C. Air Quality

This section presents the results of the air quality impact analysis conducted for the proposed Oak Knoll project. The previously-certified 1998 *Environmental Impact Statement / Environmental Impact Report for the Disposal and Reuse of the Oak Knoll Naval Medical Center Oakland* (referred to throughout this document as “1998 EIS/EIR”) evaluated several reuse alternatives for the NMCO property. The analysis in this section was conducted to determine if the mitigation measures proposed in the 1998 EIS/EIR are still valid with updated study assumptions, and if there are any new impacts. In addition, this section presents a comparison of the proposed project’s effects to those identified for the Maximum Capacity Alternative in the previously certified 1998 EIS/EIR.

As described at the start of Chapter IV, this section (and all sections of in Chapter IV) discusses environmental setting conditions (current conditions, regulatory background, and any substantial changes or new information of substantial importance); impacts and mitigation measures identified for the Maximum Capacity Alternative in the 1998 EIS/EIR; environmental impacts (direct, indirect or secondary, short-term, and cumulative) that could result from the proposed project; and mitigation measures that would reduce or eliminate significant impacts, to the extent feasible mitigation is identified.

“Pre-Base Closure Conditions,” which represent conditions when the NMCO was operational (see *Introduction to the Environmental Analysis* in Chapter IV), were not evaluated as part of any impact determination in this SEIR, but are presented in this analysis of air quality impacts for informational purposes.

This section also discusses considerations of greenhouse gas (GHG) emissions and climate change. Specifically, the discussion addresses 1) the level of knowledge currently available regarding potential primary and secondary effects of GHG emissions, including climate change (and its secondary effects); and 2) presents a qualitative analysis of the proposed project’s sources and estimated levels of GHG emissions as well as proposed project design features that would minimize GHG emissions from those sources.

Setting

Regulatory Context for Air Quality

The U.S. Environmental Protection Agency (US EPA) is responsible for implementing the programs established under the federal Clean Air Act, such as establishing and reviewing the federal ambient air quality standards and judging the adequacy of State Implementation Plans (SIP). However, the EPA has delegated the authority to implement many of the federal air quality programs to the states while retaining an oversight role to ensure that the programs continue to be implemented in accordance with federal law. In California, the California Air Resources Board (CARB) is responsible for establishing and reviewing the state ambient air quality standards, developing and managing the California SIP, securing approval of this plan from US EPA, and identifying toxic air contaminants (TACs). CARB also regulates mobile emissions sources in California, such as construction equipment, trucks, and automobiles, and oversees the activities of air quality management districts, which are organized at the county or regional level. Air quality management districts are primarily responsible for regulating stationary emissions sources at facilities within their geographic areas and for preparing the air quality plans that are required under the federal Clean Air Act and California Clean Air Act (see *Air Quality Plans*, below). The Bay Area Air Quality Management District (BAAQMD) is the regional agency with regulatory authority over emissions sources in the Bay Area, which includes all of San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Marin, and Napa counties, the southern half of Sonoma County, and the southwestern half of Solano County.

Criteria Air Pollutants

As required by the federal Clean Air Act passed in 1970, US EPA has identified six criteria air pollutants that are pervasive in urban environments and for which state and national health-based ambient air quality standards have been established. US EPA calls these pollutants *criteria air pollutants* because the agency has regulated them by developing specific public health- and welfare-based criteria as the basis for setting permissible levels. Ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead (Pb) are the six criteria air pollutants.

Ozone (O_3)

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and that can cause substantial damage to vegetation and other materials. Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NO_x). ROG and NO_x are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NO_x under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds like ozone. Ground level ozone in conjunction with suspended particulate matter in the atmosphere leads to hazy conditions generally termed as “smog.”

Carbon Monoxide (CO)

Carbon monoxide, a colorless and odorless gas, is a non-reactive pollutant that is a product of incomplete combustion and is mostly associated with motor vehicles. High carbon monoxide concentrations develop primarily during winter when periods of light wind combine with the formation of ground level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased carbon monoxide emission rates at low air temperatures. When inhaled at high concentrations, carbon monoxide combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

Nitrogen Dioxide (NO_2)

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

Sulfur Dioxide (SO_2)

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

Particulate Matter (PM)

PM-10 and PM-2.5 consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. A micron is one-millionth of a meter, or less than one-25,000th of an inch. For comparison, human hair is 50 microns or larger in diameter. PM-10 and PM-2.5 represent particulate matter of sizes that can be inhaled into the air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere often results from many kinds of aerosol-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles (PM-2.5) of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed[1] gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility.

PM-10 emissions in the project area are mainly from urban sources, dust suspended by vehicle traffic, and secondary aerosols formed by reactions in the atmosphere. Particulate concentrations near residential sources generally are higher during the winter, when more fireplaces are in use and meteorological conditions prevent the dispersion of directly emitted contaminants.

Lead (Pb)

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

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

Other Characteristics of Pollutants

Some criteria air pollutants are considered regional in nature, some are considered local, and some have characteristics that are both regional and local. Air pollutants are also characterized as "primary" or "secondary" pollutants. Primary pollutants are those emitted directly into the atmosphere (such as carbon monoxide, sulfur dioxide, lead particulates, and hydrogen sulfide). Secondary pollutants are those formed through chemical reactions in the atmosphere; these chemical reactions usually involve primary pollutants, normal constituents of the atmosphere, and other secondary pollutants. Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving ROG and NO_x. ROG and NO_x are known as precursor compounds for ozone. Ozone is a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production.

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

Ambient Air Quality Standards

Regulation of criteria air pollutants is achieved through both national and state ambient air quality standards and emissions limits for individual sources. Regulations implementing the federal Clean Air Act and its subsequent amendments established national ambient air quality standards (national standards) for the six criteria pollutants. California has adopted more stringent state ambient air quality standards for most of the criteria air pollutants. In addition, California has established state ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Because of the unique meteorological problems in the state, there is considerable difference between state and federal standards currently in effect in California, as shown in **Table IV.C-1**. The table also summarizes the related health effects and principal sources for each pollutant.

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

Attainment Status

Under amendments to the federal Clean Air Act, US EPA has classified air basins or portions thereof, as either "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the national standards have been achieved. The California Clean Air Act, which is patterned after the federal Clean Air Act, also requires areas to be designated as "attainment" or "nonattainment" for the state standards. Thus, areas in California have two sets of attainment /

nonattainment designations: one set with respect to the national standards and one set with respect to the state standards.

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

Air Quality Plans

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

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

- The *Ozone Attainment Plan for the 1-Hour National Ozone Standard* (ABAG, 2001) developed to meet federal ozone air quality planning requirements
- The recently adopted *Bay Area 2005 Ozone Strategy* (BAAQMD, 2006) developed to meet planning requirements related to the state ozone standard; and
- The *1996 Carbon Monoxide Redesignation Request and Maintenance Plan for Ten Federal Planning Areas*, developed by the air districts with jurisdiction over the ten planning areas including the BAAQMD to ensure continued attainment of the federal carbon monoxide standard. In June 1998, the EPA approved this plan and designated the ten areas as attainment. The maintenance plan was revised most recently in 2004.

The Bay Area 2001 Ozone Attainment Plan was prepared as a proposed revision to the Bay Area part of California's plan to achieve the national ozone standard. The plan was prepared in response to the US EPA's partial approval and partial disapproval of the Bay Area's 1999 Ozone Attainment Plan and finding of failure to attain the national ambient air quality standard for ozone. The Revised Plan was adopted by the Boards of the co-lead agencies (BAAQMD, MTC,

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

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

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

Source: BAAQMD, 2007, CARB, 2007b.

and ABAG) at a public meeting and approved by the ARB in 2001. In July 2003, the US EPA approved the Plan. US EPA also made an interim final determination that the Plan corrects deficiencies identified in the 1999 Plan. Following three years of low ozone levels (2001, 2002 and 2003), in October 2003, the US EPA proposed a finding that the Bay Area had attained the national one-hour standard and that certain elements of the 2001 Plan (attainment demonstration, contingency measures and reasonable further progress) were no longer required. In April 2004, the US EPA made final the finding that the Bay Area had attained the one-hour national ozone standard and approved the remaining applicable elements of the 2001 Plan: emissions inventory; control measure commitments; motor vehicle emission budgets; reasonably available control measures; and commitments to further study measures.

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

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

In April 2005, CARB established a new eight-hour average ozone standard of 0.07 ppm, which became effective on May 17, 2006. CARB is currently working on designations and implementation guidance for the new standard. The one-hour state standard has been retained.

The San Francisco Bay Area has not attained the state eight-hour standards and will be taking action as necessary to address those standards once the planning requirements have been established.

The BAAQMD is currently preparing an update to the Bay Area 2005 Ozone Strategy that will be referred to as the 2007 Ozone Strategy. The 2007 Ozone Strategy will show how the Bay Area plans to achieve the State one-hour and eight-hour ozone standards, and how the region will reduce transport of ozone and ozone precursors to neighboring air basins.

Toxic Air Contaminants (TACs)

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

Regulation of TACs is achieved through federal and state controls on individual sources. TACs have been regulated under federal air quality law since the 1977 federal Clean Air Act Amendments. The most recent federal Clean Air Act Amendments (1990) reflect a technology-based approach for reducing TACs. The first phase involves requiring facilities to install Maximum Achievable Control Technology (MACT). The MACT standards vary depending on the type of emitting source. US EPA has established MACT standards for over 20 categories of facilities or activities, such as perchloroethylene dry cleaning and petroleum refineries. The second phase of control involves determining the residual health risk represented by air toxics emissions sources after implementation of MACT standards.

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

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

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

Local Standards

BAAQMD Rules and Regulations

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

Emissions sources subject to these rules are regulated through the BAAQMD's permitting process and standards of operation. Through this permitting process, including an annual permit review, the BAAQMD monitors generation of stationary emissions and uses this information in developing its air quality plans. Any sources of stationary emissions constructed as part of the proposed project would be subject to the BAAQMD *Rules and Regulations*. Both federal and state ozone plans rely heavily upon stationary source control measures set forth in BAAQMD's *Rules and Regulations.*

City of Oakland General Plan

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

- To improve air quality in Oakland and the surrounding Bay Region. *(Objective 1)*

- Promote land use patterns and densities which help improve regional air quality conditions by: (a) minimizing dependence on single passenger autos; (b) promoting projects which minimize quick auto starts and stops, such as live-work development, mixed use development, and office development with ground floor retail space; (c) separating land uses which are sensitive to pollution from the sources of air pollution; and (d) supporting telecommuting, flexible work hours, and behavioral changes which reduce the percentage of people in Oakland who must drive to work on a daily basis. *(Policy CO-12.1)*

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

- Require construction, demolition and grading practices which minimize dust emissions *(Policy CO-12.6)*

Oakland Zoning Regulations

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

Physical Setting for Air Quality

Climate and Meteorology

Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. The project site is located in the City of Oakland and is within the boundaries of the San Francisco Bay Area Air Basin (Bay Area). The Bay Area Air Basin encompasses the nine-county region including all of Alameda, Contra Costa, Santa Clara, San Francisco, San Mateo, Marin and Napa counties, and the southern portions of Solano and Sonoma counties. The climate of the Bay Area is determined largely by a high-pressure system that is almost always present over the eastern Pacific Ocean off the West Coast of North America. During winter, the Pacific high-pressure system shifts southward, allowing more storms to pass through the region. During summer and early fall, when few storms pass through the region, emissions generated within the Bay Area can combine with abundant sunshine under the restraining influences of topography and subsidence inversions to create conditions that are conducive to the formation of photochemical pollutants, such as ozone and secondary particulates, such as nitrates and sulfates.

