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GREENHOUSE GAS/ AIR QUALITY TECHNICAL REPORT FOR THE 2090 SOUTH DELAWARE PROJECT, CITY OF SAN MATEO

Prepared for:

City of San Mateo
Planning Division
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Air Pollution Meteorology • Dispersion Modeling •Climatological Analysis

INTRODUCTION

The 2090 South Delaware project would be located on a 2.38-acre site at the south end of the large block formed by South Delaware Street, Pacific Boulevard and 19th Avenue. The project site fronts South Delaware on the east, and Pacific Boulevard on the south and west. There is currently a vacant one-story commercial building on the site. The project would demolish the existing structure on the site and replace it a 3 story residential apartment complex with 111 units.

This report describes the effects of the proposed project on greenhouse gas emissions and local/regional air quality. It discusses existing air quality, construction-related impacts, direct and indirect emissions associated with the project, the impacts of these emissions on both the local and regional scale, and mitigation measures to reduce or eliminate any identified significant impacts. The analysis was conducted using guidance provided by the Bay Area Air Quality Management District (BAAQMD).[1]

EXISTING SETTING

Air Pollution Climatology

San Mateo is located on the eastern side of the San Francisco peninsula. The peninsula region extends from northwest of San Jose to the Golden Gate. The Santa Cruz Mountains run up the center of the peninsula, with elevations exceeding 2000 feet at the southern end, decreasing to 500 feet in South San Francisco. Coastal towns experience a high incidence of cool, foggy weather in the summer. Cities in the southeastern peninsula experience warmer temperatures and fewer foggy days because the marine layer is blocked by the ridgeline to the west. San Francisco lies at the northern end of the peninsula. Because most of San Francisco's topography is below 200 feet, marine air is able to flow easily across most of the city, making its climate cool and windy.

The blocking effect of the Santa Cruz Mountains results in variations in summertime maximum temperatures in different parts of the peninsula. For example, in coastal areas and San Francisco the mean maximum summer temperatures are in the mid-60's, while in Redwood City the mean maximum summer temperatures are in the low-80's. Mean minimum temperatures during the winter months are in the high-30's to low-40's on the eastern side of the Peninsula and in the low 40's on the coast.

Two important gaps in the Santa Cruz Mountains occur on the peninsula. The larger of the two is the San Bruno Gap, extending from Fort Funston on the ocean to the San Francisco Airport. Because the gap is oriented in the same northwest to southeast direction as the prevailing winds, and because the elevations along the gap are less than 200 feet, marine air is easily able to penetrate into the bay. The other gap is the Crystal Springs Gap, between Half Moon Bay and San Carlos. As the sea breeze

[1] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2011.

strengthens on summer afternoons, the gap permits maritime air to pass across the mountains, and its cooling effect is commonly seen from San Mateo to Redwood City.

Annual average wind speeds range from 5 to 10 mph throughout the peninsula, with higher wind speeds usually found along the coast. Winds on the eastern side of the peninsula are often high in certain areas, such as near the San Bruno Gap and the Crystal Springs Gap.

The prevailing winds along the peninsula's coast are from the west, although individual sites can show significant differences. For example, Fort Funston in western San Francisco shows a southwest wind pattern while Pillar Point in San Mateo County shows a northwest wind pattern. On the east side of the mountains winds are generally from the west, although wind patterns in this area are often influenced greatly by local topographic features.

Air pollution potential is highest along the southeastern portion of the peninsula. This is the area most protected from the high winds and fog of the marine layer. Pollutant transport from upwind sites is common. In the southeastern portion of the peninsula, air pollutant emissions are relatively high due to motor vehicle traffic as well as stationary sources. At the northern end of the peninsula in San Francisco, pollutant emissions are high, especially from motor vehicle congestion. Localized pollutants, such as carbon monoxide, can build up in "urban canyons." Winds are generally fast enough to carry the pollutants away before they can accumulate.

Ambient Air Quality Standards

Criteria Pollutants

Both the U. S. Environmental Protection Agency and the California Air Resources Board have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants which represent safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. Table 1 identifies the major criteria pollutants, characteristics, health effects and typical sources. The federal and California state ambient air quality standards are summarized in Table 2.

The federal and state ambient standards were developed independently with differing purposes and methods, although both processes attempted to avoid health-related effects. As a result, the federal and state standards differ in some cases. In general, the California state standards are more stringent. This is particularly true for ozone and particulate matter (PM_{10} and $PM_{2.5}$)

