)*

- Through cooperation with other agencies, the City should create incentives to encourage travelers to use alternative transportation options. *(Policy T4.2)*

- In order to facilitate the construction of needed housing units, infill development that is consistent with the General Plan should take place throughout the City of Oakland. *(Policy N3.2)*

- The City should prepare, adopt, and implement a Bicycle and Pedestrian Master Plan as a part of the Transportation Element of [the] General Plan. *(Policy T4.5)*

Open Space, Conservation and Recreation Element

- Conserve existing City and Regional Parks characterized by steep slopes, large groundwater recharge areas, native plant and animal communities, extreme fire hazards, or similar conditions. *(Policy OS-1.1)*

- Manage Oakland's urban parks to protect and enhance their open space character while accommodating a wide range of outdoor recreational activities. (Policy OS-2.1)

- Employ a broad range of strategies, compatible with the Alameda Countywide Clean Water Program. *(Policy CO-5.3)*

- Promote land use patterns and densities which help improve regional air quality conditions by: (a) minimizing dependence on single passenger autos; (b) promoting projects which minimize quick auto starts and stops, such as live-work development,

mixed use development, and office development with ground floor retail space; (c) separating land uses which are sensitive to pollution from the sources of air pollution; and (s) supporting telecommuting, flexible work hours, and behavioral changes which reduce the percentage of people in Oakland who must drive to work on a daily basis. *(Policy CO-12.1)*

- Expanding existing transportation systems management and transportation demand management strategies which reduce congestion, vehicle idling, and travel in single passenger autos. *(Policy CO-12.3)*

- Require that development projects be designed in a manner which reduced potential adverse air quality impacts. This may include: (a) the use of vegetation and landscaping to absorb carbon monoxide and to buffer sensitive receptors; (b) the use of low-polluting energy sources and energy conservation measures; (c) designs which encourage transit use and facilitate bicycle and pedestrian travel. *(Policy CO-12.4)*

- Require new industry to use best available control technology to remove pollutants, including filtering, washing, nor electrostatic treatment of emissions. *(Policy CO-12.5)*

- Support public information campaigns, energy audits, the use of energy-saving appliances and vehicle, and other efforts which help Oakland residents, business, and City operations become more efficient. *(Policy CO-13.2)*

- Encourage the use of energy-efficient constriction and building material. Encourage site plans for new development which maximize energy efficiency. *(Policy CO-13.3)*

- Accommodate the development and use of alternative energy resources, including solar energy and technologies which convert waste or industrial byproducts to energy, provided that such activities are compatible with surrounding land uses and regional air and water quality requirements. *(Policy CO-13.4)*

Historic Preservation Element (HPE)

- Property relocation rather than demolition as part of discretionary permits – As a condition of approval for all discretionary projects involving demolition of existing or Potential Designated Historic Properties, the City will normally require that reasonable efforts be made to relocate the properties to an acceptable site. *(HPE Policy 3.7)*

Safety Element

- Prioritize the reduction of the wildfire hazard, with an emphasis on prevention. *(Policy FI-3)*

- Enforce and update local ordinance and comply with regional orders that would reduce the risk of storm-induced flooding. *(Policy FL-1)*

- Continue or strengthen city programs that seek to minimize the storm-induced flooding. *(Policy FL-2)*

City of Oakland Sustainability Programs

Oakland's sustainability efforts are managed by the Oakland Sustainability Community Development Initiative (SDI), created in 1998 (Ordinance 74678 C.M.S.). Efforts are organized into the following six major categories: Energy; Urban Design; Transportation; Waste Reduction; Water; and Environmental Health. Initiatives relevant to climate change and global warming are summarized below (City of Oakland, 2007):

- Chicago Climate Exchange - The City's Climate Protection program includes a March 2005 Council adoption of Chicago Climate Exchange Resolution (No. 79135 C.M.S.). The Chicago Climate Exchange (CCX) is a voluntary but legally binding system to reduce carbon dioxide emissions. Members agreed to reduce their emissions 1 percent per year from 2003-2006 below their baseline average. If the 1 percent reduction was not met, the City would be required to purchase GHG allowances from others in the Exchange; if the City exceeded this reduction, the additional earned GHG emission allowances could then be sold on the Exchange. Oakland met its obligated targets for period 2003-2004, but exceeded its obligated targets for 2004-2005 and 2005-2006.

- Community Choice Aggregation - Oakland has funded a Phase I feasibility study and a Phase II Implementation Plan to become a community choice aggregator, which would allow the City to purchase electricity on behalf of their residential and commercial constituents. Potential benefits of becoming an aggregator include increased use of renewable energy sources to meet Oakland's energy needs and a reduction in electricity costs.

- Energy Efficiency Participation - The City of Oakland has promoted energy efficiency with the following programs: Community Youth Energy Services (CYES), which hires and trains local youth to provide free in-home energy audits, education, and hardware installation to low income residents; CA-Leadership in Energy Efficiency Program (CA-LEEP), a CPUC-funded program which will help Oakland develop the energy efficiency component of the City's overall Sustainability Plan, positioning the City for funding from state and federal sources; the LED Christmas Light Project, a PG&E co-sponsored holiday light exchange, promoting energy efficiency and public outreach; and Savings by Design Lead Incentive Pilot, in which PG&E and the City collaborate to foster energy efficient building designs in new commercial and mixed use construction and major renovation projects.

- Renewable Energy - The City's Sustainability Program has set a priority of promoting renewable energy with a particular emphasis on solar. Aggressive renewable energy goals have been established, including: 50 percent of the city's entire electricity use from renewable sources by 2017; and 100 percent of the city's entire electricity use from renewable sources by 2030.

- Green Building - The City of Oakland has implemented Green Building principles in City buildings through the following programs: Civic Green Building Ordinance (Ordinance No. 12658 C.M.S., 2005), requiring, for certain large civic projects, techniques that minimize the environmental and health impacts of the built environment through energy, water and material efficiencies and improved indoor air quality, while also reducing the waste associated with construction, maintenance and remodeling over the life of the building; Green Building Guidelines (Resolution No. 79871, 2006) which provides

guidelines to Alameda County residents and developers regarding construction and remodeling; and Green Building Education Incentives for private developers.

- Green Economy, Business and Jobs / Green Business - The Alameda County Green Business Program offers technical assistance and incentives to businesses and agencies wishing to go beyond basic regulatory requirements. Socially Responsible Business Checklists: The Socially Responsible Business Task Force created a checklist designed to measure the relative level of social and environmental responsibility of firms nominated to receive major financial assistance from the City.

- Downtown Housing - The 10K Downtown Housing Initiative has a goal of attracting 10,000 new residents to downtown Oakland by encouraging the development of 6,000 market-rate housing units. This effort is consistent with Smart Growth principles.

- Clean Vehicles - In 2003, a "Green Fleet" Resolution established "Green Fleet" policies and procedures to reduce GHG emissions and improve air quality in the City of Oakland, and to increase the energy efficiency of the city's fleet.

- Port of Oakland Truck Replacement - Under the Truck Replacement Project, the Port provides a qualifying truck owner up to $40,000 to replace the on-road heavy-duty diesel truck, which serves the Port's Maritime Area, with a 1999 or newer model year truck. The Port will provide up to $2 million in total funding to replace approximately 80 trucks.

- Waste Reduction and Recycling - The City of Oakland has implemented the following changes:

  - *Residential Recycling*, in which yard trimmings and food waste collections were increased, with total yard trimming increases of 46 percent compared to 2004, and recycling tonnage increased by 37 percent;

  - *Business Recycling*, in which the City provides free technical assistance to Oakland businesses to start or expand their recycling programs and which includes the StopWaste Partnership program which improves environmental performance for businesses and agencies; and

  - *Construction and Demolition Recycling*, for which the City passed a resolution in July 2000 (Ordinance 12253. OMC Chapter 15.34), requiring certain nonresidential or apartment house projects to recycle 100 percent of all Asphalt & Concrete (A/C) materials and 65 percent of all other materials.

- Polystyrene Foam Ban Ordinance - In June 2006, the Oakland City Council passed the Green Food Service Ware Ordinance (Ordinance 14727, effective as of January 1, 2007), which prohibits the use of polystyrene foam disposable food service ware and requires, when cost neutral, the use of biodegradable or compostable disposable food service ware by food vendors and City facilities.

- Zero Waste Resolution - In March 2006 the Oakland City Council adopted a Zero Waste Goal by 2020 Resolution (Resolution 79774 C.M.S.), and commissioned the creation of a Zero Waste Strategic Plan to achieve the goal.

- Stormwater Management - On February 19, 2003, the Regional Water Quality Control Board, San Francisco Bay Region, issued a municipal stormwater permit under the

National Pollutant Discharge Elimination System (NPDES) permit program to the Alameda Countywide Clean Water Program (ACCWP). The purpose of the permit is to reduce the discharge of pollutants in stormwater to the maximum extent practicable and to effectively prohibit non-stormwater discharges into municipal storm drain systems and watercourses. The City of Oakland, as a member of the ACCWP, is a co-permittee under the ACCWP's permit and is, therefore, subject to the permit requirements.

Provision C.3 of the NPDES permit is the section of the permit containing stormwater pollution management requirements for new development and redevelopment projects. Among other things, Provision C.3 requires that certain new development and redevelopment projects incorporate post-construction stormwater pollution management measures, including stormwater treatment measures, stormwater site design measures, and source control measures, to reduce stormwater pollution after the construction of the project. These requirements are in addition to standard stormwater-related best management practices (BMPs) required during construction.

- Watershed Improvement - The City of Oakland, by implementing the Watershed Improvement Program has made environmental protection of creeks a priority. The City of Oakland, along with the other cities in the county, is a member of the Alameda Countywide Clean Water Program (ACCWP). ACCWP acts to limit stormwater runoff pollution and to keep creeks and the Bay healthy.

- Healthy Food Systems - The Mayor's office, working with graduate students from the University of California, developed a resolution authorizing an initial food systems assessment study. The study, authorized by the City Council on January 17, 2006 through Resolution No. 79680 C.M.S., examines current trends in Oakland's food system and recommends programs and policies that promote a sustainable food system for Oakland.

