D. AIR QUALITY

This section describes the existing air quality setting for the MacArthur Transit Village project and has been prepared using methodologies and assumptions recommended in the Air Quality Impact Assessment Guidelines of the Bay Area Air Quality Management District (BAAQMD).[1] In keeping with these guidelines, this chapter describes existing air quality, impacts of future traffic on local carbon monoxide levels, and impacts of land use-related vehicular emissions that have regional effects. Mitigation measures to reduce or eliminate potentially significant air quality impacts are identified, where appropriate. Following the Air Quality analysis, this section also includes an assessment of the project's impacts related to climate change due to associated greenhouse gas emissions.

1. Setting

The following discussion provides an overview of existing air quality conditions in the region and the Oakland area. Ambient standards and the regulatory framework relating to air quality are summarized. Climate, air quality conditions, and typical air pollutant types and sources are described.

a. Standards, Regulatory Framework, Air Quality and Criteria Pollutants. Air quality standards, the regulatory framework, and State and federal attainment status are discussed below.

(1) Air Quality Standards. Both the State and federal governments have established health-based Ambient Air Quality Standards for six air pollutants: carbon monoxide (CO), ozone (O3), nitrogen dioxide (NO2), sulfur dioxide (SO2), lead (Pb), and suspended particulate matter (PM). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride and visibility- reducing particles. These standards are designed to protect public health and welfare with a reasonable margin of safety.

In addition to primary and secondary Ambient Air Quality Standards, the State of California has established a set of episode criteria for O3, CO, NO2, SO2, and PM. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase.

California Ambient Air Quality Standards and National Ambient Air Quality Standards for the criteria air pollutants are listed in Table IV.D-1. Health effects of these criteria pollutants are described in Table IV.D-2.

[1] Bay Area Air Quality Management District, 1999. *BAAQMD CEQA Guidelines.*

Table IV.D-1 Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]		Federal Standards[b]		
		Concentration[c]	Method[e]	Primary[b,e]	Secondary[c,f]	Method[g]
Ozone (O3)	1-Hour	0.09 ppm (180 µg/m³)	Ultraviolet Photometry	No federal standard	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.07 ppm (137 µg/m³)		0.08 ppm (157 µg/m³)		
Respirable Particulate Matter (PM10)	24-Hour	50 µg/m³	Gravimetric or Beta Attenuation	150 µg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m³		–		
Fine Particulate Matter (PM2.5)	24-Hour	No Separate State Standard		35 µg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m³	Gravimetric or Beta Attenuation	15 µg/m³		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m³)	Nondispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m³)	None	Nondis-persive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m³)		35 ppm (40 mg/m³)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m³)		–		
Nitrogen Dioxide (NO2)	Annual Arithmetic Mean	0.030 ppm (56 mg/m³)	Gas Phase Chemilumin-escence	0.053 ppm (100 µg/m³)	Same as Primary Standard	Gas Phase Chemilumine scence
	1-Hour	0.18 ppm (338 µg/m³)		–		
Lead (Pb)	30-day average	1.5 µg/m³	Atomic Absorption	–	–	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	–		1.5 µg/m³	Same as Primary Standard	
Sulfur Dioxide (SO2)	Annual Arithmetic Mean	–	Ultraviolet Fluorescence	0.030 ppm (80 µg/m³)	–	Spectrophoto -metry (Pararosanilin e Method)
	24-Hour	0.04 ppm (105 µg/m³)		0.14 ppm (365 µg/m³)	–	
	3-Hour	–		–	0.5 ppm (1300 µg/m³)	
	1-Hour	0.25 ppm (655 µg/m³)		–	–	

Table IV.D-1 Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]		Federal Standards[b]		
		Concentration[c]	Method[e]	Primary[b,e]	Secondary[c,f]	Method[g]
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more (0.07–30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[h]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

[a] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, suspended particulate matter—PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

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

[d] Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

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

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

[g] Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

[h] The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: California Air Resources Board (ARB), 2007; LSA Associates, 2007.

(2) Overall Regulatory Setting. The Federal Clean Air Act governs air quality in the United States. In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulations under the California Clean Air Act. At the federal level, the United States Environmental Protection Agency (EPA) administers the Clean Air Act (CAA). The California CAA is administered by the California Air Resources Board (CARB) at the State level and by the Air Quality Management Districts at the regional and local levels. The BAAQMD regulates air quality at the regional level.

Table IV.D-2 Health Effects of Air Pollutants

Pollutant	Health Effects	Examples of Sources
Suspended Particulate Matter (PM2.5 and PM10)	• Reduced lung function • Aggravation of the effects of gaseous pollutants • Aggravation of respiratory and cardio respiratory diseases • Increased cough and chest discomfort • Soiling • Reduced visibility	• Stationary combustion of solid fuels • Construction activities • Industrial processes • Atmospheric chemical reactions
Ozone (O3)	• Breathing difficulties • Lung damage	• Formed by chemical reactions of air pollutants in the presence of sunlight; common sources are motor vehicles, industries, and consumer products
Carbon Monoxide (CO)	• Chest pain in heart patients • Headaches, nausea • Reduced mental alertness • Death at very high levels	• Any source that burns fuel such as cars, trucks, construction and farming equipment, and residential heaters and stoves
Lead (Pb)	• Organ damage • Neurological and reproductive disorders • High blood pressure	• Metals processing • Fuel combustion • Waste disposal
Nitrogen Dioxide (NO2)	• Lung damage	• See carbon monoxide sources
Toxic Air Contaminants	• Cancer • Chronic eye, lung, or skin irritation • Neurological and reproductive disorders	• Cars and trucks, especially diesels • Industrial sources such as chrome platers • Neighborhood businesses such as dry cleaners and service stations • Building materials and products

Source: ARB and EPA, 2005.

Federal CAA. The 1970 Federal CAA authorized the establishment of national health-based air quality standards and also set deadlines for their attainment. The Federal CAA Amendments of 1990 changed deadlines for attaining national standards as well as the remedial actions required of areas of the nation that exceed the standards. Under the CAA, State and local agencies in areas that exceed the national standards are required to develop State Implementation Plans to demonstrate how they will achieve the national standards for O3 by specified dates. The CAA requires that projects receiving federal funds demonstrate conformity to the approved State Implementation Plan and local air quality attainment plan for the region. Conformity with the State Implementation Plan requirements also satisfies the CAA requirements.

California CAA. In 1988, the California CAA required that all air districts in the State endeavor to achieve and maintain California Ambient Air Quality Standards for CO, O3, SO2 and NO2 by the earliest practical date. The California CAA provides districts with new authority to regulate indirect sources and mandates that air quality districts focus particular attention on reducing emissions from transportation and area-wide emission sources. Each

district plan is to achieve a 5 percent annual reduction, averaged over consecutive three-year periods, in district-wide emissions of each nonattainment pollutant or its precursors. Additional physical or economic development within the region would tend to impede the emissions reduction goals of the California CAA. Generally, the State standards for these pollutants are more stringent than the national standards.

(3) United States Environmental Protection Agency. The EPA is responsible for enforcing the Federal CAA. The EPA is also responsible for establishing the National Ambient Air Quality Standards (NAAQS). The NAAQS are required under the 1977 CAA and subsequent amendments. The EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain types of locomotives. The agency has jurisdiction over emission sources outside state waters (e.g., beyond the outer continental shelf) and establishes various emission standards, including those for vehicles sold in states other than California.

(4) California Air Resources Board. In California, the CARB, which is part of the California Environmental Protection Agency (Cal EPA), is responsible for meeting the state requirements of the Federal CAA, administering the California CAA, and establishing the California Ambient Air Quality Standards (CAAQS). The California CAA, as amended in 1992, requires all air districts in the State to endeavor to achieve and maintain the California Ambient Air Quality Standards (CAAQS). The CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles. The CARB regulates mobile air pollution sources, such as motor vehicles. Automobiles sold in California must meet the stricter emission standards established by the CARB. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. The CARB established passenger vehicle fuel specifications, which became effective on March 1996. The CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level.

AB 32, Global Warming. In 2006, Assembly Bill 32 (AB 32), known as the *California Global Warming Solutions Act of 2006,* was signed into law. This bill establishes a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of greenhouse gases (GHG). AB 32 appoints the ARB as the agency responsible for monitoring and reducing GH emission in the state of California. A more detailed discussion of GHGs is included at the end of this section.

Air Quality and Land Use Handbook. The CARB has also developed an Air Quality and Land Use Handbook[2] which is intended to serve as a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process. The CARB handbook recommends that planning agencies strongly consider proximity to these sources when finding new locations for "sensitive" land uses such as homes, medical facilities, daycare centers, schools and playgrounds.

Air pollution sources of concern include freeways, rail yards, ports, refineries, distribution centers, chrome plating facilities, dry cleaners and large gasoline service stations. Key recommendations in the Handbook include taking steps to avoid siting new, sensitive land uses (including residences, day care centers, playgrounds or medical facilities):

- Within 500 feet of a freeway, urban roads with 100,000 vehicles / day or rural roads with 50,000 vehicles/day.
- Within 1,000 feet of a major service and maintenance rail yard.
- Immediately downwind of ports (in the most heavily impacted zones) and petroleum refineries.
- Within 300 feet of any dry cleaning operation (for operations with two or more machines, provide 500 feet).
- Within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater).

The Handbook specifically states that it's recommendations are advisory and acknowledges land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues.

(5) Bay Area Air Quality Management District. The nine-county San Francisco Bay Area is considered, in air quality terms, an air basin. Overall, the air quality conditions in the San Francisco Bay Area are fairly good for a large metropolitan area due to favorable climate conditions that result in moderate temperatures and good ventilation. However, exceedances of air quality standards for ozone and respirable particulate matter pose challenges for air pollution control agencies. In addition, the CARB has identified the San Francisco Bay Area Air Basin as a transport contributor to adjacent air basins. So air pollutants emitted in the project area could contribute to air pollution problems in other areas of northern and central California.

The BAAQMD is primarily responsible for assuring that the National and State ambient air quality standards are attained and maintained in the Bay Area. The BAAQMD is also

[2] California Air Resources Board, 2005. *Air Quality and Land Use Handbook: A Community Health Perspective.* April.

responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, conducting public education campaigns, as well as many other activities. The BAAQMD has jurisdiction over much of the nine-county Bay Area. San Francisco Bay air quality attainment status is shown in Table IV.D-3.

