3.13 CLIMATE CHANGE

Introduction

This section addresses the effects of the proposed project on global greenhouse gas emissions and the potential for these emissions to contribute to global climate change. There is international scientific consensus that anthropogenic emissions of greenhouse gases[1] have and will continue to contribute to changes in the global climate. Although there is uncertainty concerning the magnitude, rate, and ultimate effects of this change, it is generally accepted that climate change will result in a number of substantial adverse environmental impacts.

Climate change is a cumulative effect of all natural and anthropogenic sources of greenhouse gases on a global scale. The greenhouse gas emissions from an individual project, even a very large development project, would not individually generate sufficient greenhouse gas emissions to measurably influence global climate change.[2] Consideration of a project's climate change impact, therefore, is essentially an analysis of a project's contribution to a cumulatively significant global impact through its emission of greenhouse gases. While it is possible to examine the quantity of greenhouse gases that would be emitted from project sources, it is not currently possible to link particular changes to the environment of California to greenhouse gases emitted from a particular source or location.

Although environmental impacts associated with climate change cannot be directly linked to individual development projects, the State of California recognizes the link between development activities and greenhouse gas emissions and is in the process of developing standards for assessment and, ultimately, regulation of the greenhouse gas emissions associated with land use. The State of California, through Assembly Bill (AB) 32 and Executive Order S-3-05, has set statewide targets for the reduction of greenhouse gas emissions. The goal of AB 32 and S-3-05 is to reduce future California greenhouse gas emissions in a state that is expected to experience rapid growth in population and economic output. While CEQA focuses on emissions associated with new development, other regulatory means will need to be implemented to address reductions in existing emissions.

Greenhouse gases would be emitted as the result of project construction activities, direct and indirect operational sources, and mobile emissions associated with the trips generated by the proposed project. Emissions from sources such as construction equipment, vehicles, energy consumption, and solid waste generation are inventoried and discussed quantitatively and qualitatively. Emissions associated with the water supply and wastewater treatment are also discussed, although these sources could not be

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1 For the purposes of this analysis, the term "greenhouse gases" refers to CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6, those gases regulated under California Assembly Bill 32 and the Kyoto Protocol of the United Nations Framework Convention on Climate Change.

2 Association of Environmental Professionals (AEP). 2007. Alternative Approaches to Analyzing Greenhouse Gas Emissions and Global Climate Change in CEQA Documents. Accessed at: www.califaep.org/userdocuments/File/AEP_Global_Climate_Change_June_29_Final.pdf; and OPR, 2008. Technical Advisory, CEQA and Climate Change: Addressing Climate Change Through CEQA Review, p. 6.

quantified due to data limitations. All emissions inventories are presented in metric tons unless otherwise indicated.

This analysis was prepared based upon a literature review that included advice for preparing CEQA climate change analyses released by the California Office of Planning and Research (OPR)[3] and OPR's Draft CEQA Guideline Amendments for Greenhouse Gas Emissions,[4] as well as approaches prepared by a number of professional associations and agencies that have published suggested approaches and strategies for complying with CEQA's environmental disclosure requirements. Such organizations include the California Attorney General's Office (AGO), the California Air Resources Board (CARB), the California Air Pollution Control Officers Association (CAPCOA), the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), and the Association of Environmental Professionals (AEP).

Sources used for this section include energy forecasts and consumption reports produced by the California Energy Commission (CEC); energy consumption data provided by the proposed project and proposed project sponsors; data from the 2007 URBEMIS air quality modeling software; the Menlo Gateway Traffic Impact Analysis (see Appendix G); and information from the CARB and the California Climate Action Team (CAT).

No comments pertaining to climate change were identified in the scoping meetings held for the proposed project or were received in response to the Notice of Preparation (see Appendix C).

Setting

Overview of Climate Change

Global climate change refers to changes in the normal[5] weather of the earth measured by alterations in wind patterns, storms, precipitation, and temperature relative to historical averages. Such changes vary considerably by geographic location. Over time, the earth's climate has undergone periodic ice ages and warming periods, as observed in fossil isotopes, ice core samples, and through other measurement techniques. Recent climate change studies use the historical record to predict future climate variations and the level of fluctuation that might be considered statistically normal given historical trends.

Temperature records from the Industrial Age (ranging from the late 18th century to the present) deviate from normal predictions in both rate and magnitude. Most modern climatologists predict an unprecedented warming period during the next century and beyond, a trend that is increasingly attributed to human-generated greenhouse gas emissions resulting from the industrial processes, transportation, solid waste generation, and land use patterns of the twentieth and twenty-first centuries.

[3] OPR, 2008. Technical Advisory, CEQA and Climate Change: Addressing Climate Change through CEQA Review.

[4] OPR, 2009. Preliminary Draft CEQA Guideline Amendments for Greenhouse Gas Emissions.

[5] "Normal" weather patterns include statistically normal variations within a specified range.

According to the IPCC, greenhouse gas emissions associated with human activities have grown since pre-industrial times, increasing by 70 percent between 1970 and 2004.[6] Increased greenhouse gas emissions are largely the result of increasing fuel consumption, particularly the incineration of fossil fuels.

The IPCC modeled several possible emissions trajectories to determine what level of reductions would be needed worldwide to stabilize global temperatures and minimize climate change impacts. Regardless of the analytic methodology used, global average temperature and sea level were predicted to rise under all scenarios.[7] In other words, there is evidence that emissions reductions can minimize climate change effects but cannot reverse them entirely. On the other hand, emissions reductions can reduce the severity of impacts, resulting in lesser environmental impacts. For example, the IPCC predicted that the range of global mean temperature change from year 1990 to 2100, given different emissions reduction scenarios, could range from 1.1°C to 6.4°C.

Greenhouse Gases

Gases that trap heat in the atmosphere are called greenhouse gases because they transform the light of the sun into heat, similar to the glass walls of a greenhouse. Common greenhouse gases include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), ozone, and aerosols. Without the natural heat trapping effect of greenhouse gas, the earth's surface would be about 34°C cooler.[8] However, it is believed that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. Global atmospheric concentrations of CO_2, CH_4, and N_2O have increased markedly since the late 18th century as a result of human activities and now far exceed pre-industrial values.

Climate change results from radiative forcings and feedbacks. Radiative forcing is defined as the difference between the radiation energy entering the earth's atmosphere and the radiation energy leaving the atmosphere. Greenhouse gases allow solar radiation to penetrate the earth's atmosphere but slow the release of atmospheric heat. A feedback is an internal process that amplifies or dampens the climate's response to a specific forcing. For example, the heat trapped by the atmosphere may cause temperatures to rise or may alter wind and weather patterns. A gas or aerosol's global warming potential is defined as its ability to trap heat in the atmosphere; it is the "cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas".[9]

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6 IPCC, 2007. R.B. Alley et al. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers.

