MUSEUM PLACE AIR QUALITY ASSESSMENT

San Jose, California

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Project: 16-051

Introduction

The purpose of this report is to address air quality and community risk impacts associated with the Museum Place mixed-use project. This project is located on Park Avenue adjacent to the Tech Museum of Innovation in San José, California. The project proposes to develop a 24-story building with 300 dwelling units, 155 hotel rooms, 176,705 square feet (sf) of office space, 60,030 sf of museum expansion, and 653 parking stalls.

Air pollutant emissions associated with construction were modeled. In addition, impacts to new sensitive receptors that will live in close proximity to local roadways and stationary sources of pollution were evaluated. This analysis addresses those issues following the guidance provided by the Bay Area Air Quality Management District (BAAQMD).

Setting

The project is located in northern Santa Clara County, which is in the San Francisco Bay Area Air Basin. Ambient air quality standards have been established at both the State and federal level. The Bay Area meets all ambient air quality standards with the exception of ground-level ozone, respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$).

Air Pollutants of Concern

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

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

Toxic Air Contaminants

Toxic air contaminants (TAC) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer) and include, but are not limited to, the criteria air pollutants. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter [DPM] near a

freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, State, and federal level.

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

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

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

Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 16, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, and elementary schools. Future residences of the project would be considered sensitive receptors.

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

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

and were posted on BAAQMD's website and included in the Air District's updated CEQA Guidelines (updated May 2011). The significance thresholds identified by BAAQMD and used in this analysis are summarized in Table 1.

The BAAQMD's adoption of significance thresholds contained in the 2011 CEQA Air Quality Guidelines was called into question by an order issued March 5, 2012, in California Building Industry Association (CBIA) v. BAAQMD (Alameda Superior Court Case No. RGI0548693). The order requires the BAAQMD to set aside its approval of the thresholds until it has conducted environmental review under CEQA. The ruling made in the case concerned the environmental impacts of adopting the thresholds and how the thresholds would indirectly affect land use development patterns. In August 2013, the Appellate Court struck down the lower court's order to set aside the thresholds (Cal. Court of Appeal, First Appellate District, Case Nos. A135335 & A136212). CBIA sought review by the California Supreme Court on three issues, including the appellate court's decision to uphold the BAAQMD's adoption of the thresholds, and the Court granted review on just one: Under what circumstances, if any, does CEQA require an analysis of how existing environmental conditions will impact future residents or users of a proposed project? In December 2015, the Supreme Court determined that an analysis of the impacts of the environment on a project – known as "CEQA-in-reverse" – is only required under two limited circumstances: (1) when a statute provides an express legislative directive to consider such impacts; and (2) when a proposed project risks exacerbating environmental hazards or conditions that already exist (Cal. Supreme Court Case No. S213478). The Supreme Court reversed the Court of Appeal's decision and remanded the matter back to the appellate court to reconsider the case in light of the Supreme Court's ruling. Accordingly, the case is currently pending back in the Court of Appeal. Because the Supreme Court's holding concerns the effects of the environment on a project (as contrasted to the effects of a proposed project on the environment), and not the science behind the thresholds, the significance thresholds contained in the 2011 CEQA Air Quality Guidelines are applied to this project.

Table 1. Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	Average Daily Emissions (lbs./day)	Annual Average Emissions (tons/year)
Criteria Air Pollutants			
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (Exhaust)	82	15
$PM_{2.5}$	54 (Exhaust)	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards for Single Sources			
Excess Cancer Risk	>10 per one million		
Hazard Index	>1.0		
Incremental annual $PM_{2.5}$	>0.3 µg/m^3		
Health Risks and Hazards for Combined Sources (Cumulative from all sources within 1,000 foot zone of influence)			
Excess Cancer Risk	>100 per one million		
Hazard Index	>10.0		
Annual Average $PM_{2.5}$	>0.8 µg/m^3		

Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, and $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less.

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

The Bay Area is considered a non-attainment area for ground-level ozone and $PM_{2.5}$ under both the Federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for PM_{10} under the California Clean Air Act, but not the federal act. The area has attained both State and federal ambient air quality standards for carbon monoxide. As part of an effort to attain and maintain ambient air quality standards for ozone and PM_{10}, the BAAQMD has established thresholds of significance for these air pollutants and their precursors. These thresholds are for ozone precursor pollutants (ROG and NOx), PM_{10}, and $PM_{2.5}$ and apply to both construction period and operational period impacts.