Table 1: Major Criteria Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
Ozone	A highly reactive photochemical pollutant created by the action of sunshine on ozone precursors (primarily reactive hydrocarbons and oxides of nitrogen. Often called photochemical smog.	Eye Irritation Respiratory function impairment.	The major sources ozone precursors are combustion sources such as factories and automobiles, and evaporation of solvents and fuels.
Carbon Monoxide	Carbon monoxide is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels.	Impairment of oxygen transport in the bloodstream. Aggravation of cardiovascular disease. Fatigue, headache, confusion, dizziness. Can be fatal in the case of very high concentrations.	Automobile exhaust, combustion of fuels, combustion of wood in woodstoves and fireplaces.
Nitrogen Dioxide	Reddish-brown gas that discolors the air, formed during combustion.	Increased risk of acute and chronic respiratory disease.	Automobile and diesel truck exhaust, industrial processes, fossil-fueled power plants.
Sulfur Dioxide	Sulfur dioxide is a colorless gas with a pungent, irritating odor.	Aggravation of chronic obstruction lung disease. Increased risk of acute and chronic respiratory disease.	Diesel vehicle exhaust, oil-powered power plants, industrial processes.
Particulate Matter ($PM_{10}/PM_{2.5}$)	Solid and liquid particles of dust, soot, aerosols and other matter which are small enough to remain suspended in the air for a long period of time.	Aggravation of chronic disease and heart/lung disease symptoms.	Combustion, automobiles, field burning, factories and unpaved roads. Also a result of photochemical processes.

Table 2: Federal and State Ambient Air Quality Standards[2,3]

Air Pollutant	Averaging Time	California Standard	Attainment Status	Federal Standard	Attainment Status
Ozone (O_3)	1 hour	0.09 ppm	N	—	
	8 hour	0.070 ppm	N	0.075 ppm	N
Respirable particulate matter (PM_{10})	24 hour	50 µg/m^3	N	150 µg/m^3	U
	Mean	20 µg/m^3	N	—	—
Fine particulate matter ($PM_{2.5}$)	24 hour	—	—	35 µg/m^3	N
	Mean	12 µg/m^3	N	15.0 µg/m^3	A
Carbon monoxide (CO)	1 hour	20 ppm	A	35 ppm	A
	8 hour	9.0 ppm	A	9 ppm	A
Nitrogen dioxide (NO_2)	1 hour	0.18 ppm	A	0.100 ppm	U
	Mean	0.030 ppm	—	0.053 ppm	A
Sulfur dioxide (SO_2)	1 hour	0.25 ppm	A	0.075 ppm	A
	24 hour	0.04 ppm	A	0.014 ppm	A
Lead	30-day	1.5 µg/m^3	A	—	—
	Quarter	—	—	1.5 µg/m^3	A
Sulfates	24 hour	25 µg/m^3	A	No Federal Standard	
Hydrogen sulfide	1 hour	0.03 ppm	U		
Vinyl chloride	24 hour	0.01 ppm	No Information Available		

Abbreviations:
A = Attainment
N = Nonattainment
U = Unclassified
ppm = parts per million
µg/m^3 = micrograms per cubic meter
30-day = 30-day average
Quarter = Calendar quarter
Mean = Annual Arithmetic Mean

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[2] California Air Resources Board, *Ambient Air Quality Standards*, 2/7/12. (http://www.arb.ca.gov/research/aaqs/aaqs2.pdf)

[3] Bay Area Air Quality Management District, *Air Quality Standards and Attainment Status,* (http://www.baaqmd.gov/Divisions/Planning-and-Research/Air-Quality-Standards.aspx), Accessed 8 March 2012.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are another group of pollutants of concern. There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important, in terms of health risk, are diesel particulate, benzene, formaldehyde, 1,3-butadiene and acetaldehyde.

Public exposure to TACs can result from emissions from normal operations, as well as accidental releases. Health effects of TACs include cancer, birth defects, neurological damage and death.

Ambient Air Quality

The BAAQMD maintains a network of monitoring sites in the Bay Area. The closest to the project site is located in Redwood City. Table 3 summarizes violations of air quality standards at this monitoring site for the period 2008-2011.

Attainment Status and Regional Air Quality Plans

The federal Clean Air Act and the California Clean Air Act of 1988 require that the State Air Resources Board (ARB), based on air quality monitoring data, designate portions of the state where the federal or state ambient air quality standards are not met as "nonattainment areas". Because of the differences between the national and state standards, the designation of nonattainment areas is different under the federal and state legislation. The U. S. Environmental Protection Agency has classified the San Francisco Bay Area as a non-attainment area for the federal 8-hour ozone standard and $PM_{2.5}$ standards. The Bay Area was designated as unclassifiable/attainment for the federal PM_{10} standard.

Under the California Clean Air Act, San Mateo County is a non-attainment area for ozone and particulate matter (PM_{10} and $PM_{2.5}$). The county is either attainment or unclassified for other pollutants.

Greenhouse Gases and Climate Change

Definition of Greenhouse Gases

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHGs) because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHG's has been implicated as a driving force for global climate change. Definitions of climate change

Table 3: Summary of Air Quality Data for Redwood City

Pollutant	Standard	Days Exceeding Standard in:			
		2008	2009	2010	2011
Ozone	State 1-Hour	0	0	2	0
Ozone	Federal 8-Hour	0	0	1	0
Ozone	State 8-Hour	0	0	1	0
Carbon Monoxide	State/Federal 8-Hour	0	0	0	0
Nitrogen Dioxide	State 1-Hour	0	0	0	0
PM_{10}	Federal 24-Hour	—	—	—	—
PM_{10}	State 24-Hour	—	—	—	—
$PM_{2.5}$	Federal 24-Hour	0	0	1	1

Source: Air Resources Board, Aerometric Data Analysis and Management (ADAM), 2012. (http://www.arb.ca.gov./adam/cgi-bin/adamtop/d2wstart)

vary between and across regulatory authorities and the scientific community, but in general can be described as the changing of the earth's climate caused by natural fluctuations and anthropogenic activities which alter the composition of the global atmosphere.