More specifically, the site lies approximately 6 miles east of San Francisco Bay (as measured east-west between the southern boundary of the site, to Alameda’s west shoreline) in the Northern Alameda and Western Contra Costa Counties climatological subregion. This subregion stretches from Richmond to San Leandro with San Francisco Bay as its western boundary and its eastern boundary defined by the Oakland-Berkeley Hills. In this area, marine air traveling through the Golden Gate, as well as across San Francisco and the San Bruno Gap, is a dominant weather factor. The Oakland-Berkeley Hills cause the westerly flow of air to split off to the north and south of Oakland, which causes diminished wind speeds. The air pollution potential in this subregion is relatively low for portions close to the Bay, due to the largely good ventilation and less influx of pollutants from upwind sources (BAAQMD, 1999).

Wind measurements taken at Metropolitan Oakland International Airport indicate that the predominant wind flow is out of the west-northwest. Northwest winds occur approximately 46 percent of the time. Average wind speeds vary from season to season with the strongest average winds occurring during summer and the lightest average winds during winter. Average wind speeds are 9.7 miles per hour (mph) during summer and 7.4 mph during winter. Temperatures in Oakland average 58 ^{o}F annually, ranging from an average of 40^{o}F on winter mornings to an average of mid-70s in the late summer afternoons. Daily and seasonal oscillations of temperature are small because of the moderating effects of the nearby ocean. In contrast to the steady temperature regime, rainfall is highly variable and confined almost exclusively to the "rainy" period from early November to mid-April. Oakland averages 18 inches of precipitation annually, but because much of the area's rainfall is derived from the fringes of mid-latitude storms, a shift in the annual storm track of a few hundred miles can mean the difference between a very wet year and near drought conditions.

Existing Air Quality

Criteria Air Pollutants

The BAAQMD operates a regional monitoring network that measures the ambient concentrations of the six criteria air pollutants. Existing and probable future levels of air quality in Oakland can generally be inferred from ambient air quality measurements conducted by the BAAQMD at its nearby monitoring stations. The Alice Street station in Oakland is nearest to the project site (located approximately 2.5 miles to the northwest) and can be considered to be representative of the air quality in the vicinity of the project site. This station monitors ozone and carbon monoxide. **Table IV.C-2** shows a five-year summary of monitoring data for ozone and carbon monoxide from the Alice Street station. The table also compares these measured concentrations with state and federal ambient air quality standards. There is no BAAQMD or CARB station that monitors PM concentrations that can be considered to be representative of concentrations in the project area. However, the Port of Oakland conducted an air quality and meteorological monitoring program in West Oakland from 1997 to 2004. The program was designed to collect baseline data on particulate air pollution in the West Oakland area prior to and during construction and operation of the Port's maritime development projects, and to help evaluate the effectiveness of its mitigation programs. The program measured PM-10 and PM-2.5 concentrations at two locations - one location was in the vicinity of Port facilities and

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

Pollutant	State/ National Standard[b]	Monitoring Data by Year				
		2001	2002	2003	2004	2005
Ozone [a]						
Highest 1 Hour Average (ppm) [c]	0.09/0.12	0.07	0.05	0.08	0.08	0.07
Days over State Standard		0	0	0	0	0
Days over National Standard		0	0	0	0	0
Highest 8 Hour Average (ppm) [c]	0.08	0.04	0.04	0.05	0.06	0.05
Days over National Standard		0	0	0	0	0
Carbon Monoxide [a]						
Highest 1 Hour Average (ppm) [c]	20/35	5.0	4.4	3.9	3.5	NA
Days over State Standard		0	0	0	0	0
Days over National Standard		0	0	0	0	0
Highest 8 Hour Average (ppm) [c]	9.0/9	4.0	3.3	2.8	2.6	2.4
Days over State/National Standard		0	0	0	0	0
Particulate Matter (PM-10) [e]						
Highest 24 Hour Average ($\mu g/m^3$) [c]	50/150	83.0	110.5	49.9	48.0	NA
Number of sampled days [d]		62	61	61	61	NA
Sampled days over State Standard [d]		10	5	0	0	NA
Sampled days over National Standard [d]		0	0	0	0	NA
Particulate Matter (PM-2.5) [e]						
Highest 24-Hour Average – National (ppm) [c]	65/35[f]	44.9	45.4	29.9	31.0	NA
Sampled days over National Standard [d, f]		0	0	0	0	NA

a Data are from BAAQMD's Alice Street station in Oakland.

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

c ppm = parts per million; g/m3 = micrograms per cubic meter.

d PM-10 and PM-2.5 are not measured every day of the year. "Number of samples" refers to the number of days in a given year during which PM-10 and PM-2.5 were measured at the Port of Oakland monitoring stations. As of publication of this SEIR, no 2006 air quality data is published by CARB.

e Combined data from the Port and residential monitoring stations are presented.

f U.S. EPA lowered the 24-hour PM-2.5 standard from 65 g/m3to 35 g/m3. Though the current standard is 35 g/m3, the estimated days over the national standard refers to days above the 65 g/m3standard..

NA = Not Available.

SOURCE: CARB, 2007a.

construction activities, and another location was in the West Oakland residential neighborhood east (downwind) of Port facilities. Because this area is upwind of the site during the prevailing west-northwest winds, it is reasonably representative of wind conditions at the project site.

Table IV.C-2 also shows PM-10 and PM-2.5 data from these locations and compares them to the state and national standards. **Table IV.C-3** shows trends in regional exceedances of the federal and state ozone standards. Because of the number of exceedances, ozone is the pollutant of greatest concern in the Bay Area.

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

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

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

SOURCE: CARB, 2007a.

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

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

Based on the data shown in **Table IV.C-2**, there have been no exceedances of the state and the federal one-hour ozone standards in the project vicinity over the last five years. The principal sources of ozone precursors ROG and NO_x in the Bay Area include on-road motor vehicles (approximately 39 percent for ROG and 52 percent for NO_x), other mobile sources (approximately 17 percent for ROG and 34 percent for NO_x), solvent evaporation (approximately 20 percent for ROG), overall fuel combustion (approximately 9 percent NO_x) and oil and gas production, such as refining (approximately 9 percent for ROG). Bay Area emissions of the ozone precursors ROG and NO_x are expected to decrease by approximately 24 and 36 percent, respectively, between 2005 and 2020 (CARB, 2006a) largely as a result of the State's on-road motor vehicle emission control program. The Bay Area has a significant motor vehicle population and these reductions are projected as vehicles meeting more stringent emission standards enter the fleet, and all vehicles use cleaner burning gasoline and diesel fuel or alternative fuels. This includes the use of improved evaporative emission control systems, computerized fuel injection, engine management systems to meet increasingly stringent California emission standards, cleaner gasoline, and the Smog Check program. ROG and NO_x emissions from other mobile sources and stationary sources are also projected to decline as more stringent emission standards and control technologies are adopted and implemented.

Table IV.C-2 shows that there have been no exceedances of state and federal ambient carbon monoxide standards at the Alice Street station in Oakland in the last five years. Based on BAAQMD carbon monoxide isopleth maps, 2006 background carbon monoxide concentrations in the project vicinity are approximately 5 parts per million, one-hour average, and 3 parts per million, eight-hour average (BAAQMD, 1999). Currently, on-road motor vehicles are responsible for approximately 69 percent of the carbon monoxide emitted within the San Francisco Bay Area and in Alameda County (CARB, 2006a). Carbon monoxide emissions are expected to decrease within the county by approximately 42 percent between 2005 and 2020 due to attrition of older, high polluting vehicles, improvements in the overall automobile fleet, and improved fuel mixtures (CARB, 2006a).

Based on data shown in **Table IV.C-2**, state PM-10 standards have been exceeded at the Port of Oakland monitoring stations on a frequent basis during the years 2000 through 2002, after which there have been no exceedances of the standard. The PM-2.5 and the national PM-10 standard have not been exceeded over the last five years. Generally, contributors to PM concentrations in the project area are primarily urban sources, dust suspended by vehicle traffic, and secondary aerosols formed by reactions in the atmosphere. Particulate concentrations near residential sources generally are higher during the winter, when more fireplaces are in use and meteorological conditions prevent the dispersion of directly emitted contaminants. Direct PM-10 emissions in Alameda County are expected to increase by approximately 19 percent between 2005 and 2020 (CARB, 2006a). This increase would be primarily from fugitive dust produced by anticipated increases in the vehicle miles traveled as well as stationary sources (such as industrial activities) and area sources (such as construction and demolition, road dust and other miscellaneous processes). Fugitive dust refers to particulate matter not emitted from a duct, tailpipe or stack, which becomes airborne due to the forces of wind, man's activity, or both. Activities that generate fugitive dust include vehicle travel over paved and unpaved roads, brake wear, tire wear, soil cultivation, off-road vehicles, or any vehicles operating on open fields or dirt roadways, wind erosion of exposed surfaces, and storage piles at construction sites. PM-2.5 emissions in Alameda County are projected to slightly increase by about 1.4 percent over the same period (CARB, 2006a), as the reduction in emissions from on-road and off-road engines would be offset by an increase in their activity and also an increase in industrial growth. Regulations are continuously reducing emission factors from sources, but the CARB projections for 2020 show an increase in total emissions generated in the future primarily in the industrial sector.

The standards for nitrogen dioxide, sulfur dioxide, and lead are being met in the Bay Area, and the latest pollutant trends suggest that these standards will not be exceeded in the foreseeable future (ABAG, 2001).

Toxic Air Contaminants

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

Sensitive Land Uses

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

Air Quality Impacts Discussion

Significance Criteria

The current significance criteria / thresholds for air quality impacts are listed below, as updated by the City of Oakland in May 2007, after publication of the Initial Study Checklist for the proposed project. The criteria are generally consistent[2] with those identified in the Initial Study (referred to therein as lettered "environmental factors") (see **Appendix A** to this SEIR) and are designated accordingly below.