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

Construction period emissions

CalEEMod provided annual emissions for construction. CalEEMod provides emission estimates for both on-site and off-site construction activities. On-site activities are primarily made up of construction equipment emissions, while off-site activity includes worker, hauling, and vendor traffic. A construction build-out scenario, including equipment list and schedule, was provided by the project applicant. The proposed project land uses were input into CalEEMod, which included: 300 dwelling units entered as "Condo/Townhouse High Rise," 176,705 sf entered as "General Office Building," 60,030 sf entered as "Library,"[3] 155 room entered as "Hotel," and 653 parking spaces entered as "Enclosed Parking with Elevator." The project would require up to 2,600 cubic yards (cy) of soil import and 150,000 cy of soil export, which were entered into the model. The anticipated 34,795 sf of building demo and 830 tons of pavement demo were entered into the model. In addition, truck traffic associated with 1,172 cy of asphalt during the paving phase and 79,900 cy of cement during the building construction phase are anticipated and were entered. The model assumes 16 cy/truck and 20 tons/truck for hauling activity.

The anticipated construction schedule assumes that the project would be built out over a period of approximately 39 months beginning as early as December 2016, or an estimated 858 construction workdays (assuming an average of 22 construction days per month). Average daily emissions were computed by dividing the total construction emissions by the number of construction days. Table 2 shows average daily construction emissions of ROG, NO_X, PM_{10} exhaust, and $PM_{2.5}$ exhaust during construction of the project. As indicated in Table 2, predicted project emissions would not exceed the BAAQMD significance thresholds. *Attachment 1* includes the CalEEMod input and output values for construction emissions.

Construction activities, particularly during site preparation and grading, would temporarily generate fugitive dust in the form of 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. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less than significant if best management practices are implemented to reduce these emissions. *Mitigation Measure AQ-1 would implement BAAQMD-recommended best management practices*.

[3] CalEEMod does not have a "museum" land use, so "library" was used in place.

Table 2. Construction Period Emissions

Scenario	ROG	NOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
Total construction emissions (tons)	8.34 tons	19.20 tons	0.77 tons	0.73 tons
Average daily emissions (pounds)[1]	19.4 lbs.	44.8 lbs.	1.8 lbs.	1.7 lbs.
BAAQMD Thresholds (pounds per day)	*54* lbs.	*54* lbs.	*82* lbs.	*54* lbs.
Exceed Threshold?	**No**	**No**	**No**	**No**
Notes: [1]Assumes 858 workdays.				

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

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

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Impact: Expose sensitive receptors to substantial pollutant concentrations? ***Less than significant.***

Two types of community risk impacts associated with the project were evaluated: (1) the impact of TAC sources near the project site upon new project residences, and (2) the impact of construction activity on nearby residences. Sensitive receptors are locations where an identifiable subset of the general population (children, asthmatics, the elderly, and the chronically ill) that is at greater risk than the general population to the effects of air pollutants are likely to be exposed. These locations include residences, schools, playgrounds, childcare centers, retirement homes, hospitals, and medical clinics. There are no nearby sensitive receptors close enough that could be significantly affected by construction community risk impacts. Future residences of the project would be considered sensitive receptors.

Operational Community Risk Impacts

Community health risk assessments typically look at all substantial sources of TACs that can affect sensitive receptors that are located within 1,000 feet of a project site. These sources include freeways or highways, busy surface streets and stationary sources identified by BAAQMD. A review of the project area indicates that traffic on South Almaden Boulevard and West San Carlos Street are the only substantial source of mobile TAC emissions within 1,000 feet of the project site. For this analysis, it is assumed that average daily traffic (ADT) on Park Avenue and S. Market Street would be less than 10,000, as these roadways are not listed in the Envision 2040 Draft Program EIR traffic analysis. A review of BAAQMD's Google Earth map tool used to identify stationary sources revealed multiple sources. Community risk impacts from these sources upon the project are reported in Table 3.