(6) Local Policies. The City of Oakland has policies related to air quality in the City's General Plan and the Standard Conditions of Approval as described below.

City of Oakland Air Quality Policies. The Open Space Conservation and Recreation (OSCAR) element of the City of Oakland's General Plan includes the following policies related to air quality;

- Policy CO-12.1: Promote land use patterns and densities which help improve regional air quality conditions. The City supports efforts of the responsible public agencies to reduce air pollution.
- Policy CO-12.4: Require that development projects be designed in a manner which reduces potential adverse air quality impacts.
- Policy CO-12.6: Control of Dust Emissions. Require construction, demolition, and grading practices which minimize dust emissions.

  These practices are currently required by the City and include the following:
  - Avoiding earth moving and other major dust generating activities on windy days.
  - Sprinkling unpaved construction areas with water during excavation, using reclaimed water where feasible. (Watering can reduce construction-related dust by 50 percent.)
  - Covering stockpiled sand, soil, and other particulates with a tarp to avoid blowing dust.
  - Covering trucks hauling dirt and debris to reduce spills. If spills do occur, they should be swept up promptly before materials become airborne.
  - Preparing a comprehensive dust control program for major construction in populated areas or adjacent to sensitive uses like hospitals and schools.
  - Operating construction and earth-moving equipment, including trucks, to minimize exhaust emissions.

City of Oakland's Standard Conditions of Approval. The City's Standard Conditions of Approval relevant to this impact topic are listed below for reference. The conditions of approval will be adopted as requirements of the proposed project if the project is approved by the City to help ensure no significant impacts (for the applicable topic) occur, as a result they are not listed as mitigation measures.

Table IV.D-3 San Francisco Bay Area Attainment Status

Pollutant	Averaging Time	California Standards[a]		National Standards[b]	
		Concentration	Attainment Status	Concentration	Attainment Status
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m³)	Attainment	9 ppm (10 mg/m³)	Attainment[c]
	1-Hour	20 ppm (23 mg/m³)	Attainment	35 ppm (40 mg/m³)	Attainment
Nitrogen Dioxide (NO2)	Annual Mean	0.03 ppm (56 µg/m³)		0.053 ppm (100 µg/m³)	Attainment
	1-Hour	0.18 ppm (338 µg/m³)	Attainment	Not Applicable	Not Applicable
Ozone (O3)	8-Hour	0.07 ppm (137 µg/m³)	Unclassified	0.08 ppm	Marginal
	1-Hour	0.09 ppm (180 µg/m³)	Nonattainment	Not Applicable	Not Applicable[d]
Suspended Particulate Matter (PM10)	Annual Mean	20 µg/m³	Nonattainment	Not Applicable	Not Applicable
	24-Hour	50 µg/m³	Nonattainment	150 µg/m³	Unclassified
Suspended Particulate Matter (PM2.5)	Annual Mean	12 µg/m³	Nonattainment	15 µg/m³	Attainment
	24-Hour	Not Applicable	Not Applicable	35 µg/m³	Unclassified
Sulfur Dioxide (SO2)	Annual Mean	Not Applicable	Not Applicable	0.03 ppm (80 µg/m³)	Attainment
	24-Hour	0.04 ppm (105 µg/m³)	Attainment	0.14 ppm (365 µg/m³)	Attainment
	1-Hour	0.25 ppm (655 µg/m³)	Attainment	Not Applicable	Not Applicable

Notes: Lead (Pb) is not listed in the table because it has been in attainment since the 1980s.
ppm = parts per million
g/m³ = milligrams per cubic meter
µg/m³ = micrograms per cubic meter

[a] California standards for O3, CO (except Lake Tahoe), SO2 (1- and 24-hour), NO2 and PM10 are values that are not to be exceeded. If the standard is for a 1-hour, 8-hour, or 24-hour average, then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average.

[b] National standards other than for O3 and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year. For example, the O3 standard is attained if, during the most recent 3- year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than 1.

[c] In April 1998, the Bay Area was redesignated to Attainment for the national 8-hour CO standard.

[d] The National 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005.

Source: Bay Area Air Quality Management District, Bay Area Attainment Status, 2007.

COA AIR-1: Dust Control. *Prior to issuance of a demolition, grading, or building permit.* During construction, the project applicant shall require the construction contractor to implement the following measures required as part of BAAQMD basic and enhanced dust control procedures required for construction sites. These include:

BASIC (Applies 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 2 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 (All "Basic" Controls listed above plus the following if the construction site is greater than 4 acres)

a) All "Basic" controls listed above, plus:

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

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

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

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

COA AIR-2: Construction Emissions. *Prior to issuance of a demolition, grading, or building permit.* To minimize construction equipment emissions during construction, the project applicant shall require the construction contractor to:

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, provides the issuance of authorities to construct and permits 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) shall be performed for such equipment used continuously during the construction period.

b. Existing Air Quality Conditions. The following discussion provides brief summaries of: (1) regional air quality, (2) local climate and air quality.

(1) Regional Air Quality. The City of Oakland is located in the San Francisco Bay Area, a large shallow air basin ringed by hills that taper into a number of sheltered valleys around the perimeter. Two primary atmospheric outlets exist. One is through the Golden Gate Strait, a direct outlet to the Pacific Ocean. The second outlet extends to the northeast, along the west delta region of the Sacramento and San Joaquin Rivers.

The City of Oakland is within the jurisdiction of the BAAQMD, which regulates air quality in the San Francisco Bay Area. Air quality conditions in the San Francisco Bay Area have improved significantly since the BAAQMD was created in 1955. Ambient concentrations of air pollutants and the number of days during which the region exceeds air quality standards have fallen dramatically. Exceedances of air quality standards occur primarily during meteorological conditions conducive to high pollution levels, such as cold, windless winter nights or hot, sunny summer afternoons.

Ozone levels, measured by peak concentrations and the number of days over the State 1-hour standard, have declined substantially as a result of aggressive programs by the BAAQMD and other regional, State and federal agencies. The reduction of peak concentrations represents progress in improving public health; however the Bay Area still exceeds the State standard for 1-hour ozone.

Levels of PM10 in the Bay Area have exceeded State standards at least two times per year during the past three years. The Bay Area is considered a nonattainment area for PM10 and PM2.5 relative to the State standard, and unclassified for the federal standards.

No exceedances of the State or federal CO standards have been recorded at any of the region's monitoring stations since 1991. The Bay Area is currently considered a maintenance area for State and federal CO standards.

Toxic air contaminants (TACs) are not criteria pollutants, but are associated with health-related effects and have appreciable concentrations within the Bay Area. The U.S. EPA and the California ARB have identified over 800 substances that are emitted into the air that may affect human health. Some of these substances are considered to be carcinogens, while others are known to have other adverse health effects. As part of ongoing efforts to identify and assess potential health risks to the public, the BAAQMD has collected and compiled air toxics emissions data from industrial and commercial sources of air pollution throughout the Bay Area. Monitoring data and emissions inventory of toxic air contaminants helps the BAAQMD determine health risk to Bay Area residents. The 2003 emissions inventory shows that emissions of many TACs are decreasing in the Bay Area.

Ambient monitoring concentrations of TACs indicate that pollutants emitted primarily from motor vehicles (1,3-butadiene and benzene) account for slightly over one half of the average calculated cancer risk from ambient air in the Bay Area.[3] According to the BAAQMD, ambient benzene levels declined dramatically in 1996 with the advent of Phase 2 reformulated gasoline. Due to this reduction, the calculated average cancer risk based on monitoring results has been reduced to 143 in one million, however, this risk does not include the risk resulting from exposure to diesel particulate matter or other compounds not monitored. Although not specifically monitored, recent studies indicate that exposure to diesel particulate matter may contribute significantly to a cancer risk (approximately 500-700 in one million) that is greater than all other measured TACs combined.[4]

The BAAQMD's 2005 Ozone Strategy is the latest Clean Air Plans which contain district-wide control measures to reduce ozone precursor emissions (i.e., ROG and NOx) and particulate matter. Ozone, in particular, results from the reaction of organic gases (ROG) and nitrogen oxide (NOx) in the atmosphere. To reduce ozone, its precursors (ROG and NOx) are regulated. The State standards for these pollutants are at least as stringent as the national standards. Exceedances of air quality standards occur primarily during meteorological conditions conducive to high pollution levels, such as cold, windless winter nights or hot, sunny summer afternoons.

(2) Local Climate and Air Quality. Air quality is a function of both local climate and local sources of air pollution. The amount of a given air pollutant in the atmosphere is determined by the amount of pollutant released and the atmosphere's ability to transport

[3] BAAQMD, 2007. *Toxic Air Contaminant Control Program Annual Report 2003 Volume 1.* August.

[4] Ibid.

and/or dilute that pollutant. The major determinants of transport and dilution are wind, atmospheric stability, terrain, and, for photochemical pollutants, sunshine.

The City of Oakland is located in the Northern Alameda and Western Contra Costa Region of the Basin. This climatological subregion stretches from Richmond to San Leandro. Its western boundary is defined by San Francisco Bay and its eastern boundary by the Oakland/Berkeley hills. The Oakland /Berkeley hills have a ridge line height of approximately 1,500 feet, a significant barrier to air flow. The most densely populated area of the subregion lies in a strip of land between San Francisco Bay and the lower hills.

Temperatures in this subregion have a narrow range due to the proximity of the moderating marine air. Maximum temperatures in summer average in the mid-70's, with minimums in the mid-50's. Winter highs are in the mid- to high-50's, with lows in the low- to mid-40's.

The air pollution potential is lowest for the parts of the subregion that are closest to the bay, due largely to good ventilation and less influx of pollutants from upwind sources. The occurrence of light winds in the evenings and early mornings occasionally causes elevated pollutant levels. The air pollution potential at the northern (Richmond) and southern (Oakland, San Leandro) parts of this subregion is marginally higher than communities directly east of the Golden Gate, because of the lower frequency of strong winds.