7 Ibid.

8 CARB, 2006. CARB Proposed Early Actions to Mitigate Climate Change in California.

9 U.S. Environmental Protection Agency (EPA). 2006. The U.S. Greenhouse Gas Emissions and Sinks: Fast Facts. Office of Atmospheric Programs.

Individual greenhouse gases have varying global warming potentials and atmospheric lifetimes (see Table 3.13-1). The carbon dioxide equivalent (CO_2e) is a consistent methodology for comparing greenhouse gas emissions since it normalizes various greenhouse gas emissions to a consistent metric. The reference gas for global warming potential is CO_2; CO_2 has a global warming potential of one. By comparison, CH_4's global warming potential is 21, as CH_4 has a greater global warming effect than CO_2 on a molecule to molecule basis.[10] One teragram ([Tg] equal to one million metric tons) of CO_2e is the mass of a project's emissions of an individual greenhouse gas multiplied by the gas's global warming potential.

Table 3.13-1
Global Warming Potentials and Atmospheric Lifetimes of Select Greenhouse Gases

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide (CO_2)	50–200	1
Methane (CH_4)	12 ±3	21
Nitrous Oxide (N_2O)	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF_4)	50,000	6,500
PFC: Hexafluoroethane (C_2F_6)	10,000	9,200
Sulfur Hexafluoride (SF_6)	3,200	23,900

Source: CCAR, 2009.

Of all greenhouse gases in the atmosphere, water vapor is the most abundant, important, and variable. It is not considered a pollutant; in the atmosphere, it maintains a climate necessary for life. The main source of water vapor is evaporation from the oceans (approximately 85 percent). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from ice and snow, and transpiration from plant leaves.

Carbon dioxide (CO_2) is an odorless, colorless gas, which has both natural and anthropogenic sources. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of CO_2 are from burning coal, oil, natural gas, and wood. Concentrations of CO_2 were 379 parts per million (ppm) in 2005, which equates to an increase of 1.4 ppm per year since 1960.[11] CO_2 is the most common greenhouse gas generated by California activities, constituting approximately 84 percent of all

[10] EPA, 2006. Non CO_2 Gases Economic Analysis and Inventory. Global Warming Potentials and Atmospheric Lifetimes. Accessed at: www.epa.gov/nonco2/econ-inv/table.html.

[11] IPCC, 2007. R.B. Alley et al. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers.

greenhouse gas emissions.[12] CO_2 emissions attributed to California activities are mainly associated with in-state fossil fuel combustion and fossil fuel combustion in out-of-state power plants supplying electricity to California. Other activities that produce CO_2 emissions include mineral production, waste combustion and reductions in vegetation**.**

Methane (CH_4) is a flammable gas and is the main component of natural gas. When one molecule of CH_4 is burned in the presence of oxygen, one molecule of CO_2 and two molecules of water are released. A natural source of CH_4 is from the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain CH_4, which is extracted for fuel. Other sources are landfills, fermentation of manure, and cattle by-products.

Nitrous oxide (N_2O), also known as laughing gas, is produced naturally by microbial processes in soil and water. Anthropogenic sources of N_2O include agricultural sources, industrial processing, fossil fuel-fired power plants, and vehicle emissions. N_2O also is used as an aerosol spray propellant and in medical applications.

Other gases that contribute to the greenhouse effect include ozone,[13] CFCs, HFCs, PFCs, SF_6, and aerosols. Generally, this analysis focuses on the major sources of greenhouse gases, including CO_2, N_2O, and CH_4, because these are the gases currently regulated in the State of California.

Greenhouse Gas Emissions Inventories

A greenhouse gas inventory is an accounting of the amount of greenhouse gases emitted to or removed from the atmosphere over a specified period of time attributed to activities by a particular entity (e.g., annual emissions and reductions attributed to the State of California). A greenhouse gas inventory also provides information on the activities that cause emissions and removals, as well as the methods used to make the calculations. This section summarizes the latest information on global, state, regional, and local greenhouse gas emissions.

Worldwide and United States Inventories. In 2004, total worldwide greenhouse gas emissions were estimated to be 49,000 Tg CO_2e.[14] In 2006, greenhouse gas emissions in the U.S. were 7,054 Tg CO_2e, a 14.7 percent increase over 1990 emissions.[15]

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[12] CEC, 2007. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004.

[13] Ozone is a greenhouse gas; however, unlike other greenhouse gases, ozone in the troposphere is relatively short-lived. It is difficult to make an accurate determination of the contribution of ozone precursors (nitrogen oxides and volatile organic compounds) to global climate change. California Environmental Protection Agency, 2004. Technical Support Document for Staff Proposal Regarding Reduction of Greenhouse Gas Emissions from Motor Vehicles Climate Change Overview.

[14] Intergovernmental Panel on Climate Change, 2007. R.B. Alley et al. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers.

[15] EPA, 2008. The U.S. Greenhouse Gas Emissions and Sinks: Fast Facts. Office of Atmospheric Programs.

California Inventory. California is the second largest contributor of greenhouse gas emissions in the U.S. and the sixteenth largest in the world.[16] In 2004, California produced 479.7 Tg CO_2e,[17] which is approximately six percent of 2004 U.S. emissions and 0.9 percent of global emissions. In California, the most common greenhouse gas is CO_2 from fossil fuel combustion, which constitutes approximately 81 percent of all greenhouse gas emissions.[18] The remainder of greenhouse gases only makes up a small percentage of the total: N_2O constitutes 6.8 percent, CH_4 6.4 percent, high GWP gases 3.5 percent, and non-fossil fuel CO_2 emissions constitute 2.3 percent.[19] CO_2 emissions in California are mainly associated with fossil fuel consumption in the transportation sector (41.2 percent) with the industrial sector as the second-largest source (22.8 percent).[20] Electricity production, from both in-state and out-of-state sources, agriculture, forestry, commercial, and residential activities comprise the balance of California's greenhouse gas emissions.

As part of the California Global Warming Solutions Act of 2006 (AB 32), discussed below, the CARB is required to establish a statewide greenhouse gas emissions limit for 2020 equivalent to 1990 emissions. In addition, Executive Order S-3-05 sets the following statewide emissions targets: a reduction of greenhouse gas emissions to 2000 levels by 2010, a reduction of greenhouse gas emissions to 1990 levels by 2020, and a reduction of greenhouse gas emissions to 80 percent below 1990 levels by 2050. CARB estimates that California's annual emissions were equivalent to 427 Tg CO_2e in 1990 and 452 Tg CO_2e in 2000.[21]

Table 3.13-2 quantifies California statewide emissions targets (AB 32 and Executive Order S-3-05 targets) by year based on the CEC's 2007 Inventory of Greenhouse Gases and Sinks.