California State law defines greenhouse gases as:

Carbon Dioxide (CO_2)
Methane (CH_4)
Nitrous Oxide (N_2O)
Hydrofluorocarbons
Perfluorocarbons
Sulfur Hexafluoride

According to the BAAQMD guidance, the most common GHG that results from human activity is carbon dioxide, followed by methane and nitrous oxide. The last 3 of the six identified GHGs are primarily emitted by industrial facilities. For this analysis, only carbon dioxide, methane and nitrous oxide emissions will be considered. These primary greenhouse gases are described below.

Carbon dioxide is primarily generated by fossil fuel combustion in stationary and mobile sources. Due to the emergence of industrial facilities and mobile sources in the past 250 years, the concentration of carbon dioxide in the atmosphere has increased 35 percent. Carbon dioxide is the most widely emitted GHG and is the reference gas (Global Warming Potential of 1) for determining GWPs for other GHGs.

Methane is emitted from biogenic sources, incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. In the United States, the top three sources of methane are landfills, natural gas systems, and enteric fermentation. Methane is the primary component of natural gas, which is used for space and water heating, steam production, and power generation. The GWP of methane is 21.

Nitrous oxide is produced by both natural and human-related sources. Primary human-related sources include agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The GWP of nitrous oxide is 310.

Greenhouse Gas Effects

There is international scientific consensus that human-caused increases in GHGs have and will continue to contribute to global warming, although there is uncertainty concerning the magnitude and rate of the warming. Potential global warming impacts in California may include, but are not limited to, 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. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

Federal Greenhouse Gas Regulations

In September 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO_2 per year. An estimated 85% of the total U.S. GHG emissions, from approximately 10,000 facilities, is covered by this final rule.

In April 2009 EPA published their Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CCA (Endangerment Finding) in the Federal Register. The Administrator proposed the finding that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CCA. The final finding was released on December 7, 2009. The findings do not in and of themselves impose any emission reduction requirements but rather allow EPA to finalize the GHG standards proposed in 2010 for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation.

State Greenhouse Gas Regulations

Assembly Bill 1493 (2002)

AB 1493 required that ARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state."

To meet the requirements of AB 1493, in 2004 ARB approved amendments to the California Code of Regulations (CCR) adding GHG emissions standards to California's existing standards for motor vehicle emissions. These amendments require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes. In December 2004, a group of car dealerships, automobile manufacturers, and trade groups representing automobile manufacturers filed suit against ARB to prevent enforcement of AB 1493. On December 12, 2007, the Court found that if California receives appropriate authorization from EPA (the last remaining factor in enforcing the standard), these regulations would be consistent with and have the force of federal law, thus, rejecting the automakers' claim. This authorization to implement more stringent standards in California was requested in 2005. Since that time, EPA failed to act on granting California authorization to implement the standards. California filed suit against EPA for the delay. In December 2007, EPA Administrator Stephen Johnson denied California's request for the waiver to implement AB 1493. The state of California filed suit against EPA for its decision to deny the CAA waiver. The recent change in

presidential administration directed EPA to reexamine its position for denial of California's CAA waiver and for its past opposition to GHG emissions regulation. California received the waiver, notwithstanding the previous denial by EPA, on June 30, 2009.

Assembly Bill 32 (2006), California Global Warming Solutions Act

In September 2006, the governor of California signed AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires the reduction of statewide GHG emissions to 1990 levels by 2020. This equates to an approximate 15 percent reduction compared to existing statewide GHG emission levels or a 30 percent reduction from projected 2020 "business as usual" emission levels. The required reduction will be accomplished through an enforceable statewide cap on GHG emissions beginning in 2012.

AB 32 directs ARB to develop and implement regulations that reduce statewide GHG emissions generated by stationary sources. Specific actions required of ARB under AB 32 include adoption of a quantified cap on GHG emissions that represent 1990 emissions levels, institution of a schedule to meet the emissions cap, and development of tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions needed to meet the cap.

AB 32 Climate Change Scoping Plan

In December 2008, ARB adopted its *Climate Change Scoping Plan*, which contains the main strategies California will implement to achieve reduction of approximately 169 million metric tons (MMT) of CO_2e, or approximately 30% from the state's projected 2020 emission level of 596 MMT of CO_2e under a business-as-usual scenario (this is a reduction of 42 MMT CO2e, or almost 10%, from 2002-2004 average emissions). The *Scoping Plan* also includes ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- improved emissions standards for light-duty vehicles
- the Low-Carbon Fuel Standard
- energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems , and
- a renewable portfolio standard for electricity production.

Senate Bills 1078 and 107 and Executive Order S-14-08

SB 1078 requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 changed the target date to 2010. In November 2008 Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Energy Standard to 33 percent renewable power by 2020.