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

a) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

b) Expose sensitive receptors to substantial pollutant concentrations;

c) Result in a substantial increase in diesel emissions

d) Result in total emissions of ROG, NOx, or PM-10 of 15 tons per year or greater, or 80 pounds (36 kilograms) per day or greater;

e) Contribute to CO concentrations exceeding the State Ambient Air Quality Standard (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 would have reduced LOS; or (4) traffic volume would increase on nearby roadways by 10% or more unless the increase in traffic volume is less than 100 vehicles per hour];

f) Result in potential to expose persons to substantial levels of Toxic Air Contaminants (TACs), such that the probability of contracting cancer for the Maximally Exposed Individual (MEI)[3] exceeds 10 in one million;

g) Result in ground level concentrations of non-carcinogenic TACs such that the Hazard Index[4] would be greater than 1 for the MEI;

h) Conflict with or obstruct implementation of the applicable air quality plan (the adopted clean air plan);

---

[2] Cumulative air quality thresholds, Criteria "j" through "l", replace Criteria "b" through "d" identified in the Initial Study.

[3] The Maximally Exposed Individual (MEI) is a hypothetical individual who, because of proximity, activities, or living habits, could potentially receive the maximum possible dose of a hazardous chemical from a given event or process. (California Office of Environmental Health Hazard Assessment, 2003)

[4] Calculated by dividing the annual average concentration of a toxic pollutant by the chronic reference exposure level for that pollutant. (CARB Emissions Inventory and Risk Glossary, http://www.arb.ca.gov/ei/riskglossary.htm)

i) Frequently create substantial objectionable odors affecting a substantial number of people;

A cumulative impact would occur if conditions would:

j) Result in any individual significant air quality impact;

k) 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);

l) Involve in a proposed General Plan Amendment that would fundamentally conflict with the currently adopted clean air plan.For project-level impact analysis, the BAAQMD provides various thresholds and tests of significance. For ROG, NO_x and PM-10, a net increase of 80 pounds per day is considered significant, while for CO, an increase of 550 pounds per day would be considered significant if it leads to or contributes to localized CO concentrations exceeding the State AAQS of 9 ppm averaged over 8 hours and 20 ppm for 1 hour (i.e., if it creates a "hot spot"). Generally, if a project results in an increase in ROG, NO_X, or PM-10 of more than 80 pounds per day, then it would also be considered to contribute considerably to a significant cumulative effect. For projects that would not lead to a significant increase of ROG, NO_X, or PM-10 emissions, the cumulative effect is evaluated based on a determination of the consistency of the project with the regional Clean Air Plan. These criteria recommended by the BAAQMD are consistent with the criteria used by the City of Oakland and enumerated above.

Although the establishment of both federal and State standards for PM-2.5 and the classification of the Bay Area as a nonattainment area with respect to the State PM-2.5 standard, the BAAQMD has not yet developed a threshold of significance for this pollutant to analyze the significance of project specific impacts (although it is in the process of updating its CEQA Guidelines which may identify an appropriate threshold).

Topics with No Impact or Otherwise Not Addressed in this SEIR

The information and analysis presented in the Initial Study (provided as **Appendix A** to this SEIR) provides substantial evidence for the conclusion that the proposed project would not constitute a significant source of odors that would be a nuisance to sensitive receptors, pursuant to Criterion "i" listed above. The Initial Study determined that odor impacts would be less than significant, as was identified in the 1998 EIS/EIR, thus no mitigation was required or identified. Therefore, this topic is not addressed further in this document.

Impacts and Mitigation Measures

Violation of Air Quality Standards / Exposure to Sensitive Receptors During Construction

The following discussion addresses the potential air quality effects during construction activities, pursuant to Criteria "a" through "c."

Comparison of the Proposed Project and the 1998 EIS/EIR Maximum Capacity Alternative, Relevant to Construction-Period Air Quality

The proposed project would create new residential and commercial development (including Club Knoll reuse and potentially the Seneca Center) like the Maximum Capacity Alternative in the 1998 EIS/EIR proposed, and would include more residential units and nearly 318,000 fewer square feet of commercial development.[5] As a result, a substantial difference in the scale, type, or duration of construction or renovation activity is not assumed. In addition, the proposed project would involve building demolition at a similar scale as would be required to develop the Maximum Capacity Alternative.

Changes in Circumstances and Information Since the 1998 EIS/EIR

While air quality in the project area has generally improved over the years, EPA and CARB have continually revised the ambient air quality standards to (more stringent) lower levels. Therefore, there is greater potential for project emissions to violate air quality standards than existed for the Maximum Capacity Alternative analyzed in the 1998 EIS/EIR. To mitigate these impacts, the BAAQMD and the City of Oakland currently require a more comprehensive set of mitigation measures than those identified in the 1998 EIS/EIR.

Summary of 1998 EIS/EIR Construction-Period Air Quality Impacts

The 1998 EIS/EIR determined that the Maximum Capacity Alternative would result in a significant impact associated with the generation of dust during building demolition, renovation, and construction activities. The 1998 EIS/EIR identified Mitigation 3, presented below, to reduce construction period fugitive dust emissions and reduce the resulting impact to less than significant.

> **1998 EIS/EIR Mitigation 3**: Use the following control practices during demolition, construction, and renovation activities:
>
> - Use mowing rather than discing for weed control, thus minimizing ground disturbance and leaving a soil cover in place;
> - Seed and water inactive portions of construction sites to maintain a grass cover;
> - Minimize the area disturbed by clearing, earthmoving, or excavation activities;

5 See **Table IV-1**, Comparison of Maximum Capacity Alternative and Proposed Oak Knoll Project, in the Chapter IV, Introduction to the Environmental Analysis.

- Prevent excessive dust generation by using water or dust control solution on all unpaved areas subject to vehicle traffic, grading, or excavation;
- Ensure that any petroleum-based dust control products used on the site meet BAAQMD regulations for cutback asphalt paving materials;
- Halt all site clearing, grading, earthmoving, and excavation activities during periods of sustained strong winds (hourly average wind speeds 20 mph or greater);
- Sweep streets adjacent to the construction vehicles and avoid excessive idling of inactive equipment.

Significance of Maximum Capacity Alternative after Implementation of 1998 EIS/EIR Mitigation: Less than Significant

Proposed Project Impact Analysis

Impact AIR-1: Activities associated with demolition, site preparation and construction would generate emissions of criteria pollutants, including suspended and inhalable particulate matter and equipment exhaust emissions, and expose sensitive receptors to substantial pollutant concentrations. (Potentially Significant)

Approach to Analysis

As conducted in the 1998 EIS/EIR and as recommended by the BAAQMD, the following SEIR analysis focuses on a qualitative approach to the evaluation of construction emissions. This approach emphasizes the implementation of control measures (based on the size of the project) to reduce the project's impact rather than a detailed quantification of emissions.

Discussion of Proposed Project Impacts

The proposed project would result in a similar potentially significant impact regarding construction-period air quality as identified for the Maximum Capacity Alternative in the 1998 EIS/EIR. Mitigation 3 identified in the 1998 EIS/EIR is revised slightly as presented below, as Mitigation Measures AIR-1a and AIR-1b to be consistent with BAAQMD's current dust control measures and asbestos airborne control measures and the City's standard conditions of approval. Compared to the 1998 mitigation, Mitigation Measure AIR-1 is more detailed, reflects current management practices, and does not reduce the requirements of the 1998 Mitigation 3. Specifically, Mitigation Measure AIR-1a replaces the 1998 Mitigation 3 and would reduce impacts from fugitive dust to less than significant to a greater extent than 1998 Mitigation 3. Mitigation Measure AIR-1b (newly identified) would reduce the potential impact of asbestos that may be present in building materials to be demolished. Mitigation Measures AIR-1a and AIR-1c specifically incorporate measures put forth by BAAQMD in its letter submitted in response to the NOP (see **Appendix B** to this SEIR).

Although not addressed in the 1998 EIS/EIR, construction activities associated with development of the Maximum Capacity Alterative would, like the project, also result in emissions of ROG, NOx, CO, PM-10 and PM-2.5 from construction equipment exhaust, construction-related vehicles, and construction worker vehicle trips. Emission levels for construction activities would vary depending on the number and type of equipment, duration of use, operation schedules, and the number of construction workers. Criteria pollutant emissions of ROG and NOx from these emission sources would incrementally add to the regional atmospheric loading of ozone precursors during project construction. BAAQMD CEQA Guidelines recognize that construction equipment emits ozone precursors, but indicate that such emissions are included in the emission inventory that is the basis for regional air quality plans. Therefore, construction emissions of ROG and NOx are not expected to impede attainment or maintenance of ozone standards in the Bay Area (BAAQMD, 1999), but would contribute to ozone precursor emission levels and thus be potentially significant.

As indicated in the Project Description (Chapter III), the project proposes to conduct construction-related concrete and asphalt recycling on site during the demolition phases of construction. This aspect of the project is consistent with the City's Construction and Demolition Recycling Ordinance (Ordinance 12253. OMC Chapter 15.34, passed in July 2000) which requires certain nonresidential or apartment house projects to recycle 100 percent of all concrete and asphalt materials. The proposed project would be subject to this ordinance, as a mixed use residential development. The recycling activities are anticipated to involve the "crushing" of uncontaminated concrete aggregate and asphalt in a stationary, on-site rubble crushing machine and conveyor. While on-site recycling and reuse of these materials would likely reduce the emissions from diesel-fueled truck trips required to off-haul debris, reduce construction debris that would otherwise be deposited in area landfills, and allow reuse of existing materials onsite, the "crushing" activity will utilize construction equipment known to emit ozone precursors and would generate construction dust and release hazardous materials into the air (e.g., silica, alkalies) from pulverized concrete and asphalt.

Implementation Mitigation Measure AIR-1c (newly identified) would reduce the impact of construction dust and construction equipment exhaust emissions associated with the proposed project (or the Maximum Capacity Alterative), including with respect to onsite concrete and asphalt recycling activities, to less than significant by requiring practices that reduce airborne dust from leaving the site and that limit the operation and specify the placement of exhaust-emitting equipment near sensitive receptors.

> **Revised Mitigation Measure AIR-1a (modified from 1998 EIS/EIR Mitigation 3): *Dust Control Measures* – During construction, the project sponsor shall require the construction contractor to implement the following measures identified as part of Bay Area Air Quality Management District's (BAAQMD) basic and enhanced dust control procedures required for construction sites. These include:**
>
> <u>*Basic Controls that Apply to All Construction Sites*</u>
>
> a) Water all active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering

frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.

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

c) Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads that are actively used, 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.

m) Limit idling time of diesel powered construction equipment to three minutes.

Enhanced Controls that Apply to Sites Greater than 4 Acres

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

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

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

q) 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 persons shall be provided to the BAAQMD prior to the start of construction. The name and telephone number of such persons, as well as a contact person at the controlling agencies (City of Oakland and BAAQMD) shall be posted on-site over the duration of construction.

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

Enhanced Controls that Apply to Concrete and Asphalt On-Site Recycling Activities During Construction

s) All "Basic" and "Enhanced" controls listed above, plus:

t) Locate all activity, storage, and staging areas where recycling of construction and demolition debris in the central portion of the project site, away from sensitive receptors on site (residences and open space completed in initial phases of development) and off site (nearby residences, school, church, and any other sensitive receptors).