Bay Area Emissions. The Bay Area Air Quality Management District (BAAQMD) prepared an inventory of greenhouse gases emissions in the Bay Area in November 2006.[22] Total greenhouse gases emissions within the San Francisco Bay Air Basin in 2002 were estimated as 94.2 million metric tons of CO_2e.

City of Menlo Park Inventory. The City of Menlo Park Climate Action Plan, adopted in 2009, states that approximately 493,237 metric tons of CO_2e were emitted by the City in 2005. According to this estimate, 99 percent of this total constitutes "community" emissions, emissions attributed to vehicles on Menlo Park's roads and highways (45.8 percent), commercial and industrial buildings (30.1 percent), residences (11.4 percent), and the closed Marsh Road Landfill (8.5 percent). The remaining emissions are municipal emissions, emissions generated by City buildings and vehicles, and waste, streetlights, and electricity for pumping water and stormwater.

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16 CEC, 2007. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004.

17 Ibid.

18 Ibid.

19 Ibid.

20 Ibid.

21 CARB, 2007. Greenhouse Gas Emissions Inventory Database [1990 - 2004]. Accessed August 5, 2008 at: www.arb.ca.gov/app/ghg/ghg_sector_data.php.

22 BAAQMD, 2006. Source Inventory of Bay Area Greenhouse Gas Emissions: Base Year 2002.

Table 3.13-2
California Greenhouse Gas Reductions Targets

Year[1]	Estimated California Population	Reduction Goal	Greenhouse Gas Target (Tg CO_2e)[2]
1990	29,828,000	N/A	427.0
2000	34,105,437	N/A	452.3
2010	39,135,676	greenhouse gases emissions at or below 2000 levels[3]	452.3
2020	44,135,923	greenhouse gases emissions at or below 1990 levels	427.0
2050	59,507,876	greenhouse gases emissions 80% below 1990 levels[4]	85.4

Source: Population data are from California Department of Finance, 2007; greenhouse gas targets are derived from CARB, 2007. Greenhouse Gas Emissions Inventory Summary [1990 - 2004].

Notes:

1. Target years specified in Executive Order S-3-05 and/or AB 32. 1990 and 2000 data are provided as a baseline.
2. Calculated by dividing the statewide greenhouse gas target by the projected population for each target year. 1 teragram (Tg) = 1 million metric tons = 1.1023 million short tons CO_2e.
3. Based on 2004 estimate.
4. Calculated by multiplying 427.0 x 20 percent, which equals 80 percent below 1990 emissions.

Gasoline use accounts for 41.6 percent of the total emissions, electricity use accounts for 21.2 percent, and natural gas accounts for 20.7 percent. The remaining emissions are from a number of combustion sources, including CH_4, diesel, paper products, food waste, wood/textiles, and plant debris.

The City's 2005 Community Emissions Inventory includes a forecast for 2020. This forecast assumes that community emissions will increase by 107,227 metric tons CO_2e by 2020, for a total of 600,464 metric tons CO_2e. The majority of the increase would be in the transportation and commercial sectors, for a total of 62,596 metric tons CO_2e and 38,618 metric tons CO_2e, respectively. Direct access and emissions from the Marsh Road Landfill are expected to decrease.

Project Area Inventory. The project area currently supports office and research and development (R&D) uses, although a small portion of the project area is undeveloped. Existing development on the Independence site includes one-and two-story structures housing approximately 85,000 square feet (s.f.) of office/R&D uses. Existing development on the Constitution site includes one- and two-story buildings which contain approximately 134,000 s.f. of office/R&D uses.

An inventory of the greenhouse gas emissions generated by existing uses is provided in Table 3.13-3, below. To estimate total existing emissions, the emissions of the individual gases were estimated based on energy consumption data, then converted to their CO_2e using the individually determined global warming potential of each gas. Thus, total greenhouse gas emissions equals total CO_2 emissions plus total CO_2e emissions from CH_4 and N_2O. The inventory includes the following emissions:

- *Direct Emissions.*[23] Direct, existing emissions sources include on-site natural gas consumption (generally used for space and water heating and food preparation) and

[23] Also known as "areawide" emissions.

emissions from landscaping equipment. These emissions were estimated using CARB's URBEMIS 2007 model.

- *Indirect Emissions*. The generation of electricity through the combustion of fossil fuels typically yields CO_2 and, to a much smaller extent, CH_4 and N_2O. By consuming electricity, existing facilities generated indirect greenhouse gas emissions. Existing electricity usage, which was used to estimate greenhouse gas emissions from existing facilities, is based upon average statewide energy consumption factors, by use, from the CEC *Commercial End-Use Study*.[24]

- *Vehicular Emissions.* Employee and visitor vehicle trips associated with existing land uses represent the largest portion of the existing emissions inventory. Existing trips and corresponding greenhouse gas emissions were estimated using the default trip length and trip generation factors for San Mateo County in the URBEMIS 2007 model.

- *Fugitive Solid Waste Emissions.* According to the EPA's emissions reporting protocol, emissions of CO_2 from solid waste interment are considered to be biogenic greenhouse gases and part of the carbon cycle, and as such, are typically not included in greenhouse gas emission inventories.[25] Nevertheless, fugitive CH_4 emissions associated with solid waste management have been estimated for use in this EIR based on the EPA State Workbook method.[26]

- *Emissions Associated with Water Supply.* Greenhouse gas emissions are also generated by the infrastructure used to distribute and treat the domestic water supply and by infrastructure used to collect and treat wastewater. By consuming water and generating wastewater, development in the project area contributes to these emissions. Emissions associated with the water supply were estimated based on per gallon electricity consumption rates reported in the CEC report *Refining Estimates of Water Related Energy Use in California*. The CCAR greenhouse gas emissions factors for electricity were applied to this total.

It is believed that the above sources represent the vast majority of the greenhouse gas emissions associated with existing development within the project area. Existing facilities may emit a small amount of HFC emissions from leakage and service of refrigeration and air conditioning equipment and from disposal at the end of the life of the equipment;[27] however, the contributions of these emissions to the total inventory are likely quite small. PFCs and SF_6 are typically used in industrial activities that are not conducted at the project area. Ozone has characteristics of a greenhouse gas; however, unlike regulated greenhouse gases, ozone in the troposphere is relatively short-lived, and therefore, has

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[24] CEC, 2006. California Commercial End-Use Survey.

[25] EPA, 1995. AP 42, Fifth Edition: Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources.

[26] EPA, 1998. State Workbook: Methodologies for Estimating Greenhouse Gas Emissions, pp. 5-1 to 5-3.