Senate Bill 1368 (2006)

SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 required the California Public Utilities Commission (PUC) to establish a greenhouse gas emission performance standard for baseload generation from investor owned utilities by February 1, 2007. The California Energy Commission (CEC) must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the greenhouse gas emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and CEC.

Senate Bill 97 (2007)

SB 97 acknowledges climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Resources Agency by July 1, 2009 guidelines for mitigating GHG emissions or the effects of GHG emissions, as required by CEQA. The California Resources Agency is required to certify and adopt these guidelines by January 1, 2010.

Senate Bill 375 (2008)

SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. As part of the alignment, SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS) which prescribes land use allocation in that MPO's Regional Transportation Plan (RTP). The ARB, in consultation with MPOs, is required to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035.

Executive Order S-3-05 (2005)

Governor Schwarzenegger signed Executive Order S-3-05 on June 1, 2005 which proclaimed California is vulnerable to the impacts of climate change. The executive order declared increased temperatures could reduce snowpack in the Sierra Nevada Mountains, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the executive order established targets for total GHG emissions which include reducing GHG emissions to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The executive order also directed the secretary of the California Environmental Protection Agency to coordinate a multiagency effort to reduce GHG emissions to the target levels. To comply with the executive order, the Secretary of the California Environmental Protection Agency created the California Climate Action Team which is

made up of members from various state agencies and commissions. The California Climate Action Team released its first report in March 2006 of which proposed achieving the GHG emissions targets by building on voluntary actions of California businesses and actions by local governments and communities along with continued implementation of state incentive and regulatory programs.

Executive Order S-13-08

Governor Schwarzenegger signed Executive Order S-13-08 on November 14, 2008 which directs California to develop methods for adapting to climate change through preparation of a statewide plan. The assessment report is required to be completed by December 1, 2010 and required to include the following four items:

- Project the relative sea level rise specific to California by taking into account issues such as coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates;
- Identify the range of uncertainty in selected sea level rise projections;
- Synthesize existing information on projected sea level rise impacts to state infrastructure (e.g., roads, public facilities, beaches), natural areas, and coastal and marine ecosystems; and
- Discuss future research needs relating to sea level rise in California.

Executive Order S-1-07

Governor Schwarzenegger signed Executive Order S-1-07 in 2007 which proclaimed the transportation sector as the main source of GHG emissions in California. The executive order proclaims the transportation sector accounts for over 40 percent of statewide GHG emissions. The executive order also establishes a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020.

Local Greenhouse Gas Regulations

The Bay Area Air Quality Management District has established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the Bay Area. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents. BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders.

Sources of Greenhouse Gas Emissions

Anthropogenic GHG emissions worldwide as of 2005 totaled approximately 30,800 CO_2 equivalent million metric tons ($MMTCO_2e$).[4] The United States was the top producer of greenhouse gas emissions as of 2005. The primary greenhouse gas emitted by human activities in the United States was CO_2, representing approximately 84 percent of total greenhouse gas emissions. Carbon dioxide from fossil fuel combustion, the largest source of US greenhouse gas emissions, accounted for approximately 80 percent of US GHG emissions.[5]

The primary contributors to GHG emissions in California are transportation, electric power production from both in state and out-of-state sources, industry, agriculture and forestry, and other sources, which include commercial and residential activities. These primary contributors to California's GHG emissions and their relative contributions are presented in Table 4.

Sensitive Receptors

The Bay Area Air Quality Management District defines sensitive receptors as facilities where sensitive receptor population groups (children, the elderly, the acutely ill and the chronically ill) are likely to be located. These land uses include residences, schools, playgrounds, child care centers, retirement homes, convalescent homes, hospitals and medical clinics.

The closest sensitive receptors are residences located adjacent to the site on the north. Residences are also located east of the project site on the opposite side of South Delaware Street.

Significance Criteria

Air Quality

California Environmental Quality Act (CEQA) guidelines provide that a project would have a significant air quality impact if it would:

- Conflict with or obstruct implementation of the applicable air quality plan,
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation,

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[4] The CO_2 equivalent emissions are commonly expressed as "million metric tons of carbon dioxide equivalent ($MMTCO_2E$)".

[5] US Environmental Protection Agency, *Inventory of US Greenhouse Gas Emissions and Sinks 1990-2006,* 2008.

Table 4: GHG Inventory for California, 2009

Source Category	**Annual GHG Emissions** ($MMTCO_2E$)	**Percent of Total**
Agriculture/Forestry	32.32	7.1
Commercial Uses	14.33	3.1
Electricity Generation (Imports)	48.05	10.5
Electricity Generation (In-State)	55.53	12.2
Industrial	81.36	17.8
Residential Uses	28.61	6.3
Transportation	172.92	37.9
Other	23.64	5.2
Totals	456.77	100.0

Source: California Air Resources Board (CARB), *Greenhouse Gas Inventory Data – 2000 to 2009,* 2011

- 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 threshold for ozone precursors),
- Expose sensitive receptors to substantial pollutant concentrations, or
- Create objectionable odors affecting a substantial number of people.