<u>Roadway TAC Impacts</u>

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

The calculator uses EMFAC2011 emission rates for the year 2014. Overall, emission rates will decrease by the time the project is constructed and occupied. The project is not likely to be occupied prior to 2018. In addition, a new version of the emissions factor model, EMFAC2014 is available. This version predicts lower emission rates. An adjustment factor of 0.5 was developed by comparing emission rates of total organic gases (TOG) for running exhaust and running losses developed using EMFAC2011 for year 2014 and those from EMFAC2014 for year 2018.

The predicted cancer risk was then adjusted using a factor of 1.3744 to account for new OEHHA guidance. This factor was provided by BAAQMD for use with their CEQA screening tools that are used to predict cancer risk[4].

The estimated average daily traffic, or ADT, volume on S. Almaden Boulevard is estimated at 40,000 vehicles or less in the project area based on the Envision 2040 Draft Program EIR traffic analysis. Using the BAAQMD *Roadway Screening Analysis Calculator* for Santa Clara County for north-south directional roadways and at a distance of approximately 350 feet east of the roadway (note that residences will be higher than ground floor, which the screening calculator uses), estimated cancer risk from S. Almaden Boulevard at the project site would be 4.6 per million and $PM_{2.5}$ concentration would be 0.2 $\mu g/m^3$. Chronic or acute HI for the roadway would be below 0.03.

The estimated ADT volume on W. San Carlos Street is estimated at 20,000 vehicles or less in the project area based on the Envision 2040 Draft Program EIR traffic analysis. Using the BAAQMD *Roadway Screening Analysis Calculator* for Santa Clara County for east-west directional roadways and at a distance of approximately 275 feet north of the roadway, estimated cancer risk from S. Almaden Boulevard at the project site would be 2.5 per million and $PM_{2.5}$ concentration would be 0.1 $\mu g/m^3$. Chronic or acute HI for the roadway would be below 0.03.

Stationary Sources

Permitted stationary sources of air pollution near the project site were identified using BAAQMD's *Stationary Source Risk & Hazard Analysis Tool*. This mapping tool uses Google Earth to identify the location of four stationary sources and their estimated risk and hazard impacts. The sources identified were entered into a Risk & Hazard Stationary Source Inquiry Form that was submitted to BAAQMD to confirm these sources and obtain updated risk and hazard information, which the District provided.[5]

- Plant 15169, which are three emergency back-up generators and three emergency diesel fire pump engines located at 151 Almaden Boulevard, is operated by Adobe Systems about 600 feet northwest of the project site. At BAAQMD's direction, risk and $PM_{2.5}$ concentrations from a diesel generator was adjusted based on BAAQMD's *Risk and Hazards Emissions Screening Calculator (Beta Version)* and *Distance Adjustment Multiplier Tool for Diesel Internal Combustion (IC) Engines*. However, even after using BAAQMD screening tools, screening level risk exceeds BAAQMD significance thresholds. Therefore, refined modeling of this source was conducted, as described below.
- Plant 14177, which are three emergency back-up generators located at 111 Almaden Boulevard, is operated by PG&E about 800 feet northwest of the project site. At BAAQMD's direction, risk and $PM_{2.5}$ concentrations from the diesel generator were adjusted based on BAAQMD's *Distance Adjustment Multiplier Tool for Diesel Internal*

[4] Correspondence with Alison Kirk, BAAQMD, November 23, 2015.
[5] Email from Alison Kirk, BAAQMD to Josh Carman, Illingworth & Rodkin, Inc. on April 26, 2016.

Combustion (IC) Engines. According to the BAAQMD screening data (and adjusted for the 800-foot distance), this facility would result in an excess cancer risk of 0.4 per million, $PM_{2.5}$ concentration of 0.0 $\mu g/m^3$ and HI of <0.01, all of which would be below BAAQMD thresholds of significance.

- Plant 13528 is an emergency back-up generator located at 95 Almaden Boulevard, operated by Pacific Bell about 700 feet northwest of the project site. At BAAQMD's direction, risk and $PM_{2.5}$ concentrations from the diesel generator were adjusted based on BAAQMD's *Distance Adjustment Multiplier Tool for Diesel Internal Combustion (IC) Engines*. According to the BAAQMD screening data (and adjusted for the 700-foot distance), this facility would result in an excess cancer risk of 6.5 per million, $PM_{2.5}$ concentration of 0.0 $\mu g/m^3$ and HI of <0.01, all of which would be below BAAQMD thresholds of significance.