[27] Godwin, David S., Marian Martin Van Pelt and Katrin Peterson, no date. Modeling Emissions of High Global Warming Potential Gases. Environmental Protection Agency.

localized rather than global effects. According to CARB, it is difficult to make an accurate determination of the contribution of ozone precursors (NO_X and ROGs) to global warming.[28] Facilities in the project area do not emit CFCs, another gas with greenhouse gas characteristics, because CFCs are banned under federal regulations. Therefore, the inventory presented in Table 3.13-3, represents a good-faith estimate of all emissions directly and indirectly associated with current on-site operations.

The total greenhouse gas emissions currently generated by existing development in the project area on an annual basis is 4,783 metric tons of CO_2e.

Table 3.13-3
Existing Annual Operational Greenhouse Gas Emissions Within the Project Area

Source of Emissions	Emissions (metric tons CO_2e) Total
Direct	290
Indirect	936
Vehicular	3,159
Solid Waste	375
Water and Wastewater	23
Total	**4,783**

Source: PBS&J, 2009.

Predicted Effects of Climate Change

Although the adverse effects of climate change will have global consequences, in most cases they would not be expected to disproportionately affect any one site or activity. In other words, many of the effects of climate change are not site-specific. Emission of greenhouse gases would contribute to the changes in the global climate, which would, in turn, have a number of physical and environmental effects. A number of general effects, some of which may not occur in the project area, are discussed below.

Sea Level Rise and Flooding. Because the project area is at a low elevation (about 5 feet above mean sea level) and in close proximity to the San Francisco Bay, natural and climate change-accelerated sea level rise could result in increased flood risks within the next 50 to 100 years. Additionally, alterations in the flow regime, and subsequent flood potential, could also occur from effects of climate change on local and regional precipitation patterns. These issues are addressed in Section 3.5, Hydrology and Water Quality, under Impact Criterion #8.

[28] CARB, 2004. Fact Sheet, Climate Change Emission Control Regulations.

In the future, precipitation events are predicted to vary in terms of timing, intensity and volume according to many climate change models.[29] Extreme storm events may occur with greater frequency.[30] The effect on peak runoff is not known because most climate change models have not used a temporal (or spatial) scale necessary to identify effects on peak flows, and existing precipitation/runoff models for assessing the effects of climate change do not yet adequately predict rainfall/runoff scenarios.[31] Changes in rainfall and runoff could affect flows in surface water bodies, causing increased flooding and runoff to the storm drain system. Refer to Section 3.5, Hydrology and Water Quality.

Water Supply. California Health and Safety Code Section 38501(a) recognizes that "[climate change] poses a serious threat to the economic well-being, public health, natural resources, and the environment of California," and notes, "the potential adverse impacts of [climate change] include…reduction in the quality and supply of water to the state from the Sierra snowpack." As most of the state, including the San Francisco Peninsula, depends on surface water supplies originating in the Sierra Nevada, this water supply reduction is a concern. The San Francisco Public Utilities Commission (SFPUC), the water wholesaler that supplies the Menlo Park Municipal Water District, recognizes that climate change may cause increased uncertainty concerning the Sierra snowpack, and a higher chance of water shortages in the Bay Area. SFPUC's initial steps to address climate change include "engaging national climate change experts to study the potential effects of reduced snowpack, rising seas and hotter temperatures on the SFPUC's water supplies, wastewater collection and energy generation."[32]

Most of the scientific models addressing climate change show that the primary effect on California's climate would be a reduced snow pack and a shift in stream-flow seasonality. A higher percentage of the winter precipitation in the mountains would likely fall as rain rather than as snow in some locations, reducing the overall snowpack. Further, as temperatures rise, snowmelt is expected to occur earlier in the year resulting in peak runoff that would likely come a month or so earlier. The end result of this would be that the state may not have sufficient surface storage to capture the resulting early runoff, and so, absent construction of additional water storage projects, a portion of the current supplies would be lost to the oceans, rather than be available for use in the state's water delivery systems.

The SFPUC predicts a decrease in snowpack volume from the current 87 percent of historic averages to 83 percent in 2025 and 76 percent in 2050.[33] Changing climatic conditions could also shift the

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[29] EPA, 2008. Climate Change Science: Precipitation and Storm Changes. Accessed January 16, 2009 at: www.epa.gov/climatechange/science/recentpsc.html.

[30] Ibid.

[31] Anderson. M. 2006. Chapter 6: Climate Change Impacts on Flood Management p. 6-22 and 6-27. In Medelin, J., J. Harou, M. Olivares, J. Lund, R. Howitt, S. Tanaka, M. Jenkins, K. Madani, and T. Zhu (Eds), Climate Warming and Water Supply Management In California: White Paper. A Report From Climate Change Center CEC-500-2005-195-SF.

[32] San Francisco Public Utilities Commission. http://sfwater.org/detail.cfm/MC_ID/18/MSC_ID/114/MTO_ID/342/C_ID/3124/Keyword/climate%20change, accessed July 2007.

[33] San Francisco Public Utilities Commission, 2008. Modeling, Coalition Building, and Adaptation Response: San Francisco's Approach to Climate Change. Presentation made by Michael Carlin, Assistant General Manager, Water Enterprise, April 10, 2008.

timing of snowmelt, so that peak runoff would occur earlier in the spring. This shift could affect the availability of the seasonal water supply, particularly during the hot summer months. However, the SFPUC states that the effect of climate change in 2025 would likely be within range of current annual variation (with a slight shift in runoff timing).[34]

Water Quality.[35] Climate change could have adverse effects on water quality, which would, in turn, affect the beneficial uses (habitat, water supply, etc.) of surface water bodies and groundwater. The changes in precipitation discussed above could result in increased sedimentation, higher concentration of pollutants, higher dissolved oxygen levels, increased temperatures, and an increase in the amount of runoff constituents reaching surface water bodies. Sea level rise, discussed above, could result in the encroachment of saline water into freshwater bodies.

Ecosystems and Biodiversity.[36] Climate change is expected to have effects on diverse types of ecosystems, from alpine to deep sea habitat. As temperatures and precipitation change, seasonal shifts in vegetation will occur; this could affect the distribution of associated flora and fauna species. As the range of species shifts, habitat fragmentation could occur, with acute impacts on the distribution of certain sensitive species. The IPCC states that "20 percent to 30 percent of species assessed may be at risk of extinction from climate change impacts within this century if global mean temperatures exceed 2 to 3°C (3.6 to 5.4°F) relative to pre-industrial levels."[37] Shifts in existing biomes could also make ecosystems vulnerable to invasive species encroachment. Wildfires, which are an important control mechanism in many ecosystems, may become more severe and more frequent, making it difficult for native plant species to repeatedly re-germinate. In general terms, climate change is expected to put a number of stressors on ecosystems, with potentially catastrophic effects on biodiversity.

