

STOCKTON HOTEL CONSTRUCTION TOXIC AIR CONTAINMENT & GREENHOUSE GAS ASSESSMENT

San José, CA

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Introduction

The purpose of this report is to address the community health risk impacts and computed greenhouse gas (GHG emissions) associated with the Stockton Hotel project at located at 615 Stockton Avenue in San José, California. The air quality impacts and GHG emissions would be associated with demolition of the existing uses at the site, construction of the new buildings and infrastructure, and operation of the project.

This project would involve construction, which would be the primary source of toxic air contaminant (TAC) and fine particulate matter (PM_{2.5}) emissions that could lead to community risk impacts, or in other words, increase health risks at sensitive receptors. GHG emissions resulting from construction and project operation are also addressed. This analysis addresses those issues following the guidance provided by the Bay Area Air Quality Management District (BAAQMD).

Project Description

The project would demolish the existing 4,426-square foot (sf) general light industrial building and construct a five-story, 120-room hotel on a 0.59-acre site. The project would also provide a total of 115 below-ground parking spaces using triple-stacked parking lifts. A historic house that is adjacent to the project site and is currently being used as a business would be moved onto the project site to be retained as back-of-house hotel operations space. The entire building would be 96,491-sf.

Note: At the time of the analysis, the land use provided were the ones stated in the Project Description. Since then the Project land uses have changed. These changes include 1,500-sf of retail (aka a grab-and-go-market) and only 82 parking spaces. The Project is also no longer proposing triple-stacked parking lifts. Instead all parking spaces would be self-park spaces and valet spaces. The entire building would now be 68,080-sf instead of 96,491-sf. The entire project would total 69,372 with the historic house, which is an existing land use that would be used by the Project once operational. Since the project is decreasing in square footage and the “Hotel” land use accounts for facilities like restaurants and service shops, an updated analysis is not necessary. Therefore, the health risk impacts and GHG emissions would be similar or slightly less than the emissions predicted in this report.

It should also be noted that construction was estimated to begin in 2019 in the original analysis. However, the construction emissions estimated would again be similar or slightly less than the emissions predicted because the model assumes vehicles used during construction would be cleaner overtime due to the phasing-in of emission control technology.

Setting

The project is located in Santa Clara 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}).

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.

Regulatory Agencies

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 published California Environmental Quality Act (CEQA) Air Quality Guidelines that are used in this assessment to evaluate air quality impacts of projects.² The detailed community risk modeling methodology used in this assessment is contained in *Attachment 1*.

San José Envision 2040 General Plan

The San José Envision 2040 General Plan includes goals, policies, and actions to reduce exposure of the City's sensitive population to exposure of air pollution and toxic air contaminants or TACs. The following goals, policies, and actions are applicable to the proposed project:

¹ Available online: <http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm>. Accessed: November 21, 2014.

² Bay Area Air Quality Management District. 2017. *BAAQMD CEQA Air Quality Guidelines*. May.

Applicable Goals – Toxic Air Contaminants

Goal MS-11 Minimize exposure of people to air pollution and toxic air contaminants such as ozone, carbon monoxide, lead, and particulate matter.

Applicable Policies – Toxic Air Contaminants

MS-11.1 Require completion of air quality modeling for sensitive land uses such as new residential developments that are located near sources of pollution such as freeways and industrial uses. Require new residential development projects and projects categorized as sensitive receptors to incorporate effective mitigation into project designs or be located an adequate distance from sources of toxic air contaminants (TACs) to avoid significant risks to health and safety.

MS-11.4 Encourage the installation of appropriate air filtration at existing schools, residences, and other sensitive receptor uses adversely affected by pollution sources.

MS-11.5 Encourage the use of pollution absorbing trees and vegetation in buffer areas between substantial sources of TACs and sensitive land uses.

Actions – Toxic Air Contaminants

MS-11.7 Consult with BAAQMD to identify stationary and mobile TAC sources and determine the need for and requirements of a health risk assessment for proposed developments.

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 16, 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, and elementary schools. The closest sensitive receptors to the project site are residences adjacent to the western and southern site boundaries. There are additional residences at farther distances from the project site.

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA and these significance thresholds were contained in the District's 2011 *CEQA Air Quality Guidelines*. These thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA. The thresholds were challenged through a series of court challenges and were mostly upheld. BAAQMD updated the *CEQA Air Quality Guidelines* in 2017 to include the latest significance thresholds that were used in this analysis are summarized in Table 1.

Table 1. Community Risk Significance and GHG Thresholds

Health Risks and Hazards for Single Sources	
Excess Cancer Risk	>10 per one million
Hazard Index	>1.0
Incremental annual PM _{2.5}	>0.3 µg/m ³
Health Risks and Hazards for Combined Sources (Cumulative from all sources within 1,000-foot zone of influence)	
Excess Cancer Risk	>100 per one million
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 for projects operational in 2020*
Note: PM _{2.5} = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less; and GHG = greenhouse gas. *BAAQMD does not have a recommended post-2020 GHG threshold yet.	

Operational Community Health Risk Impacts

Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. When operating, the project would generate automobile traffic and infrequent truck traffic; however, these emissions are anticipated to result in fairly low impacts in terms of TAC or PM_{2.5} exposure and there would be no other operational sources of TAC or PM_{2.5}, so operational sources of health risk would not be substantial and were not further evaluated. No stationary sources of TACs, such as diesel-powered emergency generators, are proposed as part of the project. The hotel use would not introduce new sensitive receptors to the area since the individuals, who are temporary occupants, would not be exposed to cancer risk or annual PM_{2.5} concentrations for an extended period of time.

Construction Community Health Risk Impacts

Project Construction Activity

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust are known as a TAC. These exhaust air pollutant emissions would not be considered to contribute substantially to existing or projected air quality violations. Construction exhaust emissions may still pose health risks for sensitive receptors such as surrounding residents. The primary community risk impact issues associated with construction emissions are cancer risk and exposure to PM_{2.5}. Diesel exhaust poses both a potential health and nuisance impact to nearby receptors. A health risk assessment of the project construction activities was conducted that evaluated potential health effects of sensitive receptors at these nearby residences from construction emissions of DPM and PM_{2.5}.³ Dispersion modeling was conducted to predict the off-site concentrations resulting from project construction, so that lifetime cancer risks and non-cancer health effects could be evaluated.

Construction activity is anticipated to include demolition, site preparation, grading, utilities, building construction, paving, and architectural coating. Construction period emissions were modeled using the California Emissions Estimator Model, Version 2016.3.2 (CalEEMod). A build-out construction schedule, including equipment usage assumptions, was based on CalEEMod defaults for a project of this type and size. The proposed project land uses were input into CalEEMod and included the following: 120 rooms and 96,491-sf entered as “Hotel” on a 0.59-acre site and 115 spaces entered as “Enclosed Parking with Elevator”. In addition, the following estimations were entered into the model: 4,426-sf of building demolition and 23,800 cubic yards (cy) of excavation. Construction activity, in terms of schedule, equipment usage and truck traffic generation, was based on the CalEEMod model default settings.

The earliest possible construction start date of January 2019 was used. The CalEEMod default provided schedule estimated 247 workdays over 12 months. *Attachment 2* includes the CalEEMod output values for construction emissions, information for schedule, equipment usage, and truck hauling.

³ DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.