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

New Mitigation Measure AIR-1c: *Construction Equipment Emissions* - To minimize construction equipment emissions during construction, the project sponsor 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, requires an authority to construct and permit to operate certain types of portable equipment used for construction purposes (e.g., gasoline or diesel-powered engines used in conjunction with power generation, pumps, compressors, and cranes) unless such equipment complies with all applicable requirements of the "CAPCOA[6] 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). Perform periodic tune-ups (every 90 days) for such equipment used continuously during the construction period.

[6] California Air Pollution Control Officers Association

c) Use alternative-powered construction equipment (i.e., CNG, biodiesel, water emulsion fuel, electric), add-on devices such as diesel oxidation catalysts or particulate filters, and diesel construction equipment that meets CARB 2000 or newer certification standard for off-road heavy-duty engines, where feasible.

Significance After Implementation of Mitigation Measures: Less than Significant.

Comparison of Construction-Period Impacts – Proposed Project and 1998 EIS/EIR Maximum Capacity Alternative

The proposed project would involve generally the same scale, extent, and duration of building demolition, renovation, and construction as the Maximum Capacity Alternative, thus it would also result in the same potentially significant but mitigable impact identified in the 1998 EIS/EIR. The Maximum Capacity Alternative did not assume on-site recycling and reuse of concrete and asphalt and thus would not involve the adverse (equipment emissions, dust) or beneficial (reduced diesel-vehicle trips and emissions) air quality effects associated with those activities. This difference does not result in a substantially more severe construction-period air quality impact compared to that identified for the Maximum Capacity Alternative in the 1998 EIS/EIR. (Mitigation measures that update and expand the 1998 Mitigation 3 to incorporate current City of Oakland and BAAQMD standards and addresses newly-proposed construction recycling activities will reduce impacts to a greater extent.)

No new impact is identified for the proposed project that was not identified for the Maximum Capacity Alternative in the 1998 EIS/EIR; new and updated mitigation measures (Revised Mitigation Measure AIR-1a and New Mitigation Measures AIR-1b and AIR-1c) are identified.

Comparison of Project Impacts with Pre-Base Closure Conditions – Construction Period Impacts

Consideration of the pre-closure setting is not relevant to the consideration of construction-period impacts in that it would not affect whether or not the characteristics that contribute to the proposed project or the Maximum Capacity Alternative are consistent with the Clean Air Plan.

Project Operational Impacts (Criteria Pollutants and Precursors)

The following discussion addresses the potential air quality effects during operation of the project activities, pursuant to Criteria "a," "b," and "d."

Comparison of the Proposed Project and the EIS/EIR Maximum Capacity Alternative, Relevant to Operational Air Quality (Criteria Pollutants and Precursors)

Once the project is fully complete and operational, emissions would be generated primarily by motor vehicle trips to and from the project site. Emissions from on-site sources such as landscaping, natural gas combustion for space and water heating, use of consumer products, and architectural coatings would form a secondary source of emissions. Prior to completion, emissions would also be generated by motor vehicles and on-site sources, specifically construction equipment (see Impact AIR-1) and construction-related traffic (see Impact TRANS-7), and would be less than levels generated from the fully complete and operational project.

Changes in Circumstances and Information Since the 1998 EIS/EIR

The air quality analysis for this SEIR uses URBEMIS2007 (version 9.2) (URBan EMISsions model) to estimate off-site (project-generated vehicle trips) and on-site emissions, while the analysis for the 1998 EIR/EIS was based on URBEMIS7G. URBEMIS7G was based on emission factors provided by MVEI7G (a computer model used by CARB to estimate on-road motor vehicle emissions) while URBEMIS2007 (version 9.2) draws emission factors from EMFAC2007 (EMissions FACtor). Generally, emission factors reported by EMFAC2007 are lower than those reported by MVEI7G as EMFAC2007 incorporates the effects of newer emission control regulations on motor vehicles and fuels. (The substantial difference in emissions for the Maximum Capacity Alternative resulting from the 1998 EIS/EIR method (EMFAC7F model) and the 2007 method (URBEMIS2007 model) are due to varying assumptions used for emission factors, vehicle miles traveled, detailed land use assumptions, and other default assumptions.) In addition there are changes in the default assumptions for vehicle mix and average trip length between the two versions. There are also changes in the details of the proposed land uses in the proposed project when compared to 1998 EIS/EIR Maximum Capacity Alternative (e.g., amounts of commercial versus residential uses).

Summary of 1998 EIS/EIR Operational Air Quality (Criteria Pollutants and Precursors) Impacts

The 1998 EIS/EIR indicated that operational emissions associated with off-site vehicle sources[7] (i.e., project-generated vehicle trips) for the Maximum Capacity Alternative would exceed the significance threshold for PM-10 emissions and therefore would result in a significant impact. (As indicated above, the 1998 analysis was conducted using the EMFAC7F model to estimate emissions.) The 1998 EIS/EIR did not recommend mitigation measures to reduce the significant impacts associated with operational traffic emissions, but indicated that because State law effectively prohibited *mandatory* trip reduction programs in the Bay Area, the City of Oakland would have few mechanisms to achieve significant additional reductions in emissions from vehicle traffic. The 1998 EIS/EIR impact was significant and unavoidable and no mitigation measures were identified.

Proposed Project Impact Analysis

Impact AIR-2: The project would generate emissions of criteria pollutants and their precursors from on-site sources and vehicular traffic to and from the project site. (Potentially Significant)

Approach to Analysis

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[7] The 1998 EIS/EIR did not address emissions that would result from on-site area sources such as natural gas usage, landscaping, and consumer products.

As in the 1998 EIS/EIR, the emission levels for ROG, NOx, and PM-10 for the project are estimated using the CARB's urban emissions model URBEMIS. However, as indicated above, while the 1998 EIS/EIR used URBEMIS7G (the most current version of the model at that time), while the analysis for this SEIR has been conducted using URBEMIS2007 (version 9.2), which is the most current version in August 2007. As in the 1998 EIS/EIR, the estimated emissions are compared to the BAAQMD significance thresholds of 80 pounds per day for ROG, NOx, and PM-10.

Daily trip generation data prepared by Fehr & Peers Associates was used with the program to estimate the mobile source emissions for the proposed project. The URBEMIS2007 program uses EMFAC2007 emission factors with a standard mix of passenger vehicles for the year 2010. Emissions from on-site area sources such as natural gas combustion for space and water heating, landscaping, and consumer products were estimated by applying default emission factors in the model to the area of proposed land uses. To allow for a consistent comparison of emissions from the proposed project and the Maximum Capacity Alternative, emissions for the Maximum Capacity Alternative (previously estimated in the 1998 EIS/EIR using URBEMIS7G) were re-estimated using URBEMIS2007 (version 9.2). Emissions from on-site area sources as well as off-site mobile sources (project-generated vehicle trips) were calculated since the 1998 EIS/EIR did not address area source emissions. The analysis presented below presents a 2010 interim year condition (cumulative year 2025 analysis is presented below under *Cumulative Air Quality Impacts*)

Discussion of Proposed Project Impacts

Table IV.C-4 shows the operational emissions associated with off-site (project-generated vehicle) and on-site area sources for the proposed project and the Maximum Capacity Alternative. The environmental effect of the proposed project is the increment of change ("net change") that occurs by comparing the proposed project's effects to the existing baseline condition (as described in the *Introduction to the Environmental Analysis* section in Chapter IV of this SEIR). **Table IV.C-4** also shows the net increase in emissions from the proposed project as well as from the Maximum Capacity Alternative (using the same analysis program).

As indicated below, the proposed project would result in a net increase in ROG, NOx, and PM-10 emissions in the year 2010, which would exceed the BAAQMD significance threshold of 80 pounds per day. This would result in a significant air quality impact, as identified for the Maximum Capacity Alternative in the 1998 EIS/EIR. Comparatively, (using the same current methodology), the net increase in PM-10 emissions would be the same for the proposed project and the Maximum Capacity Alternative and the net increases in NOx and ROG would be approximately 3 and 19 percent greater, respectively, than from the Maximum Capacity Alternative due to variations in the project land uses (e.g., amounts of commercial versus residential uses).

While the 1998 EIS/EIR did not identify mitigation measures to reduce the significant impacts associated with operational traffic emissions (as discussed above, under *Summary of 1998 EIS/EIR Impacts, Mitigation Measures, and Conclusions for Operational Air Quality*), the City

TABLE IV.C-4
ESTIMATED DAILY EMISSIONS AND NET INCREASE OVER EXISTING AND PRE-CLOSURE EMISSION LEVELS FOR PROPOSED PROJECT AND 1998 EIS/EIR MAXIMUM CAPACITY ALTERNATIVE

	Proposed Project [a,b]				Maximum Capacity Alternative [a, b]			
	ROG	**NOx**	**PM-10**	**PM-2.5**	**ROG**	**NOx**	**PM-10**	**PM-2.5**
2010 Estimated Daily Emissions (Pounds per day)								
Off-Site Project-Generated Mobile Sources	89.0	124.7	176.6	33.8	88.9	124.9	176.7	33.8
On-Site Area Sources	53.3	12.0	0.1	0.13	31.1	9.0	0.1	0.07
Total Estimated Emissions	**142.3**	**136.7**	**176.7**	**33.9**	**120.0**	**133.9**	**176.8**	**33.9**
Threshold (Pounds per day)	80	80	80	N/A	80	80	80	N/A
Significant Impact?	**Yes**	**Yes**	**Yes**	N/A	**Yes**	**Yes**	**Yes**	N/A

COMPARISON WITH PRE-CLOSURE EMISSIONS

	Proposed Project [a,b]				Maximum Capacity Alternative [a, b]			
	ROG	**NOx**	**PM-10**	**PM-2.5**	**ROG**	**NOx**	**PM-10**	**PM-2.5**
Net Daily Emissions (Pounds per Day)								
Total Estimated Project Emissions	142.3	136.7	176.7	33.9	120.0	133.9	176.8	33.9
Total Pre-Closure Emissions	*32.1*	*47.9*	*65.2*	*12.5*	*32.1*	*47.9*	*65.2*	*12.5*
Net Increase Emissions	**110.3**	**88.8**	**111.5**	**21.4**	**87.9**	**86.1**	**111.6**	**21.4**
Threshold (Pounds per day)	80	80	80	N/A	80	80	80	N/A
Significant?	**Yes**	**Yes**	**Yes**	N/A	**Yes**	**Yes**	**Yes**	N/A

a Trip generation data for the proposed project was obtained from the traffic study provided by Fehr & Peers. Trip Generation for the 1998 EIS/EIR Maximum Capacity Alternative and for Pre-Closure conditions was obtained from the 1998 EIS/EIR. and the Air Resources Board's URBEMIS2007 model for the San Francisco Bay Air Basin.

b Emissions estimates for the 1998 EIS/EIR Maximum Capacity Alternative and Pre-Closure conditions was redone using URBEMIS2007 (version 9.2) to allow for a consistent comparison with emissions for the proposed project estimated using URBEMIS2007 version 9.2.

c Assumptions for the URBEMIS2007 model for San Francisco Bay Air Basin include a default vehicle mix, summer temperature of 75 degrees F and winter temperature of 40 degrees F. All daily estimates shown are for summertime conditions, the ozone season.