- Community Gardens and Farmer's Markets - Community Gardening locations include Arroyo Viejo, Bella Vista, Bushrod, Golden Gate, Lakeside Horticultural Center, Marston Campbell, Temescal, and Verdese Carter. Weekly Farmer's Markets at the Jack London Square, Old Oakland, Grand Lake, Mandela, and Temescal districts. Both efforts promote and facilitate the principal of growing and purchasing locally.

Physical Setting for Air Quality

Climate and Meteorology

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. 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). The Bay Area Air Basin encompasses the nine-county region including 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. During 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 and secondary particulates, such as nitrates and sulfates.

More specifically, the site lies approximately 2 miles east of San Francisco Bay in the Northern Alameda and Western Contra Costa Counties climatological subregion. This subregion stretches from Richmond to San Leandro with 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. However, the air pollution potential in this subregion is relatively low for portions close to the Bay, due to the largely good ventilation and less influx of pollutants from upwind sources (BAAQMD, 1999). Yet, during summer and fall, emissions generated within, and those transported to, the East Bay can combine with abundant sunshine under the restraining influences of topography and temperature inversions to create conditions that are conducive to the formation of photochemical pollutants, like ozone.

Wind measurements taken at Metropolitan Oakland International Airport indicate that the predominant wind flow is out of the west-northwest. Northwest winds occur approximately 46 percent of the time. Average wind speeds vary from season to season with the strongest average winds occurring during summer and the lightest average winds during winter. Average wind speeds are 9.7 miles per hour (mph) during summer and 7.4 mph during winter. Temperatures in Oakland average 58 ^{o}F annually, ranging from an average of 40^{o}F on winter mornings to the 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 confined almost exclusively to the "rainy" period from early November to mid-April. Oakland averages 18 inches of precipitation annually, but because much of the area's rainfall is derived from the fringes of mid-latitude storms, 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.

Existing Air Quality

Criteria Air Pollutants

The BAAQMD operates a regional monitoring network that measures the ambient concentrations of the six criteria air 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 nearby monitoring stations. The Alice Street station in Oakland is nearest to the project site (located approximately 2.5 miles to the northwest) and can be considered to be representative of the air quality in the vicinity of the project site. This station monitors ozone and carbon monoxide. **Table IV.D-2** shows a five-year summary of monitoring data for ozone and carbon monoxide from the Alice Street station. The table also compares these measured concentrations with state and federal ambient air quality standards. There is no BAAQMD or CARB station that monitors PM concentrations that can be considered to be representative of concentrations in the

project area. The Port of Oakland conducted an air quality and meteorological monitoring program in West Oakland from 1997 to 2004. The program was designed to collect baseline data on particulate air pollution in the West Oakland area prior to and during construction and operation of the Port maritime development projects, and to help evaluate the effectiveness of its mitigation programs. The program measured PM-10 and PM2.5 concentrations at two locations - one location was in the vicinity of Port facilities and construction activities, and another location in the West Oakland residential neighborhood east (downwind) of Port facilities. **Table IV.D-2** also shows PM-10 and PM-2.5 data from these locations and compares them to the state and national standards. **Table IV.D-3** shows trends in regional exceedances of the federal and state ozone standards. Because of the number of exceedances, ozone is the pollutant of greatest concern in the Bay Area. Bay Area counties experience most ozone exceedances during the period from April through October.

In contrast to some areas of the Bay Area Air Basin, air quality in Oakland generally meets clean air standards on most days. While the meteorology is generally favorable for maintaining good air quality, the Oakland area, along with other portions of the Bay Area that make up the central urban area (i.e., Berkeley-Oakland-San Francisco), is often considered a source region for some pollutants that contribute to elevated concentration levels in downwind communities, such as the Livermore Valley. This is especially the case with mobile or transportation sources.

Motor vehicle transportation, including automobiles, trucks, transit buses, and other modes of transportation, is the major contributor to regional air pollution. Stationary sources were once important contributors to both regional and local pollution. Their role has been substantially reduced in recent years by pollution control programs, such as those of the BAAQMD. Any further progress in air quality improvement now focuses heavily on transportation sources.

Based on the data shown in **Table IV.D-2**, there have been no exceedances of the state and the federal one-hour ozone standards in the project vicinity over the last five years. The principal sources of ozone precursors ROG and NO_x in the Bay Area include on-road motor vehicles (approximately 39 percent for ROG and 52 percent for NO_x), other mobile sources (approximately 17 percent for ROG and 34 percent for NO_x), solvent evaporation (approximately 20 percent for ROG), fuel combustion (approximately 9 percent NO_x) and oil and gas production (approximately 9 percent for ROG). Bay Area emissions of the ozone precursors ROG and NO_x are expected to decrease by approximately 24 and 36 percent, respectively, between 2005 and 2020 (CARB, 2007c) largely as a result of the State's on-road motor vehicle emission control program. The Bay Area has a significant motor vehicle population and these reductions are projected as vehicles meeting more stringent emission standards enter the fleet, and all vehicles use cleaner burning gasoline and diesel fuel or alternative fuels. This includes the use of improved evaporative emission control systems, computerized fuel injection, engine management systems to meet increasingly stringent California emission standards, cleaner gasoline, and the Smog Check program. ROG and NO_x emissions from other mobile sources and stationary sources are also projected to decline as more stringent emission standards and control technologies are adopted and implemented.

TABLE IV.D-2
AIR QUALITY DATA SUMMARY (2001–2005) FOR THE PROJECT AREA

Pollutant	Standard[b]	Monitoring Data by Year				
		2001	2002	2003	2004	2005
Ozone [a]						
Highest 1 Hour Average (ppm) [c]		0.07	0.05	0.08	0.08	0.07
Days over State Standard	0.09	0	0	0	0	0
Days over National Standard	0.12	0	0	0	0	0
Highest 8 Hour Average (ppm) [c]		0.04	0.04	0.05	0.06	0.05
Days over National Standard	0.08	0	0	0	0	0
Carbon Monoxide [a]						
Highest 1 Hour Average (ppm) [c]		5.0	4.4	3.9	3.5	NA
Days over State Standard	20	0	0	0	0	0
Days over National Standard	35	0	0	0	0	0
Highest 8 Hour Average (ppm) [c]		4.0	3.3	2.8	2.6	2.4
Days over State/National Standard	9.0	0	0	0	0	0
Particulate Matter (PM-10) [e]						
Highest 24 Hour Average ($\mu g/m^3$) [c]		83.0	110.5	49.9	48.0	NA
Number of sampled days [d]		62	61	61	61	NA
Sampled days over State Standard [d]	50	10	5	0	0	NA
Sampled days over National Standard [d]	150	0	0	0	0	NA
Particulate Matter (PM-2.5) [e]						
Highest 24-Hour Average – National (ppm) [c]Highest 8-hour average, ppm[c]	65	44.9	45.4	29.9	31.0	NA
Sampled days over National Standard [d]		0	0	0	0	NA

a Data are from BAAQMD's Alice Street station in Oakland.
b Generally, state standards are not to be exceeded and federal standards are not to be exceeded more than once per year.
c ppm = parts per million; □g/m^3 = micrograms per cubic meter.
d PM-10 and PM-2.5 are not measured every day of the year. "Number of samples" refers to the number of days in a given year during which PM-10 and PM-2.5 were measured at the Port of Oakland monitoring stations.
e Combined data from the Port and residential monitoring stations are presented.

NA = Not Available.

SOURCE: CARB, 2007b.

Table IV.D-2 shows that there have been no exceedances of state and federal ambient carbon monoxide standards at the Alice Street station in Oakland in the last five years. Based on BAAQMD carbon monoxide isopleth maps, 2006 background carbon monoxide concentrations in the project vicinity are approximately 5 parts per million, one-hour average, and 3 parts per million, eight-hour average (BAAQMD, 1999). Currently, on-road motor vehicles are responsible for approximately 69 percent of the carbon monoxide emitted within the San Francisco Bay Area

TABLE IV.D-3
SUMMARY OF OZONE DATA FOR THE SAN FRANCISCO BAY AREA AIR BASIN, 1996 - 2005

	Number of Days Standard Exceeded[a]			Ozone Concentrations in ppm[b]	
Year	State 1-hr	Federal 1-hr	Federal 8-hr	Maximum 1-hr	Maximum 8-hr
2005	9	0	1	0.12	0.09
2004	7	0	0	0.11	0.084
2003	19	1	7	0.13	0.101
2002	16	2	7	0.16	0.106
2001	15	1	7	0.13	0.100
2000	12	3	9	0.15	0.144
1999	20	3	4	0.16	0.122
1998	29	8	16	0.15	0.111
1997	8	0	0	0.11	0.084
1996	34	8	14	0.14	0.112
1995	28	11	18	0.16	0.115

[a] This table summarizes the data from all of the monitoring stations within the Bay Area.
[b] ppm = parts per million.

SOURCE: CARB, 2007c.

and in Alameda County (CARB, 2007c). Carbon monoxide emissions are expected to decrease within the county by approximately 42 percent between 2005 and 2020 due to attrition of older, high polluting vehicles, improvements in the overall automobile fleet, and improved fuel mixtures (CARB, 2007c).

Based on data shown in **Table IV.D-2**, state PM-10 standards have been exceeded at the Port of Oakland monitoring stations on a frequent basis during the years 2000 through 2002, after which there have been no exceedances of the standard. The PM-2.5 and the national PM-10 standard have not been exceeded over the last five years. Generally, contributors to PM concentrations in the project area are primarily 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 19 percent between 2005 and 2020 (CARB, 2007c). This increase would be primarily from fugitive dust produced by anticipated increases in the vehicle miles traveled as well as stationary sources (such as industrial activities) and area sources (such as construction and demolition, road dust and other miscellaneous processes). Fugitive dust refers to particulate matter not emitted from a duct, tailpipe or stack, which becomes airborne due to the forces of wind, man's activity, or both. Activities that generate fugitive dust include vehicle travel over paved and unpaved roads, brake wear, tire wear, soil cultivation, off-road vehicles, or any vehicles operating on open fields or dirt roadways, wind erosion of exposed surfaces, storage piles at construction sites, etc. PM-2.5

emissions in Alameda County are projected to remain steady over the same period (CARB, 2007c), as the reduction in emissions from on-road and off-road engines would be offset by an increase in their activity and also an increase in industrial growth.

