Appendix A: Air Quality Report

295 EAST VIRGINIA STREET RESIDENTIAL PROJECT COMMUNITY HEALTH RISK ASSESSMENT

San José, California

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Project 14-091

Introduction

The purpose of this report is to address community health risk impacts associated with the proposed residential project located at 295 E. Virginia Street in San José. We understand that the project proposes to develop a five-story (up to 91 feet tall) residential building constructed on a podium above ground level parking. There would be 300 apartments. The residences would wrap around a central courtyard area. The courtyard would consist of approximately 16,300 square feet of common open space for residents and guests and include amenities such as landscaping, seating areas, and a barbecue area. Underneath the podium, a total of 150 vehicle parking spaces (including four accessible stalls), 29 motorcycle parking spaces, bicycle storage and workshop, additional storage space for tenants, a community room, and a fitness room would be provided at grade. This analysis was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD) to analyze potential community health risk impacts due to construction and operation of the proposed project. The CalEEMod model was used to predict annual GHG emissions.

The project health risk was conducted in July 2015 for a similar, but slightly smaller design of this project. Since the location of the project with respect to TAC sources has not changed, the modeling used to characterize the exposure to those sources is used in this analysis. The cancer risk predictions were updated to reflect new guidance provided by the State's Office of Environmental Health Hazards and Analysis (OEHHA) that were recommended by BAAQMD after this project analysis was completed. The updated health risk calculation methods recommended by the BAAQMD used for this evaluation are provided in *Attachment 1*.

The project construction health risk assessment conducted in 2015 would be representative of the currently proposed project, as the amount of construction associated with the current project would be about the same[1]. However, cancer risk computations were updated

Setting

The project is located in northern Santa Clara County, which is in the San Francisco Bay Area Air Basin. TACs 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 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 diesel particulate matter (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

[1] Note that CalEEMod predicts the same amount of construction with a 300-unit building as a 295-unit building, so the emissions and dispersion modeling analysis was not updated.

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.[2] 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.[3]

City of San Jose – Envision San Jose 2040 Toxic Air Contaminant Policies

The City's General Plan, i.e., Envision San Jose 2040, includes policies and implementing actions contained in Chapter 3 - Environmental Leadership that are intended to reduce exposure of people to TACs. The City's goal, policies and implementing actions are as follows:

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

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-11.2 For projects that emit toxic air contaminants, require project proponents to prepare health risk assessments in accordance with BAAQMD-recommended procedures as part of environmental review and employ effective mitigation to reduce possible health risks to a less than significant level. Alternatively, require new projects (such as, but not limited to, industrial, manufacturing, and processing facilities) that are sources of TACs to be located an adequate distance from residential areas and other sensitive receptors.

- MS-11.3 Review projects generating significant heavy-duty truck traffic to designate truck routes that minimize exposure of sensitive receptors to TACs and particulate matter.

- 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-11.6 Develop and adopt a comprehensive Community Risk Reduction Plan that includes: baseline inventory of toxic air contaminants (TACs) and particulate matter smaller than 2.5

[2] Available online: http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm. Accessed: November 21, 2014.
[3] Bay Area Air Quality Management District. 2011. BAAQMD CEQA Air Quality Guidelines. May.

microns (PM2.5), emissions from all sources, emissions reduction targets, and enforceable emission reduction strategies and performance measures. The Community Risk Reduction Plan will include enforcement and monitoring tools to ensure regular review of progress toward the emission reduction targets, progress reporting to the public and responsible agencies, and periodic updates of the plan, as appropriate.

- 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.

- MS-11.8 For new projects that generate truck traffic, require signage which reminds drivers that the State truck idling law limits truck idling to five minutes.

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 off-site sensitive receptors are residences to the east, south and west of the project site. Lowell Elementary School is located north of the project site, across I-280. The project would include residences that would be considered sensitive receptors, with exposure to air pollutant sources, such as I-280, local surface streets, and various nearby stationary sources.

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). These thresholds were challenged in court. Following litigation in the trial court, the court of appeal, and the California Supreme Court (December 17, 2015), upheld all of the Thresholds. However, the opinion issued by the Supreme Court held that CEQA does not generally require an analysis of the impacts of locating development or project sensitive receptors in areas subject to environmental hazards unless the project would exacerbate existing environmental hazards. The Supreme Court also found that CEQA requires the analysis of exposing people to environmental hazards in specific circumstances, including the location of development near airports, schools near sources of toxic contamination, and certain exemptions for infill and workforce housing. The Supreme Court also held that public agencies remain free to conduct this analysis, regardless of whether it is required by CEQA. BAAQMD recently updated these guidelines (in May 2017) in response to court challenges to the Thresholds[4]. The significance thresholds identified by BAAQMD and used in this analysis are summarized in Table 1.

[4] BAAQMD. 2017. *BAAQMD CEQA Air Quality Guidelines*. May. See http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines. Accessed July 28, 2017.

To meet Policy MS-11.1 of the Envision San Jose 2040 General Plan Update, the City requires air quality modeling for projects that contain sensitive land uses such as new residential developments that are located near sources of pollution such as freeways and industrial uses. These projects are required to incorporate effective mitigation into project designs or be located an adequate distance from sources of TACs to avoid significant risks to health and safety per thresholds contained in the BAAQMD CEQA Air Quality Guidelines (i.e., Table 1 below).

Table 1. Air Quality Significance Thresholds

Health Risks and Hazards for Single Sources (highest from all sources within 1,000-foot zone of influence)	
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

Impact: Expose sensitive receptors to substantial pollutant concentrations? ***Less than significant with mitigation measures***

Operation of the project is not expected to cause any localized emissions that could expose off-site sensitive receptors to unhealthy air pollutant levels. Construction activity would generate dust and equipment exhausts on a temporary basis. There are nearby sources of air pollutant emissions and impacts from project construction and existing sources of air pollutants are addressed.

Project Operation

Operation of this residential project is not considered a source of TAC or $PM_{2.5}$ emissions. As a result, the project operation would not cause emissions that expose sensitive receptors to unhealthy air pollutant levels. Because the project would not be a source of TACs, it would not contribute cumulatively to unhealthy exposure to TACs.

The project would include new sensitive receptors. Substantial sources of air pollution can adversely affect sensitive receptors proposed as part of new projects. A review of the area indicates that there are roadways within 1,000 feet of the site that could adversely affect new residences and one stationary source of air pollution with significant reported screening risk is located near the site. There are thresholds that address both the impact of single and cumulative TAC sources upon projects that include new sensitive receptors. The analysis of the stationary source and local surface streets used screening data provided by BAAQMD to identify the potential cancer risk and $PM_{2.5}$ exposure risks, whereas refined modeling techniques were employed to assess the impacts from I-280.

Impacts from Stationary Sources

Permitted stationary sources of air pollution near the project site were identified using the BAAQMD's *Stationary Source Risk and Hazard Analysis Tool*. This mapping tool uses Google Earth to identify the location of stationary sources and their estimated risk and hazard impacts. Only one gas station that presented some measurable risk or hazard was identified within 1,000 feet of the site. At BAAQMD's direction, risk and hazard index from the gasoline station were adjusted for distance based on BAAQMD distance adjustment factors[5]. This tool identified Plant G5313 is the Calgas facility at 288 E. Virginia Street, approximately 120 feet south of the site. When adjusted for distance, this facility poses a screening level excess cancer risk of 8.2 per million, a Hazard Index of 0.01, and no $PM_{2.5}$ concentration, which are all below BAAQMD risk thresholds.

Impacts from Local Surface Streets

Traffic on high volume roadways is a source of TAC emissions that may adversely affect sensitive receptors in close proximity the roadway. For roadways, BAAQMD provides a *Roadway Screening Analysis Calculator* to determine if roadways with traffic volumes of over 10,000 vehicles per day may have a significant effect on a proposed project. According to hourly traffic volumes provided by Hexagon Transportation Consultants, S. 7th Street is computed to have an ADT volume of 18,145 vehicles per day[6].

The *Roadway Screening Analysis Calculator* was used to predict levels at 15 feet west of S. 7th Street. The computed screening level excess cancer risk of 8.0 per million, a Hazard Index of less than 0.03, and $PM_{2.5}$ concentration of 0.24 micrograms per cubic meter ($\mu g/m^3$), which are all below BAAQMD risk thresholds.

Refined Highway Community Risk Impacts – I-280

A refined analysis of the impacts of toxic air contaminant (TAC) and $PM_{2.5}$ to new sensitive receptors is necessary to evaluate potential cancer risks and $PM_{2.5}$ concentrations from I-280. A review of the traffic information reported by Caltrans indicates that I-280 traffic includes about 2.6 percent trucks, of which 0.9 percent are considered heavy duty trucks and 1.7 percent are medium duty trucks.[7]

This analysis involved the development of DPM, organic TAC, and $PM_{2.5}$ emissions for traffic on I-280 using the CARB EMFAC2011 emission factor model and the traffic mix developed from Caltrans traffic data. DPM emissions are projected to decrease in the future and are reflected in the EMFAC2011 emissions data. CARB regulations require on-road diesel trucks to be retrofitted with particulate matter controls or replaced to meet new 2010 engine standards that have much lower DPM and $PM_{2.5}$ emissions than prior years. This regulation will substantially reduce these emissions between 2013 and 2023, with the greatest reductions occurring in 2013 through 2015. While new trucks and buses will meet strict federal standards, this measure is intended to accelerate the rate at which the fleet either turns over so there are more cleaner vehicles on the road, or retrofitted to meet similar standards. With

[5] BAAQMD provides distance adjustment multipliers for stationary sources: (1) *Distance Adjustment Multiplier Tool for Diesel Internal Combustion (IC) Engines* and (2) *Distance Adjustment Multiplier Tool for Gasoline Dispensing Facilities (GDF)*

[6] The hourly traffic volumes for S. 7th and Virginia were used, assuming the ADT = ten times the average peak hour level..

[7] California Department of Transportation. 2013. *2012 Annual Average Daily Truck Traffic on the California State Highway System*

this regulation, older, more polluting trucks would be removed from the roads much quicker. CARB anticipates a 68 percent reduction in $PM_{2.5}$ (including DPM) emission from trucks in 2014 with this regulation. EMFAC2011 includes the projected effects of these regulations on future truck emissions.

Emission factors for I-280 traffic were developed for the year 2020 using the EMFAC2011 model with default model vehicle fleet age distributions for Santa Clara County. Year 2020 emissions were conservatively assumed as being representative of future conditions over the time period that cancer risks are evaluated (30 years), since, as discussed above, overall vehicle emissions, and in particular diesel truck emissions will decrease in the future. The EMFAC2011 results were then adjusted to the traffic volume and mix of diesel-fueled vehicles on I-280 reported by Caltrans. Average daily traffic volumes were based on Caltrans data for I-280 for 2014[8]. Traffic volumes were assumed to increase 1% per year. Average hourly traffic distributions for Santa Clara County roadways were developed using the EMFAC model[9], which were then applied to the average daily traffic volumes to obtain estimated hourly traffic volumes and emissions for I-280.

For all hours of the day, other than during peak a.m. and p.m. periods, an average speed of 65 mph was assumed for all vehicles other than heavy duty trucks which were assumed to travel at a speed of 60 mph. Based on traffic data from the Santa Clara Valley Transportation Authority's 2012 Monitoring and Conformance Report, traffic speeds during the peak a.m. and p.m. periods were identified[10]. For a 2-hour period during the peak a.m. period average travel speeds of 65 mph (60 mph for trucks) and 20 mph were used for eastbound and westbound traffic, respectively. For a 2-hour period during the peak p.m. period average travel speeds of 30 mph and 65 mph (60 mph for trucks) were used for eastbound and westbound traffic, respectively.

Emissions of total organic gas (TOG) were also calculated for 2020 using the EMFAC2011 model. These TOG emissions were then used in the modeling the organic TACs. TOG emissions from exhaust and for running evaporative loses from gasoline vehicles were calculated using EMFAC2011 default model values for Santa Clara County along with the traffic volumes and vehicle mixes for I-280.

The emission rates used in the analysis are shown in *Attachment 2*.

Dispersion Modeling

Dispersion modeling of DPM and organic TAC emissions was conducted using the AERMOD model. A five-year data set (2009 - 2013) of hourly meteorological data from the San Jose Airport, prepared for use with the AERMOD model by CARB for use in health risk assessments. Other inputs to the model included road geometry, site and road elevations, hourly traffic emissions, and vehicle emission release height information. East and west bound traffic on I-280 within about 1,000 feet of the project site were evaluated with the model. Since I-280 is an elevated freeway in the project vicinity actual roadway elevations were used with the model.