"NA" – Not available; no significance threshold is available for the Bay Area.

NOTE: **Bold** values are in excess of the BAAQMD's significance thresholds, which are 80 pounds per day for ROG, NOx, and PM-10.

SOURCE: ESA, 2007.

currently generally requires that the project sponsor implement some combination of items in the following mitigation measure – as appropriate for the proposed types and scale of uses in the project – as feasible trip reduction mitigation measures that could reduce daily emission levels of the proposed project:

Mitigation Measure AIR-2: To reduce the operational air quality emissions from the proposed project, the project sponsor shall implement the following feasible mitigation measures (consistent with BAAQMD CEQA Guidelines and Alameda County Congestion Management Program – Transportation Demand Management Element) that will reduce peak hour project vehicle trips and thus motor vehicle emissions.

Rideshare and Incentive Measures

- Encourage all tenants (commercial and residential) at the site to implement and/or participate in carpool/ vanpool programs (e.g., carpool, ride matching for employees, assistance with vanpool formation, provision of vanpool vehicles, guaranteed ride home program, etc.). Distribute information about the Alameda County Congestion Management Agency's Guaranteed Ride Home Program to commercial tenants to facilitate alternative transportation modes.
- Encourage commercial tenants to implement employee rideshare incentive programs providing cash payments or pre-paid fare media such as transit passes or coupons.
- Encourage commercial tenants to meet standard, minimum employee ridesharing requirements or to provide incentives to encourage employees to rideshare.
- Encourage commercial tenants to implement a parking cash-out program for employees (e.g., non-driving employees receive transportation allowance equivalent to the value of subsidized parking).
- Provide preferential parking for carpool and vanpool vehicles within project parking structures/lots (e.g., near building entrance, sheltered area, etc.) to the extent that there is demand for such spaces.

Bicycle and Pedestrian Measures

- Provide adequate amount of secure short-term bicycle parking at or in the vicinity of the project site, at locations more convenient than auto parking, for residents, customers, and other non-commute trips.
- Encourage commercial tenants to provide secure, weather-protected bicycle parking for employees.
- Encourage commercial tenants to provide showers and lockers for employees bicycling or walking to work.
- Provide adequate street lighting within the street rights-of-way within the project site.

Transit Measures

- Construct transit facilities, such as bus turnouts/bus bulbs, benches, shelters, etc., on the project site (consistent with Mitigation Measure TRANS-9c).
- Distribute and make available information about transit information for project residents.

Components of the proposed project not considered in the emissions model would also effectively reduce daily emission levels associated with project vehicle trips. These include:

- Overall design of the project as a new residential community supported by neighborhood-serving commercial uses and services such as restaurants, anchor and Main Street retail shopping;
- An on-site network of open spaces, parks and playgrounds, bicycle and pedestrian trails, and various recreational facilities;
- A series of safe and inviting pedestrian and bicycle paths and sidewalks would be provided to facilitate mobility throughout the site and to existing bus transit service without use of motor vehicles.

Based on the above project components, coupled with the measures identified in Mitigation Measure AIR-2 (which incorporate all feasible mitigation measures encouraged by BAAQMD and Alameda County CMA, see respective comments received in response to the Notice of Preparation and Initial Study for this SEIR, provided as **Appendix B**), the operational daily emission levels from the project would be reduced. The effectiveness of the measures in Mitigation Measure AIR-2, as determined by the BAAQMD, could reduce the operational impacts of the proposed project by reducing its motor vehicle trips by 15 to 20 percent (BAAQMD, 1999). The actual reduction would depend on the combination and extent of the measures employed. Therefore, the extent of potential reduction cannot be known, and as a result, the residual impact of the proposed project's ROG, NOx, and PM-10 emissions would continue to be significant. No other feasible mitigation measures that could reduce motor vehicle trips are specified that would reduce the residual impact to less than significant.

Significance After Implementation of Mitigation Measures: Significant and Unavoidable

Comparison of Operational Air Quality (Criteria Pollutants and Precursors) Impacts – Project and 1998 EIS/EIR Maximum Capacity Alternative

The proposed project would include more residential units and less commercial development than the Maximum Capacity Alternative.The proposed project would exceed the significance threshold for ROG, NOx, and PM-10 emissions, which would also result with the Maximum Capacity Alternative when estimated using the same current methodology. This is consistent with the *overall* impact conclusion that the 1998 EIS/EIR analysis identified for the Maximum Capacity Alternative using the methodology applicable at that time. Although it is not appropriate to compare the proposed project emissions for the individual pollutants to those estimated from the Maximum Capacity Alternative as reported in the 1998 EIS/EIR (due to different methodology used for each), the proposed project would exceed threshold levels for ROG and NOx that were not identified for the Maximum Capacity Alternative in the 1998 EIS/EIR.

According to the 1998 EIS/EIR analysis using URBEMIS7G, the Maximum Capacity Alternative would result in an exceedance for PM-10 only, and **Table IV.C-4** shows that, using the current methodology which was used for the proposed project, the Maximum Capacity Alternative would also result in a net increase in ROG and NOx that would exceed the significance threshold of 80 pounds per day. This change is due primarily to the fact that the 1998 EIS/EIR analysis did not consider on-site area sources.

Based on the comparable analysis shown in **Table IV.C-4,** no new overall impact is identified for the proposed project that was not identified for the Maximum Capacity Alternative in the 1998 EIS/EIR; new mitigation measures are identified (New Mitigation Measure AIR-2), however the impact would continue to be significant and unavoidable.

Comparison of Project Impacts with Pre-Base Closure Conditions - Operational Air Quality (Criteria Pollutants and Precursors)

The lower half of **Table IV.C-4** also shows the net increase in emissions that would occur from the proposed project and the Maximum Capacity Alternative (using the same current methodology), as compared to emissions associated with pre-closure conditions (as estimated using URBEMIS2007 (version 9.2). To determine the net increase in emissions from the proposed project and the Maximum Capacity Alternative, pre-closure emission levels have been subtracted from the estimated daily emissions. Compared to the impacts identified above when using the applicable existing conditions baseline, the proposed project and the Maximum Capacity Alternative would exceed the significance threshold for ROG emissions, but not for NOx or PM-10. The same overall significant and unavoidable impact would result considering a pre-closure emissions baseline, and the same mitigation measure (New Mitigation Measure AIR-2) would apply.

Localized Carbon Monoxide (CO) Impacts

The following discussion addresses the potential effects of CO concentrations, pursuant to Criterion “e.”

Comparison of the Proposed Project and the 1998 EIS/EIR Maximum Capacity Alternative, Relevant to Localized CO Concentrations

The proposed project would include more residential units and less commercial development compared to the Maximum Capacity Alternative. Vehicle trips during weekday afternoon (p.m.) peak-hour (when traffic congestion and related carbon monoxide concentrations are worst) would be essentially the same for the proposed project and the Maximum Capacity Alternative, at approximately 1,312 and 1,575 trips, respectively (see **Table IV.B-6**, Comparison of Trip Generation Estimates).

Changes in Circumstances and Information Since the 1998 EIS/EIR

Since preparation of the 1998 CO concentration analysis, BAAQMD has developed a simplified screening method to estimate CO concentrations, which is based on CALINE4 (a model to estimate local CO concentrations from motor vehicles developed and made available by the California Department of Transportation [Caltrans]) and takes into account worst case meteorological conditions and CO field studies conducted by the BAAQMD in the Bay Area. If the results of the screening method indicate CO concentrations would be below the standards, then no further CO analysis is required (BAAQMD, 1999). The BAAQMD screening method was used to analyze CO concentrations for the proposed project.

Summary of 1998 EIS/EIR Conclusions for Localized CO Concentration Impacts

As discussed in Section IV.B, *Transportation, Circulation, and Parking,* of this SEIR, several of the study intersections analyzed for the Maximum Capacity Alternative in the 1998 EIS/EIR would operate at an unacceptable level of service (LOS) (LOS F) during peak p.m. periods under the pre-closure (1998) plus project conditions. Heavy traffic congestion at these intersections could lead to localized elevated levels of CO, or "hotspots" due to increased traffic congestion and intersection delay. However, the 1998 EIS/EIR reported that, using the CALINE4 model to estimate local CO concentrations from motor vehicles , the 1-hour and 8-hour CO concentration levels resulting with the Maximum Capacity Alternative would not exceed federal and state standards, as shown in **Table IV.C-5** below, and would be "nonsignificant" (or less than significant); no mitigation was required.

Proposed Project Impact Analysis

Impact AIR-3: Mobile emissions generated by project traffic would increase carbon monoxide concentrations at intersections in the project vicinity. (Less than Significant)

Approach to Analysis

As in the 1998 EIS/EIR, the following SEIR analysis identifies intersections in the project vicinity that are most impacted by project-generated traffic and analyzes the potential for formation of CO "hotspots" at these intersections. 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 would increase on nearby roadways by 10% or more unless the increase in traffic volume is less than 100 vehicles per hour.

Discussion of Proposed Project Impacts

The proposed project would result in a similar less-than-significant impact regarding localized CO concentrations identified for the Maximum Capacity Alternative in the 1998 EIS/EIR. To estimate the effects of the proposed project, CO concentrations were estimated for the existing plus proposed project conditions. Localized CO concentration analysis was conducted for the following two intersections that were found to operate at LOS F (before implementation of traffic mitigation measures) and were found to have a more significant contribution from project traffic when compared to other LOS F intersections analyzed in the traffic study (see **Table IV.B-7**, Intersection Levels of Service [LOS] – Summary of "Existing Plus" Conditions, in Section IV.B of this SEIR) (intersection numbers correspond to study intersections identified in Section IV.B):

- Keller Avenue / Mountain Boulevard intersection *(#2)*
- I-580 Westbound Off Ramp – Shone Avenue / Mountain Boulevard *(#4)*

The CO concentrations associated with the p.m. peak hour for the above intersections were modeled using BAAQMD's screening method. The projected one-hour and 8-hour CO concentrations for the proposed project are shown in **Table IV.C-5**. As shown in the table, concentrations for the proposed project are well under the State 1-hour and 8-hour standards for CO (i.e., 20 and 9 ppm, respectively) for both project and cumulative conditions. Also reflected in **Table IV.C-5** is the variation in CO emission factors and background CO concentrations over time. For example, there are instances where existing CO concentration levels are the same or lower than future years with the project. This is because there would be a reduction in CO emission factors and background CO concentrations (resulting from decreases in CO emissions due to attrition of older, high polluting vehicles, improvements in the overall automobile fleet, and improved fuel mixtures) within the county by approximately 42 percent between 2005 and 2020 that nullify the increase in CO caused by the project in future years [CARB, 2006a]. In other words, the future reductions in CO emissions would exceed the increase caused by the project. In each case however, by the cumulative year of 2025, these variations would "even out," thus the effect of the project shows as increased CO concentration.

