

APPENDIX C

AIR QUALITY AND GREENHOUSE GAS EMISSIONS ASSESSMENT

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988 HOWARD AVENUE DRAFT AIR QUALITY & GREENHOUSE GAS EMISSIONS ASSESSMENT

Burlingame, California

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Project 15-164

Introduction

The purpose of this report is to address air quality, toxic air contaminant (TAC), and greenhouse gas (GHG) emission impacts associated with the proposed office project located at 988 Howard Avenue in Burlingame, California. The proposed development would include a three-story, 22,295 square foot (sf) office building. The site is currently developed with a gas station and an automobile repair business. The proposed Project is to demolish the existing buildings and to redevelop the Site with the office building, a ground-level parking area, and public plazas adjacent to retail spaces. Under the project conditions, the proposed office building would be a three-story structure of approximately 55 feet in height. The building would consist of two stories of commercial uses above a ground level with a lobby, retail uses, and parking. Air quality and GHG impacts could occur due to temporary construction emissions and as a result of direct and indirect emissions from users of the new office building. The primary issue addressed in this air quality study is localized impacts from on-site emissions of construction equipment. This analysis was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD).

Setting

The project is located in northern San Mateo County, which is in the San Francisco Bay Area Air Basin. Ambient air quality standards have been established at both the State and federal level. The Bay Area meets all ambient air quality standards with the exception of ground-level ozone, respirable particulate matter (PM₁₀), and fine particulate matter (PM_{2.5}).

Air Pollutants of Concern

High ozone levels are caused by the cumulative emissions of reactive organic gases (ROG) and nitrogen oxides (NO_x). These precursor pollutants react under certain meteorological conditions to form high ozone levels. Controlling the emissions of these precursor pollutants is the focus of the Bay Area's attempts to reduce ozone levels. The highest ozone levels in the Bay Area occur in the eastern and southern inland valleys that are downwind of air pollutant sources. High ozone levels aggravate respiratory and cardiovascular diseases, reduced lung function, and increase coughing and chest discomfort.

Particulate matter is another problematic air pollutant of the Bay Area. Particulate matter is assessed and measured in terms of respirable particulate matter or particles that have a diameter of 10 micrometers or less (PM₁₀) and fine particulate matter where particles have a diameter of 2.5 micrometers or less (PM_{2.5}). Elevated concentrations of PM₁₀ and PM_{2.5} are the result of both region-wide (or cumulative) emissions and localized emissions. High particulate matter levels aggravate respiratory and cardiovascular diseases, reduce lung function, increase mortality (e.g., lung cancer), and result in reduced lung function growth in children.

Toxic Air Contaminants

Toxic air contaminants (TAC) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer) and include, but are not limited to, the criteria air

pollutants. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter [DPM] near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, State, and federal level.

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about three-quarters of the cancer risk from TACs (based on the Bay Area average). According to the California Air Resources Board (CARB), diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the State's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB has adopted and implemented a number of regulations for stationary and mobile sources to reduce emissions of DPM. Several of these regulatory programs affect medium and heavy duty diesel trucks that represent the bulk of DPM emissions from California highways. These regulations include the solid waste collection vehicle (SWCV) rule, in-use public and utility fleets, and the heavy-duty diesel truck and bus regulations. In 2008, CARB approved a new regulation to reduce emissions of DPM and nitrogen oxides from existing on-road heavy-duty diesel fueled vehicles.¹ The regulation requires affected vehicles to meet specific performance requirements between 2014 and 2023, with all affected diesel vehicles required to have 2010 model-year engines or equivalent by 2023. These requirements are phased in over the compliance period and depend on the model year of the vehicle.

The BAAQMD is the regional agency tasked with managing air quality in the region. At the State level, the CARB (a part of the California Environmental Protection Agency [EPA]) oversees regional air district activities and regulates air quality at the State level. The BAAQMD has recently published California Environmental Quality Act (CEQA) Air Quality Guidelines that are used in this assessment to evaluate air quality impacts of projects.²

Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. The closest sensitive receptors are residences living above the street level retail shops on the corner of Howard Avenue and Myrtle Road, across from the project site. There are other residences located further from the project site to the northwest through southeast.

¹ Available online: <http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm>. Accessed: June 9, 2015.

² Bay Area Air Quality Management District, 2011. *BAAQMD CEQA Air Quality Guidelines*. May.

Greenhouse Gases

Gases that trap heat in the atmosphere, GHGs, regulate the earth's temperature. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate. The most common GHGs are carbon dioxide (CO₂) and water vapor but there are also several others, most importantly methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). These are released into the earth's atmosphere through a variety of natural processes and human activities. Sources of GHGs are generally as follows:

- CO₂ and N₂O are byproducts of fossil fuel combustion.
- N₂O is associated with agricultural operations such as fertilization of crops.
- CH₄ is commonly created by off-gassing from agricultural practices (e.g., keeping livestock) and landfill operations.
- Chlorofluorocarbons (CFCs) were widely used as refrigerants, propellants, and cleaning solvents but their production has been stopped by international treaty.
- HFCs are now used as a substitute for CFCs in refrigeration and cooling.
- PFCs and sulfur hexafluoride emissions are commonly created by industries such as aluminum production and semi-conductor manufacturing.

Each GHG has its own potency and effect upon the earth's energy balance. This is expressed in terms of a global warming potential (GWP), with CO₂ being assigned a value of 1 and sulfur hexafluoride being several orders of magnitude stronger with a GWP of 23,900. In GHG emission inventories, the weight of each gas is multiplied by its GWP and is measured in units of CO₂ equivalents (CO₂e).

An expanding body of scientific research supports the theory that global warming is currently affecting changes in weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, and that it will increasingly do so in the future. The climate and several naturally occurring resources within California could be adversely affected by the global warming trend. Increased precipitation and sea level rise could increase coastal flooding, saltwater intrusion, and degradation of wetlands. Mass migration and/or loss of plant and animal species could also occur. Potential effects of global climate change that could adversely affect human health include more extreme heat waves and heat-related stress; an increase in climate-sensitive diseases; more frequent and intense natural disasters such as flooding, hurricanes and drought; and increased levels of air pollution.

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA. These Thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA and were posted on BAAQMD's website and included in the Air District's updated CEQA Guidelines (updated May 2011). The significance thresholds identified by BAAQMD and used in this analysis are summarized in Table 1.