- Plant 14985 is an emergency back-up generator located at 121 Park Center Plaza, operated by Wells Fargo about 500 feet north of the project site. At BAAQMD's direction, risk and $PM_{2.5}$ concentrations from the diesel generator were adjusted based on BAAQMD's *Distance Adjustment Multiplier Tool for Diesel Internal Combustion (IC) Engines*. According to the BAAQMD screening data (and adjusted for the 500-foot distance), this facility would result in an excess cancer risk of 0.4 per million, $PM_{2.5}$ concentration of 0.0 $\mu g/m^3$ and HI of <0.01, all of which would be below BAAQMD thresholds of significance.

- Plant 8556, which are two emergency back-up generators located at 170 S. Market Street, is operated by Fairmont Hotel about 600 feet northeast of the project site. At BAAQMD's direction, risk and $PM_{2.5}$ concentrations from the diesel generator were adjusted based on BAAQMD's *Distance Adjustment Multiplier Tool for Diesel Internal Combustion (IC) Engines*. According to the BAAQMD screening data (and adjusted for the 600-foot distance), this facility would result in an excess cancer risk of 1.5 per million, $PM_{2.5}$ concentration of 0.0 $\mu g/m^3$ and HI of <0.01, all of which would be below BAAQMD thresholds of significance.

- Plant 19298, which are six emergency back-up generators located at 150 S. 1st Street, is operated by DataPipe, Inc., about 950 feet northeast of the project site. At BAAQMD's direction, risk and $PM_{2.5}$ concentrations from the diesel generator were adjusted based on BAAQMD's *Distance Adjustment Multiplier Tool for Diesel Internal Combustion (IC) Engines*. According to the BAAQMD screening data (and adjusted for the 950-foot distance), this facility would result in an excess cancer risk of 2.0 per million, $PM_{2.5}$ concentration of 0.0 $\mu g/m^3$ and HI of <0.01, all of which would be below BAAQMD thresholds of significance.

- Plant 15031 is an emergency back-up generator located at 280 S. 1st Street, operated by US General Services Administration about 950 feet east of the project site. At BAAQMD's direction, risk and $PM_{2.5}$ concentrations from the diesel generator were adjusted based on BAAQMD's *Distance Adjustment Multiplier Tool for Diesel Internal Combustion (IC) Engines*. According to the BAAQMD screening data (and adjusted for the 950-foot distance), this facility would result in an excess cancer risk of 0.1 per million, $PM_{2.5}$ concentration of 0.0 $\mu g/m^3$ and HI of <0.01, all of which would be below BAAQMD thresholds of significance.

- Plant 15125 is an emergency back-up generator located at 301 S. Market Street, operated by San Jose Marriott Hotel about 500 feet southeast of the project site. At BAAQMD's direction, risk and $PM_{2.5}$ concentrations from the diesel generator were adjusted based on BAAQMD's *Distance Adjustment Multiplier Tool for Diesel Internal Combustion (IC) Engines*. According to the BAAQMD screening data (and adjusted for the 500-foot distance), this facility would result in an excess cancer risk of <0.1 per million, $PM_{2.5}$ concentration of 0.0 $\mu g/m^3$ and HI of <0.01, all of which would be below BAAQMD thresholds of significance.
- Plant 2060 is an emergency back-up generator operated by The Department of Convention and Cultural affairs about 650 feet south of the project site. At BAAQMD's direction, risk and $PM_{2.5}$ concentrations from the diesel generator were adjusted based on BAAQMD's *Distance Adjustment Multiplier Tool for Diesel Internal Combustion (IC) Engines*. According to the BAAQMD screening data (and adjusted for the 650-foot distance), this facility would result in an excess cancer risk of 0.5 per million, $PM_{2.5}$ concentration of 0.1 $\mu g/m^3$ and HI of <0.01, all of which would be below BAAQMD thresholds of significance.
- Plant 13431 is an emergency back-up generator located at 300 Almaden Boulevard, operated by San Jose Hilton & Towers about 450 feet south of the project site. At BAAQMD's direction, risk and $PM_{2.5}$ concentrations from the diesel generator were adjusted based on BAAQMD's *Distance Adjustment Multiplier Tool for Diesel Internal Combustion (IC) Engines*. According to the BAAQMD screening data (and adjusted for the 450-foot distance), this facility would result in an excess cancer risk of 0.9 per million, $PM_{2.5}$ concentration of 0.0 $\mu g/m^3$ and HI of <0.01, all of which would be below BAAQMD thresholds of significance.
- Plant 22565 (old Plant 17926), which are two emergency back-up generators located at 303 Almaden Boulevard, is operated by Boston Properties about 600 feet southwest of the project site. At BAAQMD's direction, risk and $PM_{2.5}$ concentrations from the diesel generator were adjusted based on BAAQMD's *Distance Adjustment Multiplier Tool for Diesel Internal Combustion (IC) Engines*. According to the BAAQMD screening data (and adjusted for the 600-foot distance), this facility would result in an excess cancer risk of 1.4 per million, $PM_{2.5}$ concentration of 0.0 $\mu g/m^3$ and HI of <0.01, all of which would be below BAAQMD thresholds of significance.