The document *CEQA Air Quality Guidelines*[6] provide refinements to the definition of a significant air quality impact. In 2012 the Alameda County Superior Court issued a judgement, in *California Building Industry Association v. Bay Area Air Quality Management District*, finding that the BAAQMD had failed to comply with CEQA when it adopted the 2011 thresholds. The court issued a writ of mandate ordering the BAAQMD to set aside the 2011 thresholds and cease dissemination of them until the BAAQMD had complied with CEQA. As such, this ruling effectively nullified the BAAQMD's adoption of the 2010 Air Quality Guidelines as updated in 2011. Nonetheless, for this analysis the BAAQMD 2011 thresholds have been used for screening purposes to determine that if a project does not exceed the 2011 thresholds it will result in a less than significant impact. The May 2011 BAAQMD significance thresholds are summarized in Table 5.

According to BAAQMD guidance, construction dust impacts are determined by whether Best Management Practices are to be utilized.

Greenhouse Gases

California Environmental Quality Act (CEQA) guidelines provide that a project would have a significant GHG impact if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; and/or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

The BAAQMD significance threshold for GHG emissions is that a development project, other than a stationary source, would have significant cumulative impact unless:

- The project can be shown to be in compliance with a qualified Climate Action Plan; or
- Project emissions of CO_2 equivalent GHGs (CO_2e) are less than 1,100 metric tons per year; or
- Project emissions of CO_2 equivalent GHGs are less than 4.6 metric tons per year per service population (residents plus employees).

[6] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2011.

Table 5: BAAQMD Project-Level Air Quality Thresholds of Significance

Pollutant	**Construction-Related**	**Operational-Related**	
Criteria Air Pollutants and Precursors	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tons/year)
ROG	54	54	10
NO_x	54	54	10
PM_{10} (Exhaust)	82	82	15
$PM_{2.5}$ (Exhaust)	54	54	10
$PM_{10}/PM_{2.5}$ (Fugitive Dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	
Accidental Release of Acutely Hazardous Air Pollutants	None	Storage or use of acutely hazardous materials locating near receptors or new receptors locating near stored or used acutely hazardous materials considered significant	
Odors	None	5 confirmed complaints per year averaged over 3 years	
Risks and Hazards (Individual Projects)	Same as Operational Thresholds	Compliance with a Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million OR Increased non-cancer risk of >1.0 Hazard Index (Chronic or Acute)Ambient $PM_{2.5}$ increase > 0.3 $\mu g/m^3$ annual average	
Risks and Hazards (Cumulative Threshold)	Same as Operational Thresholds	Compliance with a Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: >10.0 Hazard Index)from all local sources) $PM_{2.5}$ > 0.8 $\mu g/m^3$ annual average (from all local sources)	

Notes: CO = carbon monoxide; CO_2e = carbon dioxide equivalent; lb/day = pounds per day; NO_X = oxides of nitrogen; $PM_{2.5}$= fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppm = parts per million; ROG = reactive organic gases.

IMPACTS AND MITIGATION

1. Air Quality

Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

The San Francisco Bay Area Air Basin is currently non-attainment for ozone (state and federal ambient standards) and particulate matter ($PM_{2.5}$ and PM_{10}) (state ambient standard). While an air quality plan exists for ozone, none currently exists for particulate matter. The *Bay Area 2010 Clean Air Plan*[7] is the current ozone air quality plan.

A project would be judged to conflict with or obstruct implementation of the regional air quality plan if it would result in substantial new regional emissions not foreseen in the air quality planning process. The project would not result in a substantial unplanned increase in population, employment, regional growth in Vehicle Miles Traveled, or emissions, so it could not conflict with or obstruct implementation of the air quality plan.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Development projects in the Bay Area are most likely to violate an air quality standard or contribute substantially to an existing or projected air quality violation through generation of vehicle trips. New vehicle trips add to carbon monoxide concentrations near streets providing access to the site. Carbon monoxide is an odorless, colorless poisonous gas whose primary source in the Bay Area is automobiles. Concentrations of this gas are highest near intersections of major roads.

The BAAQMD has developed a preliminary screening methodology that provides a conservative indication of whether the implementation of a proposed project would result in CO emissions that exceed the CO thresholds of significance. For a development proposal, a proposed project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria are met:

- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway)

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[7] Bay Area Air Quality Management District et al., *Bay Area 2010 Clean Air Plan*, September 15, 2010.

Based on existing surface road volumes in the project vicinity, the project would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour, and would not affect any intersections where vertical and/or horizontal mixing is substantially limited.[8] Based on the BAAQMD criteria, the proposed project would have a less-than-significant impact on carbon monoxide concentrations

c) 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)?

Construction

Construction activities would include demolition, site excavation and grading as well as general construction. Heavy duty construction equipment, construction-related on-road trucks, and worker vehicles would also result in exhaust emissions of ROG, NO_x, PM_{10}, and $PM_{2.5}$ during construction of the proposed project. Exhaust emissions would vary depending on the number and type of construction equipment used, number of truck trips to the site, and number of workers present.