Table 1. Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	Average Daily Emissions (lbs./day)	Annual Average Emissions (tons/year)
Criteria Air Pollutants			
ROG	54	54	10
NO _x	54	54	10
PM ₁₀	82	82	15
PM _{2.5}	54	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards for New Sources			
Excess Cancer Risk	10 per one million		
Chronic or Acute Hazard Index	1.0		
Incremental annual average PM _{2.5}	0.3 µg/m ³		
Health Risks and Hazards for Sensitive Receptors (Cumulative from all sources within 1,000 foot zone of influence) and Cumulative Thresholds for New Sources			
Excess Cancer Risk	100 per one million		
Chronic Hazard Index	10.0		
Annual Average PM _{2.5}	0.8 µg/m ³		
Greenhouse Gas Emissions			
GHG Annual Emissions	Compliance with a Qualified GHG Reduction Strategy OR 1,100 metric tons or 4.6 metric tons per capita		
Note: ROG = reactive organic gases, NO _x = nitrogen oxides, PM ₁₀ = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, PM _{2.5} = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less; and GHG = greenhouse gas.			

BAAQMD’s adoption of significance thresholds contained in the 2011 CEQA Air Quality Guidelines was called into question by an order issued March 5, 2012, in California Building Industry Association (CBIA) v. BAAQMD (Alameda Superior Court Case No. RG10548693). The order requires BAAQMD to set aside its approval of the thresholds until it has conducted environmental review under CEQA. The ruling made in the case concerned the environmental impacts of adopting the thresholds and how the thresholds would indirectly affect land use development patterns. In August 2013, the Appellate Court struck down the lower court’s order to set aside the thresholds. However, this litigation remains pending as the California Supreme Court recently accepted a portion of CBIA's petition to review the appellate court's decision to

uphold BAAQMD's adoption of the thresholds. The specific portion of the argument to be considered is in regard to whether CEQA requires consideration of the effects of the environment on a project (as contrasted to the effects of a proposed project on the environment). Therefore, the significance thresholds contained in the 2011 CEQA Air Quality Guidelines are applied to this project.

Impacts and Mitigation Measures

Impact 1: Conflict with or obstruct implementation of the applicable air quality plan?
Less than significant.

The most recent clean air plan is the *Bay Area 2010 Clean Air Plan* that was adopted by BAAQMD in September 2010. The proposed project would not conflict with the latest Clean Air planning efforts since the project would have emissions well below the BAAQMD thresholds (see Impact 2), and development would be near existing transit with regional connections and would potentially provide employment for the surrounding residential uses. The project is too small to exceed any of the significance thresholds and, thus, it is not required to incorporate project-specific transportation control measures listed in the latest Clean Air Plan.

Impact 2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable State or federal ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? *Less than significant with construction-period mitigation measures.*

The Bay Area is considered a non-attainment area for ground-level ozone and PM_{2.5} under both the Federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for PM₁₀ under the California Clean Air Act, but not the federal act. The area has attained both State and federal ambient air quality standards for carbon monoxide. As part of an effort to attain and maintain ambient air quality standards for ozone and PM₁₀, the BAAQMD has established thresholds of significance for these air pollutants and their precursors. These thresholds are for ozone precursor pollutants (ROG and NOx), PM₁₀, and PM_{2.5} and apply to both construction period and operational period impacts.

The California Emissions Estimator Model (CalEEMod) Version 2013.2.2 was used to predict emissions from construction of the site assuming full build out of the project. The project land use types and size, and anticipated construction schedule were input to CalEEMod.

Construction period emissions

CalEEMod provided annual emissions for construction. CalEEMod provides emission estimates for both on-site and off-site construction activities. On-site activities are primarily made up of construction equipment emissions, while off-site activity includes worker, hauling, and vendor traffic. A construction build-out scenario, including equipment list and phasing schedule, was developed based on model defaults for a project of this type and size and information provided by the project applicant. The proposed project land uses were input into CalEEMod, which

included 22,295 sf entered as “General Office Building,” 1,325 sf entered as “Strip Mall” (retail), and 68 parking spaces entered as “Enclosed Parking with Elevator.” The project would require up to 6,000 cubic yards (cy) of soil export, which was entered into the model. The anticipated 90 tons for building demolition and 40 tons of pavement demolition were entered into the model. Finally, 160 cement truck one-way trips are anticipated and were entered.

The default phasing schedule assumes that the project would be built out over a period of approximately 6 months beginning in January 2016, or an estimated 123 construction workdays. Average daily emissions were computed by dividing the total construction emissions by the number of construction days. Table 2 shows average daily construction emissions of ROG, NO_x, PM₁₀ exhaust, and PM_{2.5} exhaust during construction of the project. As indicated in Table 2, predicted project emissions would not exceed the BAAQMD significance thresholds. *Attachment 1* includes the CalEEMod input and output values for construction emissions.

Construction activities, particularly during site preparation and grading, would temporarily generate fugitive dust in the form of PM₁₀ and PM_{2.5}. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less than significant if best management practices are implemented to reduce these emissions. *Mitigation Measure AQ-1 would implement BAAQMD-recommended best management practices.*

Table 2. Construction Period Emissions

Scenario	ROG	NO _x	PM ₁₀ Exhaust	PM _{2.5} Exhaust
Construction emissions (tons)	0.35 tons	0.96 tons	0.06 tons	0.05 tons
Average daily emissions (pounds) ¹	5.7 lbs.	15.6 lbs.	1.0 lbs.	0.8 lbs.
<i>BAAQMD Thresholds (pounds per day)</i>	54 lbs.	54 lbs.	82 lbs.	54 lbs.
Exceed Threshold?	No	No	No	No

Notes: ¹Assumes 123 workdays.

Operational Period Emissions

Due to the project size, operational-period emissions would be less than significant. In the 2011 update to the CEQA Air Quality Guidelines, BAAQMD identifies screening criteria for the sizes of land use projects that could result in significant air pollutant emissions. For operational impacts, the screening project size is identified at 346,000 sf. Office projects of smaller size would be expected to have less-than-significant impacts with respect to operational-period emissions. Since the project proposes to develop 22,295 sf and ground floor retail, it is concluded that emissions would be below the BAAQMD significance thresholds for the operational period. Stationary sources of air pollution (e.g., back-up generators) have not been identified with this project.

Mitigation Measure AQ-1: Include basic measures to control dust and exhaust during construction.

During any construction period ground disturbance, the applicant shall ensure that the project contractor implement measures to control dust and exhaust. Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality impacts associated with grading and new construction to a less than significant level. The contractor shall implement the following best management practices that are required of all projects:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. 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.
4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).
5. 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.
6. 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 [CCR]). Clear signage shall be provided for construction workers at all access points.
7. 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.
8. 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.