TABLE IV.C-5
ESTIMATED CARBON MONOXIDE CONCENTRATIONS OVER EXISTING AND PRE-CLOSURE CONDITIONS AT MOST IMPACTED INTERSECTIONS IN PROJECT VICINITY, FOR PROPOSED PROJECT AND 1998 EIS/EIR MAXIMUM CAPACITY ALTERNATIVE

		Concentrations (ppm)[a,b]									
Scenario	Averaging Time (hours)	Existing	Existing + Project	Existing + MCA	Cumulative	Cumulative + Project	Cumulative + MCA	Existing + Project w/ Pre-Closure	Existing + MCA w/ Pre-Closure	Cumulative + Project w/ Pre-Closure	Cumulative + MCA w/ Pre-Closure
Keller Avenue / Mountain Boulevard PM Peak Hour	1	4.02	4.02	4.08	3.84	3.99	4.04	3.90	3.96	3.87	3.92
	8	2.09	2.12	2.16	1.99	2.1	2.13	2.03	2.07	2.01	2.04
I-580 Westbound Off Ramp – Shone Avenue / Mountain Boulevard PM Peak Hour	1	3.83	3.81	3.87	3.68	3.79	3.83	3.83	3.78	3.70	3.74
	8	1.96	1.97	2.01	1.88	1.96	1.99	1.9	1.94	1.89	1.92

a Concentrations relate to a location 25 feet from the edge of the roadways that form the intersection. The carbon monoxide analysis focuses on the weekday afternoon (p.m.) peak-hour because the project's effects on traffic congestion and related carbon monoxide concentrations are greater during that period than during the morning (a.m.) peak hour. Carbon monoxide estimates shown above include background concentrations of 3.6 ppm, one-hour average, and 1.8 ppm, eight-hour average for 2007; 3.5 ppm, one-hour average and 1.7 ppm, eight-hour average for 2010 and 2025. 2010 concentrations have been used for 2025 to provide a conservative estimate, as 2025 background concentrations were not available. CO emission factors for 2015 were used for 2025. Therefore, actual concentrations in 2025 will be lower than those shown in the table. Additionally, the concentrations shown in the table represent worst-case conditions since the analysis does not consider implementation of mitigation measures that would improve conditions at these intersections to better than LOS F.

b The California ambient air quality standard for carbon monoxide is 20 ppm, one-hour average and 9 ppm, eight-hour average. The same standard applied for the Maximum Capacity Alternative analyzed in the 1998 EIS/EIR.

NOTE: **Bold** values are in excess of applicable standard. Instances where existing levels are lower or equal to existing plus project conditions are due to future reductions anticipated to CO emissions 2005-2020, which may exceed CO emissions resulting from the project in future years.

SOURCE: ESA, 2007.

Table IV.C-5 **reflects a worst-case analysis since this analysis does not consider implementation of mitigation measures identified in this SEIR that would improve p.m. peak hour (and all) conditions at these intersections to better than LOS F. Therefore, impacts resulting from the proposed project would be less than significant and essentially the same as those described for the Maximum Capacity Alternative in the 1998 EIS/EIR.Mitigation**: None Required.

Comparison of Localized CO Concentration Impacts - Project and 1998 EIS/EIR Maximum Capacity Alternative

Several of the study intersections analyzed for the proposed project would also operate at an unacceptable LOS F during peak periods with the Maximum Capacity Alternative. As discussed above, the 1998 EIS/EIR also showed that the highest CO concentrations associated with the Maximum Capacity Alternative would be in the vicinity of the I-580 off-ramp and Keller Avenue / Mountain Boulevard intersection.

Based on the analysis shown in **Table IV.C-5**, concentrations for both the proposed project and the Maximum Capacity Alternative are well under the State 1-hour and 8-hour standards for CO for both project and cumulative conditions. The current ambient air quality standard for CO emissions was the same as applied in 1998. No new impact is identified for the proposed project that was not identified for the Maximum Capacity Alternative in the 1998 EIS/EIR; no mitigation measures are required.

Comparison of Project Impacts with Pre-Base Closure Conditions – Localized CO Concentration Impacts

The pre-closure conditions, which represent conditions when the NMCO was operational (see *Introduction to the Environmental Analysis* in Chapter IV), were not evaluated as part of any impact determination in this SEIR, but are presented herein for informational purposes. **Table IV.C-5** shows the estimated concentrations that would occur from the proposed project and the Maximum Capacity Alternative, as compared to concentrations associated with pre-closure conditions. The same less-than-significant impact would result considering a pre-closure baseline.

Toxic Air Contaminants

The following discussion addresses the potential air quality effects related to toxic air contaminants, pursuant to Criteria “f” and “g.”

Comparison of the Proposed Project and the 1998 EIS/EIR Maximum Capacity Alternative, Relevant to Toxic Air Contaminants (TACs)

Both the proposed project and the Maximum Capacity Alternative would include non-residential uses that would require diesel-engine vehicles (large trucks) on site, and both scenarios would develop the project site near I-580.

Changes in Circumstances and Information Since the 1998 EIS/EIR

The California Health and Safety Code defines TACs, which have been regulated under federal air quality law since 1977, with further guidance on how TACs are identified and regulated since 1983 with State Assembly Bill 1807 and in 1987 with State Assembly Bill 2588. In recent years, the BAAQMD has administered the Bay Area's Toxic Air Contaminant Control Program (aimed at reducing public exposure to TACs from stationary sources) and has heightened public agency awareness of strategies to address local "hot spots" and background concentrations. Since preparation of the 1998 EIS/EIR, the City of Oakland has adopted a significance threshold for evaluating the potential environmental effect of TACs in CEQA documents (Criterion "g").

Regarding the physical environmental setting, as discussed in the *Physical Setting for Air Quality* in this section, the BAAQMD reported a 46 percent reduction in the calculated lifetime cancer risk from measured concentrations of TACs, excluding diesel particulate matter between 1995 and 2005 (BAAQMD, 2004). Similarly, the calculated lifetime cancer risk from diesel particulate matter has been reduced from 750 in-one-million in 1990 and 570 in-one-million in 1995 (CARB, 2007d).

Summary of 1998 EIS/EIR Conclusions for TAC Impacts

The 1998 EIS/EIR did not assess the Maximum Capacity Alternative's potential effects on diesel emissions or non-carcinogenic TACs or the exposure of persons to these emissions.

Proposed Project Impact Analysis

Impact AIR-4: The proposed project would not result in exposure of persons to substantial levels of TACs such that the probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million. (Less than Significant)

Approach to Analysis

This qualitative discussion considers the potential for the project to generate diesel emissions from large motor vehicles or other TAC source emitters, or be situated near transportation-ways or uses that involve TAC emitting sources. Based on these factors, a qualitative assessment is presented regarding the risk of exposure to the project.

Discussion of Proposed Project Impacts

The main health concern regarding TACs is associated with the very fine particles emitted from diesel engine exhaust primarily associated with diesel emissions from large trucks. Large trucks (weighing more than 9,000 pounds) are prohibited on I-580, which is adjacent and generally upwind (westward) of the project site. No other diesel or other TAC source emitters (rail road, boats and ships, etc.) are located near the project site. The commercial uses in the project (including Club Knoll reuse and potentially the Seneca Center) would potentially require diesel-engine vehicles, including large trucks, to access the site to provide deliveries, products, and/or services, and these vehicles would travel adjacent to residential uses. For relative projected intensity of activity, the approximately 82,000 square feet of commercial uses and other non-residential uses proposed by the project would demand approximately 51 large truck trips per day, as estimated by the default vehicle type mix from URBEMIS2007, which is a conservative estimate given the restriction of large trucks on I-580, discussed below. There would be little contribution of diesel emissions from I-580 given the weight limitation restricting the most prevalent diesel emitting vehicles, the limited scale of commercial and other non-residential uses that would periodically demand large trucks on-site, and the lack of other area emitters would minimize any exposure of persons to substantial levels of TACs or substantial diesel emissions and not pose significant cancer risk. The impact for the proposed project would be less than significant.

Mitigation: None Required

Comparison of TAC Exposure Impacts - Project and 1998 EIS/EIR Maximum Capacity Alternative

As indicated above, the 1998 EIS/EIR did not assess the Maximum Capacity Alternative's potential effects on diesel emissions or non-carcinogenic TACs or the exposure of persons to these emissions. However, the considerations discussed above for the proposed project and that lead to a less-than-significant impact would be similar for the Maximum Capacity Alternative. No new impact is identified for the proposed project that was not identified for the Maximum Capacity Alternative in the 1998 EIS/EIR; no mitigation measures are required.

Comparison of Project Impacts with Pre-Base Closure Conditions – TAC Exposure

While not quantified, the operation of the NMCO prior to closure would have included uses and activities that would likely have routinely involved diesel or other TAC source emitters. Namely, operation of the naval medical center included a 475,000 square-foot hospital and related storage, in addition to community, public service (post office), recreational, and residential uses throughout the site, as well as the basic operation of an active military facility all of which involve large trucks with diesel engines. A comparison of the proposed project to pre-closure conditions (versus existing baseline conditions) would demonstrate that that project would result in less of an increase in potential TAC emissions (generation or exposure) than what currently exists from the site. The same less-than-significant impact would result considering a pre-closure baseline.

Consistency with the Clean Air Plan

The following discussion addresses the consistency of the proposed project with the Clean Air Plan, pursuant to Criterion "h."

Comparison of the Proposed Project and the 1998 EIS/EIR Maximum Capacity Alternative, Relevant to Consistency with the Clean Air Plan

The proposed project would result in approximately 80 fewer persons[8] and 419 fewer peak-hour vehicle trips[9] than the Maximum Capacity Alternative in the 1998 EIS/EIR. Increases in population and associated vehicle use due to the proposed project are evaluated in the analysis as to whether the growth resulting from the project would have the potential to conflict with or obstruct implementation of the regional air quality plan (the Clean Air Plan, or CAP) for the Bay Area, which would delay the attainment of the state and federal ambient air quality standards.

Changes in Circumstances and Information Since the 1998 EIS/EIR

At the time the 1998 EIS/EIR was prepared, the applicable regional air quality plan was the 1994 Bay Area CAP, which was based on development and plans that existed in the early 1990s (U.S. Navy, 1998). The BAAQMD adopted the most recent revision to the CAP - the Bay Area 2005 Ozone Strategy - on January 4, 2006 and is preparing its update as of preparation of this SEIR. The 2005 Bay Area Ozone Strategy relies on ABAG *Projections 2003* forecasts.

Summary of 1998 EIS/EIR Conclusions for Clean Air Plan Consistency

The 1998 EIS/EIR concluded that, while the Maximum Capacity Alternative was not incorporated into the land use, transportation, and air quality forecasts used in the 1994 Bay Area Clean Air Plan (the applicable air quality plan during preparation of the 1998 EIS/EIR), the periodic update of the Plan was underway and therefore development of the Maximum Capacity Alternative would not conflict with the applicable air quality plan. Further, the 1998 EIS/EIR indicated that since the required updating of state and federal air quality plans would provide an automatic mechanism for addressing regional air quality impacts of changing land use and transportation plans, the impact would be “nonsignificant” (or less than significant). No mitigation was required.