The proposed project design calls for parking on the ground floor with five stories of residential units above. The modeling used receptors placed at proposed residential locations within the project site. Residences of the project would be located on the second floor and higher levels. Receptor heights of 4.5, 7.6, 10.6, and 13.7 meters were used in modeling the residential receptors on the second through fifth floors. Figure 1 shows the roadway links and receptor locations used in the modeling.

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[8] California Department of Transportation. 2015. *2014 Traffic Volumes on California State Highways*

[9] The Burden output from EMFAC2007, CARB's previous version of the EMFAC model, was used for this since the current web-based version of EMFAC2011 does not include Burden type output with hour by hour traffic volume information.

[10] Santa Clara Valley Transportation Authority. *2012 Monitoring and Conformance Report.* May, 2012.

Computed Cancer Risk and Non-Cancer Health Effects

Using the average DPM and TOG concentrations, the individual residential cancer risks were computed using the most recent methods recommended by BAAQMD and described in *Attachment 1*. The factors used to compute cancer risk are highly dependent on modeled concentrations, exposure period or duration, and the type of receptor. Infant and small children were assumed to reside at all dwelling units (receptors).

The maximum increased lifetime cancer risk from traffic on I-280 was computed as 25.8 in one million. This was modeled at the residential receptor in the northern portion of the second-floor residential area close to I-280 and is shown on Figure 1. Cancer risks from I-280 at other locations would be lower than the maximum risk. For third, fourth and fifth floor residential receptors the maximum increased cancer risks were 19.5, 13.6, and 9.0 in one million. The minimum cancer risk would be on the 5^{th} floor at 7.5 chances per million. The maximum increased cancer risks on the second, third and floor levels are above the BAAQMD's threshold of 10 in one million excess cancer cases per million and would be considered a *significant impact*.

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated using the maximum modeled DPM concentration and the chronic inhalation reference exposure level (REL) for DPM of 5 $\mu g/m^3$. The maximum predicted annual DPM concentration from I-280 traffic was 0.0275 $\mu g/m^3$, occurring on the second floor at the same receptor with the maximum cancer risk. The Hazard Index (HI), which is the ratio of the annual DPM concentration to the REL, was computed at 0.006. This HI is much lower than the BAAQMD significance criterion of a HI greater than 1.0. The HI at all other receptors on all floor levels would be lower than the maximum second floor HI value.

$PM_{2.5}$ Concentrations from Modeled Roadways

In addition to evaluating the health risks from TACs, potential impacts from $PM_{2.5}$ emissions for vehicles traveling on I-280 were evaluated. $PM_{2.5}$ concentrations were modeled to evaluate the potential impact of chronic exposure to $PM_{2.5}$. The same basic modeling approach that was used for assessing TAC impacts was used in the modeling of $PM_{2.5}$ concentrations. $PM_{2.5}$ emissions from all vehicles were used, rather than just the diesel powered vehicles, because all vehicle types (i.e., gasoline and diesel powered) produce $PM_{2.5}$. Additionally, $PM_{2.5}$ emissions from vehicle tire and brake wear were included in these emissions. The assessment involved, first, calculating $PM_{2.5}$ emission rates from traffic traveling on I-280. Then, dispersion modeling using emission factors and traffic volumes was conducted. The dispersion modeling of traffic using the AERMOD model was conducted in the same manner as the TAC modeling. The model provides estimated annual $PM_{2.5}$ concentrations. $PM_{2.5}$ emissions were calculated using the EMFAC2011 model for 2020. Hourly traffic volumes were calculated in the same manner as discussed earlier for the TAC modeling. The emission rate calculations and traffic volumes are shown in *Attachment 2*.

The maximum annual average $PM_{2.5}$ concentration from I-280 traffic was 1.2 $\mu g/m^3$, occurring at the receptor on the second-floor level that had the maximum cancer risk from I-280. The maximum $PM_{2.5}$ concentrations on the third, fourth and fifth floor levels are 1.0, 0.7, and 0.5 $\mu g/m^3$, respectively. The minimum exposure, occurring on the 5^{th} floor would be 0.4 $\mu g/m^3$. The second, third, fourth and fifth floor concentrations are above the BAAQMD $PM_{2.5}$ threshold of greater than 0.3 $\mu g/m^3$ and would be considered a *significant impact*. The modeling results and health risk calculations for impacts from I-280 are provided in *Attachment 2*.

Cumulative Community Risk Impacts

Based on refined modeling of I-280 and screening data provided by BAAMQD for the nearby stationary source and local roadways (i.e., S. 7th St and E. Virginia St), the combination of exposures would result in excess cancer risks of up to 45.9 per million, $PM_{2.5}$ exposures of up to 1.6 µg/m^3 and a Hazard Index less than 0.1. As shown in Table 3, these exposures exceed the cumulative source thresholds of significance identified by BAAQMD for annual $PM_{2.5}$ concentrations.

Table 3. Community Risk Impacts from Single and Cumulative Sources

Source	Maximum Cancer Risk (per million)*	Maximum Hazard Index	Maximum Annual $PM_{2.5}$ Concentration (µg/m^3)
Unmitigated Interstate 280 traffic	25.8 – 9.0	<0.01	1.2 – 0.5
7th Street traffic at 20 feet	8.0	<0.01	0.24
Virginia Street at 20 feet	4.6	<0.01	0.14
Calgas, Facility G5313	7.5	0.01	--
Maximum Single Source	25.8	<0.01	1.2
BAAQMD Threshold – Single Source	***>10.0***	***>1.0***	***>0.3***
Significant?	Yes	No	Yes
Maximum - Cumulative Sources	45.9	<0.04	1.6
BAAQMD Threshold – Cumulative Sources	***>100***	***>10.0***	***>0.8***
Significant?	***No***	***No***	***Yes***
** Includes OEHHA 2015 methods for computing cancer risk, as recommended by BAAQMD*			

Impact Finding

The project would have a *significant impact* with respect to community risk caused during project operation since single-source cancer risk would exceed 10 in one million, single-source annual $PM_{2.5}$ concentrations would exceed 0.3 µg/m^3 and cumulative-source annual $PM_{2.5}$ would exceed 0.8 µg/m^3.

Recommended Measure AQ-1 (exposure of sensitive receptors to substantial pollutant concentrations).

Maintained ventilation systems with high-efficiency air filtration of the fresh air supply would reduce overall concentrations of DPM and $PM_{2.5}$ concentrations, substantially lowering cancer risk and annual $PM_{2.5}$ concentrations. These systems should be installed on either an individual unit-by-unit basis, with individual air intake and exhaust ducts ventilating each unit separately, or through a centralized building ventilation system. Note that reducing annual PM2.5 concentrations to the threshold level would result in cancer risks below the significant threshold level.

The U.S. EPA reports particle size removal efficiency for filters rated MERV13 of 90 percent for particles in the size range of 1 to 3 µm and less than 75 percent for particles 0.3 to 1 µm.[11,12] The BAAQMD's *Planning Healthy Places* guidance indicates that MERV13 air filtration devices installed on an HVAC air

[11] American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., 2007. *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. ANSI/ASHRAE Addendum b to Standard 52.2-2007

[12] United States Environmental Protection Agency (U.S. EPA), 2009. *Residential Air Cleaners (Second Edition): A Summary of Available Information*. U.S. EPA 402-F-09-002. Revised August 2009.

intake system can remove 80-90 percent of indoor particulate matter (greater than 0.3 microns in diameter).[13]

1. Design the site to limit exposure from sources of TACs and fine particulate matter ($PM_{2.5}$) emissions. The final site layout shall locate operable windows and air intakes as far as possible and feasible from TAC sources.
2. Install air filtration at all residential units. Air filtration devices shall be rated MERV13 or higher. To ensure adequate health protection to sensitive receptors, a ventilation system shall meet the following minimal design standards:
    a. A MERV13 or higher rating;
    b. A MERV16 or higher rating for units facing I-280, where annual $PM_{2.5}$ concentrations exceed 1.1 *u*g/m^3 (unless air intakes are located where levels are below at or below 1.1 *u*g/m^3)
    c. Air exchanges per local building requirements.

    Alternately, at the approval of the City, equivalent control technology may be used if it is shown by a qualified air quality consultant or heating, ventilation, and air conditioning (HVAC) engineer that it would reduce risk below significance thresholds.
3. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required. Recognizing that emissions from air pollution sources are decreasing, the maintenance period shall last as long as significant excess cancer risk or annual $PM_{2.5}$ exposures are predicted. Subsequent studies could be conducted by an air quality expert approved by the City to identify the ongoing need for the filtered ventilation systems as future information becomes available.
4. Ensure that the lease agreement and other property documents (1) require cleaning, maintenance, and monitoring of the affected units for air flow leaks; (2) include assurance that new owners and tenants are provided information on the ventilation system; and (3) include provisions that fees associated with owning or leasing a unit(s) in the building include funds for cleaning, maintenance, monitoring, and replacements of the filters, as needed.
5. Require that, prior to building occupancy, an authorized air pollutant consultant or HVAC engineer verify the installation of all necessary measures to reduce toxic air contaminant (TAC) exposure.
6. To the greatest degree possible, plant vegetation along the project site boundaries and around outdoor use areas. This barrier would include trees and shrubs that provide a dense vegetative barrier.

<u>Effectiveness with the Implementation of Recommended Measure AQ-1</u>

A properly installed and operated ventilation system with MERV 13 air filters will reduce $PM_{2.5}$ concentrations, including from DPM, from mobile and stationary sources by 80 percent or greater indoors when compared to outdoors. The U.S. EPA reports that people, on average, spend 90 percent of their time indoors.[14] The overall effectiveness calculations take into effect time spent outdoors. Assuming two hours of outdoor exposure plus one hour of open windows (calculated as outdoor exposure) per day, the overall effectiveness of the MERV 13 filtration systems would be 70 percent. The maximum cancer risk from I-280 traffic would be reduced to 7.7 chances per million and the overall cumulative cancer risk would be reduced to 19 chances per million. Use of MERV16 filtration would provide an effectiveness that would

[13] Bay Area Air Quality Management District (BAAQMD), 2016. *Planning Healthy Places A Guidebook for addressing local sources of air pollutants in community planning*. May.
[14] Klepeis, N.E., Nelsen, WC., Ott, WR., Robinson, JP., Tsang, AM., Switzer, P., Behar, JV., Hern, SC., and Engelmann, WH. 2001. *The National Human Activity Pattern Survey (NHAPS): a resource for assessing exposure to environmental pollutants*. J. Expo Anal Environ Epidemial. 2001 May-Jun;11(3):231-52.

be at least 90 percent or overall 75 to 80 percent, reducing the maximum annual $PM_{2.5}$ levels to 0.3 *u*g/m^3 and the cumulative annual PM2.5 concentration to 0.5 *u*g/m^3. Implementation of Recommended Measure AQ-1 would reduce cancer risk and annual $PM_{2.5}$ concentrations below the recommended BAAQMD significance thresholds.

Figures 2 and 3 delineate the type of filtration systems needed at each residential unit on the second floor (podium level) to reduce the impacts to less than significant for cancer risk and $PM_{2.5}$, respectively. The same information on the type of filtration needed on each unit is shown in Figures 4 and 5 for the third floor, Figures 6 and 7 for the fourth floor, and Figures 8 and 9 for the fifth floor.