Impact 3: Violate any air quality standard or contribute substantially to an existing or projected air quality violation? *Less than significant.*

As discussed under Impact 2, the project would have emissions less than the BAAQMD screening size for evaluating impacts related to ozone and particulate matter. Therefore, the project would not contribute substantially to existing or projected violations of those standards. Carbon monoxide emissions from traffic generated by the project would be the pollutant of

greatest concern at the local level. Congested intersections with a large volume of traffic have the greatest potential to cause high-localized concentrations of carbon monoxide. Air pollutant monitoring data indicate that carbon monoxide levels have been at healthy levels (i.e., below State and federal standards) in the Bay Area since the early 1990s. As a result, the region has been designated as attainment for the standard. The highest measured level over any 8-hour averaging period during the last 3 years in the Bay Area is less than 3.0 parts per million (ppm), compared to the ambient air quality standard of 9.0 ppm. Intersections affected by the project would have traffic volumes less than the BAAQMD screening criteria and, thus, would not cause a violation of an ambient air quality standard or have a considerable contribution to cumulative violations of these standards.³

Impact 4: Expose sensitive receptors to substantial pollutant concentrations? *Less than significant with construction-period mitigation measures.*

Project impacts related to increased community risk can occur either by introducing a new sensitive receptor, such as a residential use, in proximity to an existing source of TACs or by introducing a new source of TACs with the potential to adversely affect existing sensitive receptors in the project vicinity. The BAAQMD recommends using a 1,000-foot screening radius around a project site for purposes of identifying community health risk from siting a new sensitive receptor or a new source of TACs. Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. No stationary sources of TACs, such as generators, are proposed as part of the project. The project would not introduce any new sensitive receptors to the area. Construction activity would generate dust and equipment exhausts on a temporary basis that could affect nearby sensitive receptors that include residences. Impacts associated with project construction TAC emissions were assessed.

Construction activities, particularly during site preparation and grading would temporarily generate fugitive dust in the form of PM₁₀ and PM_{2.5}. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less than significant if best management practices are employed to reduce these emissions. *Mitigation Measure AQ-1 would implement BAAQMD-required best management practices.*

Construction equipment and associated heavy-duty truck traffic generate diesel exhaust, which is a known TAC. Diesel exhaust poses both potential health and nuisance impacts to nearby receptors. A community risk assessment of the project construction activities was conducted that evaluated potential health effects to sensitive receptors at nearby residences from construction emissions of DPM and PM_{2.5}.⁴ A dispersion model was used to predict the off-site DPM concentrations resulting from project construction so that lifetime cancer risks could be predicted. Figure 1 shows the project site and sensitive receptor locations used in the air quality dispersion modeling analysis where potential health impacts were evaluated.

³ For a land-use project type, the BAAQMD CEQA Air Quality Guidelines state that a proposed project would result in a less than significant impact to localized carbon monoxide concentrations if the project would not increase traffic at affected intersections with more than 44,000 vehicles per hour.

⁴ DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.

Construction Emissions

The refined community risk assessment focused on modeling on-site construction activity. Construction period emissions were modeled using CalEEMod defaults for a project of this type and size with input from the project applicant, as described above. The CalEEMod model provided total annual PM_{2.5} exhaust emissions (assumed to be diesel particulate matter) for the off-road construction equipment and for exhaust emissions from on-road vehicles, with total emissions of 0.0505 tons (101 pounds). The on-road emissions are a result of haul truck travel, worker travel, and vendor deliveries during construction activities. A trip length of one mile was used to represent vehicle travel while at or near the construction site. For modeling purposes, it was assumed that these emissions from on-road vehicles would occur at the construction site. Fugitive PM_{2.5} dust emissions were calculated by CalEEMod as 2.2 pounds for the construction period. The project emission calculations are provided in *Attachment 1*.

Dispersion Modeling

The U.S. EPA ISCST3 dispersion model was used to predict concentrations of DPM and PM_{2.5} at existing sensitive receptors in the vicinity of the project construction site. The AERMOD dispersion model is a BAAQMD-recommended model for use in modeling analysis of these types of emission activities for CEQA projects.⁵ Emission sources for the construction site were grouped into two categories, exhaust emissions of DPM and fugitive PM_{2.5} dust emissions. The dispersion modeling utilized two area sources to represent the on-site construction emissions, one for DPM exhaust emissions and the other for fugitive PM_{2.5} dust emissions. For the exhaust emissions from construction equipment, an emission release height of six meters (19.7 feet) was used for the area source. The elevated source height reflects the height of the equipment exhaust pipes plus an additional distance for the height of the exhaust plume above the exhaust pipes to account for plume rise of the exhaust gases. For modeling fugitive PM_{2.5} emissions, a near-ground level release height of 2 meters (6.6 feet) was used for the area source. Emissions from vehicle travel around the project site were included in the modeled area sources. Construction emissions were modeled as occurring daily from 7 a.m. to 7 p.m.

The modeling used a four-year data set (2002 - 2005) of hourly meteorological data from the San Mateo Sewage Treatment Plant prepared by the BAAQMD for use with the ISCST3 model. Annual DPM and PM_{2.5} concentrations from construction activities during the 2016 were calculated using the model. DPM and PM_{2.5} concentrations were calculated at nearby sensitive receptors. Receptor heights of 1.5 meters (4.9 feet) and 5.2 meters (17 feet) were used to represent the breathing heights of residents on first and second floor levels of nearby residences and apartments.

Predicted Cancer Risk and Hazards

The maximum modeled DPM and PM_{2.5} concentrations occurred at a second floor residence on Myrtle Road across from the project site, as shown on Figure 1. Increased cancer risks were calculated using the modeled DPM concentrations and BAAQMD-recommended risk assessment

⁵ Bay Area Air Quality Management District (BAAQMD), 2012. *Recommended Methods for Screening and Modeling Local Risks and Hazards, Version 3.0*. May.

methods for infant (3rd trimester through 2 years of age), child (2 years through 16 years), and adult exposures.⁶ The cancer risk calculations were based on applying the BAAQMD-recommended age sensitivity factors to the DPM exposures. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing TACs. BAAQMD-recommended exposure parameters were used for the cancer risk calculations.⁷

Results of this assessment indicate that for project construction the incremental residential child cancer risk at the maximally exposed individual (MEI) receptor would be 18.6 in one million and the maximum incremental residential adult cancer risk would be 1.0 in one million. The maximum increased cancer risk for both child and adult exposures would be lower than the BAAQMD significance threshold of a cancer risk of 10 in one million or greater, and would be considered a *significant impact*.

The maximum modeled annual PM_{2.5} concentration was 0.22 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) occurring at the same location where the maximum cancer risk would occur. This PM_{2.5} concentration is lower than the BAAQMD significance threshold of 0.3 $\mu\text{g}/\text{m}^3$ used to judge the significance of health impacts from PM_{2.5}. This would be considered a *less-than-significant impact*.

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. Non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). California's Office of Environmental Health and Hazards (OEHHA) has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The chronic inhalation REL for DPM is 5 $\mu\text{g}/\text{m}^3$. The maximum modeled annual residential DPM concentration was 0.212 $\mu\text{g}/\text{m}^3$, which is much lower than the REL. The maximum computed hazard index based on this DPM concentration is 0.04 which is much lower than the BAAQMD significance criterion of a hazard index greater than 1.0. This would be considered a *less-than-significant impact*.