Modeling of the emergency back-up generators and diesel fire pump engines at Adobe Systems (Plant 15169) was conducted to assess cancer risks and annual $PM_{2.5}$ concentrations at residential receptor locations in the proposed project building. Figure 1 shows the modeling locations of the sources and the on-site project receptors used to represent locations of future project residents. Based on the BAAQMD emission inventory data the daily $PM_{2.5}$ and DPM emissions from the diesel engines are 0.199 pounds per day (72.64 pounds per year).[6]

To obtain an estimate of potential excess cancer risks to future project residents from these sources, the AERMOD dispersion model was used. This modeling included the use of a five-

[6] Correspondence between Joshua Carman, Illingworth & Rodkin, and Alison Kirk, BAAQMD, April 26, 2016.

year data set (2006-2010) of hourly meteorological data from the San Jose International Airport. The AERMOD model computed DPM concentrations at locations of future residential units. Because the actual locations of the emission sources are unknown, the emergency generators were modeled at the closest possible point that they could be located at the Adobe site.

Potential impacts at the proposed building were evaluated to identify where maximum impacts would occur. Receptors for modeling were placed at intervals of 6 meters (about 20 feet). Default BAAQMD stack parameters for generator screening (6 feet high stack, 3 inch diameter, 50 meter/sec exit velocity, and exit temperature of 656 degrees F) were used for the generators in the modeling.

The maximum annual average DPM concentration from the Adobe site occurred on the project's southwestern end at a concentration of 0.0134 $\mu g/m^3$. Using BAAQMD cancer risk calculation methods, which are contained in *Attachment 2*, the maximum estimated increased residential cancer risks would be 7.4. The cancer risk from this source would be lower than the BAAQMD cancer risk significance threshold of greater than 10.0 in one million and would be considered a *less-than-significant* impact.

The maximum modeled annual $PM_{2.5}$ concentration was 0.0 $\mu g/m^3$ and the maximum Hazard Index would be less than 0.01. The maximum $PM_{2.5}$ concentration and Hazard Index would be below BAAQMD significance thresholds of 0.3 $\mu g/m^3$ for $PM_{2.5}$ and 1.0 for a Hazard Index and would be considered a *less-than-significant* impact. Details of the modeling and risk calculations are included in *Attachment 3*.