Construction Emissions

The CalEEMod model provided total annual PM₁₀ exhaust emissions (assumed to be DPM) for the off-road construction equipment and for exhaust emissions from on-road vehicles, with total emissions from all construction stages as 0.1200 tons (240 pounds). The on-road emissions are a result of haul truck travel during demolition and grading activities, worker travel, and vendor deliveries during construction. A trip length of one mile was used to represent vehicle travel while at or near the construction site. It was assumed that these emissions from on-road vehicles traveling at or near the site would occur at the construction site. Fugitive PM_{2.5} dust emissions were calculated by CalEEMod as 0.0373 tons (75 pounds) for the overall construction period.

Dispersion Modeling

The U.S. EPA AERMOD dispersion model was used to predict DPM and PM_{2.5} concentrations at sensitive receptors (residences) in the vicinity of the project construction area. The AERMOD dispersion model is a BAAQMD-recommended model for use in modeling analysis of these types of emission activities for CEQA projects.⁴ Emission sources for the construction site were grouped into two categories: exhaust emissions of DPM and fugitive PM_{2.5} dust emissions. Combustion equipment exhaust emissions were modeled as a series of point sources with a nine-foot release height (construction equipment exhaust stack height) placed at 5-meter (16-foot) intervals throughout the construction site. This resulted in 92 individual point sources being used to represent mobile equipment DPM exhaust emissions in the construction area, with DPM emissions occurring throughout the project construction site. Emissions from vehicle travel on- and off-site were distributed among the point sources throughout the site. Construction fugitive PM_{2.5} dust emissions were modeled as an area source encompassing the entire construction site with a near ground level release height of two meters. Construction emissions were modeled as occurring daily between 7 a.m. to 4 p.m., when the majority of construction activity would occur.

The modeling used a five-year data set (2006-2010) of hourly meteorological data from the San José Airport meteorological site that was prepared for use with the AERMOD model by BAAQMD. Annual DPM and PM_{2.5} concentrations from construction activities during the 2019 period were calculated using the model. DPM and PM_{2.5} concentrations were calculated at nearby sensitive receptors. Receptor heights of 1.5 meters (5 feet) and 4.5 meters (15 feet) were used to represent the breathing heights of residents in nearby homes and apartment buildings with residential units on the first and second floor levels.

Predicted Cancer Risk and Hazards

Figure 1 shows the locations where the maximum-modeled DPM and PM_{2.5} concentrations occurred. The maximum concentrations occurred at a single-family residence (1.5 meters) southeast of the project site. Using the maximum annual modeled DPM concentration, the maximum increased cancer risk at the location of the maximally exposed individual (MEI) was calculated using BAAQMD recommended methods. The cancer risk calculations are based on applying the BAAQMD recommended age sensitivity factors to the TAC concentrations. 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,

⁴ Bay Area Air Quality Management District (BAAQMD), 2012, *Recommended Methods for Screening and Modeling Local Risks and Hazards, Version 3.0*. May.

as described in *Attachment 1*. Infant and adult exposures were assumed to occur at all residences through the entire construction period. *Attachment 3* includes the construction emission calculations and source information used in the modeling and the cancer risk calculations.

Results of this assessment indicate that the maximum increased residential cancer risks without any mitigation or construction emissions control would be 47.8 in one million for an infant exposure and 0.8 in one million for an adult exposure. The maximum residential excess cancer risk would be above the significance threshold of 10.0 in one million. *Implementation of Mitigation Measures AQ-1 and AQ-2 would reduce this impact to a level of less than significant. Both mitigation measures are described in more details below.*

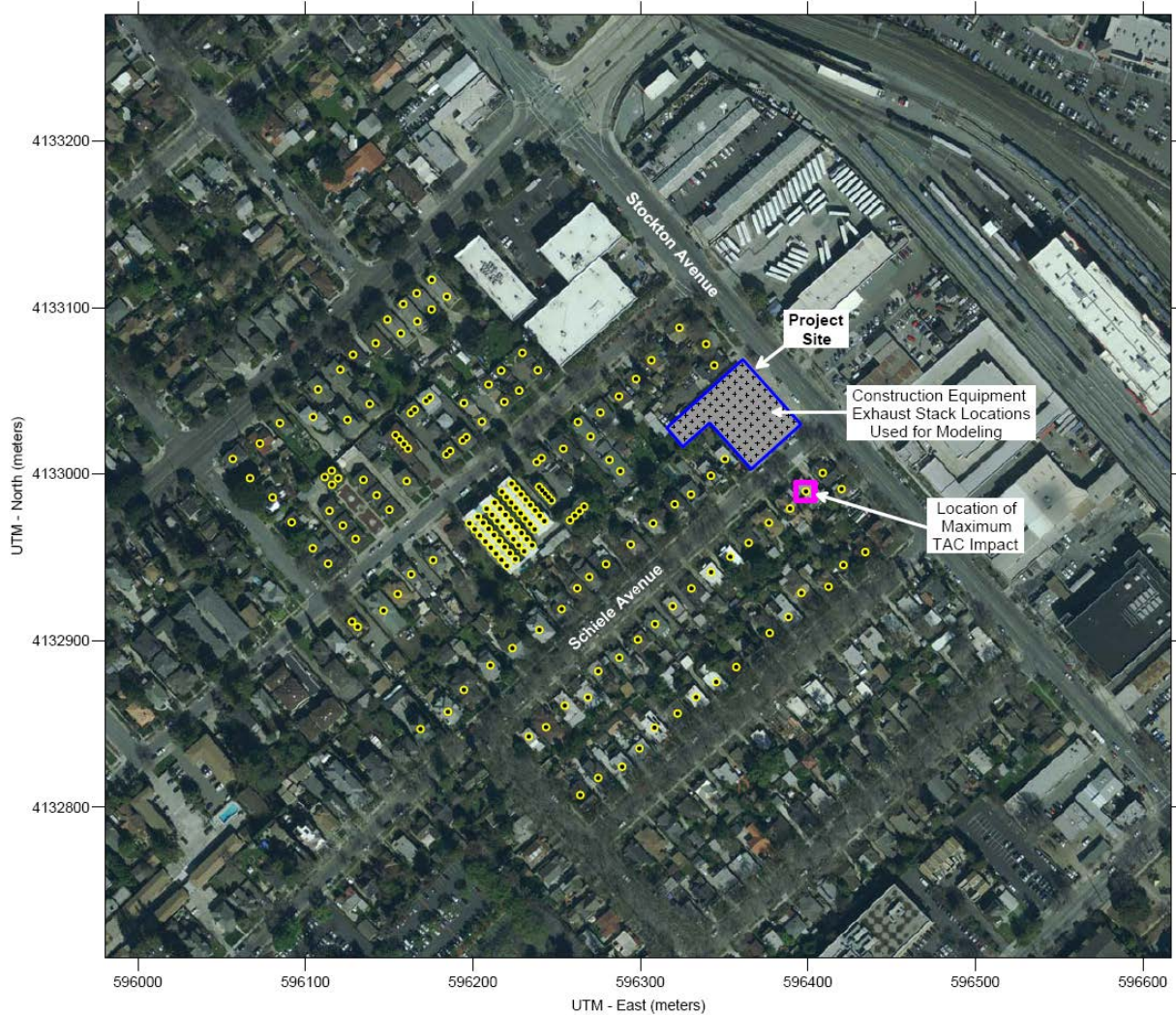
Predicted Annual PM_{2.5} Concentration

The maximum-modeled annual PM_{2.5} concentration, which is based on combined exhaust and fugitive dust emissions, would be 0.62 µg/m³. This maximum annual PM_{2.5} concentration would exceed the BAAQMD significance threshold of greater than 0.3 µg/m³. The location of the receptor with the maximum PM_{2.5} concentration is shown in Figure 1. *Implementation of Mitigation Measures AQ-1 and AQ-2 would reduce this impact to a level of less than significant.*

Non-Cancer Hazards

The maximum modeled annual residential DPM concentration (i.e., from construction exhaust) would be 0.2908 µg/m³. The maximum computed Hazard Index (HI) based on this DPM concentration would be 0.06, which does not exceed the BAAQMD significance criterion of a HI greater than 1.0.