The standards for nitrogen dioxide, sulfur dioxide, 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, 2001).

Toxic Air Contaminants

Both BAAQMD and CARB have monitoring networks in the Bay Area that measure ambient concentrations of certain TACs that are associated with important health-related effects and are present in appreciable concentrations in the Bay Area. The BAAQMD uses this information to determine risks for a particular area. Generally, ambient concentrations of TACs are similar through the urbanized areas of the Bay Area. Of the pollutants for which monitoring data are available, benzene and 1,3- butadiene (which are emitted primarily from motor vehicles) account for over one-half of the average calculated cancer risk (BAAQMD, 2004). Benzene levels have declined dramatically since 1996 with the advent of Phase 2 reformulated gasoline. The use of reformulated gasoline also appears to have led to significant decreases in 1,3-butadiene. Due largely to these observed reductions in ambient benzene and 1,3-butadiene levels, the calculated network average cancer risk has been significantly reduced in recent years. Based on 2002 ambient monitoring data, the BAAQMD reported a calculated lifetime cancer risk from measured concentrations of TACs, excluding diesel particulate matter, to be 162 in one million averaged over all Bay Area locations (BAAQMD, 2004). This is 46 percent less than what was observed in 1995 (BAAQMD, 2004). Because diesel particulate matter cannot be directly monitored in the ambient air, the BAAQMD uses CARB's estimates of the population-weighted average ambient diesel particulate concentration for the Bay Area to derive an average cancer risk from diesel particulate matter exposure at about 480 in-one-million, as of 2000 (CARB, 2006b). The risk from diesel particulate matter has been reduced from 750 in-one-million in 1990 and 570 in-one-million in 1995 (CARB, 2006b).

The TAC monitoring station closest to the project site is the Oakland – Davie Station (Davie Tennis Stadium, 198 Oak Street), approximately 2.5 miles northwest of the project site. **Table IV.D-4** provides a summary of TAC Data for the San Francisco Bay Area Air Basin.

Physical Setting for GHG Emissions and Climate Change

There is a general scientific consensus that global climate change is occurring, caused in whole or in part, by increased emissions of GHGs that keep the Earth's surface warm by trapping heat in the Earth's atmosphere(US EPA, 2000), in much the same way as glass in a greenhouse. While many studies show evidence of warming over the last century and predict future global warming,

TABLE IV.D-4
SAN FRANCISCO BAY AREA AIR BASIN TOXIC AIR CONTAMINANTS – ANNUAL AVERAGE CONCENTRATIONS AND HEALTH RISKS

TAC	Annual Average Concentration[a] and Health Risk[b]	2000	2001	2002	2003	2004
Acetaldehyde	Annual Avg	0.68	0.73	0.63	0.74	0.74
	Health Risk	3	4	3	4	4
Benzene	Annual Avg	0.56	0.43	0.45	0.44	0.37
	Health Risk	52	39	42	41	34
1,3-Butadiene	Annual Avg	0.15	0.13	0.14	0.1	0.09
	Health Risk	56	50	51	37	34
Carbon Tetrachloride	Annual Avg	0.09	0.09	0.09	0.1	
	Health Risk	25	23	24	25	
Chromium (Hexavalent)	Annual Avg	0.12	--	0.07	0.1	0.09
	Health Risk	18	--	11	14	14
para-Dichlorobenzene	Annual Avg	0.11	0.14	0.15	0.15	0.17
	Health Risk	7	9	10	10	11
Formaldehyde	Annual Avg	1.77	2.32	2.57	2.22	1.71
	Health Risk	13	17	19	16	13
Methylene Chloride	Annual Avg	0.53	0.27	0.22	0.22	0.14
	Health Risk	2	<1	<1	<1	<1
Perchloroethylene	Annual Avg	0.08	0.06	0.05	0.04	0.035
	Health Risk	3	2	2	2	1
Diesel Particulate Matter[c]	Annual Avg	1.6	1.6	1.6	1.6	1.6
	Health Risk	480	480	480	480	480

[a] Concentrations for Chromium (Hexavalent) are expressed as ng/m^3 and concentrations for diesel particulate matter are expressed as μg/m^3. Concentrations for all other TACs are expressed as ppb.
[b] Health Risk represents the number of excess cancer cases per million people based on a lifetime (70-year) exposure to the annual average concentration. There may be significant compounds other than the ones presented here for which monitoring and/or health risk information are not available.
[c] Diesel particulate matter concentration estimates are based on receptor modeling techniques, and estimates are available only for selected years. Most recent data available is for the year 2000 and has been used for all other years presented.

SOURCE: CARB, 2007a.

the causes of such warming and its potential effects are far less certain.[3] In its "natural" condition, the greenhouse effect is responsible for maintaining a habitable climate on Earth, but human activity has caused increased concentrations of these gases in the atmosphere, thereby contributing to an increase in global temperatures.

The US EPA has recently concluded that scientists know *with virtual certainty that*:

3 "Global climate change" is a broader term used to describe any worldwide, long-term change in the earth's climate. "Global warming" is more specific and refers to a general increase in temperatures across the earth, although it can cause other climatic changes, such as a shift in the frequency and intensity of weather events and even cooler temperatures even though the world, on average, is warmer.

- "Human activities are changing the composition of Earth's atmosphere. Increasing levels of greenhouse gases like CO_2 in the atmosphere since pre-industrial times are well-documented and understood.

- The atmospheric buildup of CO_2 and other greenhouse gases is largely the result of human activities such as the burning of fossil fuels.

- A warming trend of approximately 0.7 to 1.5°F occurred during the 20th century. Warming occurred in both the northern and southern hemispheres, and over the oceans.

- The major greenhouse gases emitted by human activities remain in the atmosphere for periods ranging from decades to centuries. It is therefore virtually certain that atmospheric concentrations of greenhouse gases will continue to rise over the next few decades.

- Increasing greenhouse gas concentrations tend to warm the planet."(US EPA, 2000)

At the same time, there is much uncertainty concerning the magnitude and rate of the warming. Specifically, the US EPA notes that "important scientific questions remain about how much warming will occur; how fast it will occur; and how the warming will affect the rest of the climate system, including precipitation patterns and storms. Answering these questions will require advances in scientific knowledge in a number of areas:

- Improving understanding of natural climatic variations, changes in the sun's energy, land-use changes, the warming or cooling effects of pollutant aerosols, and the impacts of changing humidity, and cloud cover.

- Determining the relative contribution to climate change of human activities and natural causes.

- Projecting future greenhouse emissions and how the climate system will respond within a narrow range.

- Improving understanding of the potential for rapid or abrupt climate change." (US EPA, 2000)

- Greenhouse Gases (GHG)

Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and water vapor (H_2O) are the principal GHGs, and when concentrations of these gases exceed the natural concentrations in the atmosphere, the greenhouse effect may be enhanced. Without these GHGs, Earth's temperature would be too cold for life to exist. CO_2, CH_4, and N_2O occur naturally as well as through human activity. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices and landfills. Man-made GHGs – with much greater heat-absorption potential than CO_2 – include fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6), which are byproducts of certain industrial processes. (Cal EPA, 2006b)

Potential Effects of Human Activity on GHG Emissions

As mentioned above, the primary GHG gas generated by human activity is CO_2. Fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles, has led to substantial increases in CO_2 emissions (and thus substantial increases in atmospheric concentrations). In 1994, atmospheric CO_2 concentrations were found to have increased by nearly 30 percent above pre-industrial (c. 1860) concentrations.

The effect each GHG has on climate change is measured as a combination of the volume of its emissions, and its global warming potential (GWP[4]), and is expressed as a function of how much warming would be caused by the same mass of CO_2. Thus, GHG gas emissions are typically measured in terms of pounds or tons of CO_2 equivalents (CO_2e).

Global Emissions

Worldwide emissions of GHGs in 2004 were 30 billion tons of CO_2e per year (UNFCC, 2007) (including both ongoing emissions from industrial and agricultural sources, but excluding emissions from land-use changes).

U.S. Emissions

In 2004, the United States emitted about 8 billion tons of CO_2e or about 25 tons/year/person. Of the four major sectors nationwide —residential, commercial, industrial and transportation — transportation accounts for the highest fraction of GHG emissions (approx. 35 to 40 percent); these emissions are entirely generated from direct fossil fuel combustion. (US EPA, 2007)

State of California Emissions

In 2004, California emitted approximately 550 million tons of CO_2e, or about 6 percent of the U.S. emissions.[5] This large number is due primarily to the sheer size of California compared to other states. By contrast, California has one of the fourth lowest per capita GHG emission rates in the country, due to the success of its energy-efficiency and renewable energy programs and commitments that have lowered the state's GHG emissions rate of growth by more than half of what it would have been otherwise. (CEC, 2007) Another factor that has reduced California's fuel use and GHG emissions is its mild climate compared to that of many other states.

The California EPA Climate Action Team reported in its March 2006 report that California's emissions were as follows:

- Carbon dioxide (CO_2) accounted for 83.3 percent;
- Methane (CH_4) accounted for 6.4 percent;
- Nitrous oxide (N_2O) accounted for 6.8 percent; and
- Fluorinated gases (HFCs, PFC, and SF_6) accounted for 3.5 percent. (CalEPA, 2006b)

4 The potential of a gas or aerosol to trap heat in the atmosphere.
5 Because of the differential heat absorption potential of various GHGs, GHG emissions are frequently measured in "carbon dioxide-equivalents," which present a weighted average based on each gas's heat absorption (or "global warming") potential.