This subregion contains a variety of industrial air pollution sources. Some industries are quite close to residential areas. The subregion is also traversed by frequently congested major freeways. Traffic and congestion, and the motor vehicle emissions they generate, are increasing.

Pollutant monitoring results for the years 2004 to 2006 are shown in Table IV.D-4, at the closest monitoring station to the project site for which data was available including the Oakland (Alice Street), San Pablo (Rumrill Boulevard) and San Francisco (Arkansas Street) monitoring stations. Ambient air quality monitoring stations indicate that air quality in the project area has generally been good. As indicated in the monitoring results, one violation of State PM10 standard was recorded in the year 2004, and three violations were recorded in the year 2006. No violation of federal PM10 standard was recorded during the three-year period. The State 1-hour ozone standard and the federal 8-hour ozone standard have not been exceeded within the past three years at these monitoring stations. Both State and federal CO, PM2.5, NO2, and SO2 standards were not exceeded in this area during the three-year period.

Table IV.D-4 Ambient Air Quality Monitoring Data

Pollutant	Standard	2004	2005	2006
Carbon Monoxide (CO)				
Maximum 1-hour concentration (ppm)		3.5[a]	3.4[a]	2.52[b]
Number of days exceeded:	State: > 20 ppm	0	0	0
	Federal: > 35 ppm	0	0	0
Maximum 8-hour concentration (ppm)		2.6	2.4	1.4[b]
Number of days exceeded:	State: > 9 ppm	0	0	0
	Federal: > 9 ppm	0	0	0
Ozone (O3)				
Maximum 1-hour concentration (ppm)		0.080[a]	0.068[a]	0.061[b]
Number of days exceeded:	State: > 0.09 ppm	0	0	0
Maximum 8-hour concentration (ppm)		0.057[a]	0.045[a]	0.050[b]
Number of days exceeded:	State: > 0.07 ppm	0	0	0
	Federal: > 0.08 ppm	0	0	0
Coarse Particulates (PM10)				
Maximum 24-hour concentration (µg/m³)		62[b]	40[b]	58[b]
Number of days exceeded:	State: > 50 µg/m³	1	0	3
	Federal: > 150 µg/m³	0	0	0
Annual arithmetic average concentration (µg/m³)		21	18	21
Exceeded for the year:	State: > 20 µg/m³	Yes	No	Yes
	Federal: > 50 µg/m³	No	No	No
Fine Particulates (PM2.5)				
Maximum 24-hour concentration (µg/m³)		46[c]	44[c]	54[c]
Number of days exceeded:	Federal: > 65 µg/m³	0	0	0
Annual arithmetic average concentration (µg/m³)		10.0[c]	9.5[c]	9.7[c]
Exceeded for the year:	State: > 12 µg/m³	No	No	No
	Federal: > 15 µg/m³	No	No	No
Nitrogen Dioxide (NO2)				
Maximum 1-hour concentration (ppm)		0.055	0.054	0.055
Number of days exceeded:	State: > 0.25 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.013	0.012	0.013
Exceeded for the year:	Federal: > 0.053 ppm	No	No	No
Sulfur Dioxide (SO2)				
Maximum 1-hour concentration (ppm)		0.019[b]	0.025[b]	0.017[b]
Number of days exceeded:	State: > 0.25 ppm	0	0	0
Maximum 3-hour concentration (ppm)		0.010[b]	0.013[b]	0.012[b]
Number of days exceeded:	Federal: > 0.5 ppm	0	0	0
Maximum 24-hour concentration (ppm)		0.005[b]	0.006[b]	0.005[b]
Number of days exceeded:	State: > 0.04 ppm	0	0	0
	Federal: > 0.14 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.002[b]	0.002[b]	0.002[b]
Exceeded for the year:	Federal: > 0.030 ppm	No	No	No

Notes: ppm = parts per million µg/m³ = micrograms per cubic meter
[a] Monitoring Results taken from the Oakland monitoring station located at 822 Alice Street.
[b] Monitoring results taken from the San Pablo Monitoring station located on Rumrill Boulevard
[c] Monitoring results taken from the San Francisco monitoring station located on Arkansas Street

Source: ARB and EPA.

c. Air Quality Issues. Seven key air quality issues – local CO hotspots, vehicle emissions, fugitive dust, odors, construction equipment exhaust, toxic air contaminants and climate change – are described below.

(1) Local Carbon Monoxide Hotspots. Local air quality is most affected by CO emissions from motor vehicles. CO is typically the pollutant of greatest concern because it is created in abundance by motor vehicles and it does not readily disperse into the air. Because CO does not readily disperse, areas of vehicle congestion can create "pockets" of high CO concentration called "hot spots." These pockets have the potential to exceed the State 1-hour standard of 20.0 ppm and/or the 8-hour standard of 9.0 ppm.

While CO transport is limited, it disperses with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations near congested roadways or intersections may reach unhealthful levels that adversely affect local sensitive receptors (e.g., residents, schoolchildren, the elderly, hospital patients, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service or with extremely high traffic volumes. In areas with high ambient background CO concentration, modeling is recommended to determine a project's effect on local CO levels.

(2) Vehicle Emissions. Long-term air emission impacts are those associated with changes in automobile travel within the City. Mobile source emissions would result from vehicle trips associated with increased vehicular travel. As is true throughout much of the U.S., motor vehicle use is projected to increase substantially in the region. The BAAQMD, local jurisdictions, and other parties responsible for protecting public health and welfare will continue to seek ways of minimizing the air quality impacts of growth and development in order to avoid further exceedances of the standards.

(3) Fugitive Dust. Fugitive dust emissions are generally associated with demolition, land clearing, exposure of soils to the air, and cut and fill operations. Dust generated during construction varies substantially on a project-by-project basis, depending on the level of activity, the specific operations, and weather conditions.

The EPA has developed an approximate emission factor for construction-related emissions of total suspended particulate of 1.2 tons per acre per month of activity. This factor assumes a moderate activity level, moderate silt content in soils being disturbed, and a semi-arid climate. The California Air Resources Board estimates that 64 percent of construction-related total suspended particulate emissions is PM10. Therefore, the emission factors for uncontrolled construction-related PM10 emissions are:

- 0.77 tons per acre per month of PM10; or
- 51 pounds per acre per day of PM10.

However, construction emissions can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors. There are a number of feasible control measures that can be reasonably implemented to significantly reduce PM10 and PM2.5 emissions from construction. Rather than attempting to provide detailed quantification of anticipated construction emissions from projects, the BAAQMD suggests the following:

> "The determination of significance with respect to construction emissions should be based on a consideration of the control measures to be implemented. From the District's perspective, quantification of emissions is not necessary, although a lead agency may elect to do so. If all of the control measures indicated as appropriate, depending on the size of the project, are implemented, then air pollution from emissions from construction activities would be considered a less-than-significant impact."[5]

(4) Odors. Odors are also an important element of local air quality conditions. Specific activities can raise concerns on the part of nearby neighbors. Major sources of odors include restaurants, manufacturing plants, and agricultural operations. Other odor producers include the industrial facilities within the region. While sources that generate objectionable odors must comply with air quality regulations, the public's sensitivity to locally produced odors often exceeds regulatory thresholds.

(5) Construction Equipment Exhaust. Construction activities cause combustion emissions from utility engines, heavy-duty construction vehicles, equipment hauling materials to and from construction sites, and motor vehicles transporting construction crews. Exhaust emissions from construction activities vary daily as construction activity levels change. The use of construction equipment results in localized exhaust emissions.

(6) Toxic Air Contaminants. In 1998 the ARB identified diesel engine particulate matter as a toxic air contaminant. Facilities that may have substantial diesel exhaust emissions include truck stops; warehouse/distribution centers; large commercial or industrial facilities; high volume transit centers; schools with high volume of bus traffic; high volume highways or high volume arterial/roadways with high levels of diesel traffic.

(7) Climate Change. Global warming is the observed increase in the average temperature of the earth's atmosphere and oceans in recent decades. The earth's average near-surface atmospheric temperature rose 0.6 ± 0.2° Celsius (1.1 ± 0.4° Fahrenheit) in the 20th century. The prevailing scientific opinion on climate change is that "most of the

[5] Bay Area Air Quality Management District, 1966. *BAAQMD CEQA Guidelines Assessing the Air Quality Impacts of Projects and Plans*. April. (Amended in December 1999.)

warming observed over the last 50 years is attributable to human activities."[6] The increased amounts of carbon dioxide (CO2) and other greenhouse gases (GHGs) are the primary causes of the human-induced component of warming. They are released by the burning of fossil fuels, land clearing and agriculture, etc., and lead to an increase in the greenhouse effect.

Greenhouse gases are present in the atmosphere naturally, released by natural sources, or formed from secondary reactions taking place in the atmosphere. They include carbon dioxide, methane, nitrous oxide and ozone. In the last 200 years, mankind has been releasing substantial quantities of greenhouse gases into the atmosphere. These extra emissions are increasing greenhouse gas concentrations in the atmosphere, enhancing the natural greenhouse effect, which is believed to be causing global warming. While man-made greenhouse gases include carbon dioxide, methane and nitrous oxide, some like the CFCs are completely new to the atmosphere.

Natural sources of carbon dioxide include the respiration (breathing) of animals and plants, and evaporation from the oceans. Together, these natural sources release about 150 billion tons of carbon dioxide each year, far outweighing the 7 billion tons of man-made emissions from fossil fuel burning, waste incineration, deforestation and industrial activities. Nevertheless, natural removal processes, such as photosynthesis by land and ocean-dwelling plant species, cannot keep pace with this extra input of man-made carbon dioxide, and consequently the gas is building up in the atmosphere.

Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Man-made sources include the mining and burning of fossil fuels, digestive processes in ruminant animals such as cattle, rice paddies and the burying of waste in landfills. Total annual emissions of methane are about 500 million tons, with man-made emissions accounting for the majority. As is the case for carbon dioxide, the major removal process of atmospheric methane – chemical breakdown in the atmosphere – cannot keep pace with source emissions, and methane concentrations in the atmosphere are increasing

2. Air Quality Impacts and Mitigation Measures

This section discusses potential impacts to air quality that could result from implementation of the project. The section begins with the significance criteria, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents the impacts associated with the project and identifies mitigation measures, as appropriate.