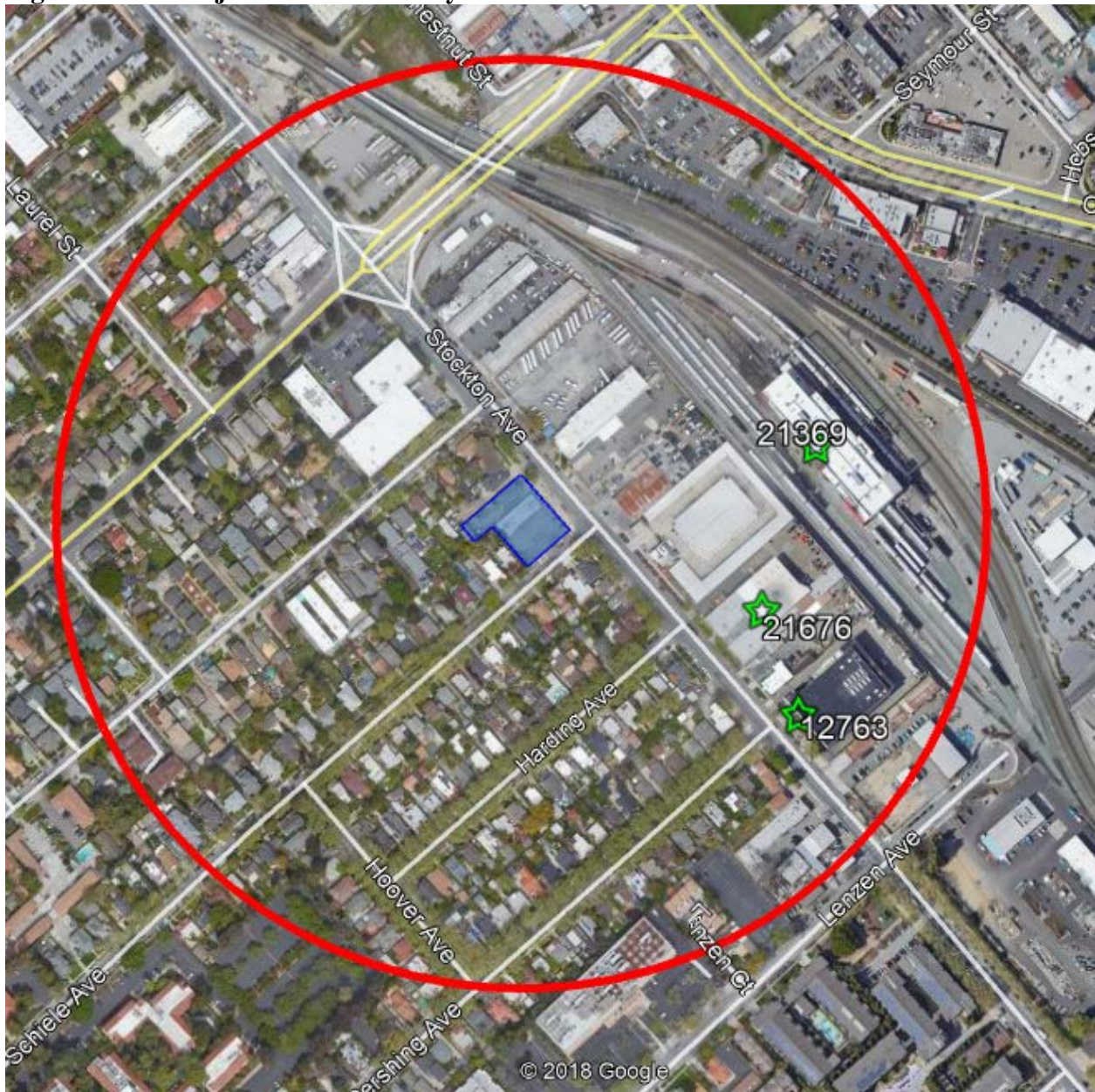
Figure 1. Project Construction Site and Locations of Off-Site Sensitive Receptors and TAC Impacts



Cumulative Impact on Construction MEI

Cumulative community risk impacts were addressed through an evaluation of TAC sources located within 1,000 feet of the construction MEI. These sources include freeways or highways, busy surface streets, and stationary sources identified by BAAQMD. A review of the project area indicates that most nearby streets are assumed to have less than 10,000 vehicles per day. A review of the project area indicates that traffic on West Taylor Street is a busy roadway that is considered a source of TACs. A review of BAAQMD's stationary source Google Earth map tool identified three stationary sources with the potential to affect the construction MEI. The Caltrain rail line is also located within the 1,000-ft of the project, but it is assumed to not have a significant impact towards cumulative exposures. Figure 2 shows the sources affecting the project site, nearby cumulative sources affecting the construction MEI. Community risk impacts from these sources upon the construction MEI are reported in Table 2. Details of the modeling and community risk calculations are included in *Attachment 4*.

Figure 2. Project Site and Nearby TAC and PM_{2.5} Sources



Local Roadways – West Taylor Street

For local roadways, BAAQMD has provided the *Roadway Screening Analysis Calculator* to assess whether roadways with traffic volumes of over 10,000 vehicles per day may have a potentially significant effect on a proposed project. Two adjustments were made to the cancer risk predictions made by this calculator: (1) adjustment for latest vehicle emissions rates predicted using EMFAC2014 and (2) adjustment of cancer risk to reflect new Office of Environmental Health Hazard Assessment (OEHHA) guidance (see *Attachment 1*).

The calculator uses EMFAC2011 emission rates for the year 2014. Overall, emission rates will decrease by the time the project is constructed and occupied. The project would not be occupied prior to at least 2018. In addition, a new version of the emissions factor model, EMFAC2014 is available. This version predicts lower emission rates. An adjustment factor of 0.5 was developed

by comparing emission rates of total organic gases (TOG) for running exhaust and running losses developed using EMFAC2011 for year 2014 and those from EMFAC2014 for 2018.

The predicted cancer risk was then adjusted using a factor of 1.3744 to account for new OEHHA guidance. This factor was provided by BAAQMD for use with their CEQA screening tools that are used to predict cancer risk.

West Taylor Street was identified as having over 10,000 vehicles per day with the average daily traffic (ADT) estimated to be 13,020 vehicles. This estimate was based on the peak-hour traffic volumes included in the project's traffic analysis for background plus project conditions.⁵ The AM and PM peak-hour volumes were averaged and then multiplied by 10 to estimate the ADT.

The BAAQMD *Roadway Screening Analysis Calculator* for Santa Clara County was used for both roadways. West Taylor Street was identified as an east-west directional roadway with the construction MEI 820 feet south of the roadway. Estimated risk values for both roadways are listed in Table 2. Note that BAAQMD has found that non-cancer hazards from all local roadways would be well below the BAAQMD thresholds. Chronic or acute HI for the roadway would be below 0.03.

Stationary Sources

Permitted stationary sources of air pollution near the project site were identified using BAAQMD's *Stationary Source Risk & Hazard Analysis Tool*. This mapping tool uses Google Earth and identified the location of seven stationary sources and their estimated risk and hazard impacts. A Stationary Source Information Form (SSIF) containing the identified sources was prepared and submitted to BAAQMD. They provided updated risk levels, emissions and adjustments to account for new OEHHA guidance⁶. The agency noted that Plant #16696 was shut-down. BAAQMD also identified Plants #19382 and #18409 as coating operation sources, which would have low health risk impacts on the construction MEI, so they were not considered within the cumulative impact analysis. Additionally, since Plant #2049 was located beyond the 1,000-ft area of influence it was not considered a source of TACs.