Cumulative Sources – New Residences

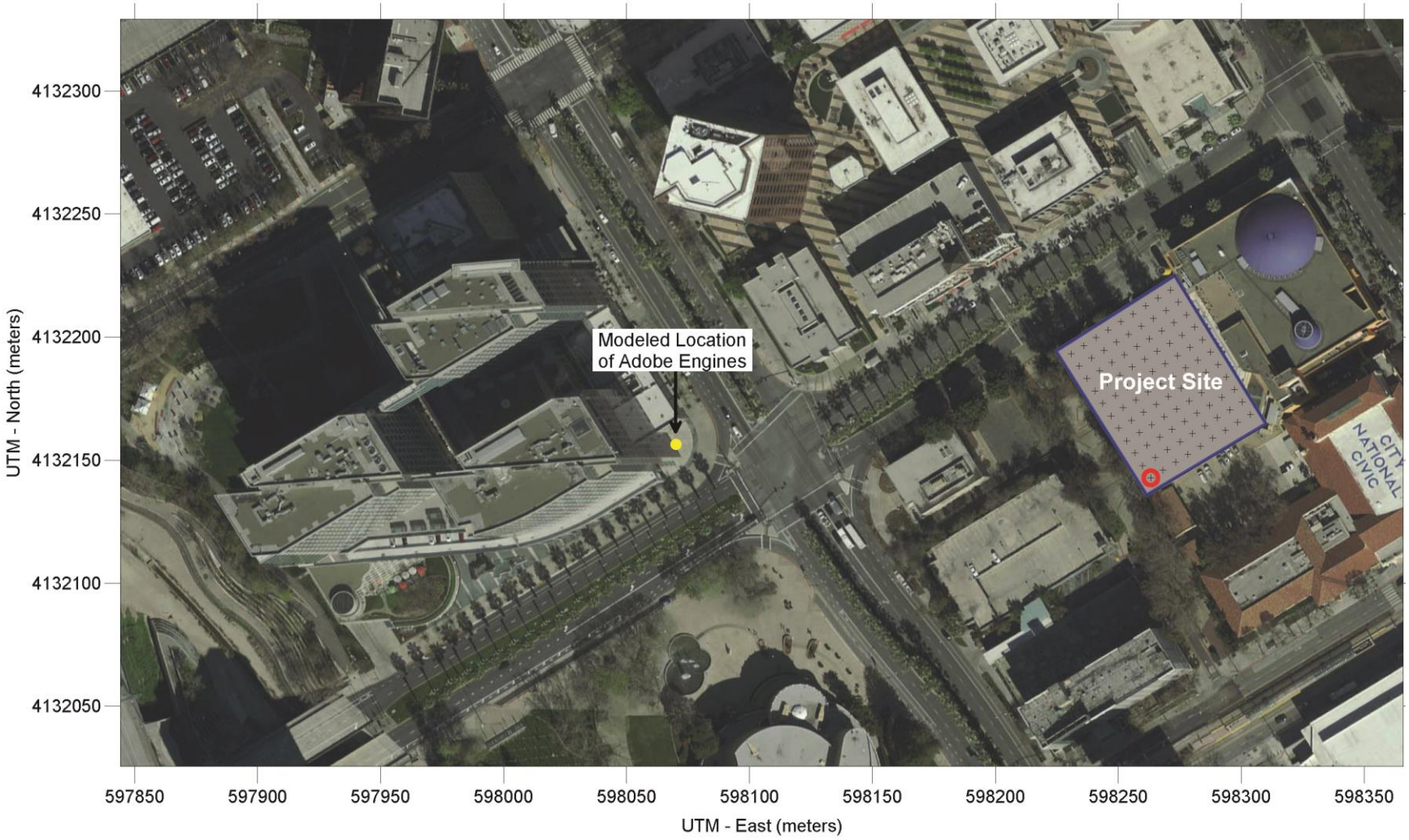
Cumulative TAC impacts are assessed by predicting the combined community risk impacts to the project and nearby sources. Table 3 reports the combination of impacts from all sources within 1,000 feet at the project site. As shown in Table 3, community risk impacts to the project site would be less than significant.