[6] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2001: The Scientific Basis*, http://www.grida.no/climate/ipcc_tar/wg1/index.htm.

a. Criteria of Significance. Implementation of the project would have a significant impact on air quality if it would:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Frequently create substantial objectionable odors affecting a substantial number of people.
- 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 percent or more unless the increase in traffic volume is less than 100 vehicles per hour.*]
- Result in total emissions of ROG, NOx, or PM10 of 15 tons per year or greater, or 80 pounds (36 kilograms) per day or greater.
- Result in potential to expose persons to substantial levels of Toxic Air Contaminants (TAC), such that the probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million.
- Result in ground level concentrations of non-carcinogenic TACs such that the Hazard Index would be greater than 1 for the MEI.
- Result in a substantial increase in diesel emissions.

A cumulative impact would occur if conditions would:

- Result in any individual significant air quality impact.
- Result in a fundamental conflict with the local general plan, when the general plan is consistent with the regional air quality plan. When the general plan fundamentally conflicts with the regional air quality plan, then if the contribution of the proposed project is cumulatively considerable when analyzed the impact to air quality should be considered significant.

b. Less-than-Significant Air Quality Impacts. A discussion of several less-than-significant impacts of the proposed project as described below.

(1) Consistency with the Air Quality Plan. The most recent BAAQMD plan for attaining California Ambient Air Quality Standards, the Bay Area 2005 Ozone Strategy, was adopted by BAAQMD on January 4, 2006. The 2005 Ozone Strategy is the fourth triennial update of the BAAQMD's original 1991 Clean Air Plan (CAP). The 2005 Ozone Strategy demonstrates how the San Francisco Bay Area will achieve compliance with the State 1-hour air quality standard for ozone and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The Ozone Strategy also includes stationary source control measures, mobile source control measures and transportation control measures. The proposed project is considered a Transportation Control Measure (TCM) under the 2005 Ozone Strategy. The project is consistent with the 2005 Ozone Strategy under TCM #15, Local Land Use Planning and Development Strategies because of the proposed project's transit-oriented development (TOD) along a major transit corridor. Although it is only required to address ozone pollution and associated control measures, the Ozone Strategy also discusses particulate matter pollution and reduction measures. The Clean Air Plan projections are based on analysis and forecasts of air pollutant emissions throughout the entire region. The forecasts rely on projections of population and employment made by the Association of Bay Area Governments (ABAG), which are based on land use projections made by local jurisdictions (e.g., General Plan process). The MacArthur Transit Village project is consistent with the General Plan designations for the project site and therefore the population and employment increase that would result from the proposed project would be consistent with projections used in the development of the Clean Air Plan. As a result, the proposed project would be consistent with regional air quality planning and not result in a significant cumulative impact to air quality.

(2) Regional Air Emissions. Regional air emissions are generated by land use development projects, primarily by the motor vehicle trips generated by the projects. These are often referred to as "indirect sources" and include projects such as shopping centers, office buildings, and residential developments. The proposed project includes the development of residential units, commercial shopping space and community space.

Mobile source emissions would result from vehicle trips associated with the proposed project. The Urban Emission Model (URBEMIS 2007 v. 9.2) computer program, which is the most current air quality model available in California for estimating emissions associated with land use development projects, was used to calculate long-term regional emissions associated with the proposed project. URBEMIS output sheets are included in Appendix B of this report.

The daily increase in emissions associated with project operational and area sources is identified in Table IV.D-5 for reactive organic gases (ROG) and nitrogen oxides (NOx) (two

precursors of ozone) and coarse particle matter (PM10). The BAAQMD has established thresholds of significance for ozone precursors and PM10 of 80 pounds per day; however, they have not established a threshold for emissions of PM2.5 or CO2. Proposed project emissions shown in Table IV.D-5 would not exceed these thresholds of significance for ROG, NOx, and PM10, and therefore, the proposed project would not have a significant effect on regional air quality.

Table IV.D-5 Project Regional Emissions in Pounds Per Day

	Reactive Organic Gases	Nitrogen Oxides	PM10	PM2.5
Operation (Vehicle) Emissions	25.0	39.5	58.3	11.1
Area Source Emissions	38.5	9.29	0.3	0.3
Total Regional Emissions	**69.5**	**48.8**	**58.6**	**11.4**
BAAQMD Significance Threshold	80.0	80.0	80.0	NA
Exceed?	No	No	No	NA

Source: LSA Associates, Inc., 2007.

(3) Contribute to Air Quality Violation. The City of Oakland is considered a non-attainment area for ozone and PM10 and PM2.5. As noted above, the Bay Area 2005 Ozone Strategy, which also addresses particulate matter, is the air quality plan that applies to projects within the City of Oakland. Based on the URBEMIS model analysis, the proposed project is not expected to contribute a significant amount of regional emissions. The proposed project would contribute to regional ozone emissions in the form of emissions from construction vehicles and the project would contribute to particulate matter emissions through construction vehicle emissions and the disturbance of soil within the project site during the construction period.

Construction activities would vary through the developmental stages of the project. Construction activities for various project stages may include the use of earthmoving equipment and water and pick-up trucks. Ground disturbance and the operation of motorized construction vehicles would incrementally increase ozone and particulate matter emissions in the region during the project construction period.

Construction emissions are considered temporary and are accounted for the regional air quality plan for attainment. Temporary, construction period air quality impacts (for all pollutants) are considered less-than-significant if standard BAAQMD particulate matter control measures are implemented. Implementation of the City's Dust Control and Construction Emissions Standard Conditions of Approval (see COA AIR-1 and AIR-2 on pages 235 and 236) which includes the required BAAQMD control measures and control measures that would reduce emissions from construction equipment, would reduce the project's construction period air quality impacts (including construction period conflicts with the 2005 Ozone Strategy) to a less-than-significant level.

(4) Cumulative Increase of Any Criteria Pollutant. Cumulative air quality impacts associated with criteria pollutants are evaluated based on both a quantification of the project-related air quality impacts and the consistency of the project with local and regional

air quality plans (i.e., the *Oakland General Plan* and the Bay Area 2005 Ozone Strategy). As shown in Table IV.D-5 emissions from the proposed project would not exceed BAAQMD significance thresholds. For projects that do not individually have a significant air quality impacts, the determination of significant cumulative impact is based on the evaluation of the consistency of the project with the local General Plan and the General Plan with the regional air quality plan. The proposed project does not individually exceed regional emission thresholds and is consistent with general plan land use assumptions and the regional air quality plan utilizes the ABAG projections, which is consistent with the City of Oakland General Plan. Therefore, the proposed project would not contribute significantly to a cumulative increase of any criteria pollutant.

(5) Exposure of sensitive receptors to substantial pollutant concentrations. Sensitive receptors are facilities that house or attract children, the elderly, and people with illnesses or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors.

As shown in Table IV.D-5 based on the type of uses proposed for the project site (residential and commercial) the operation of the project would not generate substantial pollutants and thus would not expose sensitive receptors to substantial pollutant concentrations. Construction of the project would temporarily increase localized emissions. As noted above however, temporary, construction period air quality impacts (for all pollutants) are considered less-than-significant if standard BAAQMD particulate matter control measures are implemented. Implementation of the City's City's Dust Control and Construction Emissions Standard Conditions of Approval (see COA AIR-1 and AIR-2 on pages 235 and 236) would reduce construction emissions to a less-than-significant level.

Construction emission estimates based on preliminary construction plans have been calculated using the URBEMIS 2007 model. Table IV.D-6 shows the construction emission model results. The BAAQMD does not have significance thresholds for construction emissions, therefore, this information if for informational purposes.

As discussed above, the CARB has developed guidelines to be considered in the siting of new sensitive land uses (including residential uses) to protect vulnerable populations from the adverse health impacts of traffic-related emissions. The guidelines are not regulatory, nor are they binding on local agencies. Specifically, CARB's advisory recommendation for sensitive land uses proposed near freeways and high-traffic roads is to "[a]void siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day." Sensitive uses would include residences, day care centers, playgrounds or medical facilities. The proposed project is located as close as 75 feet from State Route 24 (SR-24) and 1,000 feet from I-580. However, CARB also recognizes

Table IV.D-6 Construction Emission Estimates

	Construction Emission Estimates										
	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009 Totals (lbs/day unmitigated)	7.08	35.75	86.88	0.08	64.00	1.96	65.34	13.37	1.78	14.60	9,469.91
2010 Totals (lbs/day unmitigated)	6.58	33.23	81.12	0.08	0.35	1.82	2.17	0.13	1.66	1.78	9,472.87
2011 Totals (lbs/day unmitigated)	6.07	30.67	75.56	0.08	0.35	1.71	2.06	0.13	1.56	1.68	9,476.14
2012 Totals (lbs/day unmitigated)	33.55	28.26	70.65	0.08	0.35	1.57	1.92	0.13	1.43	1.55	9,512.65
2013 Totals (lbs/day unmitigated)	33.07	25.91	65.71	0.08	0.35	1.42	1.77	0.13	1.29	1.41	9,515.76
2014 Totals (lbs/day unmitigated)	32.63	23.68	61.10	0.08	0.35	1.28	1.63	0.13	1.16	1.28	9,518.60

Source: LSA Associates, 2007.

that there is no "one size fits all" solution to land use planning, and that in addressing housing and transportation needs, the benefits of urban infill, community economic development priorities and other quality of life issues are also important and these must be considered and weighed by local decision makers when siting projects. The Handbook also acknowledges that the relative risk from site to site can vary greatly and that to determine the actual risk near a particular facility, a site-specific analysis (e.g., health risk assessment) is necessary.

The City has not historically required projects adjacent to freeways to conduct such analysis. Since the proposed project involves development in excess of 600 housing units, is located adjacent to two freeways, BART, multiple agencies, and substantial public funding, there was a desire for a more conservative analysis that is not legally required under CEQA. As a result, a health risk assessment was performed to evaluate the risk to future site residents caused by exposure to toxic air contaminants from vehicle exhaust from I-580, SR-24 and Telegraph Avenue in accordance with these guidelines (see discussion below under Toxic Air Contaminants). The risk assessment determined that the future residents would not be exposed to significant levels of to toxic air contaminants; as a result no significant impact related to the siting of sensitive uses adjacent to a freeway would result.