The project would have a *significant impact* with respect to community risk caused by construction activities. *Mitigation Measures AQ-1 and AQ-2 would reduce this impact to a level of less than significant.*

Mitigation Measure AQ-2: Selection of equipment during construction to minimize emissions. Such equipment selection would include the following.

All diesel-powered off-road equipment larger than 50 horsepower and operating on the site for more than two days continuously shall, at a minimum, meet U.S. EPA particulate matter emissions standards for Tier 2 engines or equivalent.

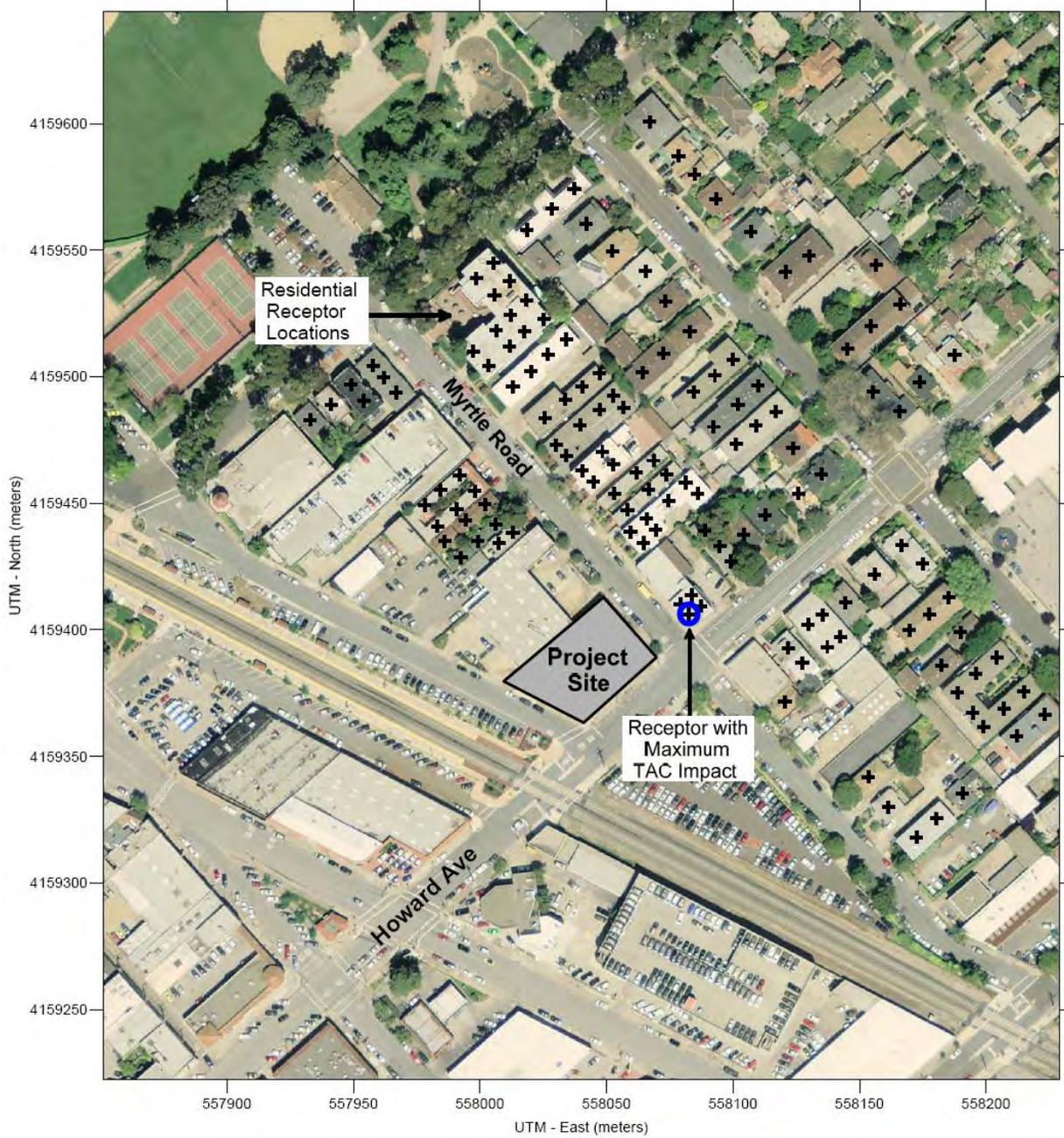
⁶ *Ibid.*

⁷ Bay Area Air Quality Management District (BAAQMD), 2010. *Air Toxics NSR Program Health Risk Screening Analysis Guidelines*, January.

Note that the construction contractor could use other measures to minimize construction period DPM emissions to reduce the predicted cancer risk below the thresholds. Such measures may be the use of alternative powered equipment (e.g., LPG-powered lifts), alternative fuels (e.g., biofuels), added exhaust devices, or a combination of measures, provided that these measures are approved by the City and demonstrated to reduce community risk impacts to less than significant.

Implementation of *Mitigation Measure AQ-1* is considered to reduce exhaust emissions by 5 percent and fugitive dust emissions by over 50 percent. Implementation of *Mitigation Measure AQ-2* would further reduce on-site diesel exhaust emissions. With mitigation, the computed maximum increased residential child cancer risk for construction would be 8.6 in one million. This cancer risk would be below the BAAQMD threshold of 10 per one million for cancer risk. *After implementation of these recommended measures, the project would have a less-than-significant impact with respect to community risk caused by construction activities.*

Figure 1. Project Construction Site and Locations of Sensitive Receptors and Maximum TAC Impact



Impact 5: Create objectionable odors affecting a substantial number of people? *Less than significant.*

The project would generate localized emissions of diesel exhaust during construction equipment operation and truck activity. These emissions may be noticeable from time to time by adjacent receptors. However, they would be localized and are not likely to adversely affect people off site by resulting in confirmed odor complaints. The project would not include any sources of significant odors that would cause complaints from surrounding uses. This would be a *less-than-significant impact*

Impact 6: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? *Less than significant.*

GHG emissions associated with development of the proposed project would occur over the short-term from construction activities, consisting primarily of emissions from equipment exhaust and worker and vendor trips. There would also be long-term operational emissions associated with vehicular traffic within the project vicinity, energy and water usage, and solid waste disposal. Emissions for the proposed project are discussed below and were analyzed using the methodology recommended in the BAAQMD CEQA Air Quality Guidelines.⁸

Construction Phase

Project construction activities are predicted to generate 108 MT of CO₂e. Neither BAAQMD nor the City has an adopted threshold of significance for construction-related GHG emissions and project construction emissions would be below the BAAQMD operational significance threshold of 1,100 MT of CO₂e annually. Therefore, this impact is considered less than significant. However, BAAQMD encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. Best management practices may include, but are not limited to: using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment for at least 15 percent of the fleet; using at least 10 percent local building materials; and recycling or reusing at least 50 percent of construction waste or demolition materials.