Human Health Impacts.[38] Climate change may also increase the risk of vector-borne infectious diseases, particularly those found in tropical areas and spread by insects—malaria, dengue fever, yellow fever, and encephalitis. Cholera, which is associated with algal blooms, could also increase. While these health impacts would largely affect tropical areas in other parts of the world, effects would also be felt in California. Warming of the atmosphere would be expected to increase smog and particulate pollution, which could adversely affect individuals with heart and respiratory problems, such as asthma. Extreme heat events would also be expected to occur with more frequency, and could

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34 Ibid.

35 IPCC, 2007: Climate Change 2007: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change [Parry, Martin L., Canziani, Osvaldo F., Palutikof, Jean P., van der Linden, Paul J., and Hanson, Clair E. (eds.)]. Cambridge University Press, Cambridge, United Kingdom, 1000 pp.

36 EPA, 2008. Climate Change – Ecosystems and Biodiversity. Accessed January 3, 2009 at: www.epa.gov/climatechange/effects/eco.html

37 IPCC, 2007: Climate Change 2007: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change [Parry, Martin L., Canziani, Osvaldo F., Palutikof, Jean P., van der Linden, Paul J., and Hanson, Clair E. (eds.)]. Cambridge University Press, Cambridge, United Kingdom, 1000 pp.

38 EPA, 2008. Climate Change – Health and Environmental Effects. Accessed January 3, 2009 at: www.epa.gov/climatechange/effects/health.html#climate

adversely affect the elderly, children, and the homeless. Finally, the water supply impacts and seasonal temperature variations expected as a result of climate change could affect the viability of existing agricultural operations, making the food supply more vulnerable.

Regulatory Setting

Executive Order S-3-05. On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05, setting statewide targets for the reduction of California's greenhouse gas emissions. The Executive Order S-3-05 states that greenhouse gases should be reduced to:

- 2000 levels by the year 2010,
- 1990 levels by the year 2020, and
- 80 percent below 1990 levels by the year 2050.

The text of Executive Order S-3-05 does not explain how the targets should be applied to individual development projects.

Executive Order S-3-05 also established the CAT for state agencies. After numerous public meetings and review of thousands of submitted comments, the CAT released its first report, *Climate Action Team Report to the Governor and the Legislature*, in March 2006, identifying key carbon reduction recommendations. A second iteration of this report was released in draft version in March 2009. This report will be released on a biennial basis from this point forward.

In April 2007, the CAT released a second report, *Proposed Early Actions to Mitigate Climate Change in California*, which identifies numerous strategies for initiation of other climate action regulations and efforts prior to the 2012 deadline established by AB 32 (discussed below). State agencies are moving ahead on many of these Early Actions.

Assembly Bill 32. Shortly after the issuance of Executive Order S-3-05, the California State Legislature adopted AB 32, the Global Warming Solutions Act of 2006. AB 32 recognizes that California is the source of substantial amounts of greenhouse gas emissions. In the Findings and Declarations for AB 32, the Legislature found that:

> The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to the marine ecosystems and that natural environment, and an increase in the incidences of infectious diseases, asthma and other health-related problems.

To avert these consequences, AB 32 requires CARB to create a plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." AB 32 requires CARB to design and implement emissions limits, regulations, and other measures, such that statewide greenhouse gas emissions would be reduced to 1990 levels by 2020, the same 2020 threshold indicated in Executive Order S-3-05. AB 32 directs CARB to develop early actions to reduce greenhouse gas emissions while

also preparing a Scoping Plan to identify how best to reach the 2020 limit. The measures and regulations to meet the 2020 target are to be in effect by 2012.

California Air Resources Board Climate Change Scoping Plan.[39] CARB's *Climate Change Scoping Plan*, adopted on December 11, 2008, reports that CARB has met the first milestones set by AB 32. As discussed above, CARB was required to prepare a historical emissions inventory and set emissions targets for 2020. In December 2007, CARB approved a 1990 emissions inventory of 427 million metric tons of CO_2e of greenhouse gases. As AB 32 requires that emissions be reduced to 1990 levels by 2020, approval of this inventory effectively determined emissions targets for 2020. As required, CARB has also identified 44 early action measures that could be enforceable on or before 2010. These measures include potential regulations affecting landfills, motor vehicle fuels, refrigerant in cars, port operations and many other sources. Regulatory development for these measures is ongoing.

The Scoping Plan also proposes a comprehensive set of actions designed to reduce overall greenhouse gas emissions in California, including:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewable energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

The Scoping Plan notes that local governments are "essential partners" in the effort to reduce greenhouse gas emissions, and that they have "broad influence and, in some cases, exclusive jurisdiction" over activities that contribute to greenhouse gas emissions. The Scoping Plan encourages local governments to adopt goals for reducing municipal greenhouse gas emissions and move towards adoption of a goal for reducing community emissions. These targets should parallel the State's commitment to reduce greenhouse gas emissions by approximately 15 percent of current levels by 2020. The Scoping Plan also observes that "[l]ocal governments have the ability to directly influence both the siting and design of new residential and commercial developments in a way that reduces greenhouse gases associated with vehicle travel, as well as energy, water, and waste"[40] and that

[39] CARB, December, 2008, Climate Change Scoping Plan, pp. ES-3 to ES-4.

[40] Ibid, p. 26.

"[i]ncreasing low-carbon travel choices (public transit, carpooling, walking and biking) combined with land use patterns and infrastructure that support these low-carbon modes of travel, can decrease average vehicle trip lengths by bringing more people closer to more destinations."[41] It also notes that regional targets will be set and achieved on a regional basis through the Senate Bill (SB) 375 implementation process, which "maintains regions' flexibility." SB 375 is discussed below.

Senate Bill 375. SB 375, which establishes mechanisms for the development of regional targets for reducing passenger vehicle greenhouse gas emissions, was adopted by the State on September 30, 2008. SB 375 requires CARB to develop vehicular greenhouse gas emission regional reduction targets for 2020 and 2035 by September 30, 2010, in consultation with metropolitan planning organizations. SB 375 recognizes the importance of achieving significant greenhouse gas reductions by changing land use patterns and improving transportation alternatives. Through the SB 375 process, metropolitan planning organizations will develop sustainable community strategies designed to integrate development patterns and the transportation network in a way that reduces greenhouse gas emissions while meeting housing needs and other regional planning objectives. However, the planning processes to implement SB 375 are only in the beginning stages and no sustainable community strategies have been adopted to date.

Senate Bill 97. The provisions of SB 97, enacted in August 2007, direct OPR to propose CEQA Guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions." SB 97 directs OPR to develop such guidelines by July 2009, and directs the Resources Agency, the agency charged with adopting the CEQA Guidelines, to certify and adopt such guidelines by January 2010. OPR released the Draft CEQA Guideline Amendments for formal adoption into law by the Resources Agency on April 13, 2009. The Resources Agency has until January 1, 2010 to adopt the CEQA Guideline Amendments into law. In addition, an OPR technical advisory memorandum, titled *CEQA and Climate Change*, was released in July 2008. Both of these documents inform the analysis in this EIR.