(6) Objectionable Odors. The operation of the project would not generate objectionable odors. The proposed project includes residential and commercial land uses which are not expected to generate objectionable odors. Odors associated with food services would need to comply with local ordinances regarding appropriate venting of cooking areas. Therefore, the project would not frequently create substantial objectionable odors affecting a substantial number of people. This potential impact would be less than significant.

(7) CO Concentrations. Vehicular traffic associated with the project would emit carbon monoxide (CO) into the air along roadway segments and near intersections. As previously described, because CO does not readily disperse, areas of vehicle congestion can create pockets of high CO concentrations, called "hot spots." Typically, high CO concentrations are associated with roadways or intersections operating at deficient levels of service (LOS) or with extremely high traffic volumes. An analysis of the potential CO hotspots was performed for intersections in the project vicinity.

The CALINE4 air pollutant dispersion model was used to evaluate CO concentrations at intersections in the vicinity of the project site. Based on the methodology suggested by the U.S. EPA and the California Department of Transportation, the second highest CO concentrations monitored at the nearest air monitoring station in the past 2 years (in this case 3.3 ppm for the 1-hour period and 2.4 ppm for the 8-hour period) were used as the background CO concentrations. Emission factors for study scenarios were obtained from the latest confirmed CARB data. The eight intersections at the perimeter of the site are listed on Tables VI-D-7, 8 and 9, below.

Table IV.D-4 lists the 1-hour and 8-hour CO concentrations for the Existing (2007) and Existing Plus Project conditions at eight intersections in the project study area. Table IV.D-8 lists the concentrations for the Cumulative Year 2015 Baseline With and Without the Proposed Project scenarios. Table IV.D-9 lists the concentrations for the Cumulative Year 2030 Baseline With and Without the Proposed Project scenarios.

Table IV.D-7 shows that all 1-hour and 8-hour CO concentrations for existing conditions, with- and without-the-project, would be below the federal and State CO standards. The 1-hour CO levels range from 3.6 to 5.3 ppm, much lower than the State CO standard of 20 ppm. The 8-hour CO levels range from 2.5 ppm to 3.7 ppm, also much lower then the State and federal standard of 9 ppm.

Table IV.D-8 shows that all 1-hour and 8-hour CO concentrations with the Cumulative Year 2015 Baseline Plus Project scenario would be below the federal and State CO standards. The 1-hour CO levels range from 3.3 ppm to 4.3 ppm, which are much lower then the State

Table IV.D-7 CO Concentrations for Existing and Existing Plus Project Conditions

No.	Intersection	Receptor Distance to Road Centerline (Meters)	Project Related Increase 1-Hr/8-Hr (ppm)	Existing Plus Project/ Existing 1-Hour CO Concentration (ppm)	Existing Plus Project/ Existing 8-Hour CO Concentration (ppm)	Exceeds State Standards	
						1-Hr	8-Hr
5	M.L. King Jr. Way/ 45th Street	11	0.0 / 0.0	4.2 / 4.2	3.0 / 3.0	No	No
		11	0.0 / 0.0	4.1 / 4.1	3.0 / 3.0	No	No
		11	0.0 / 0.0	4.1 / 4.1	3.0 / 3.0	No	No
		10	0.1 / 0.1	4.0 / 4.1	2.9 / 3.0	No	No
6	Telegraph Avenue/ 45th Street	11	0.0 / 0.0	5.0 / 5.0	3.6 / 3.6	No	No
		11	0.0 / 0.0	5.0 / 5.0	3.6 / 3.6	No	No
		10	0.0 / 0.0	5.0 / 5.0	3.6 / 3.6	No	No
		10	0.1 / 0.1	4.9 / 5.0	3.5 / 3.6	No	No
9	M.L. King Jr. Way/ 40th Street	14	0.1 / 0.0	5.1 / 5.2	3.7 / 3.7	No	No
		14	0.1 / 0.0	5.1 / 5.2	3.7 / 3.7	No	No
		14	0.1 / 0.0	5.1 / 5.2	3.7 / 3.7	No	No
		14	0.1 / 0.0	5.1 / 5.2	3.7 / 3.7	No	No
10	Frontage Road/ 40th Street	14	0.1 / 0.0	4.8 / 4.9	3.5 / 3.5	No	No
		14	0.0 / 0.0	4.7 / 4.7	3.4 / 3.4	No	No
		12	0.0 / 0.0	4.7 / 4.7	3.4 / 3.4	No	No
		12	0.0 / 0.0	4.6 / 4.6	3.3 / 3.3	No	No
13	Telegraph Avenue/ 40th Street	14	0.0 / 0.0	5.3 / 5.3	3.8 / 3.8	No	No
		14	0.1 / 0.1	5.2 / 5.3	3.7 / 3.8	No	No
		14	0.0 / 0.0	5.2 / 5.2	3.7 / 3.7	No	No
		14	0.1 / 0.0	5.1 / 5.2	3.7 / 3.7	No	No
18	M.L. King Jr. Way/ MacArthur Boulevard	14	0.0 / 0.0	4.6 / 4.6	3.3 / 3.3	No	No
		14	0.1 / 0.0	4.4 / 4.5	3.2 / 3.2	No	No
		14	0.1 / 0.0	4.4 / 4.5	3.2 / 3.2	No	No
		14	0.0 / 0.0	4.4 / 4.4	3.2 / 3.2	No	No
19	Frontage Road/ MacArthur Boulevard	14	0.0 / 0.0	4.4 / 4.4	3.2 / 3.2	No	No
		14	0.0 / 0.0	4.4 / 4.4	3.2 / 3.2	No	No
		14	0.1 / 0.1	4.3 / 4.4	3.1 / 3.2	No	No
		14	0.1 / 0.1	4.3 / 4.4	3.1 / 3.2	No	No
20	Telegraph Avenue/ MacArthur Boulevard	17	0.1 / 0.1	5.6 / 5.7	4.0 / 4.1	No	No
		14	0.1 / 0.1	5.5 / 5.6	3.9 / 4.0	No	No
		14	0.1 / 0.0	5.4 / 5.5	3.9 / 3.9	No	No
		14	0.0 / 0.0	5.3 / 5.3	3.8 / 3.8	No	No

Note: Includes ambient 1-hour concentration of 3.3 ppm and ambient 8-hour concentration of 2.4 ppm.

Source: LSA Associates, Inc., 2007.

Table IV.D-8 CO Concentrations for Cumulative Year 2015 Baseline With and Without the Project

No.	Intersection	Receptor Distance to Road Centerline (Meters)	Project Related Increase 1-Hr/8-Hr (ppm)	2015 With Project/ 2015 Without 1-Hour CO Concentration (ppm)	2015 With Project/ 2015 Without 8-Hour CO Concentration (ppm)	Exceeds State Standards	
						1-Hr	8-Hr
5	M.L. King Jr. Way/ 45th Street	11	0.0 / 0.0	3.8 / 3.8	2.8 / 2.8	No	No
		11	0.0 / 0.0	3.8 / 3.8	2.8 / 2.8	No	No
		10	0.1 / 0.1	3.7 / 3.8	2.7 / 2.8	No	No
		10	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
6	Telegraph Avenue/ 45th Street	11	0.0 / 0.0	4.4 / 4.4	3.2 / 3.2	No	No
		11	0.0 / 0.0	4.4 / 4.4	3.2 / 3.2	No	No
		10	0.0 / 0.0	4.3 / 4.3	3.1 / 3.1	No	No
		10	0.1 / 0.1	4.2 / 4.3	3.0 / 3.1	No	No
9	M.L. King Jr. Way/ 40th Street	14	0.1 / 0.1	4.3 / 4.4	3.1 / 3.2	No	No
		14	0.0 / 0.0	4.3 / 4.3	3.1 / 3.1	No	No
		14	0.0 / 0.0	4.3 / 4.3	3.1 / 3.1	No	No
		14	0.1 / 0.1	4.2 / 4.3	3.0 / 3.1	No	No
10	Frontage Road/ 40th Street	14	0.0 / 0.0	4.1 / 4.1	3.0 / 3.0	No	No
		14	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
		14	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
		12	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
13	Telegraph Avenue/ 40th Street	14	0.1 / 0.1	4.5 / 4.6	3.2 / 3.3	No	No
		14	0.0 / 0.0	4.5 / 4.5	3.2 / 3.2	No	No
		14	0.0 / 0.0	4.5 / 4.5	3.2 / 3.2	No	No
		14	0.0 / 0.0	4.4 / 4.4	3.2 / 3.2	No	No
18	M.L. King Jr. Way/ MacArthur Boulevard	14	0.1 / 0.0	4.1 / 4.2	3.0 / 3.0	No	No
		14	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
		14	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
		14	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
19	Frontage Road/ MacArthur Boulevard	14	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
		14	0.1 / 0.1	3.9 / 4.0	2.8 / 2.9	No	No
		14	0.0 / 0.0	3.9 / 3.9	2.8 / 2.8	No	No
		14	0.0 / 0.0	3.9 / 3.9	2.8 / 2.8	No	No
20	Telegraph Avenue/ MacArthur Boulevard	17	0.0 / 0.0	4.7 / 4.7	3.4 / 3.4	No	No
		14	0.0 / 0.0	4.6 / 4.6	3.3 / 3.3	No	No
		14	0.1 / 0.1	4.5 / 4.6	3.2 / 3.3	No	No
		14	0.1 / 0.0	4.4 / 4.5	3.2 / 3.2	No	No

Note: Includes ambient 1-hour concentration of 3.3 ppm and ambient 8-hour concentration of 2.4 ppm.

Source: LSA Associates, Inc., 2007.

standard of 20 ppm. The 8-hour CO levels would range from 2.3 ppm to 3.0 ppm, also much lower than the State standard of 9 ppm. Table IV.D-9 shows that all 1-hour and 8-hour CO concentrations with the Cumulative Year 2030 Baseline Plus Project scenario would be below the federal and State CO standards. The 1-hour CO levels range from 3.1 ppm to 3.6 ppm, which are much lower then the State standard of 20 ppm. The 8-hour CO levels would range from 2.1 ppm to 2.5 ppm, also much lower than the State standard of 9 ppm.