Operational Impacts

Due to the project size, operational period GHG emissions would be less than significant. In their May 2011 update to the CEQA Air Quality Guidelines, BAAQMD identified screening criteria for the sizes of land use projects that could result in significant GHG emissions. For operational impacts, the screening project size is identified at 53,000 sf. Office development projects of smaller size would be expected to have less-than-significant impacts with respect to operational period GHG emissions. Since the project proposes to operate 22,295 sf and ground floor retail, it is concluded that emissions would be below the BAAQMD significance threshold of 1,100 MT of CO₂e annually and, therefore, this impact is considered less than significant.

⁸ BAAQMD, 2011. *Op cit.*

Impact 7: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? *Less than significant.*

The project would be subject to new requirements under rule making developed at the State and local level regarding greenhouse gas emissions and would be subject to local policies that may affect emissions of greenhouse gases.

Attachment 1: CalEEMod Input and Output Worksheets, and Risk Calculations

**988 Howard, Burlingame - Construction
San Mateo County, Annual**

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	22.30	1000sqft	0.35	22,295.00	0
Enclosed Parking with Elevator	68.00	Space	0.00	23,400.00	0
Strip Mall	1.32	1000sqft	0.00	1,325.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	70
Climate Zone	5			Operational Year	2014
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MW hr)	641.35	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

Land Use - Project sf and acreage from project applicant. 47,020 gross sf.

Construction Phase - Default

Off-road Equipment - Default

Trips and VMT - Bldg Constr: 80 RT cement (160 one-way trips). Vendor trip length for cement trucks.

Demolition - 90 tons bldg demo + 40 tons pavement demo = 130 tons

Grading - 6,000 CY export

Table Name	Column Name	Default Value	New Value
tblGrading	MaterialExported	0.00	6,000.00
tblLandUse	LandUseSquareFeet	22,300.00	22,295.00
tblLandUse	LandUseSquareFeet	27,200.00	23,400.00
tblLandUse	LandUseSquareFeet	1,320.00	1,325.00
tblLandUse	LotAcreage	0.51	0.35
tblLandUse	LotAcreage	0.61	0.00
tblLandUse	LotAcreage	0.03	0.00
tblTripsAndVMT	HaulingTripLength	20.00	7.30
tblTripsAndVMT	HaulingTripNumber	0.00	160.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.3463	0.9627	0.7666	1.1700e-003	0.0209	0.0565	0.0774	5.6400e-003	0.0522	0.0579	0.0000	107.1291	107.1291	0.0190	0.0000	107.5282
Total	0.3463	0.9627	0.7666	1.1700e-003	0.0209	0.0565	0.0774	5.6400e-003	0.0522	0.0579	0.0000	107.1291	107.1291	0.0190	0.0000	107.5282

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/14/2016	5	10	
2	Site Preparation	Site Preparation	1/15/2016	1/15/2016	5	1	
3	Grading	Grading	1/16/2016	1/19/2016	5	2	
4	Building Construction	Building Construction	1/20/2016	6/7/2016	5	100	
5	Paving	Paving	6/8/2016	6/14/2016	5	5	
6	Architectural Coating	Architectural Coating	6/15/2016	6/21/2016	5	5	

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 70,530; Non-Residential Outdoor: 23,510 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Site Preparation	Graders	1	8.00	174	0.41
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Rubber Tired Dozers	1	1.00	255	0.40
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Building Construction	Cranes	1	4.00	226	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	125	0.42
Paving	Rollers	1	7.00	80	0.38

Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
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Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	13.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	750.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	17.00	8.00	160.00	12.40	7.30	7.30	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	3.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.3900e-003	0.0000	1.3900e-003	2.1000e-004	0.0000	2.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.5600e-003	0.0562	0.0435	6.0000e-005		4.0200e-003	4.0200e-003		3.8400e-003	3.8400e-003	0.0000	5.4141	5.4141	1.0800e-003	0.0000	5.4369
Total	6.5600e-003	0.0562	0.0435	6.0000e-005	1.3900e-003	4.0200e-003	5.4100e-003	2.1000e-004	3.8400e-003	4.0500e-003	0.0000	5.4141	5.4141	1.0800e-003	0.0000	5.4369

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Worker	1.0000e-005	1.0000e-005	1.3000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0204	0.0204	0.0000	0.0000	0.0204
Total	1.0000e-005	1.0000e-005	1.3000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0204	0.0204	0.0000	0.0000	0.0204

3.4 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0900e-003	0.0000	1.0900e-003	4.7000e-004	0.0000	4.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3100e-003	0.0112	8.7000e-003	1.0000e-005		8.0000e-004	8.0000e-004		7.7000e-004	7.7000e-004	0.0000	1.0828	1.0828	2.2000e-004	0.0000	1.0874
Total	1.3100e-003	0.0112	8.7000e-003	1.0000e-005	1.0900e-003	8.0000e-004	1.8900e-003	4.7000e-004	7.7000e-004	1.2400e-003	0.0000	1.0828	1.0828	2.2000e-004	0.0000	1.0874

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.5600e-003	0.1128	0.1338	2.7000e-004	6.2500e-003	1.3900e-003	7.6400e-003	1.7200e-003	1.2700e-003	2.9900e-003	0.0000	24.8617	24.8617	1.8000e-004	0.0000	24.8655
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	6.0000e-005	5.3000e-004	0.0000	9.0000e-005	0.0000	9.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0815	0.0815	0.0000	0.0000	0.0816
Total	9.6000e-003	0.1129	0.1343	2.7000e-004	6.3400e-003	1.3900e-003	7.7300e-003	1.7400e-003	1.2700e-003	3.0100e-003	0.0000	24.9432	24.9432	1.8000e-004	0.0000	24.9471

3.5 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0691	0.6853	0.4106	5.7000e-004		0.0470	0.0470		0.0432	0.0432	0.0000	53.4584	53.4584	0.0161	0.0000	53.7970
Total	0.0691	0.6853	0.4106	5.7000e-004		0.0470	0.0470		0.0432	0.0432	0.0000	53.4584	53.4584	0.0161	0.0000	53.7970