Table 3. Community Risk Impacts to New Project Residences

Source	Maximum Cancer Risk (per million)	Maximum Annual $PM_{2.5}$ Concentration ($\mu g/m^3$)	Maximum Hazard Index
S. Almaden Boulevard (Roadway Screening Calculator)	4.6	0.2	<0.03
W. San Carlos Street (Roadway Screening Calculator)	2.5	0.1	<0.03
Plant 15169, Adobe Systems (AERMOD modeling)	7.4	0.0	<0.01
Plant 14177, PG&E (SSIF and distance multiplier)	0.4	0.0	<0.01
Plant 13528, Pacific Bell (SSIF and distance multiplier)	6.5	0.0	<0.01
Plant 14985, Wells Fargo (SSIF and distance multiplier)	0.4	0.0	<0.01
Plant 8556, Fairmont Hotel (SSIF and distance multiplier)	1.5	0.0	<0.01
Plant 19298, DataPipe Inc. (SSIF and distance multiplier)	2.0	0.0	<0.01
Plant 15031, US General Services Administration (SSIF and distance multiplier)	0.1	0.0	<0.01
Plant 15125, San Jose Marriott Hotel (SSIF and distance multiplier)	<0.1	0.0	<0.01
Plant 2060, Dept. of Convention and Cultural Affairs (SSIF and distance multiplier)	0.5	0.1	<0.01
Plant 13431, San Jose Hilton & Towers (SSIF and distance multiplier)	0.9	0.0	<0.01
Plant 22565 (old Plant 17926), Boston Properties (SSIF and distance multiplier)	1.4	0.0	<0.01
Cumulative Total	<28.3	0.4	<0.17
BAAQMD Threshold – Cumulative Sources	***>100***	***>0.8***	***>10.0***
Significant	***No***	***No***	***No***

Note: Since screening risk is predicted at the nearest point on the project site from a given source, actual screening risk at the project MEI would be less than presented for the cumulative total.

Figure 1 – Project Site, On-Site Residential Receptor Locations, and Adobe Systems Stationary Sources Evaluated in the Refined Modeling



Attachment 1: CalEEMod Input and Output Worksheets, and Construction Schedule

Project Name: Museum Place					
Construction Phase	**Equipment (*See next page for example of commonly used equipment*)**	**Quantity**	**Average Hours Used Per Day**	**How Many Work Days**	**Fuel Type - if other than Diesel**
Demolition / Site Clearing (excludes any abatement) *6 weeks (30 days)* **Start Date:** Dec' 2016 **End Date**: Feb' 2016	• Concrete/Industrial Saws	Two	Eight	20	2-Cycle Fuel
	• CAT 330	One	Eight	20	
	• Tired Dozers	One	Six	25	
	• Backhoes	Two	Eight	10	
	• Dump Transfer Trucks	Five	Eight	20	
	• Street Sweepers	One	Four	30	
	• Water Trucks	One	Six	25	
Soldier Piles / Lagging / Excavation / Grading *32 weeks (160 days)* **Start Date:** Feb' 2017 **End Date**: Sept' 2017	• Bulldozers	Two	Six	150	
	• Motor Graders	Two	Six	120	
	• Excavators	Two	Six	120	
	• Pile Drivers	Two	Eight	20	
	• Mobile Crane	Two	Six	150	
	• Rough Terrain Forklift	Two	Six	130	
	• Generators	Two	Six	130	Gas
	• Air Compressor	Two	Six	120	
	• Pumps	Two	Eight	130	Gas
Trenching for Site Utilities / Paving *24 weeks (120 days)* **End Date**: Apr' 2017	• Excavator	One	Four	10	
	• Backhoe / Loader	One	Four	30	
	• Skid Steer Loaders	One	Four	30	
	• Water Trucks	One	Four	120	
	• Street Sweepers	One	Four	120	
	• Rough Terrain Forklift	One	Six	60	
	• Concrete Pumping	One	Four	10	
	• Concrete Trucks	Three	Four	4	
	• Paving Equipment	One	Eight	5	
	• Transfer Trucks	One	Four	30	
Building – Exterior *130 weeks (650 days)* **Start Date:** Sept 2017 **End Date**: Feb' 2020	• Tower Cranes	One	Eight	550	Electric
	• Aerial Lifts	Six	Eight	350	
	• Rough Terrain Forklift	Six	Six	500	
	• Power Generators	Two	Eight	550	
	• Man/Mat'l Hoist	One	Eight	375	Electric
	• Concrete Trucks	Five	Three	200	