The California Energy Commission found that transportation is the source of approximately 38 percent of the State's GHG emissions, followed by electricity generation (both in-state and out-of-state) at 23 percent, and industrial sources at 13 percent Agriculture and forestry is the source of approximately 8.3 percent, as a the source categorized as "other," which includes residential and commercial activities. (CEC, 2007)

Bay Area Emissions

In the Bay Area, fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of the Bay Area's GHG emissions, accounting for just over half of the Bay Area's 85 million tons of GHG emissions in 2002. Industrial and commercial sources were the second largest contributors of GHG emissions with about 25 percent of total emissions. Domestic sources (e.g., home water heaters, furnaces, etc.) account for about 11 percent of the Bay Area's GHG emissions, followed by power plants at 7 percent. Oil refining currently accounts for approximately 6 percent of the total Bay Area GHG emissions. (BAAQMD, 2006c)

City of Oakland Emissions

Oakland, in partnership with the Local Governments for Sustainability (ICLEI), has prepared the *Baseline Greenhouse Gas Emissions Inventory Report* to determine the community-wide levels of GHG emissions that the City of Oakland emits in its base year, 2005. (ICLEI, 2006) The community-wide levels reflect all the energy used and waste produced with the Oakland city limits. As shown in **Table IV.D-5**, Oakland emitted approximately 2.2 million tons of CO_2 equivalents (CO_2e) in 2005 from all major sources, nearly half of which from transportation . The analysis shows that the City's emissions increased by approximately 5 percent to 6 percent in each year since 2003.

TABLE IV.D-5
OAKLAND COMMUNITY-WIDE GHG EMISSIONS SUMMARY – 2005

Potential Source	Tons of Carbon Dioxide Equivalent (CO_2e)	Percent of Total
Transportation	1,138,767	47%
Commercial/Industrial	709,199	29%
Residential	580,710	24%
TOTAL	**2,248,667**	**100**

SOURCE: Oakland Baseline Greenhouse Gas Emissions Inventory, 2006

The inventory report also estimated emissions from municipal government activities, which constitute approximately 1.5 percent of total community-wide emissions.

The report also forecasts future community-wide emissions for years 2010 and 2020. From year 2005, emissions are forecasted to increase by 12 percent by 2010 (to 2.5 million tons of CO_2e), and 19.5 percent (to 2.7 million tons CO_2e) by 2020, assuming "business-as-usual" into the future.

Construction and Development Emissions

The construction and occupation of residential developments, such as the proposed project, cause GHG emissions. GHG emissions occur in connection with many activities associated with development, including use of construction equipment and building materials, vegetation clearing, natural gas usage, electrical usage (since electricity generation by conventional means is a major contributor GHG emissions, discussed below), water use (which in southern California is heavily reliant on electricity), and transportation.

However, it is important to acknowledge that new development does not necessarily create entirely new GHG emissions, since most of the persons who will visit or occupy new development will come from other locations where they were already causing such GHG emissions. Further, as discussed above, it has not been demonstrated that even new GHG emissions caused by a local development project can affect global climate change, or that a project's net increase in GHG emissions, if any, when coupled with other activities in the region, would be cumulatively considerable.

Potential Effects of Human Activity on Climate Change

Global Change

Globally, climate change has the potential to impact numerous environmental resources through potential, though uncertain, impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. A warming of about 0.2°C (0.36°F) per decade is projected, and there are identifiable signs that global warming could be taking place, including substantial ice loss in the Arctic. (IPCC, 2007)

However, the understanding of GHG emissions, particulate matter, and aerosols on global climate trends remains uncertain. In addition to uncertainties about the extent to which human activity rather than solar or volcanic activity is responsible for increasing warming, there is also evidence that some human activity has cooling, rather than warming, effects, as discussed in detail in numerous publications by the International Panel on Climate Change (IPCC), namely "Climate Change 2001, The Scientific Basis"(2001).[6]

Acknowledging uncertainties regarding the rate at which anthropogenic greenhouse gas emissions would continue to increase (based upon various factors under human control, such as future population growth and the locations of that growth; the amount, type, and locations of economic

[6] The IPCC was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme to assess scientific, technical and socio- economic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation.

development; the amount, type, and locations of technological advancement; adoption of alternative energy sources; legislative and public initiatives to curb emissions; and public awareness and acceptance of methods for reducing emissions), and the impact of such emissions on climate change, the IPCC devised a set of six "emission scenarios" which mix and match various assumptions about the rates of economic development, population growth, and technological advancement over the course of the next century. (IPCC, 2000)These emission scenarios are paired with various climate sensitivity models to attempt to account for the range of uncertainties which affect climate change projections. The wide range of temperature, precipitation, and similar projections yielded by these scenarios and models reveal the magnitude of uncertainty presently limiting climate scientists' ability to project long-range climate change (as previously discussed).

The projected effects of global warming on weather and climate are likely to vary regionally, but are expected to include the following direct effects, according to the IPCC: (IPCC, 2007)

- Snow cover is projected to contract, with permafrost areas sustaining thawing.
- Sea ice is projected to shrink in both the Arctic and Antarctic.
- Hot extremes, heat waves, and heavy precipitation events are likely to increase in frequency.
- Future tropical cyclones (typhoons and hurricanes) will likely become more intense.
- Non-tropical storm tracks are projected to move poleward, with consequent changes in wind, precipitation, and temperature patterns. Increases in the amount of precipitation are very likely in high-latitudes, while decreases are likely in most subtropical regions.
- Warming is expected to be greatest over land and at most high northern latitudes, and least over the Southern Ocean and parts of the North Atlantic Ocean.

Potential secondary effects from global warming include global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

State of California Change

According to CARB, some of the potential impacts in California of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. (CARB 2006c, 2007c) Several recent studies have attempted to explore the possible negative consequences that climate change, left unchecked, could have in California. These reports acknowledge that climate scientists' understanding of the complex global climate system, and the interplay of the various internal and external factors that affect climate change, remains too limited to yield scientifically valid conclusions on such a localized scale. Substantial work has been done at the international and national level to evaluate climatic impacts, but far less information is available on regional and local impacts. In addition, projecting regional impacts of climate change and variability relies on large-scale scenarios of

changing climate parameters, using information that is typically at too coarse a scale to make accurate regional assessments. (Kiparsky, 2003)

Below is a summary of some of the potential effects reported an array of studies that could be experienced in California as a result of global warming and climate change:

- Air Quality – Higher temperatures, conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. For other pollutants, the effects of climate change and/or weather are less well studied, and even less well understood. (US EPA, 2006) If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thus ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state. (CCCC, 2006)

- Water Supply – Uncertainty remains with respect to the overall impact of global climate change on future water supplies in California. For example, models that predict drier conditions (i.e., parallel climate model [PCM]) suggest decreased reservoir inflows and storage and decreased river flows, relative to current conditions. By comparison, models that predict wetter conditions (i.e., HadCM2) project increased reservoir inflows and storage, and increased river flows. (Brekke, 2004)

  A July 2006 technical report prepared by the California Department of Water Resources (DWR) addresses the State Water Project (SWP), the Central Valley Project, and the Sacramento-San Joaquin Delta. Although the report projects that "[c]limate change will likely have a significant effect on California's future water resources . . . [and] future water demand," it also reports that "much uncertainty about future water demand [remains], especially [for] those aspects of future demand that will be directly affected by climate change and warming. While climate change is expected to continue through at least the end of this century, the magnitude and, in some cases, the nature of future changes is uncertain. This uncertainty serves to complicate the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood." (DWR, 2006) DWR adds that "[i]t is unlikely that this level of uncertainty will diminish significantly in the foreseeable future." (DWR, 2006) Still, changes in water supply are expected to occur, and many regional studies have shown that large changes in the reliability of water yields from reservoirs could result from only small changes in inflows. (Kiparsky 2003; DWR 2005; Cayan 2006)

  Water purveyors are required by state law to prepare Urban Water Management Plans (UWMPs) that consider climatic variations and corresponding impacts on long-term water supplies. (California Water Code, Section 10631(c) For those purveyors who receive water from SWP, DWR has published a 2005 SWP Delivery Reliability Report, which presents information from computer simulations of the SWP operations based on historical data over a 73-year period (1922–1994). The DWR has confirmed that the results of those model studies "represent the best available assessment of the delivery capability of the SWP." In addition, the DWR is continuing to update its studies and analysis of water supplies. Water

purveyors incorporate this information from DWR in their continuing updates of UWMPs, and information from individual UWMPs can be incorporated into Water Supply Assessments (WSAs) and Water Verifications prepared for certain development projects in accordance with Cal. Water Code Section 10910, et. seq. and Cal. Government Code Section 66473.7, et. seq. (See Section IV.H, *Utilities and Service Systems*, in this EIR for discussion of the WSA and verifications for the proposed project.)

- Hydrology – As discussed above, climate changes could potentially affect the amount of snowfall, rainfall and snow pack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion. Sea level rise can be a product of global warming through two main processes: expansion of sea water as the oceans warm, and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could jeopardize California's water supply. In particular, saltwater intrusion would threaten the quality and reliability of the state's major fresh water supply that is pumped from the southern edge of the Sacramento/San Joaquin River Delta. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

- Agriculture – California has a $30 billion agricultural industry that produces half the country's fruits and vegetables. The California Climate Change Center (CCCC) notes that higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, water demand could increase; crop-yield could be threatened by a less reliable water supply; and greater ozone pollution could render plants more susceptible to pest and disease outbreaks. In addition, temperature increases could change the time of year certain crops, such as wine grapes, bloom or ripen, and thus affect their quality. (CCCC, 2006)

- Ecosystems and Wildlife – Increases in global temperatures and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. In 2004, the Pew Center on Global Climate Change released a report examining the possible impacts of climate change on ecosystems and wildlife. (Parmesan, 2004) The report outlines four major ways in which it is thought that climate change could affect plants and animals: (1) timing of ecological events; (2) geographic range; (3) species' composition within communities; and (4) ecosystem processes such as carbon cycling and storage.

Sensitive Land Uses

Some persons are considered more sensitive than others to air pollutants. The reasons for heightened sensitivity may include health problems, proximity to the emissions source, and duration of exposure to air pollutants. Land uses such as schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because the very young, the old, and the infirm are more susceptible to respiratory infections and other air-quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because people are often at home for extended periods. Recreational land uses are moderately sensitive to air pollution, because vigorous exercise associated with recreation places a high demand on the human respiratory system.

A variety of heavy and light industrial uses, commercial, retail, civic, and residential uses surround the project site. The residential neighborhoods of Jingletown, Rancho San Antonio, St. Elizabeth, and the Fruitvale surround and encompass the project area. The Caesar Chavez Education Center is located across East 12th Street from the project site; East 12th Street is a four-lane arterial separated by an approximately 25-foot wide grass median, over which the elevated BART tracks exist.