Figure 1. Project Site, Roadway Links, and Project Residential Receptor Locations

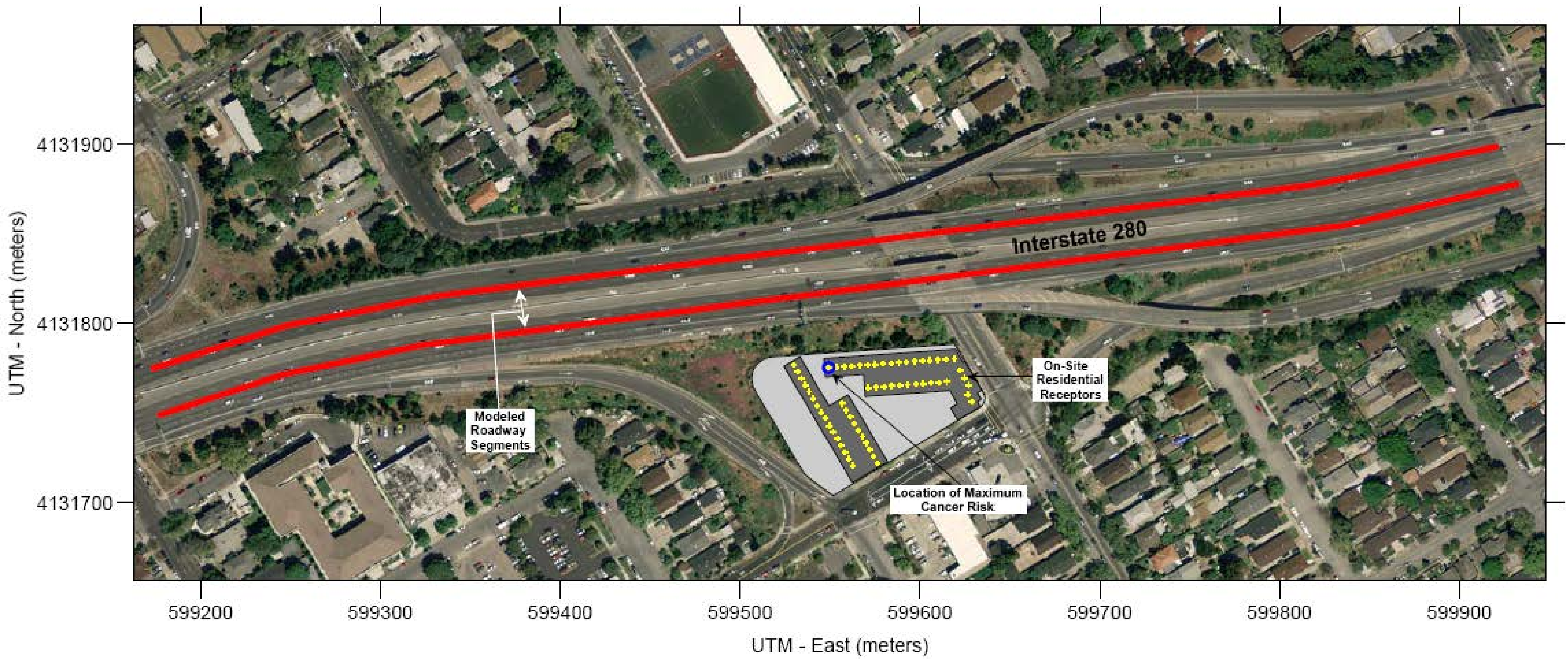

Figure 2. 2nd Floor Level - Increased Cancer Risks (per million) and Type of Filtration Needed

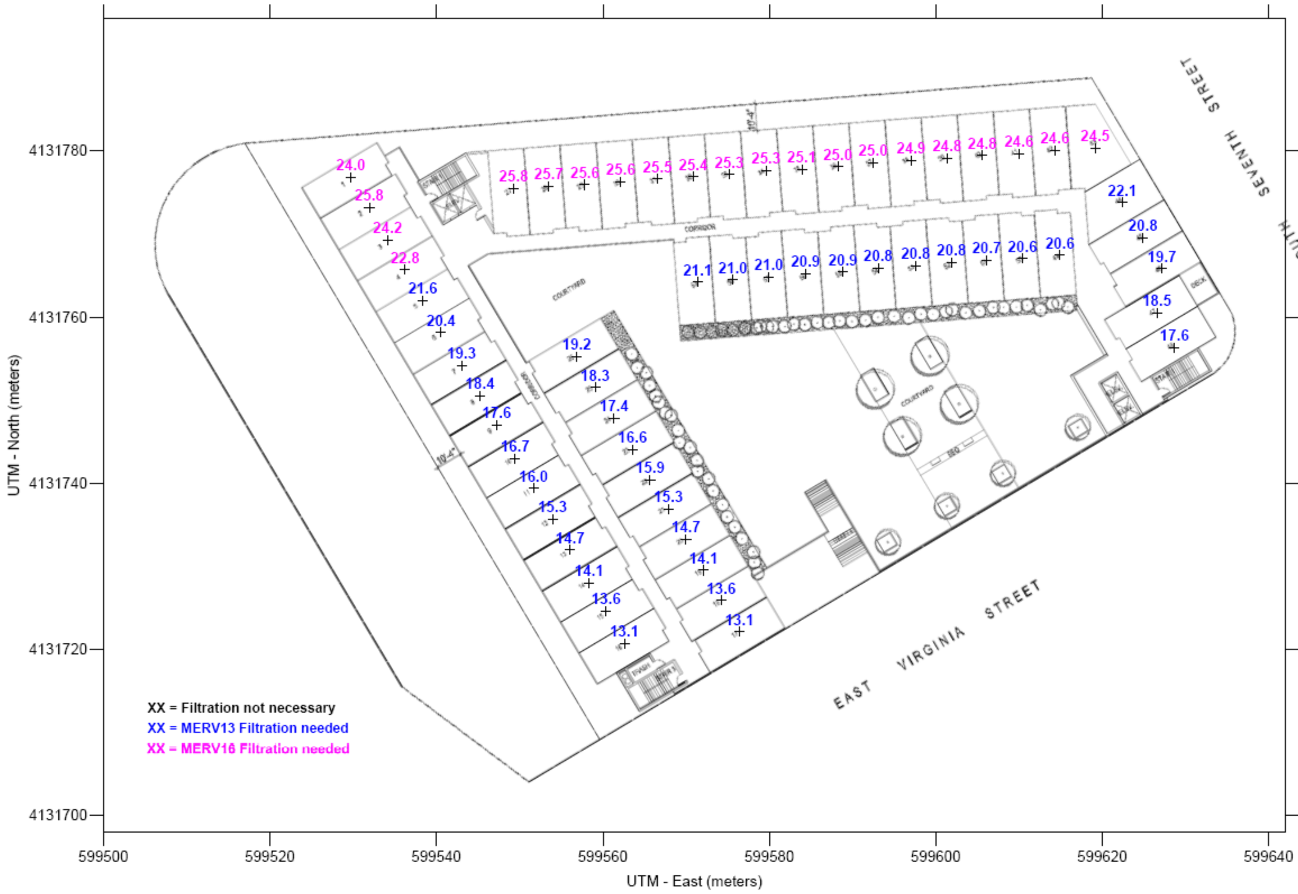

Figure 3. 2nd Floor Level - Annual PM2.5 Concentrations (µg/m^3) and Type of Filtration Needed

Figure 4. 3rd Floor Level - Increased Cancer Risks (per million) and Type of Filtration Needed

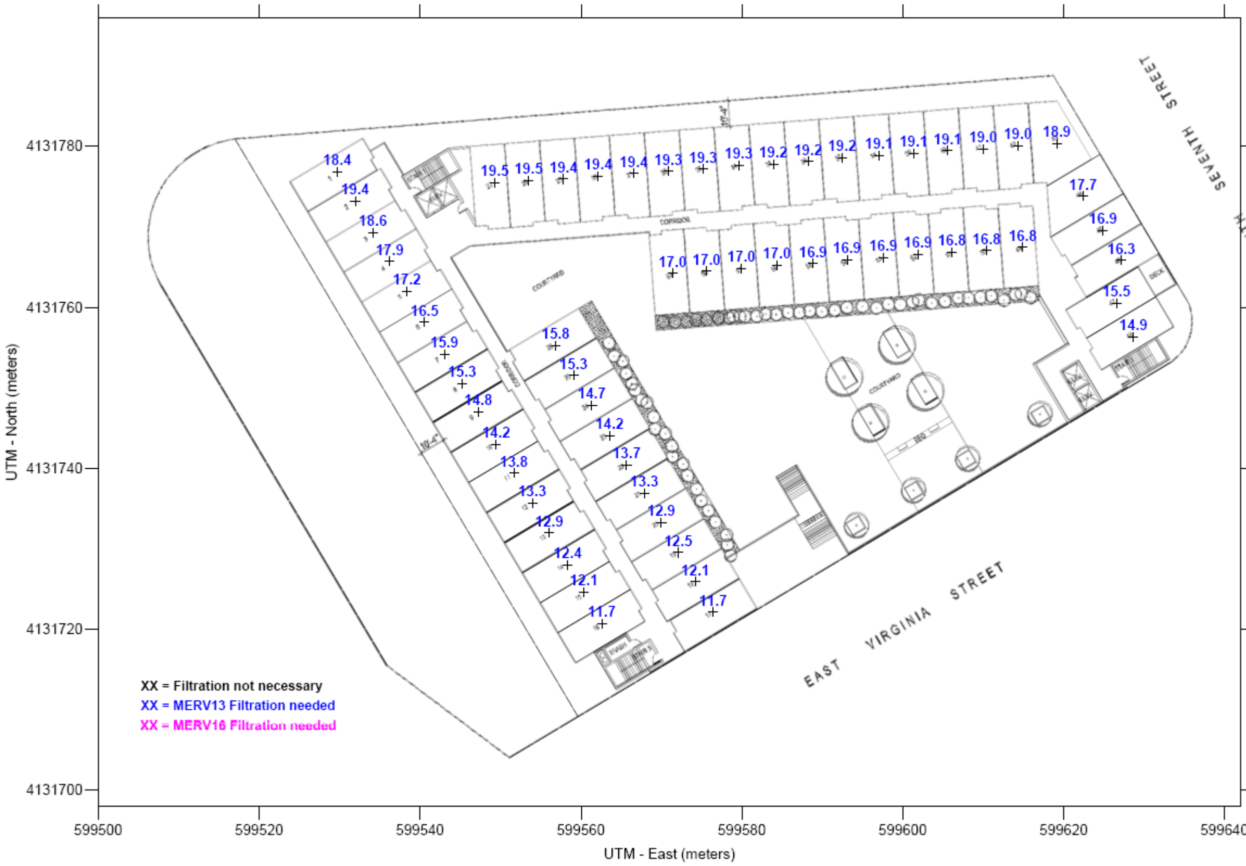

Figure 5. 3rd Floor Level - Annual PM2.5 Concentrations ($\mu g/m^3$) and Type of Filtration Needed

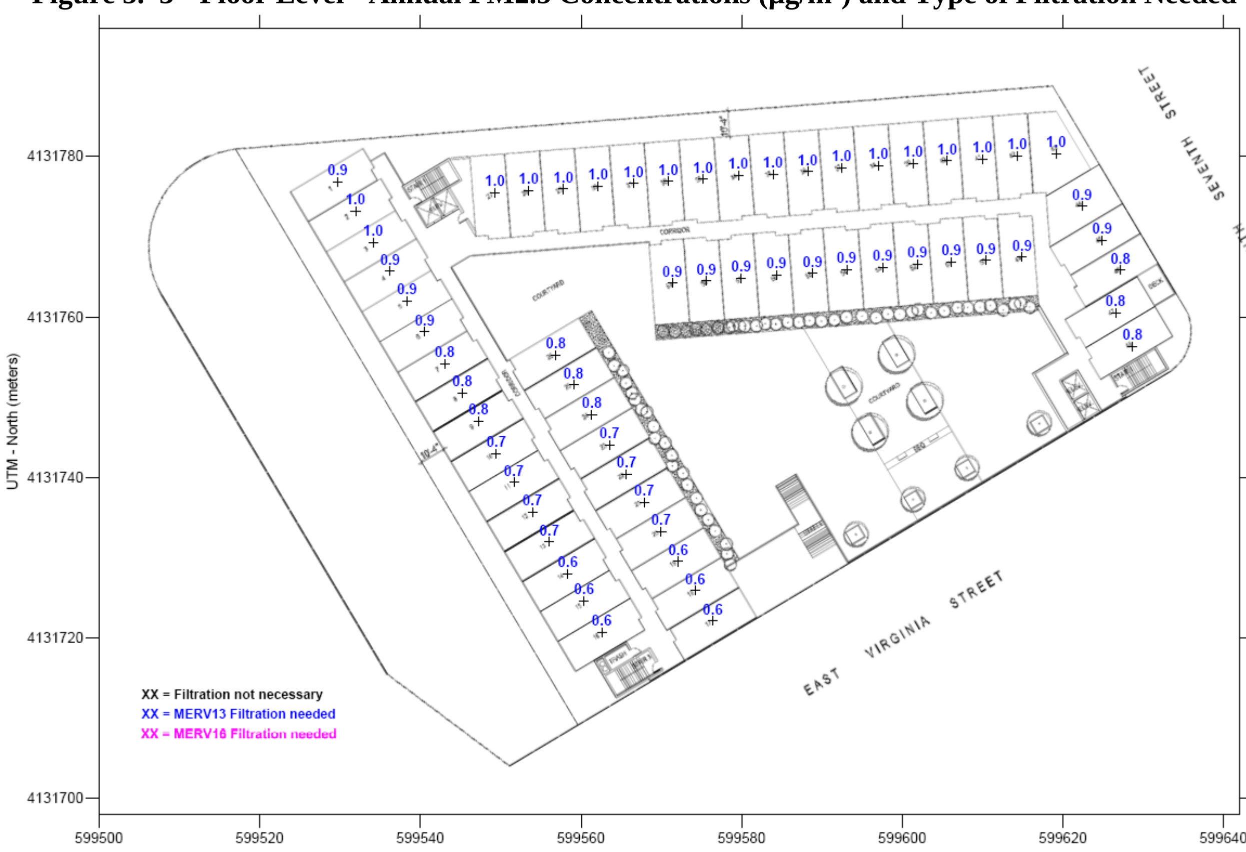

Figure 6. 4th Floor Level - Increased Cancer Risks (per million) and Type of Filtration Needed