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3500e-003	9.9800e-003	0.0206	2.0000e-005	4.9000e-004	1.1000e-004	6.0000e-004	1.3000e-004	1.0000e-004	2.4000e-004	0.0000	2.0165	2.0165	2.0000e-005	0.0000	2.0168
Vendor	5.2300e-003	0.0405	0.0694	9.0000e-005	2.5500e-003	5.8000e-004	3.1300e-003	7.3000e-004	5.3000e-004	1.2600e-003	0.0000	8.4619	8.4619	7.0000e-005	0.0000	8.4633
Worker	3.0400e-003	4.7300e-003	0.0450	9.0000e-005	7.6800e-003	6.0000e-005	7.7400e-003	2.0400e-003	6.0000e-005	2.1000e-003	0.0000	6.9283	6.9283	3.8000e-004	0.0000	6.9362
Total	9.6200e-003	0.0552	0.1350	2.0000e-004	0.0107	7.5000e-004	0.0115	2.9000e-003	6.9000e-004	3.6000e-003	0.0000	17.4066	17.4066	4.7000e-004	0.0000	17.4163

3.6 Paving - 2016

Unmitigated Construction On-Site

Off-Road	9.2000e-004	5.9300e-003	4.7100e-003	1.0000e-005		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	0.6383	0.6383	8.0000e-005	0.0000	0.6399
Total	0.2461	5.9300e-003	4.7100e-003	1.0000e-005		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	0.6383	0.6383	8.0000e-005	0.0000	0.6399

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	4.0000e-005	4.0000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0611	0.0611	0.0000	0.0000	0.0612
Total	3.0000e-005	4.0000e-005	4.0000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0611	0.0611	0.0000	0.0000	0.0612

988 Howard, Burlingame - Construction TAC
San Mateo County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	22.30	1000sqft	0.35	22,295.00	0
Enclosed Parking with Elevator	68.00	Space	0.00	23,400.00	0
Strip Mall	1.32	1000sqft	0.00	1,325.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	70
Climate Zone	5			Operational Year	2014
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MW hr)	641.35	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

Land Use - Project sf and acreage from project applicant. 47,020 gross sf.

Construction Phase - Default

Off-road Equipment - Default

Trips and VMT - Bldg Constr: 80 RT cement (160 one-way trips). Vendor trip length for cement trucks. 1 mile trip lengths.

Demolition - 90 tons bldg demo + 40 tons pavement demo = 130 tons

Grading - 6,000 CY export

Construction Off-road Equipment Mitigation - Tier 2 engines for equip > 50hp. BAAQMD BMPs.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	8.00
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblGrading	MaterialExported	0.00	6,000.00
tblLandUse	LandUseSquareFeet	22,300.00	22,295.00
tblLandUse	LandUseSquareFeet	27,200.00	23,400.00
tblLandUse	LandUseSquareFeet	1,320.00	1,325.00
tblLandUse	LotAcreage	0.51	0.35
tblLandUse	LotAcreage	0.61	0.00
tblLandUse	LotAcreage	0.03	0.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00

tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripNumber	0.00	160.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	VendorTripLength	7.30	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00
tblTripsAndVMT	WorkerTripLength	12.40	1.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.3385	0.8234	0.6527	7.3000e-004	4.2100e-003	0.0546	0.0588	1.1100e-003	0.0505	0.0516	0.0000	68.2350	68.2350	0.0184	0.0000	68.6218
Total	0.3385	0.8234	0.6527	7.3000e-004	4.2100e-003	0.0546	0.0588	1.1100e-003	0.0505	0.0516	0.0000	68.2350	68.2350	0.0184	0.0000	68.6218

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.2854	0.6595	0.6348	7.3000e-004	2.7000e-003	0.0231	0.0258	5.6000e-004	0.0231	0.0236	0.0000	68.2349	68.2349	0.0184	0.0000	68.6218
Total	0.2854	0.6595	0.6348	7.3000e-004	2.7000e-003	0.0231	0.0258	5.6000e-004	0.0231	0.0236	0.0000	68.2349	68.2349	0.0184	0.0000	68.6218

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	15.69	19.90	2.74	0.00	35.87	57.69	56.13	49.55	54.25	54.14	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/14/2016	5	10	
2	Site Preparation	Site Preparation	1/15/2016	1/15/2016	5	1	
3	Grading	Grading	1/16/2016	1/19/2016	5	2	
4	Building Construction	Building Construction	1/20/2016	6/7/2016	5	100	
5	Paving	Paving	6/8/2016	6/14/2016	5	5	
6	Architectural Coating	Architectural Coating	6/15/2016	6/21/2016	5	5	

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 70,530; Non-Residential Outdoor: 23,510 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Site Preparation	Graders	1	8.00	174	0.41
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Rubber Tired Dozers	1	1.00	255	0.40
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Building Construction	Cranes	1	4.00	226	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	125	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	13.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	750.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	17.00	8.00	160.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	3.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT

Paving	7	18.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
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3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.3900e-003	0.0000	1.3900e-003	2.1000e-004	0.0000	2.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.5600e-003	0.0562	0.0435	6.0000e-005		4.0200e-003	4.0200e-003		3.8400e-003	3.8400e-003	0.0000	5.4141	5.4141	1.0800e-003	0.0000	5.4369
Total	6.5600e-003	0.0562	0.0435	6.0000e-005	1.3900e-003	4.0200e-003	5.4100e-003	2.1000e-004	3.8400e-003	4.0500e-003	0.0000	5.4141	5.4141	1.0800e-003	0.0000	5.4369

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-005	2.4000e-004	1.3600e-003	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0313	0.0313	0.0000	0.0000	0.0314

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	5.0000e-005	5.9000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0424	0.0424	0.0000	0.0000	0.0425
Total	2.0000e-004	2.9000e-004	1.9500e-003	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0738	0.0738	0.0000	0.0000	0.0738

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					6.3000e-004	0.0000	6.3000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.4300e-003	0.0520	0.0398	6.0000e-005		2.0100e-003	2.0100e-003		2.0100e-003	2.0100e-003	0.0000	5.4141	5.4141	1.0800e-003	0.0000	5.4369
Total	2.4300e-003	0.0520	0.0398	6.0000e-005	6.3000e-004	2.0100e-003	2.6400e-003	5.0000e-005	2.0100e-003	2.0600e-003	0.0000	5.4141	5.4141	1.0800e-003	0.0000	5.4369

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-005	2.4000e-004	1.3600e-003	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0313	0.0313	0.0000	0.0000	0.0314
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	5.0000e-005	5.9000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0424	0.0424	0.0000	0.0000	0.0425
Total	2.0000e-004	2.9000e-004	1.9500e-003	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0738	0.0738	0.0000	0.0000	0.0738

3.3 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.7000e-004	0.0000	2.7000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.8000e-004	6.8200e-003	3.6700e-003	0.0000		4.2000e-004	4.2000e-004		3.8000e-004	3.8000e-004	0.0000	0.4414	0.4414	1.3000e-004	0.0000	0.4442
Total	6.8000e-004	6.8200e-003	3.6700e-003	0.0000	2.7000e-004	4.2000e-004	6.9000e-004	3.0000e-005	3.8000e-004	4.1000e-004	0.0000	0.4414	0.4414	1.3000e-004	0.0000	0.4442