The CalEEMod model was used to quantify construction emissions. CalEEMod modeling was based on a detailed construction plan provided by the project applicant (See Appendix A). For equipment that runs for a shorter time than the defined phase length, the daily usage was scaled accordingly to account for decreased emissions. Where horsepower was specified, it was used. If horsepower was not given CalEEMod defaults were used. OFFROAD 2011 load factors were used where available. Construction related emissions for the proposed project are presented in Table 6.

To be consistent with the BAAQMD thresholds of significance, the total construction period emission was divided by the number of working days in the construction period (611) to obtain the average emission in pounds per day. CalEEMod output is included in Appendix A.

The average emissions shown in Table 6 are below the BAAQMD thresholds of significance. This would be a less-than-significant impact.

Operation

Chapter 3 of the *Bay Area Air Quality Management District CEQA Guidelines* provides screening criteria developed for criteria pollutants and precursors. According to the

[8] California Environmental Health Tracking Program, Traffic Volume Linkage Tool http://www. ehib.org/traffic_tool.jsp)

Table 6: Average Daily Construction Emissions in Pounds Per Day

	ROG	**NO_x**	**PM_{10} (Exhaust)**	**$PM_{2.5}$ (Exhaust)**
Construction Emissions	5.01	40.39	1.21	1.21
BAAQMD Threshold of Significance	**54.0**	**54.0**	**82.0**	**54.0**
Significant?	**No**	**No**	**No**	**No**

ROG = Reactive Organic Gases
NO_x = Nitrogen Oxides
PM_{10} = Particulate Matter, 10 micron
$PM_{2.5}$ = Particulate Matter, 2.5 micron

BAAQMD, if the project meets the screening criteria and is consistent with the methodology used to develop the screening criteria, then its air quality impacts may be considered less than significant. In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. Therefore, additional analysis to assess cumulative impacts is unnecessary. The screening size for mid-rise apartments is 494 units. The project is substantially below this size, so it would have a less-than-significant impact with respect to criteria pollutants and ozone precursors, individually and cumulatively.

d) Expose sensitive receptors to substantial pollutant concentrations?

Construction Dust

Activities associated with site preparation, and construction would generate short-term emissions of fugitive dust. The effects of construction activities would be increased dustfall and locally elevated levels of PM_{10} and $PM_{2.5}$ downwind of construction activity. Construction dust has the potential for creating a nuisance at nearby properties.

The BAAQMD threshold of significance for construction dust impacts is whether Best Management Practices (BMPs) are to be utilized. Consistent with guidance from the BAAQMD, the applicant has agreed to require the following BAAQMD Best Management Practices in construction contracts and specifications for all construction:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations. Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take

corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

The above includes all basic BMPs identified by the Bay Area Air Quality Management District. According to the BAAQMD threshold of significance for construction impacts, construction dust impacts of the project would be less-than-significant.

Community Risks and Hazards- Construction Impacts to Off-Site Receptors

The BAAQMD has developed a screening approach to conduct initial evaluations of potential health risks from exposure to toxic air contaminants (TACs), including diesel particulate matter (DPM), and particulate matter with an aerodynamic resistance diameter of less than 2.5 micrometers ($PM_{2.5}$) from construction activities.[9] DPM, $PM_{2.5}$, and several TACs are all emitted from construction activity that uses traditional diesel-powered equipment such as bulldozers, generators, and cranes. The BAAQMD methodology uses screening tables to estimate air quality health risk impacts associated with construction activity in accordance with the BAAQMD's CEQA thresholds of significance.

According to the BAAQMD screening tables, the minimum offset distance (buffer distance) to ensure that a sensitive receptor would have a less-than-significant impact would be 150 meters (approximately 500 feet). The project is bounded on the north by residences, so there is no buffer distance between the site and sensitive receptors. Since the project cannot be shown to have a less-than-significant impact based on the screening tables, a site-specific health risk assessment was prepared.

This health risk assessment contains three quantitative determinations: emissions calculation, air dispersion modeling and health risk characterization. Emissions from diesel vehicles and equipment were estimated over the construction period. Concentrations of toxic air contaminants and $PM_{2.5}$ affecting neighboring properties were estimated by inputting emission estimates into the ISCST-3 dispersion model. Results of the air modeling exposure predictions were then applied to the respective cancer health risk factors and chronic non-cancer reference exposure levels to perform a health risk characterization that quantified individual health risks associated with predicted levels of exposure. The construction health risk analysis is described in detail in Appendix B.

The maximum off-site annual average concentration of DPM at any sensitive land use would be 0.0541 microgram per cubic meter, within the residential area immediately north of the project site. The calculated cancer risk at this location would be 9.47 in one million, which is below the threshold of significance of 10 in one million. This represents a less than significant impact.

[9] Bay Area Air Quality Management District, *Screening Tables for Air Toxics Evaluation During Construction*, May 2010.

The health risk assessment found the maximum chronic Hazard Index would be 0.0108. The acute Hazard Index would be 0.18486. Both these values are well below the BAAQMD thresholds of significance of 1.0. Therefore, project construction impacts related to non-cancer health effects would be less-than-significant.