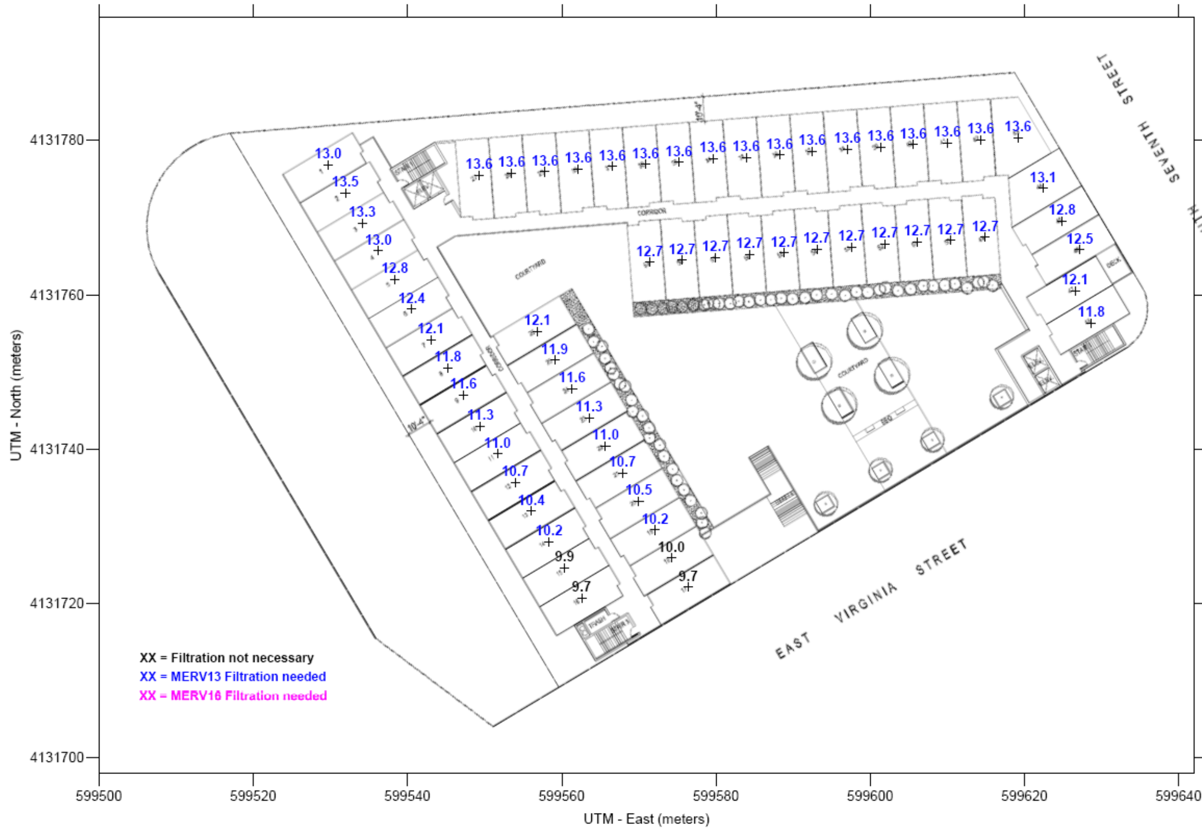

Figure 7. 4th Floor Level - Annual PM2.5 Concentrations (μg/m³) and Type of Filtration Needed

Figure 8. 5th Floor Level - Increased Cancer Risks (per million) and Type of Filtration Needed

Figure 9. 5th Floor Level - Annual PM2.5 Concentrations (µg/m³) and Type of Filtration Needed

Project Construction Activity

The California Emissions Estimator Model (CalEEMod) Version 2013.2.2 was used to predict 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. The proposed project land uses were input into CalEEMod, which included 295 residential units entered as "Condo/Townhouse High Rise," and 150 parking spaces entered as "Enclosed Parking with Elevator." The area of the site was entered as 1.68 acres. A construction build-out scenario, including equipment list and phasing schedule was based on model defaults for a project of this type and size. As a balanced site, no substantial hauling of soils is expected. Demolition would include an estimated 3,800 square feet of on-site structures and 2,083 cubic yards of pavement were assumed for demolition hauling. *Attachment 3* 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 PM_{10} 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. Fugitive dust emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Fugitive dust emissions would also depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site. 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-2 would implement BAAQMD-required best management practices*.

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known Toxic Air Contaminant (TAC). Diesel exhaust poses both a 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 from construction emissions of diesel particulate matter (DPM).[15] A dispersion model was used to predict the off-site DPM concentrations resulting from project construction so that lifetime cancer risks could be predicted. The closest sensitive receptors to the project site are residences located on S 7th Street, south of E Virginia Street. The Lowell Elementary School is located north of Interstate 280 about 400 feet north of the project site. Figure 10 shows the project site and sensitive receptor locations (school and residences) used in the air quality dispersion modeling analysis where potential health impacts were evaluated.

<u>Construction Emissions</u>

The refined health 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, as described above. Construction of the project is expected to occur over an approximate 11-month period starting in 2015. 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 (haul trucks, vendor trucks, and worker vehicles), with total emissions of 0.1438 tons (288 pounds). The on-road emissions are a result of haul truck travel, worker travel, and vendor deliveries during demolition, grading and construction activities. A trip length of 0.3 miles 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

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

were calculated by CalEEMod as 0.0115 tons (23 pounds) for the overall construction period. The project emission calculations used for modeling are provided in *Attachment 4*.

Figure 10 – Project Construction Site, Sensitive Receptor Locations, and Location of Maximum Cancer Risk

Dispersion Modeling

The U.S. EPA AERMOD dispersion model was used to predict DPM and $PM_{2.5}$ concentrations at existing sensitive receptors (residences and school) 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.[16] Emission sources for the construction site were grouped into two categories, exhaust emissions of DPM and fugitive $PM_{2.5}$ dust emissions. The AERMOD 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. To represent exhaust emissions from construction equipment, an emission release height of six meters 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 two meters 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 between 7 a.m. and 4 p.m.

The modeling used a five-year data set (2009 - 2013) of hourly meteorological data from the San Jose Airport, prepared for use with the AERMOD model by CARB for use in health risk assessments. Annual DPM and $PM_{2.5}$ concentrations from construction activities in 2016 were calculated using the model. DPM and $PM_{2.5}$ concentrations were calculated at nearby sensitive receptors at a receptor height of 1.5 meters (4.9 feet). Figure 10 shows the construction area modeled, and locations of nearby sensitive receptors.

Predicted Cancer Risk and Hazards

The maximum modeled DPM and $PM_{2.5}$ concentrations occurred at a residence on S 7th Street, south of E Virginia Street and southeast of the project site. The location of this receptor is identified on Figure 10. Increased cancer risks were calculated using the modeled concentrations and BAAQMD recommended risk assessment methods for both infant exposure (3rd trimester through 2 years of age) and adult exposure (see *Attachment 1* for a description of the risk assessment methodology). The cancer risk calculations were based on applying the BAAQMD recommended age sensitivity factors and exposure parameters to the DPM exposures. Age-sensitivity factors reflect the greater sensitivity of infants to cancer causing TACs. Infant and adult exposures were assumed to occur at all residences throughout the entire construction period and a child exposure was assumed to occur for students at the nearby school.

Results of this assessment indicate that for project construction the incremental residential infant cancer risk at the maximally exposed individual (MEI) receptor would be 37.8 in one million and the incremental residential adult cancer risk would be 0.7 in one million. The maximum school child increased cancer risk would be 0.9 in one million. The increased cancer risk for a residential infant exposure would be higher 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 annual $PM_{2.5}$ concentration was 0.25 micrograms per cubic meter ($\mu g/m^3$) occurring at the same location where maximum cancer risk would occur. This $PM_{2.5}$ concentration is at the BAAQMD significance threshold of greater than 0.3 $\mu g/m^3$ used to judge the significance of health impacts from $PM_{2.5}$. This would be considered a *less-than-significant* impact.

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

Potential non-cancer health effects due to chronic exposure to DPM were evaluated by computing the hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). 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 µg/m^3. The maximum modeled annual residential DPM concentration was 0.23 µg/m^3, which is much lower than the REL. The maximum computed hazard index based on this DPM concentration is 0.05 which is much lower than the BAAQMD significance criterion of a hazard index greater than 1.0.

Combined Construction Risk Assessment

In addition to construction of the project, there are other sources of air pollutant emissions identified within 1,000 feet of the project site. These sources include I-280, a gasoline station and S. 7th Street. Combined construction impacts were evaluated at the receptor that had the greatest impacts from construction. This is a residence along S. 7th Street, about 200 feet south-southeast of the project site. Impacts from these cumulative sources were computed using screening tools made available by BAAQMD.

The BAAQMD *Highway Screening Analysis Tool* was used to predict community risk levels from I-280, which is over 400 feet north of the residence. Impacts associated with Link 521 (6ft elevation) at 400 feet south are reported. BAAQMD's *Stationary Source Screening Analysis Tool* was used to identify fence line levels from the gasoline station at 288 E. Virginia Street (Plant G5313). The *Roadway Screening Analysis Calculator* was used to predict levels at 25 feet west of S. 7th Street. This is the only local roadway near the project site with over 10,000 ADT.

Table 2 summarizes the health impacts associated with each of the cumulative construction sources and the proposed project. The maximum combined cumulative increase in cancer risk from all unmitigated construction projects and nearby TAC sources is 96.0 in one million. The maximum annual $PM_{2.5}$ concentration would be 0.8 µg/m^3. For non-cancer health effects due to chronic exposure to DPM, the HI from all construction projects would be less than 0.11, which is below the BAAQMD HI threshold of 10.0 used to judge the significance of cumulative non-cancer health effects. The cumulative cancer risk, non-cancer hazard, and annual $PM_{2.5}$ levels would not exceed the thresholds, and therefore, be considered *less than significant*.

Attachment 4 includes the emission calculations used for the area source modeling and the cancer risk calculations.

The project would have a *significant impact* with respect to community risk caused by construction activities, since child cancer risk would exceed 10 chances in one million.

Table 2. Combined Construction Source Cancer Risks, $PM_{2.5}$ Concentrations, and Hazard Index at the Receptor with Maximum Impacts

Source	Cancer Risk (per million)	$PM_{2.5}$ Concentration ($\mu g/m^3$)	Acute and Chronic Hazard (HI)
Proposed Project Construction (Unmitigated)	37.8 Infant exposure	0.25	0.05
BAAQMD Thresholds	*>10.0*	*>0.3*	*>1.0*
Significant?	***Yes***	***No***	***No***
Interstate 280 at over 400 feet (using BAAQMD *Highway Screening Analysis Tool*)	31.8	0.31	0.03
Calgas, Facility G5313 at about 50 feet (*using BAAQMD Stationary Source Screening Analysis Tool*)	18.4	0.00	0.02
Local Roadways – S. 7th St at 35 ft (*using BAAQMD Roadway Screening Analysis Calculator*)	8.0	0.26	<0.01
Total	**96.0**	**0.82**	**<0.11**
BAAQMD Thresholds	*>100*	*>0.8*	*>10.0*
Significant?	***No***	***No***	***No***

Mitigation Measure AQ-2: Include BAAQMD-Recommended Construction Control Measures

Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality and fugitive dust-related impacts associated with grading and new construction to a less than significant. 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 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-3: Diesel Construction Equipment Selection

Develop a plan demonstrating that mobile off-road equipment larger than 25 horsepower and operating at the site for more than two days continuously shall meet U.S. EPA particulate matter emissions standards for Tier 4 engines or equivalent and all stationary pieces of construction equipment shall use best available control technology to reduce particulate matter or shall be gasoline- or alternative energy-powered. Tier 2 engines that have exhaust systems equipped with CARB Level 3 VDECS[17] would also meet this requirement.

Effectiveness of Mitigation

Implementation of Mitigation Measure AQ-2 is considered to reduce exhaust emissions and corresponding health risks by 5 percent. Implementation of Mitigation Measure AQ-3 would substantially reduce on-site diesel exhaust emissions. Emissions modeling using CalEEMod indicate that diesel particulate matter emissions would be reduced by over 80 percent with this mitigation measures. The resulting cancer risk would be less than 7 chances per million. As a result, the project with mitigation measures would have a less-than-significant impact with respect to community risk caused by construction activities.