Proposed Project Impact Analysis

Impact AIR-5: The proposed project is fundamentally consistent with the growth assumptions considered in the Bay Area Clean Air Plan. (Less than Significant)

Approach to Analysis

To be consistent with the current Bay Area Clean Air Plan, which is the 2005 Bay Area Ozone Strategy, the proposed project must not conflict with or obstruct the Plan’s implementation and should be consistent with its underlying growth assumptions. This assessment evaluates the proposed project and redevelopment of the NMCO in light of the Oakland General Plan and

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8 The Maximum Capacity Alternative was estimated to generate approximately 3,006 persons; the proposed project is estimated to generate approximately 2,926 persons (see *Population and Housing,* in the Initial Study provided in **Appendix A** to this SEIR).

9 The Maximum Capacity Alternative was estimated to generate approximately 2,618 peak hour vehicle trips; the proposed project is estimated to generate approximately 2,199 peak hour vehicle trips (see **Table IV.B-6**, Comparison of Trip Generation Estimates, in Section IV.B of this SEIR).

refers to the Mitigation Measure AIR-2, which include several transportation control measures from the Clean Air Plan.

Discussion of Proposed Project Impacts

The proposed project is consistent with the growth and redevelopment of the NMCO property, as designated by the 1998 Land Use and Transportation Element (LUTE) of the Oakland General Plan, as well as the Oak Knoll Redevelopment Plan land use map (1998), which is consistent with the LUTE. The 2005 Bay Area Ozone Strategy relies on ABAG *Projections 2003* forecasts, which would include redevelopment of the project site consistent with the 1998 LUTE and Redevelopment Plan. As such, the project's population growth and rate of traffic increase (generally, vehicle miles traveled) would not exceed values in 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 embodies. 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. (ABAG 2004)

The project would result in a less-than-significant impact because it is consistent with the growth and redevelopment assumed for the NMCO property, as designated by the 1998 Land Use and Transportation Element (LUTE) of the Oakland General Plan, as well as the Oak Knoll Redevelopment Plan land use map (1998). Further, the project would implement several measures consistent with the Clean Air Plan (through implementation of Mitigation Measure AIR-2).

Mitigation: None Required.

Comparison of Clean Air Plan Consistency Impacts - Project and 1998 EIS/EIR Maximum Capacity Alternative

The Oakland General Plan LUTE and the Oak Knoll Redevelopment Plan support redevelopment of the NMCO property with the level of growth that would occur with the Maximum Capacity Alternative in the 1998 EIS/EIR and in the growth assumptions assumed in the Clean Air Plan.

As discussed above, estimated population and traffic would be slightly less with the proposed project compared to the Maximum Capacity Alternative. The 1998 EIS/EIR concluded that Maximum Capacity Alternative would not conflict with the Clean Air Plan growth assumptions, and similarly, the proposed project would result in the same less-than-significant impact. No new impact not previously identified for the Maximum Capacity Alternative in the 1998 EIS/EIR is identified; no mitigation is required.

Comparison of Project Impacts with Pre-Base Closure Conditions – Clean Air Plan Consistency

Consideration of the pre-closure setting is not relevant to the consideration of Clean Air Plan consistency in that it would not affect the characteristics that contribute to the proposed project or the Maximum Capacity Alternative being consistent with the Clean Air Plan.

Cumulative Air Quality Impacts (Criteria Pollutants and Precursors)

The following discussion addresses the potential air quality effects under cumulative condition, pursuant to Criteria “j,” “k,” and “l.”

Comparison of the Proposed Project and the 1998 EIS/EIR Maximum Capacity Alternative, Relevant to Cumulative Air Quality Impacts (Criteria Pollutants and Precursors)

See discussion under *Operational Air Quality (Criteria Pollutants and Precursors)* regarding relevant characteristics of the proposed project and the Maximum Capacity Alternative (e.g., land uses and distributions that would affect the assessment of emission levels).

Changes in Circumstances and Information Since the 1998 EIS/EIR

See discussion under *Operational Air Quality (Criteria Pollutants and Precursors)* regarding relevant updates to emissions estimating models and methodologies available since preparation of the 1998 EIS/EIR, as well as changes in the default assumptions and the details of the proposed land uses in the proposed project when compared to 1998 EIS/EIR Maximum Capacity Alternative.

Summary of 1998 EIS/EIR Cumulative Air Quality (Criteria Pollutants and Precursors) Impacts

The 1998 EIS/EIR did not include a detailed quantitative analysis of the Maximum Capacity Alternative’s contribution to cumulative air quality impacts. However, the 1998 EIS/EIR analysis did indicate that a significant and unavoidable impact would result from regional air emissions of ozone precursor and PM-10 concentrations resulting from vehicle emissions associated with the project, combined with other foreseeable projects, including the then-proposed Leona Quarry development. As discussed under *Operational Air Quality (Criteria Pollutants and Precursors)*, the impact was considered significant and unavoidable; no mitigation measure was identified.

Proposed Project Impact Analysis

Impact AIR-6: The proposed project, together with anticipated future development in the area, would generate emissions of criteria pollutants and their precursors that would result in a cumulatively considerable net increase. (Potentially Significant)

Approach to Analysis

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. The analysis shown in **Tables IV.C-5 and IV.C-6** is referenced to make this determination.

Discussion of Proposed Project Impacts

ROG, NOx, and PM-10 emissions associated with operations of the proposed project , after implementation of mitigation measures, are estimated to exceed the BAAQMD's significance thresholds (see Impact AIR-2 and **Table IV.C-4**). Consistent with BAAQMD CEQA Guidelines, the project would result in a cumulatively considerable net increase of ROG, NOx, and PM-10 emissions, and the impact regarding cumulative regional air emissions would similarly be significant and unavoidable.

Although cumulative traffic volumes would increase by 2025, the increase would be partly offset by the reduction in emissions on a grams-per-mile basis. This is due to attrition of older, high polluting vehicles, improvements in the overall automobile fleet, and improved fuel mixtures (as a result of on-going state and federal emissions standards and programs for on-road motor vehicles). **Table IV.C-5** shows that, as a result, the cumulative effects of carbon monoxide concentrations at local intersections in 2025 would also continue to be less than significant as the worst-case carbon monoxide concentrations at the analyzed intersections would continue to be below the corresponding ambient standards (As shown in **Table IV.C-5**, the effects of the proposed project (and the Maximum Capacity Alternative) reflect worst-case conditions since the analysis does not consider implementation of mitigation measures identified in this SEIR (or 1998 EIS/EIR) that would improve p.m. peak hour (and all) conditions at intersections to better than LOS F.

New Mitigation Measure AIR-6: Same as New Mitigation Measure AIR-2

Significance after Implementation of Mitigation: Significant and Unavoidable (see discussion under New Mitigation Measure AIR-2.)

Comparison of Cumulative Air Quality (Criteria Pollutants and Precursors) Impacts - Project and 1998 EIS/EIR Maximum Capacity Alternative

Both the proposed project and the Maximum Capacity Alternative (using the same current methodology) would exceed the significance threshold for net increase in ROG, NOx, and PM-10 emissions at the project level, and therefore would also both be considered to have a cumulatively considerable air quality impact, pursuant to BAAQMD CEQA Guidelines. No new overall impact is identified for the proposed project that was not identified for the Maximum Capacity Alternative in the 1998 EIS/EIR; new mitigation measures are identified (New Mitigation Measure AIR-2), however the impact would continue to be significant and unavoidable after implementation of identified mitigation.

Comparison of Project Impacts with Pre-Base Closure Conditions - Cumulative Air Quality (Criteria Pollutants and Precursors)

The "Pre-Closure" conditions, which represent conditions when the NMCO was operational (see *Introduction to the Environmental Analysis* in Chapter IV), were not evaluated as part of any impact determination in this SEIR, but is presented herein for informational purposes. As discussed for the pre-closure assessment under *Cumulative Air Quality (Criteria Pollutants and Precursors) Impacts*, and shown in **Table IV.C-4**, if the effects of the proposed project and the Maximum Capacity Alternative are measured against the pre-closure condition, both would exceed the significance threshold for ROG emissions, but not for NOx or PM-10. Thus, the same overall significant and unavoidable cumulatively considerable impact would result, and the same mitigation measure (New Mitigation Measure AIR-2) would apply.

Discussion of GHG Emissions and Climate Change

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 (US EPA, 2000), in much the same way as glass in a greenhouse. While many studies show evidence of warming over the last century and predict future global warming, the 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.

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 CO_2 in the atmosphere since pre-industrial times are well-documented and understood.

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

- The atmospheric buildup of CO_2 and other greenhouse gases is largely the result of human activities such as the burning of fossil fuels.
- A warming trend of approximately 0.7 to 1.5°F occurred during the 20th century. Warming occurred in both the northern and southern hemispheres, and over the oceans.
- The major greenhouse gases emitted by human activities remain in the atmosphere for periods ranging from decades to centuries. It is therefore virtually certain that atmospheric concentrations of greenhouse gases will continue to rise over the next few decades.
- Increasing greenhouse gas concentrations tend to warm the planet."(US EPA, 2000)

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

- Improving understanding of natural climatic variations, changes in the sun's energy, land-use changes, the warming or cooling effects of pollutant aerosols, and the impacts of changing humidity and cloud cover.
- Determining the relative contribution to climate change of human activities and natural causes.
- Projecting future greenhouse emissions and how the climate system will respond within a narrow range.
- Improving understanding of the potential for rapid or abrupt climate change." (US EPA, 2000)

Greenhouse Gases (GHGs)

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

Potential Effects of Human Activity on GHG Emissions

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

The effect each GHG has on climate change is measured as a combination of the volume of its emissions, and its global warming potential (GWP)[11], and is expressed as a function of how much warming would be caused by the same mass of CO_2. Thus, GHG emissions are typically measured in terms of pounds or tons of CO_2 equivalents (CO_2e).

Global Emissions

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

U.S. Emissions

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

State of California Emissions

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

The California EPA Climate Action Team stated in its March 2006 report that the composition of gross climate change pollutant emissions in California in 2002 (expressed in terms of CO_2 equivalence) were as follows:

- Carbon dioxide (CO_2) accounted for 83.3 percent;
- Methane (CH_4) accounted for 6.4 percent;

11 The potential of a gas or aerosol to trap heat in the atmosphere.

- Nitrous oxide (N_2O) accounted for 6.8 percent; and
- Fluorinated gases (HFCs, PFC, and SF_6) accounted for 3.5 percent. (CalEPA, 2006b)

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

Bay Area Emissions

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

City of Oakland Emissions

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

TABLE IV.C-6

OAKLAND COMMUNITY-WIDE GHG EMISSIONS SUMMARY – 2005

Potential Source	Tons of Carbon Dioxide Equivalent (CO_2e)	Percent of Total
Transportation	1,138,767	47%
Commercial/Industrial	709,199	29%
Residential	580,710	24%
	2,248,667	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 2.5 million tons of CO_2e), and 19.5 percent (to 2.7 million tons CO_2e) by 2020, assuming continued GHG emissions at or above current rates into the future.