Draft CEQA Guideline Amendments for Greenhouse Gas Emissions. The Draft CEQA Guideline Amendments, if adopted, would add new text to the existing CEQA Guidelines (Title 14, Chapter 3 of the California Code of Regulations) pertaining to greenhouse gas emissions. A summary of key text revisions is provided below.

Section 15064.4. Determining the Significance of Impacts from Greenhouse Gas Emissions. This section would be added to clarify a lead agency's responsibility in assessing greenhouse gas impacts by using its careful judgment and discretion. The text identifies general considerations that should be weighed when determining the significance of an effect:

- The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and

[41] Ibid, p. 48.

- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

Section 15126.4. Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects. The text in this section states that lead agencies "shall consider all feasible means of mitigating greenhouse gas emissions." Feasible greenhouse gas emissions mitigation would include, but would not be limited to:

- Measures in an existing plan or program for the reduction of emission that are required as part of the lead agency's decision;
- Reductions in emissions resulting from a project through the implementation of project features, design, or other measures;
- Off-site measures, including offsets, to mitigate a project's emissions;
- Measures that sequester greenhouse gases; and
- In the case of the adoption of a plan, the identification of specific measures that may be implemented on a project-by-project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions.

Section 15130. Discussion of Cumulative Impacts. The text in this section states that greenhouse gas emissions associated with a project should be considered when the incremental contribution of the emissions may be cumulatively considerable.

Revisions to CEQA Checklist Questions. Appendix G of the CEQA Guidelines contains a sample checklist that may be used by lead agencies when considering environmental impacts. The Draft includes two new checklist questions for greenhouse gas emissions:

- Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- Would the project conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

CARB Preliminary Draft Staff Proposal, Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act. On October 24, 2008, CARB staff published its preliminary draft proposal to establish a statewide threshold of significance for emissions of greenhouse gases from industrial, commercial and residential

projects. The CARB preliminary draft proposal states that non-zero thresholds can be supported by substantial evidence, and that zero thresholds are not mandated in light of the facts that (1) some level of emissions in the near term and at mid-century is still consistent with climate stabilization and (2) current and anticipated regulations and programs apart from CEQA will proliferate and increasingly will reduce the greenhouse gas contributions of past, present, and future projects.

The preliminary draft also states that different standards should apply to different sectors because some sectors contribute more substantially to statewide emissions, and differing levels of reductions will be expected from different sectors. The preliminary draft includes the following potential thresholds for residential and commercial projects:

> Greenhouse gas emissions would be less than significant if the project is exempt from CEQA, or the project complies with a previously approved plan that addressed greenhouse gas emissions and has all of the following attributes:
>
> - Meets a community level greenhouse gas target consistent with AB 32;
> - Is consistent with a transportation related greenhouse gas reduction target adopted by CARB pursuant to SB 375;
> - Includes greenhouse gas inventory and mechanisms to monitor and evaluate emissions;
> - Incorporates mechanisms that allow the plan to be revised to meet targets; and
> - Has a certified final CEQA document; or
> - The project meets the following standards:
>   - Construction sources meet interim CARB performance standards;
>   - Operational sources meet an energy performance standard defined as CEC's Tier II Energy Efficiency Goal, and CARB performance standards (not yet specified) for water use, waste, and transportation; and
>   - The project, with performance standards, will emit no more than an amount to be specified of CO_2e emissions per year.

Bay Area Regional Agency Climate Protection Program. The Joint Policy Committee (composed of the Association of Bay Area Governments [ABAG], BAAQMD, BCDC, and Metropolitan Transportation Commission [MTC]) approved the Bay Area Regional Agency Climate Protection Program on May 4, 2007 (amended July 20, 2007) to reduce potential effects of climate change. This program includes strategies to:

- Establish management priorities based on impacts, benefits, ease of implementation, and cost-effectiveness;
- Increase public awareness and motivate action through workshops and grass-roots outreach;

- Provide assistance, such as standardization of procedures for determining impacts, maintaining and distributing data, model codes and other tools, funding for demonstration projects, and others;
- Reduce driving and promote alternative modes of transportation through mechanisms such as road pricing, mode competitiveness, and regional development planning;
- Prepare to adapt, because regardless of regional reductions in potential causes contributing to global climate change, the region will be affected by changing environmental conditions; and
- Increase the importance of CEQA review of CO_2 emissions, conduct life-cycle costing of all capital projects, encourage energy-efficient development with sliding-scale permit fees, rebates and expedited permit review processes, and return the region's freeways to a maximum of 55 miles per hour.

Menlo Park Climate Action Plan. The City of Menlo Park's Climate Action Plan (CAP - adopted in May 2009) proposes local emissions reduction strategies designed to help meet AB 32 targets. The emissions reduction strategies are generally focused on City actions, although the City would be expected to create programs directed towards reducing community emissions. As shown in Table 3.13-4, two options for emissions reduction targets are proposed in the CAP. Option 1 would set the target for 2020 community emissions at a level that would be 14 percent higher than 2005 emissions.[42] This option weighs growth projections and quantifies the projected emissions reductions from the strategies presented in the Climate Action Plan. It also assumes that a significant portion of the emissions reductions specified by AB 32 targets would be met through state emissions reduction programs. Option 2 would set an emissions reduction target at 15 percent below 2005 levels by 2020 for both municipal and community emissions. The option assumes that additional strategies, beyond those presented in the CAP, will have to be developed at the local level. The City Council will consider these options along with others that may be developed during the 2009-10 CAP revision, one of which may be adopted in the future.

The state currently has a goal to reduce emissions to 1990 levels by 2020, if state reduction strategies are also taken into account. State strategies, such as fuel efficiency standards, statewide green building standards, transportation system improvements, and other strategies, would be expected to reduce emissions in Menlo Park by 123,000 metric tons CO_2e annually.

The City's 2020 emissions forecast predicts that the City would produce up to 600,464 metric tons CO_2e under a "worst-case" baseline scenario. Existing and planned emissions reduction strategies in the CAP are expected to result in reductions of approximately 157,997 metric tons CO_2e (including reductions from State strategies), for a reduced 2020 total of 442,467 metric tons CO_2e.

[42] The 2020 target is 3 percent below business-as-usual 2020 emissions. This is equivalent to 14 percent above 2005 emissions.