Based on the results of the CALINE4 analysis, the proposed project would not result in any CO hotspots.

(8) Toxic Air Contaminants. According to the BAAQMD CEQA Guidelines, any project with the potential to expose sensitive receptors (including residential areas) or the general public to substantial levels of toxic air contaminants would be deemed to have a significant impact. This applies to receptors locating near existing sources of toxic air contaminants, as well as sources of toxic air contaminants locating near existing receptors.

A health risk assessment was performed to evaluate the risk to future site residents caused by exposure to toxic air contaminants from vehicle exhaust from I-580, SR-24 and Telegraph Avenue. The risk assessment considered specific meteorological conditions for the project site and the site's proximity to these roadway locations. The health risk assessment estimated the potential non-cancer health effects of diesel exhaust using a measure known as the chronic hazard index. A chronic hazard index of less than 1.0 indicates that a chemical would not have a significant non-cancer health effect. The maximum chronic hazard index associated with vehicle emissions on the project site is 0.0000002, which is well below the significance criterion.

The health risk assessment also estimated the maximum individual cancer risk resulting from the inhalation of diesel exhaust over a 70-year lifetime using the guidelines for air toxics hot spots recommended by the California Office of Environmental Health Hazard Assessment. The maximum individual cancer risk for an individual living at the proposed development is no more than 0.0004 in 1 million. This risk is well below the significance criterion threshold of 10 in 1 million. Thus, the cancer risk associated with future residential use of the project site would not exceed the significance criterion for toxic air contaminants as established by the BAAQMD.

Additional details on the methodology of the health risk assessment and complete model output results are located in Appendix B.

c. Significant Air Quality Impacts. The proposed project would not result in any significant air quality impacts.

Table IV.D-9 CO Concentrations for Cumulative Year Baseline 2030 With and Without the Project

No.	Intersection	Receptor Distance to Road Centerline (Meters)	Project Related Increase 1-Hr/8-Hr (ppm)	2030 With Project/ 2030 Without 1-Hour CO Concentration (ppm)	2030 With Project/ 2030 Without 8-Hour CO Concentration (ppm)	Exceeds State Standards	
						1-Hr	8-Hr
5	M.L. King Jr. Way/ 45th Street	11	0.0 / 0.0	3.6 / 3.6	2.6 / 2.6	No	No
		11	0.0 / 0.0	3.5 / 3.5	2.5 / 2.5	No	No
		10	0.0 / 0.0	3.5 / 3.5	2.5 / 2.5	No	No
		10	0.0 / 0.0	3.5 / 3.5	2.5 / 2.5	No	No
6	Telegraph Avenue/ 45th Street	11	0.0 / 0.0	3.8 / 3.8	2.8 / 2.8	No	No
		11	0.0 / 0.0	3.8 / 3.8	2.8 / 2.8	No	No
		10	0.0 / 0.0	3.8 / 3.8	2.8 / 2.8	No	No
		10	0.0 / 0.0	3.8 / 3.8	2.8 / 2.8	No	No
9	M.L. King Jr. Way/ 40th Street	14	0.0 / 0.0	3.8 / 3.8	2.8 / 2.8	No	No
		14	0.0 / 0.0	3.8 / 3.8	2.8 / 2.8	No	No
		14	0.0 / 0.0	3.8 / 3.8	2.8 / 2.8	No	No
		14	0.0 / 0.0	3.8 / 3.8	2.8 / 2.8	No	No
10	Frontage Road/ 40th Street	14	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
		14	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
		14	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
		12	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
13	Telegraph Avenue/ 40th Street	14	0.0 / 0.0	3.9 / 3.9	2.8 / 2.8	No	No
		14	0.0 / 0.0	3.9 / 3.9	2.8 / 2.8	No	No
		14	0.0 / 0.0	3.9 / 3.9	2.8 / 2.8	No	No
		14	0.1 / 0.0	3.8 / 3.9	2.8 / 2.8	No	No
18	M.L. King Jr. Way/ MacArthur Boulevard	14	0.0 / 0.0	3.8 / 3.8	2.8 / 2.8	No	No
		14	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
		14	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
		14	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
19	Frontage Road/ MacArthur Boulevard	14	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
		14	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
		14	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
		14	0.0 / 0.0	3.7 / 3.7	2.7 / 2.7	No	No
20	Telegraph Avenue/ MacArthur Boulevard	17	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
		14	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
		14	0.1 / 0.1	3.9 / 4.0	2.8 / 2.9	No	No
		14	0.0 / 0.0	3.9 / 3.9	2.8 / 2.8	No	No

Note: Includes ambient 1-hour concentration of 3.3 ppm and ambient 8-hour concentration of 2.4 ppm.

Source: LSA Associates, Inc., 2007.

d. Cumulative Air Quality Impacts. The geographic area considered for the air quality cumulative is generally the BAAQMD Air Basin. Cumulative green house gas emissions are considered in a larger context (see discussion below).

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-5 shows that the operational emissions of ROG, NOx and PM10 due to project-related traffic estimates based on the CARB model URBEMIS2007 would be less than the significance criteria of 80 pounds per day. Tables IV.D-7, IV.D-8 and IV.D-9 show that the project would not result in any or significantly contribute to any significant CO related impacts (see Sections 2.b.(2) and 2.b.(7)). As a result, no significant project impacts were identified. 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 Air Plan, in this case, the 2005 Bay Area Ozone Strategy and with the local general plan.

As discussed in Section 2.b.(1), Consistency with the Air Quality Plan, the MacArthur Transit Village project is consistent with the General Plan designations for the project site and therefore the population and employment increase that would result from the proposed project would be consistent with projections used in the development of the Clean Air Plan.

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 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.[7]

[7] ABAG, "What is Smart Growth?" August 2004. www.abag.ca.gov/planning/smartgrowth/whatisSG.html, accessed February 13, 2007.

The proposed project would be a 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) TOD Guidelines. 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.[8] 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.

As a result, the proposed project would be consistent with regional air quality planning and not result in a significant cumulative impact to air quality when considered together with the impact of past, present, existing, pending and reasonably foreseeable future development.

3. Greenhouse Gas Emissions and Climate Change Setting

a. 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 greenhouse gases (GHGs) that keep the Earth's surface warm by trapping heat in the Earth's atmosphere,[9] in much the same way as glass traps heat in a greenhouse. While many studies show evidence of warming over the last century and predict future global warming, the precise causes of such warming and its potential effects are far less certain.[10] 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.

[8] Alameda County Congestion Management Agency (ACCMA), 2007. Transit Oriented Development Resource Guidebook.

[9] U.S. Environmental Protection Agency (US EPA), Global Warming – Climate: Uncertainties (web page), January 2000, http://yosemite.epa.gov/oar/globalwarming.nsf/content/ClimateUncertainties.html#likely, accessed July 24, 2007.

[10] "Global climate change" is a broad 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 in certain areas, even though the world, on average, is warmer.

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

- "Human activities are changing the composition of Earth's atmosphere. Increasing levels of greenhouse gases like CO2 in the atmosphere since pre-industrial times are well-documented and understood.
- The atmospheric buildup of CO2 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."[11]

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."[12]

b. Greenhouse Gases (GHGs). Carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), ozone (O3), 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. CO2, CH4, and N2O occur naturally as well as through human activity. Of these gases, CO2 and CH4 are emitted in the greatest quantities from human activities. Emissions of CO2 are largely by-products of fossil fuel combustion, whereas CH4 results from off-gassing

[11] US EPA, 2000, op. cit.

[12] Ibid.

associated with agricultural practices and landfills. Man-made GHGs – with much greater heat-absorption potential than CO2 – include fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFC), and sulfur hexafluoride (SF6), which are byproducts of certain industrial processes.[13]

c. Potential Effects of Human Activity on GHG Emissions. As mentioned above, the primary GHG generated by human activity is CO2. Fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles, has led to substantial increases in CO2 emissions (and thus substantial increases in atmospheric concentrations). In 1994, atmospheric CO2 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),[14] and is expressed as a function of how much warming would be caused by the same mass of CO2. Thus, GHG emissions are typically measured in terms of pounds or tons of CO2 equivalents (CO2e).

(1) Global Emissions. Worldwide emissions of GHGs in 2004 were 30 billion tons of CO2e per year[15] (including both ongoing emissions from industrial and agricultural sources, but excluding emissions from land-use changes).

(2) U.S. Emissions. In 2004, the United States emitted about 8 billion tons of CO2e 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 (approximately 35 to 40 percent); these emissions are entirely generated from direct fossil fuel combustion.[16]

(3) State of California Emissions. In 2004, California emitted approximately 550 million tons of CO2e, or about 6 percent of the U.S. emissions. 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

[13] CalEPA, 2006b. *Final 2006 Climate Action Team Report to the Governor and Legislature.* Sacramento, CA. April 3.

[14] The potential of a gas or aerosol to trap heat in the atmosphere.

[15] United Nations Framework Convention on Climate Change (UNFCCC), *Sum of Annex I and Non-Annex I Countries Without Counting Land-Use, Land-Use Change and Forestry (LULUCF). Predefined Queries: GHG total without LULUCF* (Annex I Parties). Bonn, Germany, http://unfccc.int/ghg_emissions_data/predefined_queries/items/3814.php, accessed May 2, 2007.

[16] US EPA, 2000, op. cit.

otherwise.[17] 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 stated in its March 2006 report that the composition of gross climate change pollutant emissions in California in 2002 (expressed in terms of CO2 equivalence) were as follows:

- Carbon dioxide (CO2) accounted for 83.3 percent;
- Methane (CH4) accounted for 6.4 percent;
- Nitrous oxide (N2O) accounted for 6.8 percent; and
- Fluorinated gases (HFCs, PFC, and SF6) accounted for 3.5 percent.[18]

The California Energy Commission found that transportation is the source of approximately 41 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 20 percent. Agriculture and forestry is the source of approximately 8.3 percent, as is the source categorized as "other," which includes residential and commercial activities.[19]

(4) 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.[20]

(5) 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 emitted in its base year, 2005.[21] The community-wide levels reflect all the energy used and waste produced within the Oakland city limits. As shown in Table IV.D-10, Oakland emitted

[17] California Energy Commission (CEC) , Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004 - Final Staff Report, publication # CEC-600-2006-013-SF, Sacramento, CA, December 22, 2006; and January 23, 2007 update to that report.