Construction and Development Emissions

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

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

Potential Effects of Human Activity on 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 could be taking place, including substantial ice loss in the Arctic. (IPCC, 2007)

However, the understanding of GHG emissions, particulate matter, and aerosols on global climate trends remains uncertain. In addition to uncertainties about the extent to which human activity rather than solar or volcanic activity is responsible for increasing warming, there is also evidence that some human activity has cooling, rather than warming, effects, as discussed in detail in numerous publications by the International Panel on Climate Change (IPCC), namely "Climate Change 2001, The Scientific Basis"(2001).[12]

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

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12 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.

alternative energy sources; legislative and public initiatives to curb emissions; and public awareness and acceptance of methods for reducing emissions), and the impact of such emissions on climate change, the IPCC devised a set of six "emission scenarios" which mix and match various assumptions about the rates of economic development, population growth, and technological advancement over the course of the next century.[13] (IPCC, 2000) These emission scenarios are paired with various climate sensitivity models to attempt to account for the range of uncertainties which affect climate change projections. The wide range of temperature, precipitation, and similar projections yielded by these scenarios and models reveal the magnitude of uncertainty presently limiting climate scientists' ability to project long-range climate change (as previously discussed).

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

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

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

Potential Effects of Human Activity on State of California Change

According to CARB, some of the potential impacts in California of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. (CARB 2006c, 2007c) Several recent studies have attempted to explore the possible negative consequences that climate change, left unchecked, could have in California. These reports acknowledge that climate scientists' understanding of the complex global climate system, and the interplay of the various internal and external factors that affect climate change, remains too limited to yield scientifically valid conclusions on such a localized scale. Substantial work has been done at the international and national level to evaluate climatic impacts, but far less information is available on regional and local impacts. In addition, projecting regional impacts of climate change and variability relies on large-scale scenarios of changing climate parameters, using information that is typically at too coarse a scale to make accurate regional assessments. (Kiparsky, 2003)

Below is a summary of some of the potential effects reported 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, and even less well understood. (US EPA, 2006) If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thus ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state. (CCCC, 2006)

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

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

2006)Water purveyors, 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 Setting for Greenhouse Gas Emissions and Climate Change*) that consider climatic variations and corresponding impacts on long-term water supplies. (California Water Code, Section 10631(c)). DWR has published a 2005 SWP Delivery Reliability Report, which presents information from computer simulations of the SWP operations based on historical data over a 73-year period (1922–1994). The DWR has confirmed that the results of those model studies "represent the best available assessment of the delivery capability of the SWP." In addition, the DWR is continuing to update its studies and analysis of water supplies. 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 SEIR for discussion of the WSA and verifications for the proposed project.)

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

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

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

Regulatory Context for GHG Emissions and Climate Change

International and Federal

Kyoto Protocol

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

Climate Change Technology Program

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

U.S. Environmental Protection Agency (US EPA)

To date, the US EPA has not regulated GHGs under the Clean Air Act (discussed above) based on its assertion in *Massachusetts et. al. v. EPA et. al* (U.S. Supreme Court, 2007) 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 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.

State of California

Assembly Bill (AB) 1493

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

Executive Order (EO) S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order (EO) S-3-05, establishing statewide GHG emissions reduction targets. This EO provides that by 2010, emissions shall be reduced to 2000 levels; by 2020, emissions shall be reduced to 1990 levels; and by 2050, emissions shall be reduced to 80 percent of 1990 levels. The Secretary of the California Environmental Protection Agency (CalEPA) is charged with coordinating oversight of efforts to meet these targets and formed the Climate Action Team (CAT) to carry out the EO. Several of the programs developed by the CAT to meet the emission targets are relevant to residential construction and are outlined in a March 2006 report.(CalEPA 2006a) These include 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 required to adopt rules and regulations, which shall become operative January 1, 2012) to achieve the maximum technologically feasible and cost-effective GHG emission reductions.

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

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

California Senate Bill 1368 (SB 1368)

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

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, (Brekke, 2004)

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

City of Oakland General Plan

Land Use and Transportation Element (LUTE)

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

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

- Transit-oriented developments should be pedestrian oriented, encourage 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 CO_2; 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 CO_2 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) (US EPA, 2006a).

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 (US EPA, 2006b). Also, wildfire results in the loss of vegetation; carbon is stored in vegetation, and when the vegetation burns, the carbon returns to the atmosphere (NASA, 2004). 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.

- 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 (City of Oakland, 2007):

- <u>Chicago Climate Exchange</u> - 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 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.

Significance Thresholds for GHG Emissions and Climate Change

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

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

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

- Uncertainties exist regarding the effect of human activities on climate change, and the potential human activities that may reverse global warming trends.
- Lack of guidance for analysis of climate change issues in CEQA documents.
- Lack of methodology for evaluating GHGs, specifically determining the incremental increase in GHG emissions for an individual project, the impacts of a particular development project on global climate change, and the significance of any such impacts under CEQA.
- Lack of methodology for determining whether GHG emissions from an individual project are significant;[14]
- Lack of scientific basis to accurately project future climate trends, much less the likely adverse environmental impacts resulting from those trends in any specific location. (Australian Govt., 2007)

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

For all of the reasons summarized above (and discussed in detail under *Regulatory Setting for GHG Emissions and Climate Change* in this section), and pursuant to Section 15145 of the CEQA Guidelines, until such time as a 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[15] 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

14 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 immeasurable.

15 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.

SEIR does 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 SEIR 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 on the proposed project are not discussed in this SEIR.

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. (UNEP, 2007) As of yet, there is no study that quantitatively assesses all of the GHG emissions associated with each phase of the construction and use of an individual residential development.

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

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

- Construction Activities – Construction equipment typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates 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. (CEC, 2004)

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

While the proposed project and all developments of similar land 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.

Estimated GHG Emission from the Proposed Project

Although it is possible to generally estimate a project's contribution of CO_2 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 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.

TABLE IV.C-7
ESTIMATED EMISSIONS OF GREENHOUSE GASES FROM PROPOSED PROJECT AND CITYWIDE

Emission Source	Emissions (pounds CO_2e per day)			
	CO_2	CH_4	N_2O	Total CO_2e
Motor vehicle trips	91,292	292	5733	97,317
Space and water heating	14,667	684	106	15,456
Landscape maintenance	60	<1	4	64
Solid waste generation	-	4,586	-	4,586
Total Operational GHG Emissions from Project [a]	106,019	5,562	5,843	**117,424**
Total Citywide 2005 GHG Emissions				*12.3 million*
Proposed Project Percent of Total Citywide Emissions				*0.9546 %*

[a] Total reflects a gross estimate that does not account for changes to vehicle miles traveled and existing household emissions generated by new project occupants who currently generate emissions elsewhere in Oakland, the Bay Area region, or beyond.

SOURCE: ESA, 2007

In light of the considerations outlined above, **Table IV.C-7** presents a gross estimate of the proposed project's total GHG emissions and its comparison to the City's baseline GHG levels (approximately 2.2 million tons of CO_2e in 2005, or 12.3 million pounds per day). GHG emissions would result from increases in motor vehicle trips resulting from the proposed project, as well as from natural gas combustion and solid waste generation by future occupants of proposed residences**.**

While the project emissions shown in **Table IV.C-7** are considered high and are a very general estimate, the estimate is sufficient to evaluate the project's potential contribution toward GHG emissions and provides an indication of the order of magnitude of potential project emissions compared to estimated citywide emissions. GHG emissions from the proposed project could vary substantially 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 CO_2 emissions from vehicle trips associated with the project is likely much greater than what would actually occur. Although the future CO_2 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 Oak Knoll residents 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. Because URBEMIS2007 only estimates $CO_{2,}$ scaling factors derived from the State of California Inventory of GHG Emissions were used to determine the relative emissions of methane (CH_4) and nitrous oxide (N_20) in order to generate emissions of GHG as carbon dioxide equivalents (CO_2e).

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

Project Design Features

While no significant impacts have been identified, and no mitigation is required, project characteristics 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.

- 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 proposed project incorporates and supports sustainable development goals including the renovation and reuse of Club Knoll (avoiding the demolition and disposal of existing resources or energy to obtain and prepare raw resources for replacement structure); development of a "village" plan that "combines housing, open space, recreation, civic and retail uses into a balanced and walkable community" (Calthorpe Associates, 2006); and development of pedestrian and bicycle facilities throughout the proposed development areas. The integration of varied uses and services onsite and nearby (e.g. bank, church, supermarket, restaurant, laundry, hair care, etc.) with a diversity of housing types proposed would reduce automobile use within the compact, pedestrian and bicycle-friendly community with access to transit (AC Transit service available along Mountain Boulevard adjacent to the project site, and Golf Links Road nearby).

- 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 (Title 24) and the requirements of pertinent City policies as identified in the City of Oakland General Plan, helping to reduce future energy demand as well as reduce the project's contribution to regional GHG emissions. The project would also consider use of reduced-emission or zero-emission energy alternatives and reducing energy demand through conservation or improved energy efficiencies, to the greatest extent feasible.

- 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 described in the Project Description (Chapter III), the project will conduct construction-related concrete and asphalt recycling on site during the demolition phases of construction. As a result, construction-related truck traffic, which primarily have diesel fueled engines, would be reduced since demolition debris hauled off site would be reused on site. In addition, reuse of concrete and asphalt debris reduces the amount of material introduced to area landfills.

- Enhanced Natural Resources - The project proposes to daylight and restore Rifle Range Creek, and to some extent its tributaries (subject to review and approvals from several permitting agencies), which will enhance water quality, stormwater flow, and native vegetative habitats. Also, the project would establish approximately 50 acres (approximately 30 percent) of the total site as open space and would involve vegetation management to reduce risk of wildfire. Through its adherence to regulatory requirements incorporated in mitigation measures identified in this SEIR, the project would implement post-construction stormwater pollution management, treatment, design, and source control measures to reduce the rate and volume of stormwater flows and stormwater pollution after the construction of the project.

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 characteristics and design features that the project proposes. In addition, emissions would also be reduced since the project is subject to all the regulatory requirements and mitigation measures in this SEIR that would reduce GHG emissions of the project. These include mitigation measures to address adherence to best management construction practices and equipment use (Mitigation Measure AIR-1a through AIR-1c), to reduce daily emission levels from the project by facilitating use of alternative transportation modes (Mitigation Measure AIR-2), 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 (Mitigation Measure HYD-1 through HYD-11, identified in *Hydrology and Water Quality* in the Initial Study, which is included as **Appendix A** to this SEIR). Overall, the project entails or will implement 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.

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