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.1200e-003	2.1200e-003	0.0000	0.0000	2.1200e-003
Total	1.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.1200e-003	2.1200e-003	0.0000	0.0000	2.1200e-003

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Fugitive Dust					1.2000e-004	0.0000	1.2000e-004	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9000e-004	4.1300e-003	3.5000e-003	0.0000		1.4000e-004	1.4000e-004		1.4000e-004	1.4000e-004	0.0000	0.4414	0.4414	1.3000e-004	0.0000	0.4442
Total	1.9000e-004	4.1300e-003	3.5000e-003	0.0000	1.2000e-004	1.4000e-004	2.6000e-004	1.0000e-005	1.4000e-004	1.5000e-004	0.0000	0.4414	0.4414	1.3000e-004	0.0000	0.4442

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.1200e-003	2.1200e-003	0.0000	0.0000	2.1200e-003
Total	1.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.1200e-003	2.1200e-003	0.0000	0.0000	2.1200e-003

3.4 Grading - 2016

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0900e-003	0.0000	1.0900e-003	4.7000e-004	0.0000	4.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3100e-003	0.0112	8.7000e-003	1.0000e-005		8.0000e-004	8.0000e-004		7.7000e-004	7.7000e-004	0.0000	1.0828	1.0828	2.2000e-004	0.0000	1.0874

Total	1.3100e-003	0.0112	8.7000e-003	1.0000e-005	1.0900e-003	8.0000e-004	1.8900e-003	4.7000e-004	7.7000e-004	1.2400e-003	0.0000	1.0828	1.0828	2.2000e-004	0.0000	1.0874
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Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.7400e-003	0.0140	0.0782	2.0000e-005	3.2000e-004	9.0000e-005	4.1000e-004	9.0000e-005	8.0000e-005	1.7000e-004	0.0000	1.8082	1.8082	3.0000e-005	0.0000	1.8088
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.2000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	8.4800e-003	8.4800e-003	0.0000	0.0000	8.5000e-003
Total	4.7600e-003	0.0140	0.0783	2.0000e-005	3.3000e-004	9.0000e-005	4.2000e-004	9.0000e-005	8.0000e-005	1.7000e-004	0.0000	1.8167	1.8167	3.0000e-005	0.0000	1.8173

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.9000e-004	0.0000	4.9000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9000e-004	0.0104	7.9600e-003	1.0000e-005		4.0000e-004	4.0000e-004		4.0000e-004	4.0000e-004	0.0000	1.0828	1.0828	2.2000e-004	0.0000	1.0874
Total	4.9000e-004	0.0104	7.9600e-003	1.0000e-005	4.9000e-004	4.0000e-004	8.9000e-004	1.0000e-004	4.0000e-004	5.0000e-004	0.0000	1.0828	1.0828	2.2000e-004	0.0000	1.0874

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.7400e-003	0.0140	0.0782	2.0000e-005	3.2000e-004	9.0000e-005	4.1000e-004	9.0000e-005	8.0000e-005	1.7000e-004	0.0000	1.8082	1.8082	3.0000e-005	0.0000	1.8088
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.2000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	8.4800e-003	8.4800e-003	0.0000	0.0000	8.5000e-003
Total	4.7600e-003	0.0140	0.0783	2.0000e-005	3.3000e-004	9.0000e-005	4.2000e-004	9.0000e-005	8.0000e-005	1.7000e-004	0.0000	1.8167	1.8167	3.0000e-005	0.0000	1.8173

3.5 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0691	0.6853	0.4106	5.7000e-004		0.0470	0.0470		0.0432	0.0432	0.0000	53.4584	53.4584	0.0161	0.0000	53.7970
Total	0.0691	0.6853	0.4106	5.7000e-004		0.0470	0.0470		0.0432	0.0432	0.0000	53.4584	53.4584	0.0161	0.0000	53.7970

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	1.0100e-003	2.9900e-003	0.0167	0.0000	7.0000e-005	2.0000e-005	9.0000e-005	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.3858	0.3858	1.0000e-005	0.0000	0.3859
Vendor	3.7900e-003	0.0132	0.0556	2.0000e-005	3.6000e-004	1.0000e-004	4.6000e-004	1.0000e-004	9.0000e-005	2.0000e-004	0.0000	1.6986	1.6986	2.0000e-005	0.0000	1.6990
Worker	2.0800e-003	8.0000e-004	9.9900e-003	1.0000e-005	6.3000e-004	1.0000e-005	6.4000e-004	1.7000e-004	1.0000e-005	1.8000e-004	0.0000	0.7210	0.7210	6.0000e-005	0.0000	0.7222
Total	6.8800e-003	0.0169	0.0823	3.0000e-005	1.0600e-003	1.3000e-004	1.1900e-003	2.9000e-004	1.2000e-004	4.2000e-004	0.0000	2.8053	2.8053	9.0000e-005	0.0000	2.8071

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0234	0.5324	0.3965	5.7000e-004		0.0192	0.0192		0.0192	0.0192	0.0000	53.4583	53.4583	0.0161	0.0000	53.7969
Total	0.0234	0.5324	0.3965	5.7000e-004		0.0192	0.0192		0.0192	0.0192	0.0000	53.4583	53.4583	0.0161	0.0000	53.7969

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0100e-003	2.9900e-003	0.0167	0.0000	7.0000e-005	2.0000e-005	9.0000e-005	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.3858	0.3858	1.0000e-005	0.0000	0.3859
Vendor	3.7900e-003	0.0132	0.0556	2.0000e-005	3.6000e-004	1.0000e-004	4.6000e-004	1.0000e-004	9.0000e-005	2.0000e-004	0.0000	1.6986	1.6986	2.0000e-005	0.0000	1.6990
Worker	2.0800e-003	8.0000e-004	9.9900e-003	1.0000e-005	6.3000e-004	1.0000e-005	6.4000e-004	1.7000e-004	1.0000e-005	1.8000e-004	0.0000	0.7210	0.7210	6.0000e-005	0.0000	0.7222
Total	6.8800e-003	0.0169	0.0823	3.0000e-005	1.0600e-003	1.3000e-004	1.1900e-003	2.9000e-004	1.2000e-004	4.2000e-004	0.0000	2.8053	2.8053	9.0000e-005	0.0000	2.8071

3.6 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.8000e-003	0.0266	0.0182	3.0000e-005		1.6500e-003	1.6500e-003		1.5300e-003	1.5300e-003	0.0000	2.4575	2.4575	6.7000e-004	0.0000	2.4717
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.8000e-003	0.0266	0.0182	3.0000e-005		1.6500e-003	1.6500e-003		1.5300e-003	1.5300e-003	0.0000	2.4575	2.4575	6.7000e-004	0.0000	2.4717