[17] Verified diesel emission control systems

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.[18] 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.[19] 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.[20] 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, 95^{th} percentile breathing rates are used for the third trimester and infant exposures, and 80^{th} percentile breathing rates for child and adult exposures. Additionally, CARB and the BAAQMD recommend the use of residential exposure duration of 30 years for sources with long-term emissions (e.g., roadways).

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).

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[18] 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.

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

[20] BAAQMD, 2016. *BAAQMD Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines*. January 2016.

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

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

Where:

CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
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 = $C_{air} \times DBR \times A \times (EF/365) \times 10^{-6}$

Where:

C_{air} = concentration in air ($\mu g/m^3$)
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 →	**3rd Trimester**	**0<2**	**2 < 9**	**2 < 16**	**16 - 30**
DPM Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$		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 ($\mu g/m^3$).

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: I-280 Traffic Data and Health Risk Calculations

295 E Virginia St, San Jose, CA

SR-87 Traffic Data and PM2.5 & TOG Emission Factors - 60 mph Trucks & 65 mph Other Vehicles

Analysis Year = ***2020***

Vehicle Type	2014 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	149,944	158,940	0.33%	527	65	0.0121	0.0192	0.0015	0.0202	0.044
LDT	66,284	70,261	0.07%	50	65	0.0188	0.0195	0.0017	0.0333	0.103
MDT	3,706	3,928	6.48%	254	60	0.0190	0.0217	0.0027	0.0498	0.161
HDT	2,066	2,190	88.92%	1,948	60	0.0797	0.1107	0.0682	0.0864	0.115
Total	222,000	235,320	-	2,780	62.5	-	-		-	-
Mix Avg Emission Factor						**0.06025**	**0.02018**	**0.00218**	**0.02467**	**0.06365**
Increase From 2014		1.06								
Vehicles/Direction		117,660		1,390						
Avg Vehicles/Hour/Direction		**4,903**		**58**						

Traffic Data Year = ***2014***

2014 Caltrans AADT & 2013 Truck % Data	Total	Total Truck	Truck by Axle: 2	3	4	5
I-280, Ahead San Jose, 10th Street	222,000	5,772	3,706	704	196	1,166
			64.20%	12.20%	3.40%	20.20%
Percent of Total Vehicles		2.60%	1.67%	0.32%	0.09%	0.53%

Traffic Increase per Year (%) = ***1.00%***

295 E Virginia St, San Jose, CA

Interstate 280 Traffic Data and PM2.5 & TOG Emission Factors - 30 mph

Analysis Year = ***2020***

Vehicle Type	2014 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	149,944	158,940	0.33%	527	30	0.0152	0.0196	0.0019	0.0259	0.044
LDT	66,284	70,261	0.07%	50	30	0.0270	0.0200	0.0022	0.0440	0.103
MDT	3,706	3,928	6.48%	254	30	0.0311	0.0220	0.0030	0.0783	0.161
HDT	2,066	2,190	88.92%	1,948	30	0.0692	0.1035	0.0610	0.4439	0.115
Total	222,000	235,320	-	2,780	30	-	-		-	-
Mix Avg Emission Factor						**0.05473**	**0.02055**	**0.00255**	**0.03258**	**0.06365**

295 E Virginia St, San Jose, CA

Interstate 280 Traffic Data and PM2.5 & TOG Emission Factors - 20 mph

Analysis Year = ***2020***

Vehicle Type	2014 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	149,944	158,940	0.33%	527	20	0.0214	0.0209	0.0032	0.0440	0.044
LDT	66,284	70,261	0.07%	50	20	0.0383	0.0216	0.0038	0.0739	0.103
MDT	3,706	3,928	6.48%	254	20	0.0448	0.0292	0.0102	0.1459	0.161
HDT	2,066	2,190	88.92%	1,948	20	0.0716	0.1066	0.0641	0.6270	0.115
Total	222,000	235,320	-	2,780	20	-	-	-	-	-
Mix Avg Emission Factor						**0.05903**	**0.02207**	**0.00407**	**0.05526**	**0.06365**

295 E Virginia St, San Jose, CA
Interstate 280
DPM Modeling - Roadway Links, Traffic Volumes, and DPM Emissions
Year = 2020

Road Link	Description	Direction	No. Lanes	Link Length (m)	Link Width (ft)	Link Width (m)	Release Height (m)	Diesel ADT	Average Speed (mph)
EB-280	Eastbound I-280	E	4	767	68	20.6	3.4	1,390	variable
WB-280	Westbound I-280	W	4	758	68	20.6	3.4	1,390	variable

2020 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - EB-280

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.19%	44	0.0687	9	6.81%	95	0.0575	17	6.03%	84	0.0525
2	2.01%	28	0.0556	10	5.89%	82	0.0734	18	4.13%	57	0.0409
3	2.21%	31	0.0496	11	6.74%	94	0.0583	19	3.46%	48	0.0396
4	2.83%	39	0.0770	12	7.21%	100	0.0594	20	2.31%	32	0.0283
5	1.79%	25	0.0683	13	6.57%	91	0.0594	21	2.48%	35	0.0698
6	2.80%	39	0.0797	14	6.55%	91	0.0586	22	3.42%	47	0.0740
7	5.05%	70	0.0789	15	5.74%	80	0.0570	23	1.92%	27	0.0680
8	5.44%	76	0.0558	16	4.72%	66	0.0515	24	0.69%	10	0.0657
								Total		1,390	

2020 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - WB-280

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.19%	44	0.0687	9	6.81%	95	0.0569	17	6.03%	84	0.0581
2	2.01%	28	0.0556	10	5.89%	82	0.0734	18	4.13%	57	0.0420
3	2.21%	31	0.0496	11	6.74%	94	0.0583	19	3.46%	48	0.0396
4	2.83%	39	0.0770	12	7.21%	100	0.0594	20	2.31%	32	0.0283
5	1.79%	25	0.0683	13	6.57%	91	0.0594	21	2.48%	35	0.0698
6	2.80%	39	0.0797	14	6.55%	91	0.0586	22	3.42%	47	0.0740
7	5.05%	70	0.0789	15	5.74%	80	0.0570	23	1.92%	27	0.0680
8	5.44%	76	0.0549	16	4.72%	66	0.0515	24	0.69%	10	0.0657
								Total		1,390	

295 E Virginia St, San Jose, CA
Interstate 280
PM2.5 & TOG Modeling - Roadway Links, Traffic Volumes, and PM2.5 Emissions
Year = 2020

Group Link	Description	Direction	No. Lanes	Link Length (m)	Link Width (ft)	Link Width (m)	Release Height (m)	ADT	Average Speed (mph)
EB-280	Eastbound I-280	E	4	767	68	20.6	1.4	117,660	variable
WB-280	Westbound I-280	W	4	758	68	20.6	1.4	117,660	variable

2020 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - EB-280

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.08%	1274	0.0219	9	7.07%	8322	0.0203	17	7.39%	8698	0.0203
2	0.36%	423	0.0231	10	4.26%	5007	0.0210	18	8.30%	9771	0.0201
3	0.29%	343	0.0238	11	4.59%	5404	0.0205	19	5.81%	6838	0.0197
4	0.18%	212	0.0349	12	5.84%	6871	0.0204	20	4.38%	5149	0.0196
5	0.45%	526	0.0227	13	6.18%	7266	0.0202	21	3.29%	3870	0.0200
6	0.81%	955	0.0236	14	6.03%	7096	0.0202	22	3.31%	3892	0.0203
7	3.77%	4431	0.0207	15	7.09%	8339	0.0200	23	2.47%	2910	0.0200
8	7.92%	9319	0.0198	16	7.23%	8513	0.0198	24	1.90%	2232	0.0196
								Total		117,660	

2020 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - WB-280

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.08%	1274	0.0219	9	7.07%	8322	0.0222	17	7.39%	8698	0.0200
2	0.36%	423	0.0231	10	4.26%	5007	0.0210	18	8.30%	9771	0.0197
3	0.29%	343	0.0238	11	4.59%	5404	0.0205	19	5.81%	6838	0.0197
4	0.18%	212	0.0349	12	5.84%	6871	0.0204	20	4.38%	5149	0.0196
5	0.45%	526	0.0227	13	6.18%	7266	0.0202	21	3.29%	3870	0.0200
6	0.81%	955	0.0236	14	6.03%	7096	0.0202	22	3.31%	3892	0.0203
7	3.77%	4431	0.0207	15	7.09%	8339	0.0200	23	2.47%	2910	0.0200
8	7.92%	9319	0.0217	16	7.23%	8513	0.0198	24	1.90%	2232	0.0196
								Total		117,660	

295 E Virginia St, San Jose, CA
Interstate 280 Traffic Data and Entrained PM2.5 Road Dust Emission Factors

$E_{2.5} = [k(sL)^{0.91} \times (W)^{1.02} \times (1-P/4N) \times 453.59$

where:

$E_{2.5} = PM_{2.5}$ emission factor (g/VMT)

k = particle size multiplier (g/VMT) [$k_{PM2.5} = k_{PM10} \times (0.0686/0.4572) = 1.0 \times 0.15 = 0.15$ g/VMT][a]

sL = roadway specific silt loading (g/m^2)

W = average weight of vehicles on road (Bay Area default = 2.4 tons)[a]

P = number of days with at least 0.01 inch of precipitation in the annual averaging period

N = number of days in the annual averaging period (default = 365)

Notes: [a] CARB 2014, Miscellaneous Process Methodology 7.9, Entrained Road Travel, Paved Road Dust (Revised and updated, April 2014)

Road Type	Silt Loading (g/m^2)	Average Weight (tons)	County	No. Days ppt > 0.01"	$PM_{2.5}$ Emission Factor (g/VMT)
Freeway	0.02	2.4	Santa Clara	64	0.00996

SFBAAB[a]

Road Type	Silt Loading (g/m^2)
Collector	0.032
Freeway	0.02
Local	0.32
Major	0.032

SFBAAB[a]

County	>0.01 inch precipitation
Alameda	61
Contra Costa	60
Marin	66
Napa	68
San Francisco	67
San Mateo	60
Santa Clara	64
Solano	54
Sonoma	69

295 E. Virginia, San Jose, CA - El Camino Real Traffic - TACs & PM2.5
AERMOD Risk Modeling Parameters and Maximum Concentrations
On-Site 2nd Floor Residential Receptors (4.5 meter receptor heights)

Emissions Year	2020
Receptor Information	
Number of Receptors	94
Receptor Height =	4.5 m - second floor level
Receptor distances =	ar residential locations

Meteorological Conditions	
BAAQMD San Jose Airport Met Data	2006-2010
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

MEI Maximum Concentrations

Meteorological	Concentration (μg/m^3)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2006-2010	0.02753	1.1048	2.6165

Meteorological	PM2.5 Concentrations (μg/m^3)		
Data Years	Total PM2.5	Road Dust PM2.5	Vehicle PM2.5
2006-2010	1.2395	0.4088	0.8306

295 E. Virginia, San Jose, CA - I-280 Traffic -Maximum Cancer Risks
On-Site 2nd Floor Residential Receptors (4.5 meter receptor heights)
30-Year Residential Exposure

Cancer Risk Calculation Method

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

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
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 ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

	Infant/Child			Adult
Age -->	3rd Trimester	0 - <2	2 - <16	16 - 30
Parameter				
ASF	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	14
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates

Road Traffic Cancer Risk by Year - Maximum Impact Receptor Location

				Maximum - Exposure Information							
		Exposure		Age	Annual TAC Conc (ug/m3)			Cancer Risk (per million)			
Exposure Year	Year	Duration (years)	Age	Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	Total
0	2017	0.25	-0.25 - 0*	10	0.0275	1.1048	2.6165	0.374	0.086	0.012	0.47
1	2017	1	1	10	0.0275	1.1048	2.6165	4.52	1.036	0.145	5.70
2	2018	1	2	10	0.0275	1.1048	2.6165	4.52	1.036	0.145	5.70
3	2019	1	3	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
4	2020	1	4	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
5	2021	1	5	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
6	2022	1	6	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
7	2023	1	7	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
8	2024	1	8	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
9	2025	1	9	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
10	2026	1	10	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
11	2027	1	11	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
12	2028	1	12	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
13	2029	1	13	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
14	2030	1	14	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
15	2031	1	15	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
16	2032	1	16	3	0.0275	1.1048	2.6165	0.71	0.163	0.023	0.90
17	2033	1	17	1	0.0275	1.1048	2.6165	0.08	0.0181	0.003	0.100
18	2034	1	18	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
19	2035	1	19	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
20	2036	1	20	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
21	2037	1	21	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
22	2038	1	22	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
23	2039	1	23	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
24	2040	1	24	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
25	2041	1	25	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
26	2042	1	26	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
27	2043	1	27	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
28	2044	1	28	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
29	2045	1	29	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
30	2046	1	30	1	0.0275	1.1048	2.6165	0.08	0.018	0.003	0.100
Total Increased Cancer Risk			**Total**					20.49	4.695	0.656	**25.84**