Impacts and Mitigation Measures

Significance Criteria

For air quality, a project may be deemed to have a significant adverse impact on the environment if it would:

1. Conflict with or obstruct implementation of the applicable air quality plan;

2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

3. 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);

4. Expose sensitive receptors to substantial pollutant concentrations;

5. Frequently create substantial objectionable odors affecting a substantial number of people;

6. Contribute to CO concentrations exceeding the State AAQS of 9 ppm averaged over 8 hours and 20 ppm for 1 hour. [NOTE: Pursuant to BAAQMD, localized carbon monoxide concentrations should be estimated for projects in which (1) vehicle emissions of CO would exceed 550 lb/day; (2) intersections or roadway links would decline to LOS E or F; (3) intersections operating at LOS E or F will have reduced LOS; or (4) traffic volume increase on nearby roadways by 10% or more unless the increase in traffic volume is less than 100 vehicles per hour.];

7. Result in total emissions of ROG, NO_x, or PM_{10} of 15 tons per year or greater, or 80 pounds (36 kilograms) per day or greater;

8. Result in potential to expose persons to substantial levels of Toxic Air Contaminants (TAC), such that the probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million;

9. Result in ground level concentrations of non-carcinogenic TACs such that the Hazard Index would be greater than 1 for the MEI;

10. Result in a substantial increase in diesel emissions;

11. If a proposed General Plan Amendment would fundamentally conflict with the currently adopted clean air plan**.**

The following air quality analysis addresses all of these general criteria except Criterion #5 regarding odors. Since 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 maintained at a less than significant level. The regulation states that a person shall not discharge any odorous substance that remains odorous after dilution with odor-free air. The regulation also specifies the dilution rates for different emission point elevations and the method of collection and analysis of samples; and prohibits a person from discharging any odorous substance, which causes the ambient air at or beyond the property line of such person to be odorous and to remain odorous after dilution with four parts of odor-free air. The requirements of Regulation 7 apply once the Air Pollution Control Officer (APCO) receives odor complaints from ten or more complainants within a 90-day period that allege that a person has caused odors perceived at or beyond the property line of such person, and deemed to be objectionable by the complainants in the normal course of their work, travel, or residency. When the limits of this regulation become effective as a result of citizen complaints described above, the limits remain effective until such time as no citizen complaints have been received by the APCO for 1 year. The limits of this regulation become applicable again if and when the APCO receives odor complaints from five or more complainants within a 90-day period. Restaurants and other establishments for the purpose of preparing food for human consumption employing less than 5 persons are exempt from this regulation; the establishments employing less than 5 persons are not anticipated to create odor impacts that would pose a substantial adverse effect to nearby receptors.

For project-level impact analyses, the BAAQMD provides various thresholds and tests of significance. For ROG, NOx and PM-10, a net increase of 80 pounds per day is considered significant, while for CO, an increase of 550 pounds per day would be considered significant if it leads to or contributes to CO concentrations exceeding the State Ambient Air Quality Standard of 9 ppm averaged over 8 hours and 20 ppm for 1 hour (i.e., if it creates a “hot spot”). Generally, if a project results in an increase in ROG, NOx, or PM-10 of more than 80 pounds per day, then it would also be considered to contribute considerably to a significant cumulative effect. For projects that would not lead to a significant increase of ROG, NOx, 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. These criteria recommended by the BAAQMD are consistent with the criteria used by the City of Oakland and enumerated above.

GHG Emissions and Climate Change

As of preparation of this EIR, there are no statutes, regulations, guidelines, or case law decisions requiring analysis of climate change within a CEQA document. Under AB 32, the CARB, the sole agency in charge of regulating sources of emissions of GHG in California, has been tasked with adopting regulations for reduction of GHG emissions. As of the date of this analysis, no air district in California, including the BAAQMD, is known to have identified a significance threshold for GHG emissions or a methodology for analyzing air quality impacts related to GHG emissions. In particular, there is currently no emission rate criterion for the purposes of identifying a significant contribution to global climate change in CEQA documents.

As identified in Section 15064(a) of the CEQA Guidelines, "determining whether a project may have a significant effect plays a critical role in the CEQA process." In addition, as outlined in Sections 15064(h) and 15130 of the CEQA Guidelines, an environmental impact report (EIR) is required to evaluate cumulative impacts when they can be determined to be "cumulatively considerable." (Any potential impact of a project on climate change could only be cumulative because the project is making an incremental contribution to an overall change in the environment.). However, the CEQA Guidelines and the CEQA Initial Study Checklist do not contain any provisions that specifically set forth requirements for analysis of global climate change impacts in an EIR. As stated in Section 15064(b) of the State CEQA Guidelines, "The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data." Additionally, CEQA Guidelines Section 15145 states, "If, after thorough investigation, a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact."

The City of Oakland has determined, based upon the discussion above and the factors discussed previously and summarized below, that the project's impact on global climate change is speculative and cannot be evaluated at this time:

- Uncertainties regarding human activities and climate change, and the –potential human activities that may reverse global warming trends.
- Lack of guidance for analysis of climate change issues in CEQA documents.
- Lack of methodology for evaluating GHGs, specifically determining the incremental increase in GHG emissions for an individual project, the impacts of a particular development project on global climate change, and the significance of any such impacts under CEQA.
- Lack of methodology for determining whether GHG emissions from an individual project are significant;[7]
- Lack of scientific basis to accurately project future climate trends, much less the likely adverse environmental impacts resulting from those trends in any specific location. (Australian Govt., 2007)

For all of the reasons summarize above (and discussed in detail in the *Environmental Setting* of this section), and pursuant to Section 15145 of the CEQA Guidelines, until such time as a sufficient scientific basis exists to 1) ascertain the incremental impact of an individual project on climate change, and to 2) accurately project future climate trends associated with that increment

7 While the direct output of greenhouse gases from a project can theoretically be estimated (provided valid methodologies are developed), the emission of GHGs associated with implementation of any one development project would not result in any discernable direct impact globally or locally on climate, water availability, plant or wildlife species, populations, habitats, or ecosystems. The indirect effects of project-specific greenhouse gases emissions from a development such as the proposed high-density residential project, are negligible at best, and available science considers them immeasurable.

of change, and 3) guidance is provided by regulatory agencies on the control of GHG emissions[8] and thresholds of significance, the significance of an individual project's contribution to global GHG emissions is too speculative to be determined. Therefore, further analysis and application of current emissions scenarios, climate models, and climate change projections to the proposed project is also speculative. However, this EIR does present estimated GHG emissions of the proposed project, project-related activities that could contribute to the generation of increased GHG emissions, the project design features that would avoid or minimize those emissions, and the approaches to reduce those emissions.

Methodology

Air Quality

Project-related air quality impacts fall into two categories: impacts due to construction, and 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 increased motor vehicle trips. Onsite stationary sources (such as natural gas boilers for water and space heating) and area sources (such as landscaping and use of consumer products) would result in lesser quantities of pollutant emissions.

For construction-related 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 Urban Emissions model, URBEMIS2007 for the expected project buildout year 2025 and compared to BAAQMD significance thresholds. Carbon monoxide impacts were evaluated using the BAAQMD's methodology for manual calculation of carbon monoxide concentrations specified in the 1999 BAAQMD CEQA Guidelines. Analysis was conducted for baseline conditions (generally 2005), 2010, and 2025 (cumulative analysis year) for both with- and without-project conditions. As discussed in Section IV.C, *Transportation, Circulation, and Parking,* the traffic analysis is based on baseline traffic conditions established as of August and November 2004. Therefore, the baseline condition for traffic-related air quality emissions would also be as of the August and November 2004 period.

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

8 Refer to the discussion under "Regulatory Setting, California" regarding the Proposed Early Actions to Mitigate Climate Change in California published by CARB in April 2007. There are no early action measures specific to residential development included in the list of 36 measures identified for CARB to pursue during calendar years 2007, 2008, and 2009.

GHG Emissions and Climate Change

Approach to CEQA Analysis of GHG Emissions and Climate Change Impacts in this EIR

While the preceding discussion outlines the speculative nature of determining the significance of an individual project's contribution to global GHG emissions at this time, the City of Oakland has provided a discussion of the proposed project in the *Impacts Analysis* section below, for consideration by decision makers. Discussed below are the project's estimated GHG emissions, project-related activities that could contribute to the generation of increased GHG emissions, and project design features that would avoid or minimize those emissions.

The approach employed is that, in lieu of an adopted significance threshold for GHG emissions or a methodology for analyzing air quality impacts related to GHG emissions, the effects of a proposed project may be evaluated based not upon the quantity of emissions, but rather on whether practicable available control measures are implemented, similar to construction-related dust emissions within the San Francisco Air Basin. Theoretically, if a project implements reduction strategies identified in AB-32, the Governor's Executive S-3-05, or other strategies to help toward reducing GHGs to the level proposed by the governor and targeted by the City of Oakland, it could reasonably follow that the project would not result in a significant contribution to the cumulative impact of global climate change. Alternatively, a project could reduce a potential cumulative contribution to GHG emissions by contributing to available mitigation programs, such as reforestation, tree planting, or carbon trading. In addition, it can be fairly stated that a project also could inherently reduce GHG emissions through density and locale (e.g., compact development near transit and activity nodes of work or shopping)

Since the project site is located in an area that would not be subject to coastal or other flooding resulting from climate change, the potential effects of climate change on the proposed project are not discussed in this EIR.

Project Construction Impacts

Impact AIR-1: Activities associated with demolition, site preparation, and construction throughout development of the project would generate suspended and inhalable particulate matter. (Potentially Significant)

Construction-related emissions may cause adverse effects on the local air quality. Project construction would involve the eventual demolition of all existing buildings at the project site and new construction across approximately 9.7 acres. The project entails approximately 810 condominiums and town homes, approximately 25,950 square feet of retail space, and parking in six new buildings that would be constructed in six phases over a period of approximately 15 to 20 years. As indicated above (and in the Project Description in Chapter III of this Draft EIR), the project would be developed in multiple phases. Generally, the first phase could involve any one or more of the six development sites, with subsequent phases developed every two to four years thereafter. The project sponsor proposes to allow each development site to be fully constructed and occupied before initiating construction on another site. The construction impacts identified herein would apply to construction activities throughout development of the project, although the effects would be intermittent between each phase.