[18] CalEPA, 2006b, op. cit.

[19] California Energy Commission (CEC), 2007, op. cit.

[20] BAAQMD, 2006. *Source Inventory of Bay Area Greenhouse Gas Emissions.* November.

[21] International Council for Local Environmental Initiatives (ICLEI), 2006. City of Oakland Baseline Greenhouse Gas Emissions Inventory Report, December.

approximately 2.4 million tons of CO2 equivalents (CO2e) in 2005 from all major sources, nearly half of which were from transportation. The report shows that the City's emissions increased by approximately 5 percent to 6 percent in each year since 2003.

Table IV.D-10 Oakland Community-wide GHG Emissions Summary – 2005 (tons/year)

Potential Source	Tons of Carbon Dioxide Equivalent (CO2e)	Percent of Total
Transportation	1,138,767	47%
Commercial/Industrial	709,199	29%
Residential	580,710	24%
Total	**2,428,676**	**100**

Source: ICLEI 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 2.7 million tons of CO2e), and 19.5 percent (to 2.9 million tons CO2e) by 2020, assuming continued GHG emissions at or above current rates into the future.

(6) 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), 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 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.

d. Potential Effects of Human Activity on Global Climate 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 is taking place, including substantial ice loss in the Arctic.[22]

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).[23]

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 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 utilize various assumptions about the rates of economic development, population growth, and technological advancement over the course of the next century.[24] 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.[25]

- Snow cover is projected to contract, with permafrost areas sustaining thawing.

[22] International Panel on Climate Change (IPCC) *Special Report on Emissions Scenarios, 2000,* www.grida.no/climate/ipcc/emission/002.htm, accessed July 24, 2007.

[23] 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.

[24] IPCC, 2000, op. cit.

[25] Ibid.

- 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.

e. Potential Effects of Human Activity on State of California. 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.[26] 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 general a scale to make accurate regional assessments.[27]

Below is a summary of some of the potential effects reported in 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,

[26] California Air Resources Board (CARB), 2006c. *Public Workshop to Discuss Establishing the 1990 Emissions Level and the California 2020 Limit and Developing Regulations to Require Reporting of Greenhouse Gas Emissions*, Sacramento, CA. December 1.

[27] Kiparsky, M. and P.H. Gleick, 2003. *Climate Change and California Water Resources: A Survey and Summary of the Literature*. Oakland, CA: Pacific Institute for Studies in Development. July.

and even less well understood.[28] 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.[29]

- 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.[30]

  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."[31] DWR adds that "[i]t is unlikely that this level of uncertainty will diminish significantly in the foreseeable future."[32] 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

[28] US EPA, 2007, op. cit.

[29] California Climate Change Center (CCCC), 2006. *Our Changing Climate: Assessing the Risks to California,* CEC-500-2006-077, Sacramento, CA. July.

[30] Brekke, L.D., et al, 2004. "Climate Change Impacts Uncertainty for Water Resources in the San Joaquin River Basin, California." *Journal of the American Water Resources Association*. 40(2): 149–164. Malden, MA, Blackwell Synergy for AWRA.

[31] California Department of Water Resources (DWR), 2006. *Progress on Incorporating Climate Change into Management of California Water Resources*, Sacramento, CA. July.

[32] Ibid.

changes in inflows.[33] Water purveyors, such as the East Bay Municipal Utilities District (EBMUD), are required by state law to prepare Urban Water Management Plans (UWMPs) (discussed below, under *Regulatory Context for Greenhouse Gas Emissions and Climate Change*) that consider climatic variations and corresponding impacts on long-term water supplies.[34] 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 notes 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. EBMUD would incorporate this information from DWR in its update of its current UWMP 2005 (required every five years per the California Water Code), and information from the UWMP 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 change 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 also 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 portion 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 CO2 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 that certain crops, such as wine grapes, bloom or ripen, and thus affect their quality.[35]

[33] Kiparsky 2003, op. cit; DWR, 2005, op. cit.; Cayan, D., et al, 2006. Scenarios of Climate Change in California: An Overview (White Paper, CEC-500-2005-203-SF), Sacramento, CA. February.

[34] California Water Code, Section 10631(c).

[35] California Climate Change Center (CCCC), 2006, op. cit.

- 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.[36] 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.

f. Regulatory Context for GHG Emissions and Climate Change.

(1) 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.

g. 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.[37]

(1) 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 its assertion in *Massachusetts et. al. v. EPA et. al*[38] 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 GHGs and the increase in global

[36] Parmesan, C. and H. Galbraith, *Observed Impacts of Global Climate Change in the U.S.*, Arlington, VA: Pew Center on Global Climate Change, November 2004.

[37] Climate Change Technology Program (CCTP), About the U.S. Climate Change Technology Program (web page), Washington, D.C., last updated April 2006, http://www.climatetechnology.gov/about/index.htm, accessed July 24, 2007.

[38] U.S. Supreme Court, *Massachusetts et. al. v. EPA et. al* (No. 05-1120, 415F 3d 50), April 2, 2007.

surface air temperatures has not been unequivocally established," However, in the same case, (*Massachusetts v. EPA*) the U.S. Supreme Court held that the US EPA can, and should, consider regulating motor-vehicle GHG emissions.

(2) 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 "CO2-equivalent fleet average emission" standards. The standards will be phased in from 2009 to 2016, reducing emissions by 22 percent 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.[39] These include prohibition of 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 require 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

[39] California Environmental Protection Agency (CalEPA), 2006a. Climate Action Team, *Executive Summary. Climate Action Team Report to Governor Schwarzenegger and the California Legislature*. Sacramento, CA, March.

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.*[40] 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."[41] 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 enforcement of 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. 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.[42]

California Senate Bill 97 (SB 97). Governor Schwarzenegger signed SB 97 (Chapter 185, Statutes 2007) into law on August 24, 2007. The legislation provides partial guidance on how greenhouse gases should be addressed in certain CEQA documents.

[40] CalEPA, Air Resources Board (CARB), *Proposed Early Actions to Mitigate Climate Change in California.* Sacramento, CA, April 20, 2007.

[41] Ibid.

[42] Collard, Gary, California Energy Commission, email correspondence to Robert Vranka, Ph.D, ESA, July 12, 2007.

SB 97 requires the Governor's Office of Planning and Research ("OPR") to prepare CEQA Guidelines for the mitigation of GHG emissions, including, but not limited to, effects associated with transportation or energy consumption. OPR must prepare these guidelines and transmit them to the Resources Agency by July 1, 2009. The Resources Agency must then certify and adopt the guidelines by January 1, 2010. OPR and the Resources Agency are required to periodically review the guidelines to incorporate new information or criteria adopted by ARB pursuant to the Global Warming Solutions Act, scheduled for 2012.

The second part of SB 97 codifies safe harbor for highways and flood control projects. It provides that the failure of a CEQA document for a project funded by Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 or the Disaster Preparedness and Flood Prevention Bond Act of 2006 to adequately analyze the effects of GHG emission otherwise required to be reduced pursuant to the regulations adopted under the Global Warming Solutions Act (which are not slated for adoption until January 1, 2012), does not create a cause of action for a violation of CEQA. This portion of SB 97 has a sunset date of January 1, 2010.

The bill does not address the obligation to analyze GHGs in projects not protected by the safe harbor provision. One possible interpretation is that there is no duty until the guidelines are adopted, because CEQA Guidelines Section 15007, Subdivision (b), provides that guideline amendments apply prospectively only.

California Urban Water Management Act. The California Urban Water Management Planning Act requires various water purveyors throughout the State of California (such as EBMUD) 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. As discussed above, this is relevant to global climate change which may affect future water supplies in California, as conditions may become drier or wetter, affecting reservoir inflows and storage and increased river flows.[43]

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

(1) 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:

[43] Brekke, 2004, op. cit.

- 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 night 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 streets" 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 (OSCAR). The OSCAR Element includes policies that address GHG reduction and global climate change. Listed below are OSCAR policies that encourage the provision of open space, which increases vegetation area (trees, grass, landscaping, etc.) to effect cooler climate, reduce excessive solar gain, and absorb CO2; OSCAR policies that encourage stormwater management, which relates to the maintenance of floodplains and infrastructure to accommodate potential increased storms and flooding; and OSCAR policies that encourage energy efficiency and use of alternative energy sources, which directly address reducing GHG emissions.

- 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)*
- *See Policy CO-12.1, above, under OSCAR policies that address general air quality.*

- Expand existing transportation systems management and transportation demand management strategies which reduce congestion, vehicle idling, and travel in single passenger autos. *(Policy CO-12.3)*
- *See Policy CO-12.4, above, under OSCAR policies that address general air quality.*
- Require new industry to use best available control technology to remove pollutants, including filtering, washing, or electrostatic treatment of emissions. *(Policy CO-12.5)*
- Support public information campaigns, energy audits, the use of energy-saving appliances and vehicles, and other efforts which help Oakland residents, businesses, and City operations become more energy efficient. *(Policy CO-13.2)*
- Encourage the use of energy-efficient construction and building materials. 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). A key HPE policy relevant to climate change encourages the reuse of existing building (and building materials) resources, which could reduce landfill material (a source of methane, a GHG), avoid the incineration of materials (which produces CO2 as a by-product), avoid the need to transport materials to disposal sites (which produces GHG emissions), and eliminate the need for materials to be replaced by new product (which often requires the use of fossil fuels to obtain raw and manufacture new material).[44]

Safety Element. Safety Element policies that address wildfire hazards relate to climate change in that increased temperatures could increase fire risk in areas that become drier due to climate change.[45] Also, wildfire results in the loss of vegetation; carbon is stored in vegetation, and when the vegetation burns, the carbon returns to the atmosphere.[46] The occurrence of wildfire also emits particulate matters into the atmosphere. Safety Element policies regarding storm-induced flooding hazards related to the potential to accommodate potential increase in storms and flooding as a result of climate change.

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[44] US EPA, 2006a. General Information on the Link Between Solid Waste and Greenhouse Gas Emissions (web page), October, http://www.epa.gov/climatechange/wycd/waste/generalinfo.html, accessed August 10, 2007.