* Third trimester of pregnancy

295 E. Virginia, San Jose, CA - El Camino Real Traffic - TACs & PM2.5
AERMOD Risk Modeling Parameters and Maximum Concentrations
On-Site 3rd Floor Residential Receptors (7.6 meter receptor heights)

Emissions Year	2020
Receptor Information	
Number of Receptors	94
Receptor Height =	7.6 m - third floor level
Receptor distances =	ar residential locations
Meteorological Conditions	
BAAQMD San Jose Airport Met Data	2006-2010
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

MEI Maximum Concentrations

Meteorological	Concentration ($\mu g/m^3$)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2006-2010	0.02046	0.8919	2.1124

Meteorological	PM2.5 Concentrations ($\mu g/m^3$)		
Data Years	Total PM2.5	Road Dust PM2.5	Vehicle PM2.5
2006-2010	1.0012	0.6706	0.3306

295 E. Virginia, San Jose, CA - I-280 Traffic -Maximum Cancer Risks
On-Site 3rd Floor Residential Receptors (7.6 meter receptor heights)
30-Year Residential Exposure

Cancer Risk Calculation Method

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

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
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 ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

	Infant/Child			Adult
Age -->	3rd Trimester	0 - <2	2 - <16	16 - 30
Parameter				
ASF	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	14
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates

Road Traffic Cancer Risk by Year - Maximum Impact Receptor Location

				Maximum - Exposure Information				Cancer Risk (per million)			
		Exposure		Age	Annual TAC Conc (ug/m3)						
Exposure Year	Year	Duration (years)	Age	Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	Total
0	2017	0.25	-0.25 - 0*	10	0.0205	0.8919	2.1124	0.278	0.069	0.010	0.36
1	2017	1	1	10	0.0205	0.8919	2.1124	3.36	0.836	0.117	4.31
2	2018	1	2	10	0.0205	0.8919	2.1124	3.36	0.836	0.117	4.31
3	2019	1	3	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
4	2020	1	4	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
5	2021	1	5	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
6	2022	1	6	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
7	2023	1	7	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
8	2024	1	8	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
9	2025	1	9	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
10	2026	1	10	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
11	2027	1	11	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
12	2028	1	12	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
13	2029	1	13	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
14	2030	1	14	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
15	2031	1	15	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
16	2032	1	16	3	0.0205	0.8919	2.1124	0.53	0.132	0.018	0.68
17	2033	1	17	1	0.0205	0.8919	2.1124	0.06	0.0146	0.002	0.075
18	2034	1	18	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
19	2035	1	19	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
20	2036	1	20	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
21	2037	1	21	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
22	2038	1	22	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
23	2039	1	23	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
24	2040	1	24	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
25	2041	1	25	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
26	2042	1	26	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
27	2043	1	27	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
28	2044	1	28	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
29	2045	1	29	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
30	2046	1	30	1	0.0205	0.8919	2.1124	0.06	0.015	0.002	0.075
Total Increased Cancer Risk			**Total**					15.23	3.791	0.529	**19.55**

* Third trimester of pregnancy

295 E. Virginia, San Jose, CA - El Camino Real Traffic - TACs & PM2.5
AERMOD Risk Modeling Parameters and Maximum Concentrations
On-Site 4th Floor Residential Receptors (10.6 meter receptor heights)

Emissions Year	2020
Receptor Information	
Number of Receptors	94
Receptor Height =	10.6 m - fourth floor level
Receptor distances =	ar residential locations

Meteorological Conditions

BAAQMD San Jose Airport Met Data	2006-2010
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

MEI Maximum Concentrations

Meteorological	Concentration (µg/m^3)		
Data Years	DPM	Exhaust TOG	Evaporative TOG
2006-2010	0.01430	0.6159	1.4587

Meteorological	PM2.5 Concentrations (µg/m^3)		
Data Years	Total PM2.5	Road Dust PM2.5	Vehicle PM2.5
2006-2010	0.6938	0.4647	0.2292

295 E. Virginia, San Jose, CA - I-280 Traffic -Maximum Cancer Risks
On-Site 4th Floor Residential Receptors (10.6 meter receptor heights)
30-Year Residential Exposure

Cancer Risk Calculation Method

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

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
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 ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

	Infant/Child			Adult
Age -->	3rd Trimester	0 - <2	2 - <16	16 - 30
Parameter				
ASF	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	14
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates

Road Traffic Cancer Risk by Year - Maximum Impact Receptor Location

				Maximum - Exposure Information				Cancer Risk (per million)			
		Exposure		Age	Annual TAC Conc (ug/m3)						
Exposure Year	Year	Duration (years)	Age	Sensitivity Factor	DPM	Exhaust TOG	Evaporative TOG	DPM	Exhaust TOG	Evaporative TOG	Total
0	2017	0.25	-0.25 - 0*	10	0.0143	0.6159	1.4587	0.194	0.048	0.007	0.25
1	2017	1	1	10	0.0143	0.6159	1.4587	2.35	0.578	0.081	3.01
2	2018	1	2	10	0.0143	0.6159	1.4587	2.35	0.578	0.081	3.01
3	2019	1	3	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
4	2020	1	4	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
5	2021	1	5	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
6	2022	1	6	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
7	2023	1	7	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
8	2024	1	8	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
9	2025	1	9	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
10	2026	1	10	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
11	2027	1	11	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
12	2028	1	12	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
13	2029	1	13	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
14	2030	1	14	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
15	2031	1	15	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
16	2032	1	16	3	0.0143	0.6159	1.4587	0.37	0.091	0.013	0.47
17	2033	1	17	1	0.0143	0.6159	1.4587	0.04	0.0101	0.001	0.053
18	2034	1	18	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
19	2035	1	19	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
20	2036	1	20	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
21	2037	1	21	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
22	2038	1	22	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
23	2039	1	23	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
24	2040	1	24	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
25	2041	1	25	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
26	2042	1	26	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
27	2043	1	27	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
28	2044	1	28	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
29	2045	1	29	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
30	2046	1	30	1	0.0143	0.6159	1.4587	0.04	0.010	0.001	0.053
Total Increased Cancer Risk			**Total**					10.64	2.618	0.366	**13.63**

* Third trimester of pregnancy

295 E. Virginia, San Jose, CA - El Camino Real Traffic - TACs & PM2.5
AERMOD Risk Modeling Parameters and Maximum Concentrations
On-Site 5th Floor Residential Receptors (13.7 meter receptor heights)

Emissions Year	2020
Receptor Information	
Number of Receptors	94
Receptor Height =	13.7 m - fifth floor level
Receptor distances =	ar residential locations
Meteorological Conditions	
BAAQMD San Jose Airport Met Data	2006-2010
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

MEI Maximum Concentrations

Meteorological Data Years	Concentration (μg/m^3)		
	DPM	Exhaust TOG	Evaporative TOG
2006-2010	0.00943	0.4056	0.9607

Meteorological Data Years	PM2.5 Concentrations (μg/m^3)		
	Total PM2.5	Road Dust PM2.5	Vehicle PM2.5
2006-2010	0.4590	0.3074	0.1516

295 E. Virginia, San Jose, CA - I-280 Traffic -Maximum Cancer Risks
On-Site 5th Floor Residential Receptors (13.7 meter receptor heights)
30-Year Residential Exposure

Cancer Risk Calculation Method

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

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
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 ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

Cancer Potency Factors $(mg/kg\text{-}day)^{-1}$

TAC	CPF
DPM	1.10E+00
Vehicle TOG Exhaust	6.28E-03
Vehicle TOG Evaporative	3.70E-04

	Infant/Child			Adult
Age -->	3rd Trimester	0 - <2	2 - <16	16 - 30
Parameter				
ASF	10	10	3	1
DBR* =	361	1090	572	261
A =	1	1	1	1
EF =	350	350	350	350
ED =	0.25	2	14	14
AT =	70	70	70	70
FAH =	1.00	1.00	1.00	0.73

* 95th percentile breathing rates

Road Traffic Cancer Risk by Year - Maximum Impact Receptor Location

				Maximum - Exposure Information				Cancer Risk (per million)			
		Exposure		Age	Annual TAC Conc (ug/m3)						
Exposure		Duration		Sensitivity		Exhaust	Evaporative		Exhaust	Evaporative	
Year	Year	(years)	Age	Factor	DPM	TOG	TOG	DPM	TOG	TOG	Total
0	2017	0.25	-0.25 - 0*	10	0.0094	0.4056	0.9607	0.128	0.031	0.004	0.16
1	2017	1	1	10	0.0094	0.4056	0.9607	1.55	0.380	0.053	1.98
2	2018	1	2	10	0.0094	0.4056	0.9607	1.55	0.380	0.053	1.98
3	2019	1	3	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
4	2020	1	4	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
5	2021	1	5	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
6	2022	1	6	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
7	2023	1	7	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
8	2024	1	8	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
9	2025	1	9	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
10	2026	1	10	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
11	2027	1	11	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
12	2028	1	12	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
13	2029	1	13	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
14	2030	1	14	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
15	2031	1	15	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
16	2032	1	16	3	0.0094	0.4056	0.9607	0.24	0.060	0.008	0.31
17	2033	1	17	1	0.0094	0.4056	0.9607	0.03	0.0066	0.001	0.035
18	2034	1	18	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
19	2035	1	19	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
20	2036	1	20	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
21	2037	1	21	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
22	2038	1	22	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
23	2039	1	23	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
24	2040	1	24	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
25	2041	1	25	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
26	2042	1	26	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
27	2043	1	27	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
28	2044	1	28	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
29	2045	1	29	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
30	2046	1	30	1	0.0094	0.4056	0.9607	0.03	0.007	0.001	0.035
Total Increased Cancer Risk			**Total**					7.02	1.724	0.241	**9.0**

* Third trimester of pregnancy

Attachment 3: CalEEMod Input and Output Worksheets

295 E. Virginia St. - San Jose

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	138.00	Space	0.00	55,200.00	0
Condo/Townhouse High Rise	255.00	Dwelling Unit	1.23	255,000.00	729

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 58

Climate Zone 4 **Operational Year** 2014

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Land Use - Lot acreage from PD.

Trips and VMT - 3,800 s.f. building demo = 17 trips + 2,083 CY pavement demo (estimated from Google Earth) at 16 CY/truck or 260 one-way trips (130 trucks) = 277 total demo trips. 0.3 mile trip lengths to calculate risk from on-site vehicle travel.

Demolition - Estimated from Google Earth (two buildings on-site).

Construction Off-road Equipment Mitigation - Tier 4 engines for equipment >50 hp + BAAQMD fugitive dust BMPs.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
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	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblLandUse	LotAcreage	1.24	0.00
tblLandUse	LotAcreage	3.98	1.23
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	0.30
tblTripsAndVMT	HaulingTripNumber	17.00	277.00
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30

tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	VendorTripLength	7.30	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30
tblTripsAndVMT	WorkerTripLength	12.40	0.30

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					
2015	0.4256	2.3082	2.1174	2.3500e-003	0.0225	0.1502	0.1727	9.6800e-003	0.1443	0.1540	0.0000	201.6441	201.6441	0.0448	0.0000	202.5854
2016	2.1518	0.3904	0.3567	4.3000e-004	9.0000e-004	0.0249	0.0258	2.5000e-004	0.0239	0.0242	0.0000	36.9530	36.9530	8.0700e-003	0.0000	37.1224
Total	**2.5774**	**2.6986**	**2.4741**	**2.7800e-003**	**0.0234**	**0.1751**	**0.1986**	**9.9300e-003**	**0.1682**	**0.1782**	**0.0000**	**238.5971**	**238.5971**	**0.0529**	**0.0000**	**239.7078**

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					

2015	0.2582	0.6498	2.0001	2.3500e-003	0.0129	0.0433	0.0562	3.2500e-003	0.0432	0.0465	0.0000	201.6438	201.6438	0.0448	0.0000	202.5852
2016	2.1238	0.1085	0.3577	4.3000e-004	9.0000e-004	6.7700e-003	7.6700e-003	2.5000e-004	6.7600e-003	7.0100e-003	0.0000	36.9530	36.9530	8.0700e-003	0.0000	37.1224
Total	**2.3819**	**0.7583**	**2.3578**	**2.7800e-003**	**0.0138**	**0.0500**	**0.0639**	**3.5000e-003**	**0.0500**	**0.0535**	**0.0000**	**238.5968**	**238.5968**	**0.0529**	**0.0000**	**239.7075**