The remaining three stationary sources were then adjusted with the appropriate distance multiplier values provided by BAAQMD or the emissions information was used in refined modeling. Plant #12763, #21676, and #21369 are all generators with Plant #21369 also being an oil/water separator. The risk values from these plants were adjusted for distance based on BAAQMD's *Distance Adjustment Multiplier Tool for Diesel Internal Combustion Engines*. Concentration levels and community risk impacts from these sources upon the project are reported in Table 2.

Railway: Caltrain Rail Line

The project site is located about 500 feet southwest of the Caltrain rail line, and rail activity currently generates TAC and PM_{2.5} emissions from locomotive exhaust. The Peninsula Corridor Electrification Project is a key component of the Caltrain Modernization program that would electrify most of the trains on the Caltrain Corridor from San Francisco to San Jose. Under this

⁵ Correspondence with Fiona Phung, David J. Powers, October 11, 2018

⁶ Correspondence with Areana Flores, BAAQMD, August 10, 2018.

program diesel-locomotive hauled trains would be converted to Electric Multiple Unit or EMU trains by 2023. The EMU trains would not have TAC or PM_{2.5} emissions, and consequently, would not result in community risk impacts. There is a phase-in period where some Caltrain trains would continue to be diesel powered. Significant community risk impacts are not anticipated since the construction MEI is located about 500 feet from the tracks. Since many of the trains will be converted to electric power, cancer risk would be less than 10 per million and annual PM_{2.5} concentrations and non-cancer hazards would be very low

Summary of Construction Health Risk Impacts

Table 2 reports both the project and cumulative community risk impacts. Without mitigation, the project would have a *significant* impact with respect to community risk caused by project construction activities, since the maximum cancer risk and PM_{2.5} concentration exceed the single-source thresholds of 10.0 per million for cancer risk and 0.3 µg/m³ for PM_{2.5}, respectively. As shown in Table 2, the combined annual cancer risk and Hazard risk values, which includes unmitigated and mitigated, would not exceed the cumulative threshold. *Attachment 4* includes the construction emission calculations and source information used in the modeling and the cancer risk calculations.

Table 2. Impacts from Combined Sources at Construction MEI

Source		Maximum Cancer Risk (per million)	PM _{2.5} concentration (µg/m ³)	Hazard Index
Project Construction	Unmitigated	47.8 (infant)	0.62	0.06
	Mitigated	5.5 (infant)	0.13	0.01
BAAQMD Single-Source Threshold		>10.0	>0.3	>1.0
Significant?				
	Unmitigated	Yes	Yes	No
	Mitigated	No	No	No
West Taylor Street (east-west) at 820 feet south ADT 13,020		0.7	0.02	<0.03
Plant #21369 (Generator, Oil/Water Separator) at 650 feet		0.2	<0.01	<0.01
Plant #21676 (Generator) at 430 feet		2.1	<0.01	<0.01
Plant #12763 (Generator) at 560 feet		0.6	<0.01	<0.01
<i>Combined Sources</i>	<i>Unmitigated</i>	51.4 (infant)	<0.67	<0.12
	<i>Mitigated</i>	9.1 (infant)	<0.18	<0.07
BAAQMD Cumulative Source Threshold		>100	>0.8	>10.0
Significant?				
	Unmitigated	No	No	No
	Mitigated	No	No	No

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.

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

The project shall develop a plan demonstrating that the off-road equipment used on-site to construct the project would achieve a fleet-wide average 88-percent reduction in DPM exhaust emissions or greater. One feasible plan to achieve this reduction would include the following:

1. All diesel-powered off-road equipment, larger than 25 horsepower, operating on the site for more than two days continuously shall, at a minimum, meet U.S. EPA NO_x and particulate matter emissions standards for Tier 3 engines and this equipment shall include CARB-certified Level 3 Diesel Particulate Filters⁷ or equivalent. Equipment that meets U.S. EPA Tier 4 interim standards or use of equipment that is electrically powered or uses non-diesel fuels would meet this requirement.

⁷ See <http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm>

Effectiveness of Mitigation AQ-1 & AQ-2

The measures included above would be consistent with BAAQMD-recommended basic control measures for reducing fugitive particulate matter that are contained in the BAAQMD CEQA Air Quality Guidelines. Implementation of *Mitigation Measure AQ-2* would further reduce on-site diesel exhaust emissions by over 88 percent. With mitigation, the computed maximum increased lifetime residential cancer risk from construction, assuming infant exposure, would be 5.5 in one million or less, the maximum annual PM_{2.5} concentration would be 0.13 µg/m³, and the Hazard Index would be 0.01. As a result, impacts would be reduced to *less than significant* with respect to community risk caused by construction activities.

Greenhouse Gases

Setting

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. 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 climate change 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 are adversely affected by the global warming trend. Increased precipitation and sea level rise will 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.

Recent Regulatory Actions

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

AB 32, the Global Warming Solutions Act of 2006, codified the State's GHG emissions target by directing CARB to reduce the State's global warming emissions to 1990 levels by 2020. AB 32 was signed and passed into law by Governor Schwarzenegger on September 27, 2006. Since that time, the CARB, CEC, California Public Utilities Commission (CPUC), and Building Standards Commission have all been developing regulations that will help meet the goals of AB 32 and Executive Order S-3-05.

A Scoping Plan for AB 32 was adopted by CARB in December 2008. It contains the State's main strategies to reduce GHGs from business-as-usual emissions projected in 2020 back down to 1990 levels. Business-as-usual (BAU) is the projected emissions in 2020, including increases in emissions caused by growth, without any GHG reduction measures. The Scoping Plan has a range of GHG reduction actions, including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system.

Senate Bill 375, California's Regional Transportation and Land Use Planning Efforts (2008)

California enacted legislation (SB 375) to expand the efforts of AB 32 by controlling indirect GHG emissions caused by urban sprawl. SB 375 provides incentives for local governments and applicants to implement new conscientiously planned growth patterns. This includes incentives for creating attractive, walkable, and sustainable communities and revitalizing existing communities. The legislation also allows applicants to bypass certain environmental reviews under CEQA if they build projects consistent with the new sustainable community strategies. Development of more alternative transportation options that would reduce vehicle trips and miles traveled, along with traffic congestion, would be encouraged. SB 375 enhances CARB's ability to reach the AB 32 goals by directing the agency in developing regional GHG emission reduction targets to be achieved from the transportation sector for 2020 and 2035. CARB works with the metropolitan planning organizations (e.g. Association of Bay Area Governments [ABAG] and Metropolitan Transportation Commission [MTC]) to align their regional transportation, housing, and land use plans to reduce vehicle miles traveled and demonstrate the region's ability to attain its GHG reduction targets. A similar process is used to reduce transportation emissions of ozone precursor pollutants in the Bay Area.

SB 350 Renewable Portfolio Standards

In September 2015, the California Legislature passed SB 350, which increases the states Renewables Portfolio Standard (RPS) for content of electrical generation from the 33 percent target for 2020 to a 50 percent renewables target by 2030.