Project-related construction activities would 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. The 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_X, CO, SOx, PM-10) primarily from operation of heavy equipment construction machinery (primarily diesel operated), portable auxiliary equipment and construction worker automobile trips (primarily gasoline operated);
- Evaporative emissions (ROG) from asphalt paving and architectural coating applications.

Demolition may result in airborne entrainment of asbestos, a toxic air contaminant, particularly where structures built prior to 1980 are being demolished. As stated above, the project would involve demolition of all existing structures on the project site. 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. Therefore, the project has t the potential to result in public health hazards associated with airborne asbestos fibers or lead dust would be at a less than significant level.

The proposed project would be subject to the following standard conditions of approval, which would reduce the potential impact to less than significant.

> **Standard Condition AIR-1a: Asbestos Removal – If asbestos is found to be present in building materials to be removed, demolition and disposal is required to be conducted in accordance with procedures specified by Regulation 11, Rule 2 (Asbestos Demolition, Renovation and Manufacturing) of Bay Area Air Quality Management District (BAAQMD) regulations, as may be amended.**

Construction-related fugitive dust emissions at the project site would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. Without mitigation, construction activities may result in significant quantities of dust, and as a result, local visibility and PM-10 and PM-2.5 concentrations may be adversely affected, temporarily and intermittently, 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, potentially as far as several hundred feet from the site and could result in nuisance 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 BAAQMD 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. Residential, educational, and outdoor recreation land uses are located as close as 300 feet from the boundaries of the project site.

The proposed project would be subject to the following dust control measures as conditions of approval. Implementation of the measures would reduce impacts from fugitive dust to on- and off-site receptors to a less than significant level.

Standard Condition AIR-1b: Dust Control Measures – During construction, the project applicant shall require the construction contractor to implement the following measures required as part of Bay Area Air Quality Management District's (BAAQMD) basic and enhanced dust control procedures required for construction sites. These include:

Basic Controls that Apply to All Construction Sites

a) Water all active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.

b) Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).

c) 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.

d) Sweep daily (with water sweepers using reclaimed water if possible) all paved access roads, parking areas and staging areas at construction sites.

e) Sweep streets (with water sweepers using reclaimed water if possible) at the end of each day if visible soil material is carried onto adjacent paved roads.

f) Limit the amount of the disturbed area at any one time, where feasible.

g) Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.

h) Pave all roadways, driveways, sidewalks, etc. as soon as feasible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.

i) Replant vegetation in disturbed areas as quickly as feasible.

j) Enclose, cover, water twice daily or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).

k) Limit traffic speeds on unpaved roads to 15 miles per hour.

l) Clean off the tires or tracks of all trucks and equipment leaving any unpaved construction areas.

Enhanced Controls that Apply to Sites Greater than 4 Acres

m) All "Basic" controls listed above, plus

n) Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

o) Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for one month or more).

p) Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holidays and weekend periods when work may not be in progress. The name and telephone number of such persons shall be provided to the BAAQMD prior to the start of construction as well as posted on-site over the duration of construction.

q) Install appropriate wind breaks at the construction site to minimize wind blown dust.

(*Also see Standard Condition HAZ-1e*.)

Significance after Implementation of Standard Conditions: Less than Significant.

Impact AIR-2: Activities associated with demolition, site preparation and construction throughout development of the project would generate emissions of criteria pollutants, including equipment exhaust emissions. (Less than Significant)

Construction activities would result in the emission of ROG, NO_x, CO, SOx 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 number and type of equipment use, duration of use, operation schedules (the time and frequency), and the number of construction workers traveling to the worksite by motorized vehicle. Criteria pollutant emissions of ROG and NO_x from these emissions 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_x would not be expected to impede attainment or maintenance of ozone standards in the Bay Area (BAAQMD, 1999). The impact of construction equipment exhaust emissions would therefore be less than significant.

However, while not required to mitigate a significant impact for the proposed project, the City of Oakland requires that the project shall implement the following standard conditions of approval to minimize construction equipment emissions during construction:

Standard Condition AIR-2: Construction Emissions -

a) Demonstrate compliance with BAAQMD Regulation 2, Rule 1 (General Requirements) for all portable construction equipment subject to that rule. BAAQMD Regulation 2, Rule 1, requires an authority to construct and permit to operate certain types of portable equipment used for construction purposes (e.g., gasoline or diesel-powered engines used in conjunction with power generation, pumps, compressors, and cranes) unless such equipment complies with all applicable requirements of the "CAPCOA" Portable Equipment Registration Rule" or with all applicable requirements of the Statewide Portable Equipment Registration Program. This exemption is provided in BAAQMD Rule 2-1-105.

b) Perform low- NOx tune-ups on all diesel-powered construction equipment greater than 50 horsepower (no more than 30 days prior to the start of use of that equipment). Periodic tune-ups (every 90 days) should be performed for such equipment used continuously during the construction period.

Mitigation: None Required.

Project Operations Impacts

Impact AIR-3: The project would result in increased emissions of criteria pollutants and their precursors from vehicular traffic to and from the project site, however, the emission increases from the project would not exceed Bay Area Air Quality Management District significance criteria. (Less than Significant)

The project would result in an increase in criteria air pollutant emissions from a variety of emissions sources, including on-site area sources (e.g., natural gas combustion for space and water heating, landscape maintenance, use of consumer products such as hairsprays, deodorants, cleaning products, etc.) and mobile on-road sources (automobile and truck trips). Exhaust emissions from passenger vehicle travel associated with the project were calculated by using the URBEMIS2007 program of CARB, which uses EMFAC2007 emission factors and a standard mix of passenger vehicles in 2013. The last phase of construction of the project is expected to occur in 2025 and so it has been used as the project buildout year in this analysis. URBEMIS2007 also calculates area source emissions based on the size of the project.

The proposed project would result in approximately 4,437 new vehicle trips per day. **Table IV.D-6** summarizes project-generated mobile and area emissions of criteria pollutants for the project in the year 2025 (buildout) and compares them with significance threshold emission

TABLE IV.D-6
ESTIMATED DAILY EMISSIONS FOR THE PROPOSED PROJECT

Air Pollutant	Project Emissions,[a] 2025 (pounds/day)			Significance Threshold (pounds/day)
	Area Source Emissions	Vehicular Emissions[b]	Total	
NO_X	6.4	12.1	18.5	80
PM-10	0.02	59.3	59.3	80
ROG	46.0[c]	16.5	62.5[d]	80
CO	423.15	195.7	618.9[d]	550[d]

[a] Emission factors were generated by the Air Board's URBEMIS2007 model for San Francisco Bay Air Basin, and assume a default vehicle mix. All daily estimates are for summertime conditions except for CO, which assumes wintertime conditions.
[b] Vehicular emission levels shown represent a conservative analysis (overstated effects) as emissions associated with baseline vehicle trips from the project site are not deducted.
[c] Due to the large residential component of the project, almost 54 percent of the total ROG emissions are emitted from the use of consumer products while the remainder is composed of emissions from architectural coatings (e.g. repainting of project structures for maintenance – 18 percent) and mobile sources (26 percent).
[d] 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 AIR-4 for analysis of project CO emissions.

NOTE: **No** values exceed applicable standards.

SOURCE: ESA, 2007

levels. As indicated in **Table IV.D-6**, project-related mobile emissions of ROG, NO_X and PM-10 (CO emissions are discussed Impact AIR-4) would not exceed the significance threshold emission levels. Therefore, impacts from increase in these emissions would be less than significant.

Mitigation: None Required.

Impact AIR-4: Mobile emissions generated by project traffic would increase carbon monoxide concentrations at intersections in the project vicinity. (Less than Significant)

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 baseline traffic volumes but also cause baseline non-project traffic to travel at slower, more polluting speeds.

To evaluate "hot spot" potential, a microscale impact analysis was conducted adjacent to five intersections in the vicinity of the project site, would be most impacted by project traffic. The intersections were chosen based on their level of service (LOS) and the percentage contribution of project-traffic. It was assumed that if the relatively higher volumes of project-generated traffic at these intersections did not result in adverse impacts, impacts at other nearby intersections would experience similar or less substantial effects. For this analysis, local carbon monoxide

concentrations were estimated by applying the BAAQMD's methodology for manual calculation of CO concentrations along roadways and intersections to the results of the traffic study prepared for this project. Results of the concentrations levels are shown in **Table IV.D-7**.

TABLE IV.D-7
ESTIMATED CARBON MONOXIDE CONCENTRATIONS AT SELECTED INTERSECTIONS IN PROJECT VICINITY

Scenario	Averaging Time (hours)	Concentrations (ppm)[a,b]				
		E. 12th St. / 29th Ave.	E. 12th St. / 25th Ave.	Foothill / Fruitvale	E. 12th St. / IDerby Ave.	International / 42nd Ave.
Baseline	1	6.45	6.22	6.48	6.14	7.08
PM Peak Hour	8	4.33	4.16	4.35	4.11	4.77
Baseline + Project	1	6.54	6.22	6.43	6.16	7.09
PM Peak Hour	8	4.39	4.17	4.32	4.13	4.78
2010 Baseline	1	5.99	5.78	5.94	5.73	6.49
PM Peak Hour	8	4.02	3.87	3.98	3.83	4.37
2010 + Project	1	6.05	5.79	5.95	5.74	6.5
PM Peak Hour	8	4.06	3.88	3.99	3.85	4.37
2025 Baseline	1	5.33	5.12	5.24	5.09	5.76
PM Peak Hour	8	3.58	3.43	3.52	3.41	3.89
2025 + Project	1	5.38	5.13	5.24	5.1	5.77

[a] Concentrations relate to a location 25 feet from the edge of the roadways that form the intersection. The carbon monoxide analysis focuses on the weekday afternoon (p.m.) peak-hour because the project's effects on traffic congestion and related carbon monoxide concentrations are greater during that period than during the morning (a.m.) peak hour. Carbon monoxide estimates shown above include background concentrations of 5.6 ppm, one-hour average, and 3.7 ppm, eight-hour average for 2006; 5.2 ppm, one-hour average and 3.5 ppm, eight-hour average for 2010 and 4.5 ppm, one-hour average and 3 ppm, eight-hour average for 2025. [b] The California ambient air quality standard for carbon monoxide is 20 ppm, one-hour average and 9 ppm, eight-hour average.