	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	N20	CO2e
Percent Reduction	**7.58**	**71.90**	**4.70**	**0.00**	**41.06**	**71.43**	**67.85**	**64.75**	**70.29**	**69.99**	**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	4/1/2015	4/28/2015	5	20	
2	Site Preparation	Site Preparation	4/29/2015	4/30/2015	5	2	
3	Grading	Grading	5/1/2015	5/6/2015	5	4	
4	Building Construction	Building Construction	5/7/2015	2/10/2016	5	200	
5	Paving	Paving	2/11/2016	2/24/2016	5	10	
6	Architectural Coating	Architectural Coating	2/25/2016	3/9/2016	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0

Residential Indoor: 516,375; Residential Outdoor: 172,125; Non-Residential Indoor: 82,800; Non-Residential Outdoor: 27,600

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	8.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37

Site Preparation	Graders		1	8.00	174	0.41
Site Preparation	Rubber Tired Dozers		1	7.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes		1	8.00	97	0.37
Grading	Graders		1	6.00	174	0.41
Grading	Rubber Tired Dozers		1	6.00	255	0.40
Grading	Tractors/Loaders/Backhoes		1	7.00	97	0.37
Building Construction	Cranes		1	6.00	226	0.29
Building Construction	Forklifts		1	6.00	89	0.20
Building Construction	Generator Sets		1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes		1	6.00	97	0.37
Building Construction	Welders		3	8.00	46	0.45
Paving	Cement and Mortar Mixers		1	6.00	9	0.56
Paving	Pavers		1	6.00	125	0.42
Paving	Paving Equipment		1	8.00	130	0.36
Paving	Rollers		1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes		1	8.00	97	0.37
Architectural Coating	Air Compressors		1	6.00	78	0.48

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	5	13.00	0.00	277.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Building Construction	7	207.00	36.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	41.00	0.00	0.00	0.30	0.30	0.30	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Clean Paved Roads

3.2 Demolition - 2015

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					1.8700e-003	0.0000	1.8700e-003	2.8000e-004	0.0000	2.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0307	0.2968	0.2206	2.4000e-004		0.0187	0.0187		0.0175	0.0175	0.0000	22.7618	22.7618	5.7700e-003	0.0000	22.8829
Total	**0.0307**	**0.2968**	**0.2206**	**2.4000e-004**	**1.8700e-003**	**0.0187**	**0.0205**	**2.8000e-004**	**0.0175**	**0.0178**	**0.0000**	**22.7618**	**22.7618**	**5.7700e-003**	**0.0000**	**22.8829**

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	1.6000e-003	3.9100e-003	0.0239	0.0000	4.0000e-005	2.0000e-005	6.0000e-005	1.0000e-005	2.0000e-005	3.0000e-005	0.0000	0.3653	0.3653	1.0000e-005	0.0000	0.3655
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	3.7000e-004	1.0000e-004	1.3000e-003	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0531	0.0531	1.0000e-005	0.0000	0.0533
Total	**1.9700e-003**	**4.0100e-003**	**0.0252**	**0.0000**	**7.0000e-005**	**2.0000e-005**	**9.0000e-005**	**2.0000e-005**	**2.0000e-005**	**4.0000e-005**	**0.0000**	**0.4184**	**0.4184**	**2.0000e-005**	**0.0000**	**0.4187**

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					8.4000e-004	0.0000	8.4000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8400e-003	0.0123	0.1484	2.4000e-004		3.8000e-004	3.8000e-004		3.8000e-004	3.8000e-004	0.0000	22.7618	22.7618	5.7700e-003	0.0000	22.8829
Total	**2.8400e-003**	**0.0123**	**0.1484**	**2.4000e-004**	**8.4000e-004**	**3.8000e-004**	**1.2200e-003**	**6.0000e-005**	**3.8000e-004**	**4.4000e-004**	**0.0000**	**22.7618**	**22.7618**	**5.7700e-003**	**0.0000**	**22.8829**

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	1.6000e-003	3.9100e-003	0.0239	0.0000	4.0000e-005	2.0000e-005	6.0000e-005	1.0000e-005	2.0000e-005	3.0000e-005	0.0000	0.3653	0.3653	1.0000e-005	0.0000	0.3655
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	3.7000e-004	1.0000e-004	1.3000e-003	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0531	0.0531	1.0000e-005	0.0000	0.0533
Total	**1.9700e-003**	**4.0100e-003**	**0.0252**	**0.0000**	**7.0000e-005**	**2.0000e-005**	**9.0000e-005**	**2.0000e-005**	**2.0000e-005**	**4.0000e-005**	**0.0000**	**0.4184**	**0.4184**	**2.0000e-005**	**0.0000**	**0.4187**

3.3 Site Preparation - 2015

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					5.8000e-003	0.0000	5.8000e-003	2.9500e-003	0.0000	2.9500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.5400e-003	0.0269	0.0170	2.0000e-005		1.4700e-003	1.4700e-003		1.3500e-003	1.3500e-003	0.0000	1.6345	1.6345	4.9000e-004	0.0000	1.6448
Total	**2.5400e-003**	**0.0269**	**0.0170**	**2.0000e-005**	**5.8000e-003**	**1.4700e-003**	**7.2700e-003**	**2.9500e-003**	**1.3500e-003**	**4.3000e-003**	**0.0000**	**1.6345**	**1.6345**	**4.9000e-004**	**0.0000**	**1.6448**

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	8.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.2700e-003	3.2700e-003	0.0000	0.0000	3.2800e-003
Total	**2.0000e-005**	**1.0000e-005**	**8.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**3.2700e-003**	**3.2700e-003**	**0.0000**	**0.0000**	**3.2800e-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					
Fugitive Dust					2.6100e-003	0.0000	2.6100e-003	6.6000e-004	0.0000	6.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1000e-004	9.0000e-004	0.0105	2.0000e-005		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	1.6345	1.6345	4.9000e-004	0.0000	1.6448

Total	**2.1000e-004**	**9.0000e-004**	**0.0105**	**2.0000e-005**	**2.6100e-003**	**3.0000e-005**	**2.6400e-003**	**6.6000e-004**	**3.0000e-005**	**6.9000e-004**	**0.0000**	**1.6345**	**1.6345**	**4.9000e-004**	**0.0000**	**1.6448**

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	8.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.2700e-003	3.2700e-003	0.0000	0.0000	3.2800e-003
Total	**2.0000e-005**	**1.0000e-005**	**8.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**3.2700e-003**	**3.2700e-003**	**0.0000**	**0.0000**	**3.2800e-003**

3.4 Grading - 2015

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					9.8300e-003	0.0000	9.8300e-003	5.0500e-003	0.0000	5.0500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1300e-003	0.0439	0.0282	3.0000e-005		2.3900e-003	2.3900e-003		2.2000e-003	2.2000e-003	0.0000	2.6849	2.6849	8.0000e-004	0.0000	2.7017
Total	**4.1300e-003**	**0.0439**	**0.0282**	**3.0000e-005**	**9.8300e-003**	**2.3900e-003**	**0.0122**	**5.0500e-003**	**2.2000e-003**	**7.2500e-003**	**0.0000**	**2.6849**	**2.6849**	**8.0000e-004**	**0.0000**	**2.7017**

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	5.0000e-005	1.0000e-005	1.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	6.5400e-003	6.5400e-003	0.0000	0.0000	6.5500e-003
Total	**5.0000e-005**	**1.0000e-005**	**1.6000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**6.5400e-003**	**6.5400e-003**	**0.0000**	**0.0000**	**6.5500e-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					
Fugitive Dust					4.4200e-003	0.0000	4.4200e-003	1.1400e-003	0.0000	1.1400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.4000e-004	1.4800e-003	0.0170	3.0000e-005		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	2.6849	2.6849	8.0000e-004	0.0000	2.7017
Total	**3.4000e-004**	**1.4800e-003**	**0.0170**	**3.0000e-005**	**4.4200e-003**	**5.0000e-005**	**4.4700e-003**	**1.1400e-003**	**5.0000e-005**	**1.1900e-003**	**0.0000**	**2.6849**	**2.6849**	**8.0000e-004**	**0.0000**	**2.7017**

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					

	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
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	5.0000e-005	1.0000e-005	1.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	6.5400e-003	6.5400e-003	0.0000	0.0000	6.5500e-003
Total	**5.0000e-005**	**1.0000e-005**	**1.6000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**6.5400e-003**	**6.5400e-003**	**0.0000**	**0.0000**	**6.5500e-003**

3.5 Building Construction - 2015

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	0.3078	1.8437	1.2829	1.8800e-003		0.1270	0.1270		0.1226	0.1226	0.0000	159.4431	159.4431	0.0368	0.0000	160.2154
Total	**0.3078**	**1.8437**	**1.2829**	**1.8800e-003**		**0.1270**	**0.1270**		**0.1226**	**0.1226**	**0.0000**	**159.4431**	**159.4431**	**0.0368**	**0.0000**	**160.2154**

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	0.0280	0.0799	0.3662	9.0000e-005	8.9000e-004	5.2000e-004	1.4100e-003	2.6000e-004	4.8000e-004	7.4000e-004	0.0000	7.4599	7.4599	1.3000e-004	0.0000	7.4626
Worker	0.0504	0.0130	0.1772	9.0000e-005	4.0700e-003	1.8000e-004	4.2500e-003	1.1000e-003	1.6000e-004	1.2700e-003	0.0000	7.2316	7.2316	8.5000e-004	0.0000	7.2495
Total	**0.0784**	**0.0928**	**0.5433**	**1.8000e-004**	**4.9600e-003**	**7.0000e-004**	**5.6600e-003**	**1.3600e-003**	**6.4000e-004**	**2.0100e-003**	**0.0000**	**14.6915**	**14.6915**	**9.8000e-004**	**0.0000**	**14.7121**

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	0.1743	0.5382	1.2554	1.8800e-003		0.0421	0.0421		0.0421	0.0421	0.0000	159.4429	159.4429	0.0368	0.0000	160.2152
Total	**0.1743**	**0.5382**	**1.2554**	**1.8800e-003**		**0.0421**	**0.0421**		**0.0421**	**0.0421**	**0.0000**	**159.4429**	**159.4429**	**0.0368**	**0.0000**	**160.2152**

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	0.0280	0.0799	0.3662	9.0000e-005	8.9000e-004	5.2000e-004	1.4100e-003	2.6000e-004	4.8000e-004	7.4000e-004	0.0000	7.4599	7.4599	1.3000e-004	0.0000	7.4626
Worker	0.0504	0.0130	0.1772	9.0000e-005	4.0700e-003	1.8000e-004	4.2500e-003	1.1000e-003	1.6000e-004	1.2700e-003	0.0000	7.2316	7.2316	8.5000e-004	0.0000	7.2495
Total	**0.0784**	**0.0928**	**0.5433**	**1.8000e-004**	**4.9600e-003**	**7.0000e-004**	**5.6600e-003**	**1.3600e-003**	**6.4000e-004**	**2.0100e-003**	**0.0000**	**14.6915**	**14.6915**	**9.8000e-004**	**0.0000**	**14.7121**

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	0.0477	0.2979	0.2133	3.2000e-004		0.0198	0.0198		0.0191	0.0191	0.0000	26.9259	26.9259	5.9200e-003	0.0000	27.0501
Total	**0.0477**	**0.2979**	**0.2133**	**3.2000e-004**		**0.0198**	**0.0198**		**0.0191**	**0.0191**	**0.0000**	**26.9259**	**26.9259**	**5.9200e-003**	**0.0000**	**27.0501**

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	4.3200e-003	0.0125	0.0592	1.0000e-005	1.5000e-004	7.0000e-005	2.2000e-004	4.0000e-005	6.0000e-005	1.1000e-004	0.0000	1.2516	1.2516	2.0000e-005	0.0000	1.2520
Worker	7.9000e-003	1.9500e-003	0.0270	2.0000e-005	6.9000e-004	3.0000e-005	7.2000e-004	1.9000e-004	3.0000e-005	2.1000e-004	0.0000	1.1852	1.1852	1.3000e-004	0.0000	1.1879
Total	**0.0122**	**0.0144**	**0.0862**	**3.0000e-005**	**8.4000e-004**	**1.0000e-004**	**9.4000e-004**	**2.3000e-004**	**9.0000e-005**	**3.2000e-004**	**0.0000**	**2.4368**	**2.4368**	**1.5000e-004**	**0.0000**	**2.4399**

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	0.0268	0.0885	0.2103	3.2000e-004		6.4900e-003	6.4900e-003		6.4900e-003	6.4900e-003	0.0000	26.9258	26.9258	5.9200e-003	0.0000	27.0501

Total	**0.0268**	**0.0885**	**0.2103**	**3.2000e-004**		**6.4900e-003**	**6.4900e-003**		**6.4900e-003**	**6.4900e-003**	**0.0000**	**26.9258**	**26.9258**	**5.9200e-003**	**0.0000**	**27.0501**