Table 3.13-4 Menlo Park Climate Action Plan Emissions Targets				
	Community Reductions		Municipal Reductions	
Year	Target	Annual Emissions Target (metric tons CO_2e)	Target	Annual Emissions Target (metric tons CO2e)
Option 1				
2012	Limit community emissions to 4% over 2005 emissions	510,696	Reduce municipal emissions by 10% of 2005 emissions	1,965
2020	Limit community emissions to 14% over 2005 emissions	505,786	Reduce municipal emissions by 26% of 2005 emissions	1,615
Option 2				
2020	Reduce community emissions by 15% below 2005 emissions	417,396	Reduce municipal emissions by 15% of 2005 emissions	1,856
Source: City of Menlo Park, 2009. Climate Action Plan.				

Menlo Park General Plan. Although the General Plan does not include policies explicitly designed to address greenhouse gas emissions and climate change, a number of goals and policies in the General Plan would be expected to contribute to this end. These policies include the following:

> **Policy I-B-4:** Uses and activities shall be encouraged which will strengthen and complement the relationship between the Transportation Center and the Downtown area and the nearby El Camino Real corridor.

Goal I-G: To promote the preservation of open-space lands for recreation, protection of natural resources, the production of managed resources, protection of health and safety, and/or the enhancement of scenic qualities.

> **Policy I-G-11:** Well-designed pedestrian facilities should be included in areas of intensive pedestrian activity.
>
> **Policy I-H-1:** The community design should help conserve resources and minimize waste.
>
> **Policy I-H-2:** The use of water-conserving plumbing fixtures in all new public and private development shall be required.
>
> **Policy I-H-3:** Plant material selection and landscape and irrigation design for City parks and other public facilities and in private developments shall adhere to the City's Water Efficient Landscape Ordinance.
>
> **Policy I-H-12:** Street orientation, placement of buildings, and use of shading should contribute to the energy efficiency of the community.

Policy I-I-2: The regional land use planning structure should be integrated within a larger transportation network built around transit rather than freeways and the City shall influence transit development so that it coordinates with Menlo Park's land use planning structure.

Policy II-A-12: The City shall endeavor to provide for the safe, efficient, and equitable use of streets by pedestrians and bicyclists through good roadway design, maintenance, and effective traffic law enforcement.

Goal II-B: To promote the use of public transportation.

Policy II-B-1: The City shall consider transit modes in the design of transportation improvements and the review and approval of development projects.

Policy II-B-2: As many activities as possible should be located within easy walking distance of transit stops, and transit stops should be convenient and close to as many activities as possible.

Policy II-B-3: The City shall promote improved public transit service and increased transit ridership, especially to office and industrial areas and schools.

Goal II-C: To promote the use of alternatives to the single occupant automobile.

Policy II-C-1: The City shall work with all Menlo Park employers to encourage employees to use alternatives to the single occupancy automobile in their commute to work.

Goal II-D: To promote the safe use of bicycles as a commute alternative and for recreation.

Policy II-D-3: The design of streets within Menlo Park shall consider the impact of street cross section, intersection geometrics and traffic control devices on bicyclists.

Policy II-D-4: The City shall require new commercial and industrial development to provide secure bicycle storage facilities on-site.

Goal II-E: To promote walking as a commute alternative and for short trips.

Policy II-E-1: The City shall endeavor to maintain safe sidewalks and walkways where existing within the public right of way.

Impacts and Mitigation Measures

Climate Change Analysis Methodology

As described in Chapter 2, Project Description, the maximum amount of development assumed under the proposed M-3 zoning would include 173,667 s.f. of hotel uses, 694,669 s.f. of R&D/office uses, 69,467 s.f. of health club uses, 6,947 s.f. of restaurant uses, and 10,420 s.f. of commercial/retail uses. Inventory methods similar to those used to estimate existing emissions from the project area were

applied to the proposed project to determine the net increase in emissions associated with new development.

Construction Emissions. Project construction activities would require demolition of existing buildings, grading, building construction, paving, and employee and vendor trips. Although specific construction phasing information is not available at this time, for modeling purposes it was assumed that new development proposed under the project would be constructed over a 5-year period, starting in 2010. The URBEMIS 2007 model was used to estimate annual construction emissions for this period.

Typically, more than 80 percent of the total energy consumption associated with development takes place during the use of buildings, and less than 20 percent is consumed during construction.[43] Using the URBEMIS model, it is estimated that the average daily CO_2 emissions associated with construction equipment exhaust for the proposed project would be approximately 1,097 metric tons CO_2 per year, with total emissions of 5,484 metric tons CO_2. Model output sheets are included in Appendix I.

Operational Emissions. Operational emissions sources associated with proposed development include direct, indirect, vehicular, and fugitive solid waste emissions. These sources were inventoried according to the methods used to inventory the emissions associated with existing land uses in the project area (refer to Setting). The net operational emissions associated with proposed development would be approximately 23,737 metric tons CO_2e, as presented in Table 3.13-5, below.

Table 3.13-5
Increased Annual Operational Greenhouse Gas Emissions, Proposed Project

	Emissions (metric tons CO_2e)		
Source of Emissions	**Existing**	**Proposed Project**	**Total Future Emissions**
Direct	290	1,453	1,743
Indirect	936	3,934	4,870
Vehicular	3,159	16,072	19,231
Solid Waste	375	2,227	2,602
Water and Wastewater	23	51	74
Total	**4,783**	**23,737**	**28,520**

Source: PBS&J, 2009. Calculations provided in Appendix I.

Effects of Climate Change. Refer to Section 3.5, Hydrology and Water Quality for an evaluation of flooding associated with projected sea level rise in the project area. At this time, as discussed in the Setting, it is not possible to predict other climate change effects specific to the project area.

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

Standards of Significance

The CEQA Guidelines do not currently provide numeric or quantitative thresholds of significance for greenhouse gas emissions. The Draft CEQA Guideline Amendments, released in April 2009, state that each local lead agency must develop its own significance criteria based on local conditions, data, and guidance from public agencies and other sources. As discussed under Applicable Plans and Policies and shown in Table 3.13-4, the City may adopt an emissions reduction target in the near future. Two options, described in the 2009 version of the CAP, will be considered for future adoption, along with other targets that might be developed during a planned 2009-10 revision of the CAP. However, since neither of these targets has been adopted, the City has chosen not to use either CAP threshold as the standard of significance for this analysis. For the purposes of this analysis, the City has determined that a project's contribution to the cumulative climate change impact would be considerable if it would:

- **Impact Criterion #1:** Fail to implement all emission-reduction strategies deemed to be feasible by the City.

Project Evaluation

This section discusses the potential impacts of the proposed project that would be allowed under the GPA/ZOA. The analysis of the proposed project's climate change impact is essentially an analysis of the project's contribution to a cumulatively significant global warming impact through its emission of greenhouse gases. The cumulative impacts of the proposed project, with respect to the issue of climate change, are therefore captured in this cumulative analysis.