NOTE: No values exceed applicable standards.

SOURCE:ESA, 2007.

As shown in **Table IV.D-7**, the analysis demonstrated that no exceedances would occur in the vicinity of –any of the five analyzed intersections under any of the scenarios. Therefore, the effect of the project on local carbon monoxide standards would be less than significant. Further, carbon monoxide concentrations in 2010 and 2025 are projected to be progressively lower compared to existing baseline conditions due to improvements in the automobile fleet, attrition of older, high-polluting vehicles, and improved fuel mixtures (BAAQMD, 1999). Such reduction would offset any effects of increase in traffic due to cumulative development. The number of daily and peak hour vehicle trips generated during construction periods would be less than the number of trips generated during operation of the project. Therefore, the impacts of construction traffic on carbon monoxide levels at intersections in the vicinity of the project would also be less than significant.

Thus, project-related and cumulative traffic would have a less than significant impact on local carbon monoxide concentrations.

Mitigation: None Required.

Impact AIR-5: The proposed project could result in exposure of persons to substantial levels of Toxic Air Contaminants (TACs) such that the probability of contracting cancer for the Maximally Exposed Individual exceeds 10 in one million. (Less than Significant)

Diesel Particulate Matter (DPM) emissions from the project during operation would occur primarily from the delivery trucks that would be visiting the site. Based on the traffic analysis conducted by Korve Engineering, Inc. (Korve, 2007) for this project, daily traffic increases due to the project would be approximately 4,437 total vehicle trips by 2025. To determine the proportion of new trips that would be diesel operated, the general vehicle fleet percentages contained in URBEMIS2007 were used. URBEMIS2007 estimates that in 2025, when the project is expected to be fully operational, there would be approximately 98 total daily trips by diesel powered vehicles. Likewise, the percentage of vehicles and trucks within each weight class and the portion of these trucks that are fueled by diesel were also obtained from URBEMIS2007. Diesel exhaust emissions rates for all diesel trucks were obtained from CARB's EMFAC2007 emissions model, assuming an average vehicle speed of 30 mph. Total emissions were calculated for a total distance of one mile, which includes one-half mile as the truck approaches the site and one-half mile as the truck leaves the site. The annual average DPM emissions for these truck-travel distances were estimated to be approximately 5.2 lbs in the year 2025.

Annual average DPM concentration impacts from diesel vehicles operating near the site were calculated using the SCREEN3 model, and the incremental cancer risks were estimated from these concentrations. The estimated incremental DPM concentrations near the site ranged from 0.0013 to 0.0019 microgram per cubic meter. The incremental cancer risks from exposure to these concentrations were estimated to be 0.45 to 0.65 in a million. Since these impacts are substantially less than the BAAQMD significance threshold of 10 in a million, the impacts would be less than significant.

The *Air Quality and Land Use Handbook* prepared by CARB recommends that sensitive uses no be located within 500 feet of a heavily traveled freeway and does not require further analysis when locating sensitive uses at distances greater than 500 feet from freeways with 100,000 or more vehicles/day (CARB, 2005). DPM emissions from trucks and heavy-duty vehicles on the I-880 freeway are not expected to contribute significantly to the health risk at the project site given its distance of approximately one-quarter mile (approximately 1,300 feet) south of the project site. The electrified BART trains that operates on the elevated track adjacent to the project site is not a source of DPM or other TAC emissions.

DPM emissions from the operation of passenger trains (operated by Amtrak) and freight trains along the railroad tracks located along the southern boundary of the project site would be the primary source of DPM emissions near the project site. The impact from train activity is generally much lower than freeways due to the infrequent and intermittent nature of activity along train

tracks. Freeways form a constant source of emissions with only the emissions strength varying with traffic level. Future project residents would be exposed to these emissions in addition to background health risk levels to which all residents of the Bay Area are exposed. Given the proximity of most development in the Bay Area to trains, freeways and other sources of DPM, the background health risk calculated for the Bay Area that was derived by BAAQMD from the monitoring of surrogates to DPM at several locations in the region already accounts for increased health risk from proximity to train tracks. Moreover CARB's *Air Quality and Land Use Handbook* does not identify activity along train tracks as a source of concern for DPM emissions. The impact is much greater when sensitive uses are proposed to be located close to rail yards where greater emissions of DPM can occur in a confined area. For these locations, CARB requires a more detailed site specific analysis. Given that the project site is abutted by tracks whose activity can be described as "infrequent" by the Federal Transit Administration (FTA) criteria[9] (US DOT, 2006), DPM emissions from this activity is not expected to pose a significant health risk to future occupants of the project. This impact would therefore be less than significant.

Mitigation: None Required.

Cumulative Air Quality Impacts

Impact AIR-6: The proposed project is fundamentally consistent with the growth assumptions of the Bay Area Clean Air Plan. (Less than Significant)

Locally, emissions from project sources would be combined with emissions from other sources, primarily including area traffic (local streets and freeways) from existing and future development in the greater project area. Although cumulative traffic volumes would increase by 2025, this increase would be partly offset by the reduction in emissions on a grams-per-mile basis. This is due to attrition of older, high polluting vehicles, improvements in the overall automobile fleet, and improved fuel mixtures (as a result of on-going state and federal emissions standards and programs for on-road motor vehicles). Cumulative impacts on carbon monoxide concentrations at local intersections in 2025 would be less than significant as the worst-case carbon monoxide concentrations at all the analyzed intersections would be below the corresponding ambient standards.

According to the BAAQMD CEQA Guidelines, any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. **Table IV.D-6** shows that the operational emissions of ROG, NO_x and PM-10 due to project-related traffic estimates based on the CARB model URBEMIS2007 would be less than the significance criteria of 80 pounds per day. For projects that individually have a less than significant impact on regional air quality, the BAAQMD Guidelines state that the cumulative impact should be determined based on the project's consistency with the applicable local Clean

[9] FTA designates rail activity frequency as either frequent or infrequent for the purposes of vibration assessment, depending upon the number of pass-by events per day. "Infrequent" activity is fewer than 70 events per day.

Air Plan, in this case, the 2005 Bay Area Ozone Strategy. For a project to be consistent with the 2005 Bay Area Ozone Strategy, the project must not conflict with or obstruct its implementation, and should be consistent with its underlying growth assumptions, which are the ABAG *Projections 2003* forecasts. Between 2005 and 2025, ABAG *Projections 2003* forecast citywide population growth of approximately 18 percent (415,700 to 489,100) and forecast citywide increase in households of 20 percent (153,520 to 184,350). For the same period, Oakland's Cumulative Growth Scenario (which routinely project greater growth projections than ABAG, see Appendix D) forecasts an approximately 9 percent growth in population (107,260 to 117,060) in the project area (*with the proposed project*) and a 16 percent growth in households (34,220 to 39,630).[10] Since growth rates anticipated for the area of the proposed project would not exceed ABAG's projected growth rate for Oakland, the project would not conflict with the underlying growth assumptions of the 2005 Bay Area Ozone Strategy.

The BAAQMD CEQA Guidelines state that if a project requires a General Plan Amendment – as the proposed project does – a fundamental conflict could occur if the project generates more vehicle miles traveled (VMT) than what would occur from the project site under the zoning and land use designations that exist without the proposed General Plan Amendment. Therefore, when considering the western approximately 3.2 acres of the site where a General Plan Amendment is required to allow the residential land uses envisioned for the project, the proposed project would result in fewer total daily vehicle trips (thus, vehicle miles traveled) than would development under the existing General Plan land use classification (*Business Mix*) and zoning (M-30 General Industrial). The project proposes 310 dwelling units and 2,900 commercial square feet on the portion of the site currently designated *Business Mix* (Sites I and II), which would result in approximately 1,300 total daily vehicle trips.[11] Under the existing zoning and land use classification, with consideration also given to the vision of "growth and change" that the General Plan LUTE specifies along the East 12th Street Corridor in the project area and that is supported by the Coliseum Redevelopment Plan goals, a theoretic development of 40,000 square feet of commercial use which could occur in the existing M-30 General Industrial Zone and the *Business Mix* land use classification is assumed, which could generate approximately 1,560 total daily vehicle trips (and potentially fewer given the site's proximity to BART and transit).[12] [13]

In addition, the proposed project would generally be consistent with the 2005 Bay Area Ozone Strategy through consistency with the Smart Growth principles that are incorporated into ABAG's *Projections 2003* and that the proposed project, as well as the Oakland Cumulative Growth Scenario, embody. As described by ABAG, Smart Growth refers to

> …development that revitalizes central cities …, supports and enhances public transit, promotes walking and bicycling, and preserves open

[10] San Antonio and Fruitvale Areas, generally I-580 on the north, the Oakland Estuary on the south, Lake Merritt and the Channel on the west, and approximately High Street on the east, as defined consistent with Census Tracts encompassing the project area, as identified and combined for purposes of this EIR (see Appendix D, Table D-3).
[11] Assuming the same trip generation methodology applied Table IV.C-7, Project Weekday Trip Generation.
[12] Assuming the same trip generation methodology applied in Appendix E for General Light Industrial land use.
[13] Scenario of 35,000 commercial square feet is estimated based on the parcel site (3.7 acres) and a potential developable area of approximately 25 percent of the total site area.