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	4.3200e-003	0.0125	0.0592	1.0000e-005	1.5000e-004	7.0000e-005	2.2000e-004	4.0000e-005	6.0000e-005	1.1000e-004	0.0000	1.2516	1.2516	2.0000e-005	0.0000	1.2520
Worker	7.9000e-003	1.9500e-003	0.0270	2.0000e-005	6.9000e-004	3.0000e-005	7.2000e-004	1.9000e-004	3.0000e-005	2.1000e-004	0.0000	1.1852	1.1852	1.3000e-004	0.0000	1.1879
Total	**0.0122**	**0.0144**	**0.0862**	**3.0000e-005**	**8.4000e-004**	**1.0000e-004**	**9.4000e-004**	**2.3000e-004**	**9.0000e-005**	**3.2000e-004**	**0.0000**	**2.4368**	**2.4368**	**1.5000e-004**	**0.0000**	**2.4399**

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					
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.4400e-003	0.0660	0.0454	7.0000e-005		4.0400e-003	4.0400e-003		3.7200e-003	3.7200e-003	0.0000	6.2071	6.2071	1.8400e-003	0.0000	6.2457
Total	**6.4400e-003**	**0.0660**	**0.0454**	**7.0000e-005**		**4.0400e-003**	**4.0400e-003**		**3.7200e-003**	**3.7200e-003**	**0.0000**	**6.2071**	**6.2071**	**1.8400e-003**	**0.0000**	**6.2457**

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					
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	1.7000e-004	4.0000e-005	5.8000e-004	0.0000	1.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0257	0.0257	0.0000	0.0000	0.0257
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
Total	**1.7000e-004**	**4.0000e-005**	**5.8000e-004**	**0.0000**	**1.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0257**	**0.0257**	**0.0000**	**0.0000**	**0.0257**

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	1.0100e-003	4.7900e-003	0.0497	7.0000e-005		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	6.2071	6.2071	1.8400e-003	0.0000	6.2457
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0100e-003**	**4.7900e-003**	**0.0497**	**7.0000e-005**		**1.6000e-004**	**1.6000e-004**		**1.6000e-004**	**1.6000e-004**	**0.0000**	**6.2071**	**6.2071**	**1.8400e-003**	**0.0000**	**6.2457**

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					

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	1.7000e-004	4.0000e-005	5.8000e-004	0.0000	1.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0257	0.0257	0.0000	0.0000	0.0257
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
Total	**1.7000e-004**	**4.0000e-005**	**5.8000e-004**	**0.0000**	**1.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0257**	**0.0257**	**0.0000**	**0.0000**	**0.0257**

3.7 Architectural Coating - 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					
Archit. Coating	2.0829					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8400e-003	0.0119	9.4200e-003	1.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	1.2766	1.2766	1.5000e-004	0.0000	1.2798
Total	**2.0847**	**0.0119**	**9.4200e-003**	**1.0000e-005**		**9.8000e-004**	**9.8000e-004**		**9.8000e-004**	**9.8000e-004**	**0.0000**	**1.2766**	**1.2766**	**1.5000e-004**	**0.0000**	**1.2798**

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	5.4000e-004	1.3000e-004	1.8400e-003	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0810	0.0810	1.0000e-005	0.0000	0.0811
Total	**5.4000e-004**	**1.3000e-004**	**1.8400e-003**	**0.0000**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0810**	**0.0810**	**1.0000e-005**	**0.0000**	**0.0811**

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	2.0829					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.5000e-004	6.4000e-004	9.1600e-003	1.0000e-005		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	1.2766	1.2766	1.5000e-004	0.0000	1.2798
Total	**2.0830**	**6.4000e-004**	**9.1600e-003**	**1.0000e-005**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**1.2766**	**1.2766**	**1.5000e-004**	**0.0000**	**1.2798**

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	5.4000e-004	1.3000e-004	1.8400e-003	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0810	0.0810	1.0000e-005	0.0000	0.0811
Total	**5.4000e-004**	**1.3000e-004**	**1.8400e-003**	**0.0000**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0810**	**0.0810**	**1.0000e-005**	**0.0000**	**0.0811**

Project Name:		295 E. Virginia St., San Jose					Complete ALL Portions in Yellow
	See Equipment Type TAB for type, horsepower and load factor						
Qty	Description	HP	Load Factor	Hours/day	Total Work Days	Annual Hours	Comments
	Demolition	Start Date:	4/1/2015				
		End Date:	4/28/2015				
1	Concrete/Industrial Saws	81	0.73			0	**Demolition Volume**
1	Rubber-Tired Dozers	255	0.3953			0	Square footage of buildings to be demolished
3	Tractors/Loaders/Backhoes	97	0.3685			0	(*or* total tons to be hauled)
	Other Equipment?						_3,800_ square feet *or*
							_?_ Hauling volume (tons)
	Site Preperation	Start Date:	4/29/2015				Any pavement demolished and hauled? _?_ tons
		End Date:	4/30/2015				
1	Graders	174	0.4087				
1	Rubber Tired Dozers	255	0.3953			0	
1	Tractors/Loaders/Backhoes	97	0.3685			0	
	Other Equipment?						
	Grading / Excavation	Start Date:	5/1/2015				
		End Date:	5/6/2015				**Soil Hauling Volume**
1	Graders	174	0.4087			0	Export volume = _?_ cubic yards?
1	Rubber Tired Dozers	255	0.3953			0	Import volume = _?_ cubic yards?
1	Tractors/Loaders/Backhoes	97	0.3685			0	
	Other Equipment?						
	Building - Exterior	Start Date:	5/7/2015				Cement Trucks? _?_ Total Round-Trips
		End Date:	2/10/2016				
1	Cranes	226	0.2881			0	Electric? (Y/N) ___ Otherwise assumed diesel
1	Forklifts	89	0.201			0	Liquid Propane (LPG)? (Y/N) ___ Otherwise Assumed diesel
1	Generator Sets	84	0.74			0	Or temporary line power? (Y/N) ___
1	Tractors/Loaders/Backhoes	97	0.3685			0	
3	Welders	46	0.45			0	
	Other Equipment?						
Building - Interior/Architectural Coating		Start Date:	2/25/2016				
		End Date:	3/9/2016				
1	Air Compressors	78	0.32			0	
	Aerial Lift	62	0.3			0	
	Other Equipment?						
	Paving	Start Date:	2/11/2016				
		Start Date:	2/24/2016				
1	Cement and Mortar Mixers	9	0.56			0	
1	Pavers	125	0.4154			0	Asphalt? ___ cubic yards or ____ round trips?
1	Paving Equipment	130	0.3551			0	
1	Rollers	80	0.3752			0	
1	Tractors/Loaders/Backhoes	97	0.3685			0	
	Other Equipment?						

Attachment 4: Construction Health Risk Assessment

295 E Virginia St., San Jose, CA

DPM Construction Emissions and Modeling Emission Rates

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2016	Construction	0.1438	CON_DPM	287.6	0.08755	1.10E-02	6,900	1.60E-06
Total		***0.1438***		***288***	***0.0875***	***0.0110***		

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

PM2.5 Fugitive Dust Construction Emissions for Modeling

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	PM2.5 Emissions (lb/yr)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (g/s)	Modeled Area (m^2)	PM2.5 Emission Rate $g/s/m^2$
2016	Construction	CON_FUG	0.01150	23.0	0.00700	8.82E-04	6,900	1.28E-07
Total			***0.0115***	***23.0***	***0.0070***	***0.0009***		

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

295 E Virginia St., San Jose, CA - Construction Health Impact Summary

Maximum Impacts at MEI Location - Unmitigated

Emissions Year	Maximum Concentrations: Exhaust PM10/DPM ($\mu g/m^3$)	Maximum Concentrations: Fugitive PM2.5 ($\mu g/m^3$)	Cancer Risk (per million): Child	Cancer Risk (per million): Adult	Hazard Index (-)	Maximum Annual PM2.5 Concentration ($\mu g/m^3$)
2016	0.2303	0.0197	**37.8**	**0.7**	**0.046**	**0.25**

Maximum Impacts at Lowell Elementary School Student Receptors

Construction Year	Unmitigated Emissions				
	Maximum Concentrations: Exhaust PM2.5/DPM ($\mu g/m^3$)	Maximum Concentrations: Fugitive PM2.5 ($\mu g/m^3$)	Student Cancer Risk (per million)	Hazard Index (-)	Maximum Annual PM2.5 Concentration ($\mu g/m^3$)
2016	0.0331	0.0516	**0.9**	**0.007**	**0.08**

295 E Virginia St., 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 $(mg/kg\text{-}day)^{-1}$
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 ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant/Child				Adult
Age -->	**3rd Trimester**	**0 - 2**	**2 - 9**	**2 - 16**	**16 - 30**
Parameter					
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 DPM Conc (ug/m3) Year	Annual	Age Sensitivity Factor	Infant/Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Annual	Age Sensitivity Factor	Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
0	0.25	-0.25 - 0*	-	-	10	-	-	-	-	-		
1	1	0 - 1	2016	0.2303	10	37.83	2016	0.2303	1	0.66	0.0197	0.250
2	1	1 - 2	2017	0.0000	10	0.00	2017	0.0000	1	0.00		
3	1	2 - 3	2018	0.0000	3	0.00	2018	0.0000	1	0.00		
4	1	3 - 4	2019	0.0000	3	0.00	2019	0.0000	1	0.00		
5	1	4 - 5	2020	0.0000	3	0.00	2020	0.0000	1	0.00		
6	1	5 - 6	2021	0.0000	3	0.00	2021	0.0000	1	0.00		
7	1	6 - 7	2022	0.0000	3	0.00	2022	0.0000	1	0.00		
8	1	7 - 8	2023	0.0000	3	0.00	2023	0.0000	1	0.00		
9	1	8 - 9	2024	0.0000	3	0.00	2024	0.0000	1	0.00		
10	1	9 - 10	2025	0.0000	3	0.00	2025	0.0000	1	0.00		
11	1	10 - 11	2026	0.0000	3	0.00	2026	0.0000	1	0.00		
12	1	11 - 12	2027	0.0000	3	0.00	2027	0.0000	1	0.00		
13	1	12 - 13	2028	0.0000	3	0.00	2028	0.0000	1	0.00		
14	1	13 - 14	2029	0.0000	3	0.00	2029	0.0000	1	0.00		
15	1	14 - 15	2030	0.0000	3	0.00	2030	0.0000	1	0.00		
16	1	15 - 16	2031	0.0000	3	0.00	2031	0.0000	1	0.00		
17	1	16-17	2032	0.0000	1	0.00	2032	0.0000	1	0.00		
18	1	17-18	2033	0.0000	1	0.00	2033	0.0000	1	0.00		
19	1	18-19	2034	0.0000	1	0.00	2034	0.0000	1	0.00		
20	1	19-20	2035	0.0000	1	0.00	2035	0.0000	1	0.00		
21	1	20-21	2036	0.0000	1	0.00	2036	0.0000	1	0.00		
22	1	21-22	2037	0.0000	1	0.00	2037	0.0000	1	0.00		
23	1	22-23	2038	0.0000	1	0.00	2038	0.0000	1	0.00		
24	1	23-24	2039	0.0000	1	0.00	2039	0.0000	1	0.00		
25	1	24-25	2040	0.0000	1	0.00	2040	0.0000	1	0.00		
26	1	25-26	2041	0.0000	1	0.00	2041	0.0000	1	0.00		
27	1	26-27	2042	0.0000	1	0.00	2042	0.0000	1	0.00		
28	1	27-28	2043	0.0000	1	0.00	2043	0.0000	1	0.00		
29	1	28-29	2044	0.0000	1	0.00	2044	0.0000	1	0.00		
30	1	29-30	2045	0.0000	1	0.00	2045	0.0000	1	0.00		
Total Increased Cancer Risk						**37.8**				**0.66**		

* Third trimester of pregnancy

295 E Virginia St., San Jose, CA - Construction Impacts - Without Mitigation
Maximum DPM Cancer Risk Calculations From Construction
Lowell Elementary School - 1.5 meters - Child Exposure

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

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
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 ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
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EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant/Child				**Adult**
Age -->	**3rd Trimester**	**0 - 2**	**2 - 9**	**2 - 16**	**16 - 30**
Parameter					
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

		Student - Exposure Information			**Student**		
Exposure Year	**Exposure Duration (years)**	**DPM Conc (ug/m3) Year**	**DPM Conc (ug/m3) Annual**	**Age* Sensitivity Factor**	**Cancer Risk (per million)**	**Fugitive PM2.5**	**Total PM2.5**
1	1	2016	0.0331	3	0.94	0.0516	0.085

* Students assumed to be from 2 to 9 years of age