Executive Order EO-B-30-15 (2015) and SB 32 GHG Reduction Targets

In April 2015, Governor Brown signed Executive Order which extended the goals of AB 32, setting a greenhouse gas emissions target at 40 percent of 1990 levels by 2030. On September 8, 2016, Governor Brown signed SB 32, which legislatively established the GHG reduction target of 40 percent of 1990 levels by 2030. In November 2017, CARB issued *California's 2017*

Climate Change Scoping Plan. While the State is on track to exceed the AB 32 scoping plan 2020 targets, this plan is an update to reflect the enacted SB 32 reduction target.

The new Scoping Plan establishes a strategy that will reduce GHG emissions in California to meet the 2030 target (note that the AB 32 Scoping Plan only addressed 2020 targets and a long-term goal). Key features of this plan are:

- Cap and Trade program places a firm limit on 80 percent of the State’s emissions;
- Achieving a 50-percent Renewable Portfolio Standard by 2030 (currently at about 29 percent statewide);
- Increase energy efficiency in existing buildings (note that new
- Develop fuels with an 18-percent reduction in carbon intensity;
- Develop more high-density, transit-oriented housing;
- Develop walkable and bikeable communities
- Greatly increase the number of electric vehicles on the road and reduce oil demand in half;
- Increase zero-emissions transit so that 100 percent of new buses are zero emissions;
- Reduce freight-related emissions by transitioning to zero emissions where feasible and near-zero emissions with renewable fuels everywhere else; and
- Reduce “super pollutants” by reducing methane and hydrofluorocarbons or HFCs by 40 percent.

In the updated Scoping Plan, CARB recommends statewide targets of no more than 6 metric tons CO_{2e} per capita (statewide) by 2030 and no more than 2 metric tons CO_{2e} per capita by 2050. The statewide per capita targets account for all emissions sectors in the State, statewide population forecasts, and the statewide reductions necessary to achieve the 2030 statewide target under SB 32 and the longer-term State emissions reduction goal of 80 percent below 1990 levels by 2050.

Significance Thresholds

The BAAQMD’s CEQA Air Quality Guidelines recommended a GHG threshold of 1,100 metric tons or 4.6 metric tons (MT) per capita. These thresholds were developed based on meeting the 2020 GHG targets set in the scoping plan that addressed AB 32. Development of the project would occur in 2020. Although BAAQMD has not published a quantified threshold for 2030 yet, this assessment uses a “Substantial Progress” efficiency metric of 2.6 MT CO_{2e}/year/service population and a bright-line threshold of 660 MT CO_{2e}/year based on the GHG reduction goals of EO B-30-15. The service population metric of 2.6 is calculated for 2030 based on the 1990 inventory and the projected 2030 statewide population and employment levels⁸. The 2030 bright-line threshold is a 40 percent reduction of the 2020 1,100 MT CO_{2e}/year threshold.

⁸ Association of Environmental Professionals, 2016. *Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California*. April.

CalEEMod Modeling

CalEEMod was used to predict GHG emissions from operation of the site assuming full build-out of the project. The project land use types and size and other project-specific information were input to the model, as described above. CalEEMod output is included in *Attachment 2*.

Land Uses

The project land uses were input to CalEEMod as described above for the construction period modeling.

Model Year

Emissions associated with vehicle travel depend on the year of analysis because emission control technology requirements are phased-in over time. Therefore, the earlier the year analyzed in the model, the higher the emission rates utilized by CalEEMod. The earliest the project could possibly be constructed and begin operating would be 2020. Emissions associated with build-out later than 2020 would be lower.

Trip Generation Rates

CalEEMod allows the user to enter specific vehicle trip generation rates, which were input to the model using the daily trip generation rate provided in the project trip generation table. The Saturday and Sunday trip rates were assumed to be the weekday rate adjusted by multiplying the ratio of the CalEEMod default rates for Saturday and Sunday trips. The traffic analysis provided project trip generation values for the hotel.⁹ The weekday trip rate used for the hotel was 3.50; the rate included the *Urban Low-Transit* location-based reduction. As a result, the Saturday trip rate was 3.51 and the Sunday trip rate was 2.55.

Energy

CalEEMod defaults for energy use were used, which include the 2016 Title 24 Building Standards. GHG emissions modeling includes those indirect emissions from electricity consumption. The electricity produced emission rate was modified in CalEEMod. CalEEMod has a default emission factor of 641.3 pounds of CO₂ per megawatt of electricity produced, which is based on PG&E's 2008 emissions rate. PG&E published 2015 emissions rates for 2009 through 2015, which showed the emission rate for delivered electricity had been reduced to 405 pounds CO₂ per megawatt of electricity delivered.¹⁰ The projected GHG intensity factor for the year 2020 is 290 pounds of CO₂ per megawatt of electricity produced, which was input to the model.¹¹

⁹ Hexagon Transportation Consultants, Inc. *615 Stockton Avenue Hotel Development Transportation Analysis*. 17 October.

¹⁰ PG&E 2017. Climate Change. See http://www.pgecorp.com/corp_responsibility/reports/2017/en02_climate_change.html accessed March 13, 2018.

¹¹ PG&E. 2015. Greenhouse Gas Emission Factors: Guidance for PG&E Customers
See: https://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

Other Inputs

Default model assumptions for emissions associated with solid waste generation use were applied to the project. Water/wastewater use were changed to 100% aerobic conditions to represent wastewater treatment plant conditions.

Existing Uses

A CalEEMod model run was developed to compute emissions from use of the existing building as if it was operating in 2021. The input for this modeling scenario included 4,426-sf entered as “General Light Industry”. This input was applied to the modeling in the same manner described for the proposed project.

Service Population Emissions

The project service population efficiency rate is based on the number of future residents or employees. Hotel occupants are not considered residents since the individuals stay the hotel for a temporary amount of time. Based on information from the applicant, the maximum number of employees per shift would be seven. Therefore, the total future service population is estimated to be 21 employees.

Construction Emissions

GHG emissions associated with construction were computed to be 457 MT of CO_{2e} for the total construction period. These are the emissions from on-site operation of construction equipment, vendor and hauling truck trips, and worker trips. Neither the City nor BAAQMD have an adopted threshold of significance for construction-related GHG emissions, though BAAQMD recommends quantifying emissions and disclosing that GHG emissions would occur during construction. BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. Best management practices assumed to be incorporated into construction of the proposed project include but are not limited to: using local building materials of at least 10 percent and recycling or reusing at least 50 percent of construction waste or demolition materials.

Operational Emissions

The CalEEMod model, along with the project vehicle trip generation rates, was used to estimate daily emissions associated with operation of the fully-developed site under the proposed project. As shown in Table 3, annual net emissions resulting from operation of the proposed project are predicted to be 663 MT of CO_{2e} for the year 2020 and 589 MT of CO_{2e} for the year 2030. The 2020 emissions would not exceed the 2020 significance threshold of 1,100 MT of CO_{2e}/yr nor would the 2030 emissions exceed the 2030 “Substantial Progress” threshold of 660 MT of CO_{2e}/yr. To be considered significant, the project must exceed both the GHG significance threshold in metric tons per year and the service population significance threshold. This project only exceeds the service population significance threshold. Therefore, the project would have a *less-than-significant* impact regarding GHG emissions.

Table 3. Annual Project GHG Emissions (CO₂e) in Metric Tons

Source Category	Existing Land Use in 2020	Proposed Project in 2020	Proposed Project in 2030
Area	1	1	1
Energy Consumption	11	362	362
Mobile	26	305	231
Solid Waste Generation	3	33	33
Water Usage	1	4	4
Total (MT CO ₂ e/yr)	42	705	631
Net Emissions		663	589
<i>Significance Threshold</i>		<i>1,100 MT CO₂e/yr</i>	<i>660 MT CO₂e/yr</i>
Service Population Emissions (MT CO ₂ e/year/service population)		33.6	30.0
<i>Significance Threshold</i>		<i>4.6 in 2020</i>	<i>2.6 in 2030</i>
<i>Significant (Exceeds both thresholds)?</i>		<i>No</i>	<i>No</i>

Supporting Documentation

Attachment 1 is the methodology used to compute community risk impacts, including the methods to compute lifetime cancer risk from exposure to project emissions.