Impact CC-1: *Future development under the proposed project would result in a net increase in greenhouse gas emissions. Because the project has not implemented all mitigation measures deemed by the City to be feasible, the project would have a potentially significant impact. (PS)*

Greenhouse Gas Emissions. The City's Greenhouse Gas Inventory took into account growth based on existing land use controls. To implement the proposed project, the current zoning and land use designations for the project area would have to be amended. Therefore, the new emissions associated with the project would result in a net increase over the emissions forecasted in the CAP inventory.

As shown in Table 3.13-5, above, future development under the proposed project would be expected to result in a net increase in greenhouse gas emissions in the project area of approximately 23,737 metric tons CO_2e, approximately 4.8 percent of the 2005 citywide inventory. The citywide inventory, as presented in the CAP, estimates that the City's total emissions were approximately 493,237 metric tons CO_2e in 2005.

However, this estimate represents a worst-case scenario and does not take into account the design strategies proposed under the project for reducing project greenhouse gas emissions. Strategies that the project sponsor has committed to implementing are listed in Table 3.13-6.

Table 3.13-6
Proposed Project Emissions Reduction Strategies

Strategy
Energy Efficiency, General The project sponsor would seek LEED certification. A key objective of the project is to approach a minimum of 5 to 15 percent energy savings over a similar, conventionally designed structure built to the standards of California's Title 24 energy code.
Energy Efficient Roofs and Building Design The proposed project would incorporate cool and green roofs, with roof parapet-mounted trellis structures that would shade the upper floor terraces while providing the ability to support photovoltaic solar collectors. Between 66 and 75 percent of the roof area of proposed structures could be usable for photovoltaic panels, which could provide a portion of the project's power. This design approach would comply with the intent of this program. Exposed roof finishes would be highly reflective. In addition, buildings would be oriented to maximize passive heating and cooling efficiency, and natural ventilation would be used where appropriate. A high-performance building envelope and glazing, as well as shaded east, south, and west facades, would control heat gain and reduce the demand for cooling. Fifty percent of the parking lot and other hard surfaces would be shaded with tree canopy cover, while remaining area would use reflective surface and grid paving techniques. The proposed project would collect heat outputs from laundry and cooking machinery for reuse in building HVAC.
Heat Island Effect Minimization Fifty percent of the parking lot and other hard surfaces would be shaded with tree canopy cover, while remaining area would use reflective surface and grid paving techniques. The proposed project would collect heat outputs from laundry and cooking machinery for reuse in building HVAC.
Landscaping and Indoor Water Efficiency The proposed project includes a number of water conservation features. Features would be installed to capture rainwater and runoff on site, which would be used to irrigate landscaping and for water features integrated into the landscape design. Landscape watering would be expected to use 50 percent less water than traditional systems as a result of water delivery system efficiencies and drought-resistant plantings. Evaporative water loss would be minimized by covering pools, adjusting fountain operating hours, and using a water treatment approach that reduces the need for draw down and replacement. Indoor potable water usage would be reduced through use of low-flow and waterless restroom toilets, urinals, lavatories, and sinks. Grey water reuse is being evaluated to offset potable water needs for landscape irrigation. Water from the final laundry rinse cycle would be used as the first rinse cycle of the next load.
Construction Waste Diversion/Recycling The proposed project would include a construction waste diversion plan. Existing paving and concrete structures would be crushed and reused as a base material, and a high percentage of construction waste would be recycled or salvaged. All facilities would include labeled recycling receptacles to encourage waste diversion.
Alternative Transportation The proposed project would implement the following TDM measures to reduce transportation-related impacts: ▪ Bicycle lockers and racks; ▪ Showers and changing rooms; ▪ Shuttle service; ▪ Subsidized public transit tickets; ▪ Subsidize pedestrian/bicyclists who commute to work; ▪ Vanpool program; ▪ Preferential carpool and vanpool parking; ▪ Employee commute surveys; ▪ Alternative work schedules; ▪ Install and maintain alternative transportation kiosks;

Table 3.13-6 Proposed Project Emissions Reduction Strategies
Strategy
▪ Telecommuting; ▪ Commute assistance center; ▪ Provision of on-site amenities; ▪ Guaranteed ride home program; and ▪ Create connections for non-motorized travel.
Infill Development The proposed project would increase the land use intensity of the project area by developing higher intensity uses within the project area, as well as including a more pedestrian-friendly environment with sidewalks and other pedestrian amenities.
Climate Change Education During the leasing process, the project sponsor would inform prospective tenants about the green building practices used during construction of new structures. This information would help to raise tenant awareness of the proposed project's energy efficiency goals.
Source: PBS&J, 2009.

Implementation of these project features would result in an emissions reduction of at least 8,662 metric tons CO_2e (see Table 3.13-7).[44] The reductions reported are conservative and do not take into account certain features for which quantitative emissions reductions data is not available (e.g., the use of recycled materials, bicycle improvements, etc.). Moreover, some emissions reductions, such as those related to water consumption, were accounted for in the baseline inventory. After taking into account proposed emissions reduction strategies, the proposed project would be expected to result in annual greenhouse gas emissions of approximately 15,075 metric tons CO_2e.

Table 3.13-7
Operational Greenhouse Gas Reductions, Proposed Project

Source of Emissions	Reduction (metric tons CO_2e)
Direct	218
Indirect	590
Vehicular	7,854
Solid Waste	N/A
Water and Wastewater	N/A
Total	**8,662**

Source: PBS&J, 2009. Calculations provided in Appendix I.

Although the proposed project would include a number of emissions reductions design features, the City has determined that additional feasible emissions reductions strategies are available. Therefore, the proposed project would have a potentially significant impact with respect to climate change.

[44] In comparison to a similar project that did not include emissions-reducing measures.

MITIGATION MEASURE. Mitigation Measures CC-1.1 would reduce potentially significant climate change impacts to a less-than-significant level. (LTS)

CC-1.1 To the extent feasible and to the satisfaction of the City, the project sponsor shall incorporate the following measures into the design, construction and operation of the project, in addition to other applicable measures identified in the City of Menlo Park Climate Action Plan.

- Develop an On-Site Renewable Energy System that consists of solar, wind, geothermal, biomass and/or bio-gas strategies. This system shall reduce grid-based energy purchases and provide at least 2.5 percent of the project energy cost from renewable energy. Such a strategy could include installation of photovoltaic panels and solar and tankless hot water heaters;
- Install light colored "cool" roofs and cool pavements;
- Install energy efficient heating and cooling systems, appliances and equipment, and control systems;
- Install light emitting diodes (LEDs) for outdoor lighting;
- Install the infrastructure to deliver and use reclaimed water for landscape irrigation;
- Install charging stations for election vehicles for employee and visitors; and
- Implement a recycled content purchasing policy (e.g., prohibiting use of plastic water bottles).