[45] US EPA, Climate Change – Health and Environmental Effects: Health (web page), October 2006b, www.epa.gov/climatechange/effects/health.html, accessed July 24, 2007.

[46] National Aeronautics and Space Administration (NASA), *El Nino-Related Fires Increase Greenhouse Gas Emissions, January 5, 2005,* http://www.nasa.gov/centers/goddard/news/topstory/2004/0102firenino.html, accessed August 10, 2007.

- Prioritize the reduction of the wildfire hazard, with an emphasis on prevention. *(Policy FI-3)*
- Enforce and update local ordinances 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 hazard. *(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:[47]

- 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 1 percent reduction target for period 2003-2004, but in 2004-2005 and 2005-2006 the City's emissions increased and the target was not met.
- 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 its 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

[47] City of Oakland, Oakland Sustainable Community Development Initiative, (web page), http://www.sustainableoakland.com/Page774.aspx, last updated March 2007, accessed June 25, 2007.

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. Additionally, the City implemented a Socially Responsible Business Task Force, which 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. One of the goals of the Healthy Food Systems program is the utilization and support of local agricultural as a potential means to reduce truck miles necessary to distribute food locally, which contributes to GHG emissions.
- 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 locations include the Jack London Square, Old Oakland, Grand Lake, Mandela, and Temescal districts. Both efforts promote and facilitate the principal of growing and purchasing locally, which effects reductions in truck and vehicle use and GHG emissions.

4. Greenhouse Gas Emissions and Climate Change Impacts

a. Significance Thresholds for GHG Emissions and Climate Change. As of preparation of this EIR, there are no statutes, regulations or guidelines 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, the BAAQMD has not 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." 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 for the following reasons:

- Uncertainties exist regarding the effect of human activities on climate change and potential human activities that may reverse global warming trends.
- Lack of guidance address 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;[48]
- 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. [49]

(1) Approach and Conclusion to CEQA Analysis of GHG Emissions and Climate Change Impacts in this EIR. For all of the reasons summarized above (and discussed in detail under *Regulatory Context for GHG Emissions and Climate Change* in this section), and pursuant to Section 15145 of the CEQA Guidelines, until such time as: (1) sufficient scientific basis exists to ascertain the incremental impact of an individual project on climate change, and to accurately project future climate trends associated with that increment of change, and (2) guidance is provided by regulatory agencies on the control of GHG emissions[50] 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

[48] While the direct output of greenhouse gases from a project can be estimated, 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 not measurable.

[49] Australian Government, Bureau of Meteorology, 2007. *The Greenhouse Effect and Climate Change*. Melbourne, Victoria, Australia.

[50] 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.

discuss, for consideration by decision makers 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 further reduce those emissions.

The approach employed in this EIR is that, given the speculative nature of the potential effects of climate change and lack 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 Order 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.

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

b. Potential Project Activities Contributing to GHG Emissions. 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.[51] 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. However, planting of additional vegetation would result in additional carbon sequestration and lower the carbon footprint of the project.

[51] United Nations Environment Programme (UNEP), 2007. *Buildings and Climate Change: Status, Challenges and Opportunities*, Paris, France.

- Construction Activities – Construction equipment typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as carbon dioxide, methane and nitrous oxide. Furthermore, methane is emitted during the fueling of heavy equipment.
- Gas, Electric and Water Use – Natural gas use results in the emissions of two GHGs: 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.[52]
- 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. Also, as discussed previously, the project is designed to limit auto trips.

While the proposed project and all developments of similar land uses 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.

c. Estimated GHG Emission from the Proposed Project. Although it is possible to generally estimate a project's contribution of CO2 or other GHGs into the atmosphere, it is a matter of speculation whether any particular 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

[52] California Energy Commission (CEC), 2004. *Water Energy Use in California* (online information sheet) Sacramento, CA, August 24, http://energy.ca.gov/pier/iaw/industry/water.html, accessed July 24, 2007.

of GHG emissions. As previously discussed, 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 cannot be judged.

In light of the considerations outlined above, Table IV.D-11 presents a gross estimate of the proposed project's CO2e emissions resulting from the proposed project associated increases in motor vehicle trips resulting from the proposed project, as well as from natural gas combustion.

Table IV.D-11 Estimated CO2e Emissions from the Proposed Project (Tons/Year)

	CO2e
Operation (Vehicle) Emissions	5,467
Space and Water Heating	940
Total Project CO2e Emissions	**6,407**
Total CO2e Emissions for Oakland	**2,248,667**
Project Percentage	**0.3 Percent**

Source: LSA Associates, Inc., 2007.

CO2 emissions represent more than 90 percent of the project's contribution of GHG emissions. There are no federal, State, or local emissions thresholds established for GHGs such as CO2. As a comparison, the entire State generated approximately 2.2 billion (2,197,992,329) lbs/day of CO2 in 2004. The estimate provides an indication of the order of magnitude of potential project emissions compared to estimated Statewide emissions. GHG emissions from the proposed project could vary based on several factors, such as the size of homes, the type and extent of energy efficiency measures that might be incorporated into each the design of project buildings, and the type and size of appliances installed in project buildings. This level of detail is not yet known for the project. In addition, the estimated CO2 emissions from vehicle trips associated with the project is likely much greater than what would actually occur. Although the future CO2 emission levels reflect reductions resulting from the increased efficiency of future vehicle models, it does not take into account reductions in vehicle emissions that may occur with implementation of AB 1493 (discussed above under *Regulatory Context for GHG Emissions and Climate Change*).

Further, the methodology applied here assumes that all emission sources with the project would be new sources that would combine with existing conditions. For this assessment, it is not possible to predict whether emission sources (residents and businesses) associated with the project would move from outside the air basin (and thus generate "new" emissions within the air basin), or whether they are sources that already exist and are merely relocated within the air basin. Because the effects of GHGs are global, if the project merely shifts the location of the GHG-emitting activities (locations of residences and businesses and where

people drive), there would not be a net new increase of emissions. It also can not be determined until buildout of the project whether residents of the MacArthur Transit Village will, as a result of moving to the project, have shorter commute distances; require fewer vehicle trips; walk, bike, or use public transit more often, instead of driving; or use overall less energy by virtue of the project's characteristics. If these types of changes occur, overall vehicle miles traveled could be reduced and it could be argued that the project would result in a potential net reduction in GHG emissions, locally and globally.

GHG emissions associated with the proposed project were calculated using the URBEMIS2007 Version 9.2 model of the California Air Resources Board and trip generation data from the project traffic analysis. The URBEMIS2007 model also estimates CO2 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).

d. Project Design Features. While no significant impacts have been identified, and no mitigation is required, project characteristics and design features which help implement reduction strategies identified in AB-32 and the Governor's Executive Order S-3-05 have been included in the project and would reduce the amount of GHG emissions generated during construction and operation are discussed below.

- City of Oakland – According the Pedestrian Master Plan, the City of Oakland has the highest walking rates for all cities in the nine-county San Francisco Bay Region. It is noted that these high pedestrian trips are likely because the neighborhoods are densely populated and well served by transit, including Bay Area Rapid Transit (BART), AC Transit, Amtrack, and the Alameda Ferry. As such, the Project would reduce transportation-related GHG emissions compared to emissions from the same level of development elsewhere in the outer Bay Area.
- 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.
- Construction Waste – The proposed project will be required to comply with the Construction and Waste Reduction Ordinance and submit a Construction and Demolition Waster Reduction Plan for review and approval. As a result, construction-related truck traffic, which primarily have diesel fueled engines, would be reduced since demolition debris that would otherwise be hauled off-site would be reused on-site. In addition, reuse of concrete, asphalt, and other debris will reduce the amount of material introduced to area landfills.

- Transit-Oriented Development – The project would be a Transit Oriented Development, developing high-density housing in the central area of Oakland near transit stations (including Bay Area Rapid Transit (BART) stations, AC Transit centers, and other transportation nodes. In this zone, the Planning Code requires less parking than any other zone in the City in the number thereby encouraging the use of transit and pedestrian activity. As such, the project would reduce transportation-related GHG emissions compared to emissions from the same level of development elsewhere in the outer Bay Area. Because transit service is generally less available in most portions of the outlying areas than in the central area of Oakland, 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.
- Urban Infill Near Multiple Transit Modes – The project would develop high-density housing within four blocks of at least two modes of transit and within an area developed with pedestrian facilities. Therefore, the project would facilitate walking and non-vehicular travel to a greater extent than would be the case for similar development in outlying areas without extensive transit availability. 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.
- Inner Bay Location Near Transit – The project's location in Oakland would reduce transportation-related GHG emissions compared to emissions from development with the same amount of population and employment growth in the outer Bay Area. Because transit service is generally less available in most areas of the outlying areas than in Oakland, 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. Development on the project site would include a greater number of potential residents and visitors that could potentially utilize alternative modes of travel.
- New Urbanist Community Design Principles – The project's integration of varied uses and services on-site and nearby with housing would reduce automobile use within the community with access to public transit.
- Construction Operations and Building and Site Design – The project sponsor will work with the City to develop specific sustainable building and site design, construction, and operational methods and standards that could be incorporated with the project. Sources include *GreenPoint* Rated (a program of Build It Green, sponsored by a number of Bay Area public agencies and jurisdictions); 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; and California Green Builder program). Examples of approaches that the project would incorporate as feasible 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.

In addition, as discussed in Section IV.F, *Hydrology and Water Quality,* the project may decrease the amount of impervious area and increase vegetation on the site.

e. 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 building characteristics and design features that the project proposes. In addition, the project is subject to all the regulatory requirements including the City's Standard Conditions of Approval, which would reduce GHG emissions of the project. These include conditions to address adherence to best management construction practices and equipment use (see City's Dust Control and Construction Emissions Standard Conditions of Approval (see COA AIR-1 and AIR-2 on pages 235 and 236) and to minimize post construction stormwater runoff that could affect the ability to accommodate potentially increased storms and flooding within existing floodplains and infrastructure systems. Overall, the project would entail implementing reduction strategies identified in AB 32, the Governor's Executive Order S-3-05, and other strategies to help reduce GHGs to the level proposed by the governor and targeted by the City of Oakland.