Attachment 2 includes the CalEEMod output for project construction TAC emissions and GHG emissions. Also included are any modeling assumptions.

Attachment 3 is the construction health risk assessment. AERMOD dispersion modeling files for this assessment, which are quite voluminous, are available upon request and would be provided in digital format.

Attachment 4 includes the screening community risk calculations from sources affecting the construction MEI.

Attachment 1: Health Risk Calculation Methodology

A health risk assessment (HRA) for exposure to Toxic Air Contaminates (TACs) requires the application of a risk characterization model to the results from the air dispersion model to estimate potential health risk at each sensitive receptor location. The State of California Office of Environmental Health Hazard Assessment (OEHHA) and California Air Resources Board (CARB) develop recommended methods for conducting health risk assessments. The most recent OEHHA risk assessment guidelines were published in February of 2015.¹² These guidelines incorporate substantial changes designed to provide for enhanced protection of children, as required by State law, compared to previous published risk assessment guidelines. CARB has provided additional guidance on implementing OEHHA's recommended methods.¹³ This HRA used the recent 2015 OEHHA risk assessment guidelines and CARB guidance. The BAAQMD has adopted recommended procedures for applying the newest OEHHA guidelines as part of Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants.¹⁴ Exposure parameters from the OEHHA guidelines and the recent BAAQMD HRA Guidelines were used in this evaluation.

Cancer Risk

Potential increased cancer risk from inhalation of TACs are calculated based on the TAC concentration over the period of exposure, inhalation dose, the TAC cancer potency factor, and an age sensitivity factor to reflect the greater sensitivity of infants and children to cancer causing TACs. The inhalation dose depends on a person's breathing rate, exposure time and frequency of exposure, and the exposure duration. These parameters vary depending on the age, or age range, of the persons being exposed and whether the exposure is considered to occur at a residential location or other sensitive receptor location.

The current OEHHA guidance recommends that cancer risk be calculated by age groups to account for different breathing rates and sensitivity to TACs. Specifically, they recommend evaluating risks for the third trimester of pregnancy to age zero, ages zero to less than two (infant exposure), ages two to less than 16 (child exposure), and ages 16 to 70 (adult exposure). Age sensitivity factors (ASFs) associated with the different types of exposure are an ASF of 10 for the third trimester and infant exposures, an ASF of 3 for a child exposure, and an ASF of 1 for an adult exposure. Also associated with each exposure type are different breathing rates, expressed as liters per kilogram of body weight per day (L/kg-day). As recommended by the BAAQMD, 95th percentile breathing rates are used for the third trimester and infant exposures, and 80th percentile breathing rates for child and adult exposures. Additionally, CARB and the BAAQMD recommend the use of a residential exposure duration of 30 years for sources with long-term emissions (e.g., roadways).

¹² OEHHA, 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. February.

¹³ CARB, 2015. *Risk Management Guidance for Stationary Sources of Air Toxics*. July 23.

¹⁴ BAAQMD, 2016. *BAAQMD Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines*. December 2016.

Under previous OEHHA and BAAQMD HRA guidance, residential receptors are assumed to be at their home 24 hours a day, or 100 percent of the time. In the 2015 Risk Assessment Guidance, OEHHA includes adjustments to exposure duration to account for the fraction of time at home (FAH), which can be less than 100 percent of the time, based on updated population and activity statistics. The FAH factors are age-specific and are: 0.85 for third trimester of pregnancy to less than 2 years old, 0.72 for ages 2 to less than 16 years, and 0.73 for ages 16 to 70 years. Use of the FAH factors is allowed by the BAAQMD if there are no schools in the project vicinity that would have a cancer risk of one in a million or greater assuming 100 percent exposure (FAH = 1.0).

Functionally, cancer risk is calculated using the following parameters and formulas:

$$\text{Cancer Risk (per million)} = CPF \times \text{Inhalation Dose} \times ASF \times ED/AT \times FAH \times 10^6$$

Where:

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

ASF = Age sensitivity factor for specified age group

ED = Exposure duration (years)

AT = Averaging time for lifetime cancer risk (years)

FAH = Fraction of time spent at home (unitless)

$$\text{Inhalation Dose} = C_{\text{air}} \times DBR \times A \times (EF/365) \times 10^{-6}$$

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)

10⁻⁶ = Conversion factor

The health risk parameters used in this evaluation are summarized as follows:

Parameter	Exposure Type →	Infant		Child		Adult
	Age Range →	3 rd Trimester	0<2	2 < 9	2 < 16	16 - 30
DPM Cancer Potency Factor (mg/kg-day) ⁻¹		1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
Daily Breathing Rate (L/kg-day)*		361	1,090	631	572	261
Inhalation Absorption Factor		1	1	1	1	1
Averaging Time (years)		70	70	70	70	70
Exposure Duration (years)		0.25	2	14	14	14
Exposure Frequency (days/year)		350	350	350	350	350
Age Sensitivity Factor		10	10	3	3	1
Fraction of Time at Home		0.85-1.0	0.85-1.0	0.72-1.0	0.72-1.0	0.73

* 95th percentile breathing rates for 3rd trimester and infants and 80th percentile for children and adults.

Non-Cancer Hazards

Potential 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). 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 total HI is calculated as the sum of the HIs for each TAC evaluated and the total HI is compared to the BAAQMD significance thresholds to determine whether a significant non-cancer health impact from a project would occur.

Typically, for residential projects located near roadways with substantial TAC emissions, the primary TAC of concern with non-cancer health effects is diesel particulate matter (DPM). For DPM, the chronic inhalation REL is 5 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).

Annual PM_{2.5} Concentrations

While not a TAC, fine particulate matter (PM_{2.5}) has been identified by the BAAQMD as a pollutant with potential non-cancer health effects that should be included when evaluating potential community health impacts under the California Environmental Quality Act (CEQA). The thresholds of significance for PM_{2.5} (project level and cumulative) are in terms of an increase in the annual average concentration. When considering PM_{2.5} impacts, the contribution from all sources of PM_{2.5} emissions should be included. For projects with potential impacts from nearby local roadways, the PM_{2.5} impacts should include those from vehicle exhaust emissions, PM_{2.5} generated from vehicle tire and brake wear, and fugitive emissions from re-suspended dust on the roads.