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1000e-004	4.0000e-005	5.3000e-004	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0382	0.0382	0.0000	0.0000	0.0382
Total	1.1000e-004	4.0000e-005	5.3000e-004	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0382	0.0382	0.0000	0.0000	0.0382

Mitigated Construction On-Site

Off-Road	9.2000e-004	5.9300e-003	4.7100e-003	1.0000e-005		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	0.6383	0.6383	8.0000e-005	0.0000	0.6399
Total	0.2461	5.9300e-003	4.7100e-003	1.0000e-005		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	0.6383	0.6383	8.0000e-005	0.0000	0.6399

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	9.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	6.3600e-003	6.3600e-003	0.0000	0.0000	6.3700e-003
Total	2.0000e-005	1.0000e-005	9.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	6.3600e-003	6.3600e-003	0.0000	0.0000	6.3700e-003

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2452					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8000e-004	5.8800e-003	4.5800e-003	1.0000e-005		2.4000e-004	2.4000e-004		2.4000e-004	2.4000e-004	0.0000	0.6383	0.6383	8.0000e-005	0.0000	0.6399
Total	0.2455	5.8800e-003	4.5800e-003	1.0000e-005		2.4000e-004	2.4000e-004		2.4000e-004	2.4000e-004	0.0000	0.6383	0.6383	8.0000e-005	0.0000	0.6399

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	9.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	6.3600e-003	6.3600e-003	0.0000	0.0000	6.3700e-003
Total	2.0000e-005	1.0000e-005	9.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	6.3600e-003	6.3600e-003	0.0000	0.0000	6.3700e-003

988 Howard Ave, Burlingame, CA

DPM Construction Emissions and Modeling Emission Rates - Unmitigated

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions			Modeled Area (m ²)	DPM Emission Rate (g/s/m ²)
				(lb/yr)	(lb/hr)	(g/s)		
2016	Construction	0.0505	CON_DPM	101.0	0.0231	2.91E-03	1,458	1.99E-06

hr/day = 12 (7am - 7pm)
 days/yr = 365
 hours/year = 4380

PM2.5 Fugitive Dust Construction Emissions for Modeling - Unmitigated

Construction Year	Activity	Area Source	PM2.5 Emissions				Modeled Area (m ²)	PM2.5 Emission Rate g/s/m ²
			(ton/year)	(lb/yr)	(lb/hr)	(g/s)		
2016	Construction	CON_FUG	0.0011	2.2	0.00051	6.39E-05	1,458	4.38E-08

hr/day = 12 (7am - 7pm)
 days/yr = 365
 hours/year = 4380

988 Howard Ave, Burlingame, CA - Health Impacts Summary

Construction Year	Maximum Concentrations		Cancer Risk (per million)		Hazard Index (-)	Maximum Annual PM2.5 Concentration (µg/m ³)
	Exhaust PM2.5/DPM (µg/m ³)	Fugitive PM2.5 (µg/m ³)	Child	Adult		
			2016	0.2125	0.0044	18.6

**988 Howard Ave, Burlingame, CA- Construction Emissions
Maximum DPM Cancer Risk Calculations From Construction Activities
Off-Site Residential Receptor Locations - 1.5 meters**

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor (mg/kg-day)⁻¹

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10⁻⁶ / AT

Where: C_{air} = concentration in air (µg/m³)

DBR = daily breathing rate (L/kg body weight-day)

A = Inhalation absorption factor

EF = Exposure frequency (days/year)

ED = Exposure duration (years)

AT = Averaging time period over which exposure is averaged.

10⁻⁶ = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Exposure Year	Exposure Duration (years)	Infant/Child - Exposure Information			Infant/Child Cancer Risk (per million)	Adult - Exposure Information			Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
		DPM Conc (ug/m3)		Exposure Adjust Factor		Modeled		Exposure Adjust Factor			
		Year	Annual			Year	Annual				
1	1	2016	0.1688	10	14.77	2016	0.1688	1	0.77	0.0069	0.176
2	1		0.0000	10	0.00		0.0000	1	0.00		
3	1		0.0000	4.75	0.00		0.0000	1	0.00		
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					14.77				0.77		

988 Howard Ave, Burlingame, CA- Construction Emissions
Maximum DPM Cancer Risk Calculations From Construction Activities
Off-Site Residential Receptor Locations - 5.2 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor (mg/kg-day)⁻¹

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10⁻⁶ / AT

Where: C_{air} = concentration in air (µg/m³)

DBR = daily breathing rate (L/kg body weight-day)

A = Inhalation absorption factor

EF = Exposure frequency (days/year)

ED = Exposure duration (years)

AT = Averaging time period over which exposure is averaged.

10⁻⁶ = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Exposure Year	Exposure Duration (years)	Infant/Child - Exposure Information			Infant/Child Cancer Risk (per million)	Adult - Exposure Information			Adult Cancer Risk (per million)
		DPM Conc (ug/m3)		Exposure Adjust Factor		Modeled		Exposure Adjust Factor	
		Year	Annual			Year	Annual		
1	1	2016	0.2125	10	18.60	2016	0.2125	1	0.97
2	1		0.0000	10	0.00		0.0000	1	0.00
3	1		0.0000	4.75	0.00		0.0000	1	0.00
4	1		0.0000	3	0.00		0.0000	1	0.00
5	1		0.0000	3	0.00		0.0000	1	0.00
6	1		0.0000	3	0.00		0.0000	1	0.00
7	1		0.0000	3	0.00		0.0000	1	0.00
8	1		0.0000	3	0.00		0.0000	1	0.00
9	1		0.0000	3	0.00		0.0000	1	0.00
10	1		0.0000	3	0.00		0.0000	1	0.00
11	1		0.0000	3	0.00		0.0000	1	0.00
12	1		0.0000	3	0.00		0.0000	1	0.00
13	1		0.0000	3	0.00		0.0000	1	0.00
14	1		0.0000	3	0.00		0.0000	1	0.00
15	1		0.0000	3	0.00		0.0000	1	0.00
16	1		0.0000	3	0.00		0.0000	1	0.00
17	1		0.0000	1.5	0.00		0.0000	1	0.00
18	1		0.0000	1	0.00		0.0000	1	0.00
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65	1		0.0000	1	0.00		0.0000	1	0.00
66	1		0.0000	1	0.00		0.0000	1	0.00
67	1		0.0000	1	0.00		0.0000	1	0.00
68	1		0.0000	1	0.00		0.0000	1	0.00
69	1		0.0000	1	0.00		0.0000	1	0.00
70	1		0.0000	1	0.00		0.0000	1	0.00
Total Increased Cancer Risk					18.6				1.0

Fugitive PM2.5 0.0044
Total PM2.5 0.217