> spaces and agricultural lands. … Focusing new housing and commercial development within already developed areas requires less public investment in new roads, utilities and amenities. Investment in the urban core can reduce crime, promote affordable housing and create vibrant central cities and small towns. By coordinating job growth with housing growth, and ensuring a good match between income levels and housing prices, smart growth aims to reverse the trend toward longer commutes, particularly to bedroom communities beyond the region's boundaries. People who live within easy walking distance of shops, schools, parks and public transit have the option to reduce their driving and therefore pollute less than those living in car-dependent neighborhoods. (ABAG 2004)

The proposed project would be a transit-oriented development (TOD), consistent with the aforementioned Smart Growth concepts, Oakland General Plan LUTE policies (see *City of Oakland Local Plan and Policies Relevant to GHG Emissions and Climate Change*, above), and the Alameda County Congestion Management Agency (ACCMA). ACCMA has adopted transportation and land use goals that characterize TODs as "residential or mixed-use development designed and located to make transit use as attractive and convenient as possible." Specifically, ACCMA considers TODs to be located within one-third mile of a transit station or trunkline bus route and include moderately high-density housing and small, local-serving businesses co-located in a planned community that has been designed for convenient walk, bicycle, and transit access. (ACCMA, 2007) In addition, the project would be infill development that would provide new housing and space for new jobs, and would be walking distance from a number of local schools.

In summary, the project would not fundamentally conflict with the 2005 Bay Area Ozone, the currently adopted Clean Air Plan, and would not result in a cumulative air quality impact. The impact would be less than significant.

Mitigation: None Required.

Project's Potential to Generate Increased Greenhouse Gas Emissions and Affect Climate Change

Although it is possible to generally estimate a project's contribution of CO_2 into the atmosphere, it is a matter of speculation whether that project increases existing levels of GHGs globally or in the State of California. Moreover, even if it is assumed that a project does create an incremental increase in those emissions, it is typically not possible to determine whether or how an individual project's relatively small incremental contribution might translate into physical effects on the environment given the considerations discussed previously in this section.

The amount of increased GHG emissions that may be generated by the proposed project would not, by itself, influence global climate change. It cannot currently be determined if the proposed project would provide an incremental contribution to the cumulative increase of GHG emissions.

As previously noted, there are no published thresholds of significance, and no regulatory guidance available that evaluate climate change and GHG emissions in conjunction with individual development projects. In addition, the scientific and technical literature indicates that there is not yet a methodology for reflecting the impact of individual land use decisions in climate change models. Until such time that sufficient scientific basis exists to accurately project future climate trends and guidance is provided by regulatory agencies on the control of GHG emissions and thresholds of significance, the significance of the proposed project's contribution to global GHG emissions, pursuant to CEQA, cannot be judged, but is likely less than significant.

Potential Project Activities Contributing to GHG Emissions

As also previously discussed, the construction and operation of the proposed residential and commercial project would generate GHG emissions, with the majority of energy consumption (and associated generation of GHG emissions) occurring during operation. Typically more than 80 percent of the total energy consumption takes place during the use of buildings and less than 20 percent is consumed during construction. (UNEP, 2007) As of yet, there is no study that quantitatively assesses all of the GHG emissions associated with each phase of the construction and use of an individual residential development.

Overall, the following activities associated with a typical residential development could contribute to the generation of GHG emissions:

- Removal of Vegetation – The net removal of vegetation for construction results in a loss of the carbon sequestration in plants. Alternately, planting of additional vegetation would result in additional carbon sequestration and lower the carbon footprint of the project.

- Construction Activities – Construction equipment typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGes such as carbon dioxide, methane and nitrous oxide. Furthermore, methane is emitted during the fueling of heavy equipment.

- Gas, Electric and Water Use – Gas use results in the emissions of two GHGes: methane (the major component of natural gas) and carbon dioxide from the combustion of natural gas. Methane is released prior to initiation of combustion of the natural gas (as before a flame on a stove is sparked), and from the small amount of methane that is uncombusted in a natural gas flame. Electricity use can result in GHG production if the electricity is generated by combusting fossil fuel. California's water conveyance system is energy intensive. Preliminary estimates indicate that total energy used to pump and treat this water exceeds 15,000 GWh per year, or at least 6.5 percent of the total electricity used in the state per year. (CEC, 2004)

- Motor Vehicle Use – Transportation associated with the proposed project would result in GHG emissions from the combustion of fossil fuels in daily automobile and truck trips. However, these emissions would not be "new" since drivers are likely relocated from another area.

While the proposed project and all developments of similar land use would generate GHG emissions as described above, the City of Oakland's ongoing implementation of its Sustainability

Community Development Initiative (which includes an array of programs and measures, discussed previously under *Regulatory Context for GHG Emissions and Climate Change*) will collectively reduce the levels of GHG emissions and contributions to global climate change attributable to activities throughout Oakland.

Estimated GHG Emission from the Proposed Project

With consideration given to the above discussion regarding the extent to which GHG emissions from an individual project may, by itself, influence global climate change, the following estimate of the proposed project's emissions is provided to allow a comparison with the City's baseline (approximately 2.2 million tons of CO_2e in 2005, or 12.3 million pounds per day; see **Table IV.D-5**).

GHG emissions would result from increases in motor vehicle trips resulting from the proposed project, as well as from natural gas combustion and solid waste generation by future occupants of proposed residences**. Table IV-D-8** presents the GHG emissions that would result from the proposed project.

TABLE IV.D-8
ESTIMATED EMISSIONS OF GREENHOUSE GASES FROM PROPOSED PROJECT AND CITYWIDE

Emission Source	Emissions (pounds CO_2e per day)			
	CO_2	CH_4	N_2O	Total CO_2e
Motor vehicle trips	28,895	92	1,815	30,802
Space and water heating	21,678	1010	156	22,844
Landscape maintenance	15	<1	1	16
Solid waste generation	---	6,116	---	6,116
Total Operational GHG Emissions from Project	50,588	7,218	1,972	**59,778**
Total Citywide 2005 GHG Emissions				*12.3 million*
Project percentage of Total Citywide 2005 GHG Emissions				*0.486 %*

SOURCE: ESA, 2007

GHG emissions associated with the proposed project were calculated using the URBEMIS 2007 Version 9.2.0 model of the California Air Resources Board and trip generation data from the project traffic analysis.[14] Because URBEMIS2007 only estimates CO_2, scaling factors derived from the State of California Inventory of GHG Emissions were used to determine the relative

[14] Consistent with the trip generation estimated for the traffic analysis in this EIR, no credit is taken for emissions (i.e., trips) from existing site uses – uses that would be eliminated by the project (primarily self-storage facilities, a small auto repair/maintenance shop, and a Caltrans maintenance facility). Thus, the estimated emissions can be considered conservative.

emissions of methane (CH_4) and nitrous oxide (N_20) in order to generate emissions of GHG as carbon dioxide equivalents (CO_2e).

The URBEMIS2007 model also estimates CO_2 emissions from natural gas combustion for space and water heating and fuel combustion for landscape maintenance, based on land use size (number of dwelling units or commercial square footage). Again, the appropriate scaling factors from the State GHG Inventory were used to determine the relative amounts of methane and nitrous oxide emitted from residential fuel combustion. Emissions of GHG from solid waste generation associated with the project were determined using an emission factor from U.S. EPA.

Project Design Features

While no significant impacts have been identified, and no mitigation is required, project characteristics, design features which have been included in the project to reduce the amount of GHG emissions generated during construction and operation are provided below.

- Urban Infill Location - The project would be a TOD, developing high-density housing in the central area of Oakland. As such, the project would reduce transportation-related GHG emissions compared to emissions from the same amount of population and employment growth elsewhere in the outer Bay Area. Because transit service is generally less available in most areas of the outlying areas than in the central area of Oakland (and in particular at the project site near BART and multiple transit services), development in those locations would likely result in increased peak-hour vehicle trips of relatively long distances, and often in single-occupant vehicles, compared to development at the project site.

- Proximity to Multiple Transit Modes - The project would develop high-density housing within three blocks of BART and International Boulevard, a primary transit corridor, and within an area developed with pedestrian facilities and proposed enhancements to bicycle facilities. Therefore, the project would facilitate walking and other non-vehicular travel more viable than would be the case for similar population and employment growth in outlying areas away from transit. In addition, the high-density development would include a greater number of potential residents that could potentially utilize or engage in alternative modes of travel than in a lower density development on the project site.

- Energy Efficiency - The proposed project would be required to comply with all applicable local, state and federal regulations associated with the generation of GHG emissions and energy conservation. In particular, construction of the proposed project would also be required to meet California Energy Efficiency Standards for Residential and Nonresidential Buildings and the requirements of pertinent City policies as identified in the City of Oakland General Plan, helping to reduce future energy demand as well as reduce the project's contribution to regional GHG emissions. The project would also consider use of reduced-emission or zero-emission energy alternatives and reducing energy demand through conservation or improved energy efficiencies, to the greatest extent feasible.

- Building and Site Design - As described in the Project Description (Chapter III), the project sponsor has identified as an objective for the proposed project its aims to incorporate to the greatest extent feasible site and building design principles and standards into the project that promote sustainable development. These include specific sustainable construction and operational and standards that would be appropriate for the project and that support goals to increase energy efficiency. The project sponsor, in collaboration with the City, will

consider methods outlined in existing programs, such as the *GreenPoint* Rated (a program of Build It Green, sponsored by a number of Bay Area public agencies and jurisdictions) or LEED standards (Leadership in Energy and Environmental Design Green Building Rating System™, the nationally accepted benchmark for the design, construction, and operation of high performance green buildings). These include

- use of exceptionally durable and/or reused materials;
- materials that avoid toxic emissions;
- equipment and fixtures that conserve energy;
- maximizing efficient and natural lighting and ventilation; and
- maximizing on-site landscaping, including above-grade.

In addition, as discussed in Section IV.I, *Hydrology and Water Quality*, the project would decrease the amount of impervious area and increase vegetation on the site, and could result in fewer vehicle trips compared to development that could otherwise occur under the existing General Plan land use classifications on portions of the site (*Business Mix and Regional Commercial*).

Conclusion

Although no significant impacts have been identified, and no mitigation is required, the project's GHG emissions generated during construction and operation would be minimized by virtue of the existing characteristics and design features that have been included in the project. In addition, emissions would also be reduced since the project is subject to all the regulatory requirements, mitigation measures, and standard conditions in this EIR that would reduce GHG emissions of the project. These include, for example, standard conditions for transportation management to address cumulating air quality impacts, adherence to best management construction practices and equipment use, and maximizing Provision C.3 standards regulating post construction stormwater.

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