Attachment 2: CalEEMod Modeling Output

Attachment 3: Construction Health Risk Calculations

615 Stockton Ave., San Jose CA

DPM Construction Emissions and Modeling Emission Rates - Unmitigated

Construction Year	Activity	DPM (ton/year)	Source Type	No. Sources	DPM Emissions			Emissions per Point Source
					(lb/yr)	(lb/hr)	(g/s)	(g/s)
2019	Construction	0.1200	Point	92	240.0	0.07306	9.21E-03	1.00E-04

hr/day = 9 (7am - 4pm)
 days/yr = 365
 hours/year = 3285

PM2.5 Fugitive Dust Construction Emissions for Modeling - Unmitigated

Construction Year	Activity	Area Source	PM2.5 Emissions				Modeled Area (m ²)	DPM Emission Rate
			(ton/year)	(lb/yr)	(lb/hr)	(g/s)		g/s/m ²
2019	Construction	CON_FUG	0.03730	74.6	0.02271	2.86E-03	2,406	1.19E-06

hr/day = 9 (7am - 4pm)
 days/yr = 365
 hours/year = 3285

DPM Construction Emissions and Modeling Emission Rates - With Mitigation

Construction Year	Activity	DPM (ton/year)	Source Type	No. Sources	DPM Emissions			Emissions per Point Source
					(lb/yr)	(lb/hr)	(g/s)	(g/s)
2019	Construction	0.0139	Point	92	27.8	0.00846	1.07E-03	1.16E-05

hr/day = 9 (7am - 4pm)
 days/yr = 365
 hours/year = 3285

PM2.5 Fugitive Dust Construction Emissions for Modeling - With Mitigation

Construction Year	Activity	Area Source	PM2.5 Emissions				Modeled Area (m ²)	DPM Emission Rate
			(ton/year)	(lb/yr)	(lb/hr)	(g/s)		g/s/m ²
2019	Construction	CON_FUG	0.01010	20.2	0.00615	7.75E-04	2,406	3.22E-07

hr/day = 9 (7am - 4pm)
 days/yr = 365
 hours/year = 3285

615 Stockton Ave., San Jose CA - Construction Health Impact Summary

Maximum Impacts at MEI Location - Unmitigated

Emissions Year	Maximum Concentrations		Cancer Risk (per million)		Hazard Index (-)	Maximum Annual PM2.5 Concentration ($\mu\text{g}/\text{m}^3$)
	Exhaust PM10/DPM ($\mu\text{g}/\text{m}^3$)	Fugitive PM2.5 ($\mu\text{g}/\text{m}^3$)	Infant/Child	Adult		
	<i>2019</i>	0.2908	0.3334	47.8	0.8	0.058

Maximum Impacts at MEI Location - With Mitigation

Emissions Year	Maximum Concentrations		Cancer Risk (per million)		Hazard Index (-)	Maximum Annual PM2.5 Concentration ($\mu\text{g}/\text{m}^3$)
	Exhaust PM10/DPM ($\mu\text{g}/\text{m}^3$)	Fugitive PM2.5 ($\mu\text{g}/\text{m}^3$)	Infant/Child	Adult		
	<i>2019</i>	0.0337	0.1121	5.5	0.1	0.007

615 Stockton Ave., San Jose CA - Construction Impacts - Without Mitigation
Maximum DPM Cancer Risk and PM2.5 Calculations From Construction
Impacts at Off-Site MEI Location - 1.5 meter receptor height

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

- Where: CPF = Cancer potency factor (mg/kg-day)⁻¹
 ASF = Age sensitivity factor for specified age group
 ED = Exposure duration (years)
 AT = Averaging time for lifetime cancer risk (years)
 FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10⁻⁶

- 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)
 10⁻⁶ = Conversion factor

Values

Age --> Parameter	Infant/Child				Adult
	3rd Trimester	0 - 2	2 - 9	2 - 16	16 - 30
ASF =	10	10	3	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
DBR* =	361	1090	631	572	261
A =	1	1	1	1	1
EF =	350	350	350	350	350
AT =	70	70	70	70	70
FAH =	1.00	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Exposure Year	Exposure Duration (years)	Age	Infant/Child - Exposure Information			Infant/Child Cancer Risk (per million)	Adult - Exposure Information			Adult Cancer Risk (per million)	Maximum Fugitive PM2.5	Maximum Total PM2.5
			DPM Conc (ug/m3)		Age Sensitivity Factor		Modeled		Age Sensitivity Factor			
			Year	Annual			Year	Annual				
0	0.25	-0.25 - 0*	-	-	10	-	-	-	-	-	-	-
1	1	0 - 1	2019	0.2908	10	47.76	2019	0.2908	1	0.83	0.3334	0.624
2	1	1 - 2	2020	0.0000	10	0.00	2020	0.0000	1	0.00		
3	1	2 - 3	2021	0.0000	3	0.00	2021	0.0000	1	0.00		
4	1	3 - 4	2022	0.0000	3	0.00	2022	0.0000	1	0.00		
5	1	4 - 5	2023	0.0000	3	0.00	2023	0.0000	1	0.00		
6	1	5 - 6	2024	0.0000	3	0.00	2024	0.0000	1	0.00		
7	1	6 - 7	2025	0.0000	3	0.00	2025	0.0000	1	0.00		
8	1	7 - 8	2026	0.0000	3	0.00	2026	0.0000	1	0.00		
9	1	8 - 9	2027	0.0000	3	0.00	2027	0.0000	1	0.00		
10	1	9 - 10	2028	0.0000	3	0.00	2028	0.0000	1	0.00		
11	1	10 - 11	2029	0.0000	3	0.00	2029	0.0000	1	0.00		
12	1	11 - 12	2030	0.0000	3	0.00	2030	0.0000	1	0.00		
13	1	12 - 13	2031	0.0000	3	0.00	2031	0.0000	1	0.00		
14	1	13 - 14	2032	0.0000	3	0.00	2032	0.0000	1	0.00		
15	1	14 - 15	2033	0.0000	3	0.00	2033	0.0000	1	0.00		
16	1	15 - 16	2034	0.0000	3	0.00	2034	0.0000	1	0.00		
17	1	16-17	2035	0.0000	1	0.00	2035	0.0000	1	0.00		
18	1	17-18	2036	0.0000	1	0.00	2036	0.0000	1	0.00		
19	1	18-19	2037	0.0000	1	0.00	2037	0.0000	1	0.00		
20	1	19-20	2038	0.0000	1	0.00	2038	0.0000	1	0.00		
21	1	20-21	2039	0.0000	1	0.00	2039	0.0000	1	0.00		
22	1	21-22	2040	0.0000	1	0.00	2040	0.0000	1	0.00		
23	1	22-23	2041	0.0000	1	0.00	2041	0.0000	1	0.00		
24	1	23-24	2042	0.0000	1	0.00	2042	0.0000	1	0.00		
25	1	24-25	2043	0.0000	1	0.00	2043	0.0000	1	0.00		
26	1	25-26	2044	0.0000	1	0.00	2044	0.0000	1	0.00		
27	1	26-27	2045	0.0000	1	0.00	2045	0.0000	1	0.00		
28	1	27-28	2046	0.0000	1	0.00	2046	0.0000	1	0.00		
29	1	28-29	2047	0.0000	1	0.00	2047	0.0000	1	0.00		
30	1	29-30	2048	0.0000	1	0.00	2048	0.0000	1	0.00		
Total Increased Cancer Risk						47.8				0.83		

* Third trimester of pregnancy

615 Stockton Ave., San Jose CA - Construction Impacts - Without Mitigation
Maximum DPM Cancer Risk and PM2.5 Calculations From Construction
Impacts at Off-Site MEI Location - 4.5 meter receptor height

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

- Where: CPF = Cancer potency factor (mg/kg-day)⁻¹
 ASF = Age sensitivity factor for specified age group
 ED = Exposure duration (years)
 AT = Averaging time for lifetime cancer risk (years)
 FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10⁻⁶

- 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)
 10⁻⁶ = Conversion factor