Concentrations of $PM_{2.5}$ in the adjacent residential area north of the project site were predicted to be below 0.3 $\mu g/m^3$, therefore, project construction impacts related to $PM_{2.5}$ emissions would be less-than-significant.

Operational Community Risks and Hazards- Impacts to Project Residents

The project would include residences that are sensitive receptors that would be exposed to mobile and stationary sources of TACs affecting the site. For assessing community risks and hazards, BAAQMD recommends that any proposed project that includes the siting of a receptor assess associated impacts within 1,000 feet, taking into account both individual and nearby cumulative sources. Cumulative sources represent the combined total risk values of each individual source within the 1,000-foot evaluation zone.

Mobile Sources

The BAAQMD methodology for mobile source risks considers highways and heavily-travelled surface streets (carrying 10,000 or more daily vehicle trips) within 1,000 feet of the project site. Two highways are within 1,000 feet of the project boundaries: SR 92 to the north and SR82 (El Camino Real) to the west. The BAAQMD's Highway Screening Analysis Tool[10] was used to conservatively estimate risks associated with proximity to these highways.

The BAAQMD methodology also considers high-volume roadways (carrying 10,000 or more daily vehicle trips). There are two surface streets within 1,000 feet of the project boundaries that carry 10,000 or more daily vehicle trips: South Delaware Street and East 20th Street. BAAQMD's Roadway Screening Analysis Tables[11] screening procedures were used to conservatively estimate risks associated with proximity to these roadways.

The project site is near the Caltrain Peninsula rail line, which is the site of diesel train locomotive emissions. Caltrain has proposed the electrification of trains on this line, but the schedule is currently uncertain. This analysis has assumed that the use of diesel powered locomotives would continue on these tracks.

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[10] http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx

[11] http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/County%20Surface% 20Street%20Screening%20Tables%20Dec%202011.ashx?la=en

Diesel Particulate Matter (DPM) and $PM_{2.5}$ concentrations from train locomotives operating adjacent the project site were evaluated with the CALQHCR line source model. While this model was developed for roads, inputs were modified so that locomotive emissions could be modeled as a line source. The estimated emissions per mile were calculated based on the weekday and weekend schedules for Caltrain Peninsula trains. Based on the current Caltrain schedule, an average of 71.14 trains per day pass the project site. Emission rates for locomotives were based on the typical Caltrain GMEMD F40PH locomotive. For the purposes of the analysis, trains were assumed to be traveling at 40 mph on average, with a Throttle Notch setting of 4. DPM/$PM_{2.5}$ emission rates for this locomotive class were taken from an California Air Resources Board study.[12] The locomotive emission rate for DPM was 6.46 grams per mile, resulting in an average emission rate of 19.149 grams per mile per hour.

Diesel total organic gases (TOG) emission rates were developed using EPA emission factors for "passenger and commuter" locomotives.[13]

The model was run on five years of meteorological data provided by the Bay Area Air Quality Management District from the San Mateo Wastewater Treatment Plan. Peak 1-hour concentrations of TOG were estimated from the annual concentration using a standard ratio of annual average to peak 1-hour concentration of 0.08.

Mobile source risks from vehicles and trains for the project are shown in Table 7. Concentrations of DPM and calculated risks from trains reflects the fact that the proposed design incorporates "a central heating, air conditioning, and ventilation (HVAC) system in each residential unit, where required, to meet or exceed an efficiency standard of MERV 13. Installation of the HVAC system includes a high efficiency filter (HEPA Filter or ASHRAE 85% filter) as well as ongoing maintenance of the mechanical ventilation by the property management group, so that the required specification (an efficiency of no less than 85% in removing particles) is maintained."

All mobile source risks are below the BAAQMD single-source thresholds of significance. The health risk assessment for trains is described in detail in Appendix C.

Permitted Stationary Sources

The neighborhood of the proposed project includes several existing stationary sources of air pollutants. The BAAQMD database of permitted stationary sources indicates that there are seven permitted sources of air pollutants within the 1000-foot zone of influence of the project with non-trivial TAC emissions. Table 7 shows BAAQMD-

[12] California Air Resources Board, *Roseville Rail Yard Study*, Appendix B, October 14, 2004.
[13] EPA Office of Transportation and Air Quality, *Emissions Factors for Locomotives,* EPA-420-F-09-025, April 2009.