Values

Parameter	Infant/Child				Adult
	3rd Trimester	0 - 2	2 - 9	2 - 16	16 - 30
ASF =	10	10	3	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
DBR* =	361	1090	631	572	261
A =	1	1	1	1	1
EF =	350	350	350	350	350
AT =	70	70	70	70	70
FAH =	1.00	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Exposure Year	Exposure Duration (years)	Age	Infant/Child - Exposure Information			Infant/Child Cancer Risk (per million)	Adult - Exposure Information			Adult Cancer Risk (per million)	Maximum	
			DPM Conc (ug/m3)		Age Sensitivity Factor		Modeled		Age Sensitivity Factor		Fugitive PM2.5	Total PM2.5
			Year	Annual			Year	Annual				
0	0.25	-0.25 - 0*	-	-	10	-	-	-	-	-	-	-
1	1	0 - 1	2019	0.0209	10	3.43	2019	0.0209	1	0.06	0.0075	0.028
2	1	1 - 2	2020	0.0000	10	0.00	2020	0.0000	1	0.00		
3	1	2 - 3	2021	0.0000	3	0.00	2021	0.0000	1	0.00		
4	1	3 - 4	2022	0.0000	3	0.00	2022	0.0000	1	0.00		
5	1	4 - 5	2023	0.0000	3	0.00	2023	0.0000	1	0.00		
6	1	5 - 6	2024	0.0000	3	0.00	2024	0.0000	1	0.00		
7	1	6 - 7	2025	0.0000	3	0.00	2025	0.0000	1	0.00		
8	1	7 - 8	2026	0.0000	3	0.00	2026	0.0000	1	0.00		
9	1	8 - 9	2027	0.0000	3	0.00	2027	0.0000	1	0.00		
10	1	9 - 10	2028	0.0000	3	0.00	2028	0.0000	1	0.00		
11	1	10 - 11	2029	0.0000	3	0.00	2029	0.0000	1	0.00		
12	1	11 - 12	2030	0.0000	3	0.00	2030	0.0000	1	0.00		
13	1	12 - 13	2031	0.0000	3	0.00	2031	0.0000	1	0.00		
14	1	13 - 14	2032	0.0000	3	0.00	2032	0.0000	1	0.00		
15	1	14 - 15	2033	0.0000	3	0.00	2033	0.0000	1	0.00		
16	1	15 - 16	2034	0.0000	3	0.00	2034	0.0000	1	0.00		
17	1	16-17	2035	0.0000	1	0.00	2035	0.0000	1	0.00		
18	1	17-18	2036	0.0000	1	0.00	2036	0.0000	1	0.00		
19	1	18-19	2037	0.0000	1	0.00	2037	0.0000	1	0.00		
20	1	19-20	2038	0.0000	1	0.00	2038	0.0000	1	0.00		
21	1	20-21	2039	0.0000	1	0.00	2039	0.0000	1	0.00		
22	1	21-22	2040	0.0000	1	0.00	2040	0.0000	1	0.00		
23	1	22-23	2041	0.0000	1	0.00	2041	0.0000	1	0.00		
24	1	23-24	2042	0.0000	1	0.00	2042	0.0000	1	0.00		
25	1	24-25	2043	0.0000	1	0.00	2043	0.0000	1	0.00		
26	1	25-26	2044	0.0000	1	0.00	2044	0.0000	1	0.00		
27	1	26-27	2045	0.0000	1	0.00	2045	0.0000	1	0.00		
28	1	27-28	2046	0.0000	1	0.00	2046	0.0000	1	0.00		
29	1	28-29	2047	0.0000	1	0.00	2047	0.0000	1	0.00		
30	1	29-30	2048	0.0000	1	0.00	2048	0.0000	1	0.00		
Total Increased Cancer Risk						3.4				0.06		

* Third trimester of pregnancy

**615 Stockton Ave., San Jose CA - Construction Impacts - With Mitigation
Maximum DPM Cancer Risk and PM2.5 Calculations From Construction
Impacts at Off-Site MEI Location - 1.5 meter receptor height**

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

- Where: CPF = Cancer potency factor (mg/kg-day)⁻¹
 ASF = Age sensitivity factor for specified age group
 ED = Exposure duration (years)
 AT = Averaging time for lifetime cancer risk (years)
 FAH = Fraction of time spent at home (unitless)

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10⁻⁶

- 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)
 10⁻⁶ = Conversion factor

Values

Age --> Parameter	Infant/Child				Adult
	3rd Trimester	0 - 2	2 - 9	2 - 16	16 - 30
ASF =	10	10	3	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
DBR* =	361	1090	631	572	261
A =	1	1	1	1	1
EF =	350	350	350	350	350
AT =	70	70	70	70	70
FAH =	1.00	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Exposure Year	Exposure Duration (years)	Age	Infant/Child - Exposure Information			Infant/Child Cancer Risk (per million)	Adult - Exposure Information			Adult Cancer Risk (per million)	Maximum	
			DPM Conc (ug/m3)		Age Sensitivity Factor		Modeled		Age Sensitivity Factor		Fugitive PM2.5	Total PM2.5
			Year	Annual			Year	Annual				
0	0.25	-0.25 - 0*	-	-	10	-	-	-	-	-	-	-
1	1	0 - 1	2019	0.0337	10	5.53	2019	0.0337	1	0.10	0.1121	0.126
2	1	1 - 2	2020	0.0000	10	0.00	2020	0.0000	1	0.00		
3	1	2 - 3	2021	0.0000	3	0.00	2021	0.0000	1	0.00		
4	1	3 - 4	2022	0.0000	3	0.00	2022	0.0000	1	0.00		
5	1	4 - 5	2023	0.0000	3	0.00	2023	0.0000	1	0.00		
6	1	5 - 6	2024	0.0000	3	0.00	2024	0.0000	1	0.00		
7	1	6 - 7	2025	0.0000	3	0.00	2025	0.0000	1	0.00		
8	1	7 - 8	2026	0.0000	3	0.00	2026	0.0000	1	0.00		
9	1	8 - 9	2027	0.0000	3	0.00	2027	0.0000	1	0.00		
10	1	9 - 10	2028	0.0000	3	0.00	2028	0.0000	1	0.00		
11	1	10 - 11	2029	0.0000	3	0.00	2029	0.0000	1	0.00		
12	1	11 - 12	2030	0.0000	3	0.00	2030	0.0000	1	0.00		
13	1	12 - 13	2031	0.0000	3	0.00	2031	0.0000	1	0.00		
14	1	13 - 14	2032	0.0000	3	0.00	2032	0.0000	1	0.00		
15	1	14 - 15	2033	0.0000	3	0.00	2033	0.0000	1	0.00		
16	1	15 - 16	2034	0.0000	3	0.00	2034	0.0000	1	0.00		
17	1	16-17	2035	0.0000	1	0.00	2035	0.0000	1	0.00		
18	1	17-18	2036	0.0000	1	0.00	2036	0.0000	1	0.00		
19	1	18-19	2037	0.0000	1	0.00	2037	0.0000	1	0.00		
20	1	19-20	2038	0.0000	1	0.00	2038	0.0000	1	0.00		
21	1	20-21	2039	0.0000	1	0.00	2039	0.0000	1	0.00		
22	1	21-22	2040	0.0000	1	0.00	2040	0.0000	1	0.00		
23	1	22-23	2041	0.0000	1	0.00	2041	0.0000	1	0.00		
24	1	23-24	2042	0.0000	1	0.00	2042	0.0000	1	0.00		
25	1	24-25	2043	0.0000	1	0.00	2043	0.0000	1	0.00		
26	1	25-26	2044	0.0000	1	0.00	2044	0.0000	1	0.00		
27	1	26-27	2045	0.0000	1	0.00	2045	0.0000	1	0.00		
28	1	27-28	2046	0.0000	1	0.00	2046	0.0000	1	0.00		
29	1	28-29	2047	0.0000	1	0.00	2047	0.0000	1	0.00		
30	1	29-30	2048	0.0000	1	0.00	2048	0.0000	1	0.00		
Total Increased Cancer Risk						5.5				0.10		

* Third trimester of pregnancy

Attachment 4: Screening Community Risk Calculations