Table 7: Health Risks Associated with Mobile Sources and Permitted Stationary Sources

Source	$PM_{2.5}$ Concentration ($\mu g/m^3$)	Lifetime Cancer Risk (in a million)	Acute Hazard Index	Chronic Hazard Index
Mobile Sources				
SR 92	0.032	3.563	0.003	0.007
SR 82	0.022	1.46	0.002	0.006
South Delaware Street	0.147	3.79	0.02	0.02
East 20th Street	0.059	1.68	0.02	0.02
Trains	0.018	9.75	0.103	0.0036
Permitted Stationary Sources				
City of San Mateo 1949 Pacific Street Diesel Generator	0.0037	1.19	Negl.	0.0004
Comcast 83 East 21st Street Diesel Generator	0.0039	1.258	Negl.	0.0005
Swift Realty 2121 El Camino Real Diesel Generator	0.026	1.03	Negl.	0.003
Conoco Philips 404 E. 19th Street Gas Dispensing	0.0	0.66	Negl.	Negl.
Arco 1950 S. Delaware St. Gas Dispensing	0.0	0.50	Negl.	Negl.
City of San Mateo 1949 Pacific Street Gas Dispensing	0.0	1.688	Negl.	0.002
Palm Avenue Motors 2180 Palm Avenue Unspecified	0.017	0.00182	Negl.	0.00277
Cumulative Impact	0.3286	26.59	N.A.	0.06527
BAAQMD Cumulative Threshold	0.8	100	N.A.	10

estimated cancer risk, non-cancer chronic risks and $PM_{2.5}$ concentrations for each of these sources. Risk information for permitted sources was provided by the BAAQMD.[14] Correspondence with the District is included in Appendix D.

All risks for permitted stationary sources are below the BAAQMD single-source thresholds of significance.

Cumulative Risks

The results of the cumulative health risk analysis are shown at the bottom of Table 7. The estimated $PM_{2.5}$ concentration, lifetime cancer risk and chronic non-cancer health risk from mobile and permitted sources are summed and compared to the BAAQMD cumulative Community Risks and Hazards thresholds.[15] Cumulative risks are below the corresponding thresholds.

e) Create objectionable odors affecting a substantial number or people?

The proposed project would not include uses that have been identified by BAAQMD as potential sources of objectionable odors. Sources of odors include restaurants, manufacturing plants, and agricultural operations and industrial operations such as wastewater treatment plants and solid waste transfer stations or landfills.

As a new sensitive receptor for odors, the project is quite distant from the types of land uses that identified by the BAAQMD as having potential to create objectionable odors. Therefore the proposed project would have a less than significant odor impact because it would not frequently create substantial objectionable odors affecting a substantial number of people.

2. Global Warming Gases

Would the project:

f) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment, or

The project will not generate greenhouse gas emissions that will have a significant impact on the environment.

The CalEEMod program estimated construction and operational emission of greenhouse gases for the proposed project. Project construction emissions were calculated as 1,950.87 $MTCO_2E$, to be emitted over the construction period. Construction emissions are generally considered separately from operational emissions

[14] Email from Ian Peterson, BAAQMD, to Donald Ballanti dated March 16, 2012.
[15] There is no BAAQMD cumulative threshold of significance for acute health risk.

because construction emissions are a one-time event, while operational emissions would be continuous over the life of the project.

BAAQMD has not adopted thresholds for construction emissions but recommends quantification and disclosure of these emissions.

Operational GHG emissions by source are shown in Table 8. Total operational emissions were estimated at 964.40 $MTCO_2E$. The CalEEMod output is included in Appendix A.

The BAAQMD significance threshold for operational GHG emissions is that a development project, other than a stationary source, would have significant cumulative impact unless:

- The project can be shown to be in compliance with a qualified Climate Action Plan; or
- Project emissions of CO_2 equivalent GHGs (CO_2e) are less than 1,100 metric tons per year; or
- Project emissions of CO_2 equivalent GHGs are less than 4.6 metric tons per year per service population (residents plus employees).

g) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The project does not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The City has adopted a Greenhouse Gas Emissions Reduction Program, and is utilizing the corresponding monitoring tool, in conformance with CEQA Guidelines section 15183.5. In addition, the Greenhouse Gas Emission Reduction Program has been designed to meet the requirements of the Bay Area Air Quality Management District's (BAAQMD) CEQA Guidelines and the corresponding criteria for a Qualified Greenhouse Gas Emissions Reduction Strategy as defined by the BAAQMD. The Program quantifies specific policies in the Sustainable Initiatives Plan and General Plan, and concludes that with the combination of the Sustainable Initiative Plan, General Plan policies, regional, and State policies and programs, the City will reach its 2020 greenhouse gas emission reduction target.

The levels at which the contribution to greenhouse gases are deemed not to be cumulatively considerable are set forth in the Greenhouse Gas Emissions Reduction Program as shown in Table 9.

Applying the City's General Plan Policies and Greenhouse Gas Emissions Reduction Program, this project will not result in the City exceeding the levels set forth above. As a result, the greenhouse gas impacts are less than significant.

Table 8: Operational Greenhouse Gas Emissions

Source	Annual Emission ($MTCO_2E$)
Area Sources	1.40
Energy	177.58
Mobile (Vehicles)	739.65
Waste	23.23
Water	22.54
Total	964.40

Table 9: Greenhouse Gas Emissions Reduction Summary[16]

Emissions Reduction Summary (Metric Tons CO_2E)		
	2020	**2030**
Business-as-usual Forecast	721,367	764,267
Emissions Reduction Target	519,384	305,707
Emissions Forecast with SIP, General Plan, regional, and state policies and programs.	516,750	411,875

[16] City of San Mateo, *Greenhouse Gas Emissions Reduction Program*, June 2010.