Project Name: Museum Place					
Construction Phase	**Equipment (*See next page for example of commonly used equipment*)**	**Quantity**	**Average Hours Used Per Day**	**How Many Work Days**	**Fuel Type - if other than Diesel**
Building – Interior/ Architectural Coating **Start Date:** Jan' 2018 **End Date**: Feb' 2020	• Welding Generators	Three	Eight	50	
	• Air Compressors	Five	Eight	100	
	• Fans	Forty	Eight	500	Electric
	• Manlifts	Twenty	Six	650	Electric
	• Forklifts	Three	Eight	200	
OTHER – Provide as Applicable					
Soil Hauling Volume	Export volume = 150,000 cubic yards? Import volume = 2,600 cubic yards?				
Demolition Volume	Square footage of buildings to be demolished, or total tons to be hauled. =34,795 square feet or =___ hauling volume (tons) Pavement demolished and hauled =830 tons				
Power	Line Power (Y/N) _Y__ or Generator use (Y/N) ___? If generator use, then fuel type (diesel/gasoline/propane) ___				
Cement	Cement Trucks = __ Total Round-Trips OR Cement =79,900 cubic yards				
Asphalt	1,172 cy or ____ round trips				

Example of Equipment Commonly Used for Each Construction Phase
Demolition
Concrete/Industrial Saws
Excavators
Rubber-Tired Dozers
Site Preparation
Rubber Tired Dozers
Tractors/Loaders/Backhoes
Grading / Excavation
Excavators
Graders
Scrapers
Rubber Tired Dozers
Tractors/Loaders/Backhoes
Trenching
Excavator
Tractor/Loader/Backhoe
Building - Exterior
Cranes
Forklifts

Generator Sets
Tractors/Loaders/Backhoes
Welders
Building – Interior/ Architectural Coating
Air Compressors
Aerial Lift
Paving
Cement and Mortar Mixers
Pavers
Paving Equipment
Rollers
Tractors/Loaders/Backhoes

Museum Place, San Jose - Construction

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Condo/Townhouse High Rise	300.00	Dwelling Unit	1.50	300,000.00	858
Hotel	155.00	Room	0.00	225,060.00	0
General Office Building	176.71	1000sqft	0.00	176,705.00	0
Library	60.03	1000sqft	0.00	60,030.00	0
Enclosed Parking with Elevator	653.00	Space	0.00	261,200.00	0

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 - Land use numbers from PD, acreage est. from google earth. Museum expansion entered as "Library"

Construction Phase - Anticipated phasing schedule provided by applicant. Site prep in Demo, Trenching in Paving.

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Off-road Equipment - Proposed equipment list provided by applicant

Grading - 2,600cy import, 150,000 export

Demolition - 34,795 sf bldg demo

Trips and VMT - Demo: 158 trips + 84 (830 tons pavement @ 20tons/truck) = 316. Bldg: 79,900cy cement @ 16 cy/truck = 9,988. Paving: 1,172cy asphalt = 148. Vendor trip length for cement and asphalt.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	650.00
tblConstructionPhase	NumDays	200.00	650.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	NumDays	4.00	160.00
tblConstructionPhase	NumDays	10.00	120.00
tblConstructionPhase	PhaseEndDate	8/25/2022	2/27/2020
tblConstructionPhase	PhaseEndDate	3/13/2020	2/27/2020
tblConstructionPhase	PhaseEndDate	8/23/2017	9/12/2017
tblConstructionPhase	PhaseEndDate	2/27/2018	9/15/2017
tblConstructionPhase	PhaseStartDate	2/28/2020	9/1/2017
tblConstructionPhase	PhaseStartDate	9/16/2017	9/1/2017
tblConstructionPhase	PhaseStartDate	1/12/2017	2/1/2017
tblConstructionPhase	PhaseStartDate	9/13/2017	4/1/2017
tblGrading	MaterialExported	0.00	150,000.00
tblGrading	MaterialImported	0.00	2,600.00
tblLandUse	LotAcreage	4.69	1.50
tblLandUse	LotAcreage	5.17	0.00
tblLandUse	LotAcreage	4.06	0.00
tblLandUse	LotAcreage	1.38	0.00
tblLandUse	LotAcreage	5.88	0.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.20	0.20
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.37

tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	LoadFactor	0.20	0.20
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Rough Terrain Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Rough Terrain Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	5.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	UsageHours	6.00	1.20
tblOffRoadEquipment	UsageHours	8.00	5.30
tblOffRoadEquipment	UsageHours	8.00	6.80
tblOffRoadEquipment	UsageHours	8.00	5.00
tblOffRoadEquipment	UsageHours	6.00	5.60
tblOffRoadEquipment	UsageHours	8.00	2.70
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOffRoadEquipment	UsageHours	6.00	4.50
tblOffRoadEquipment	UsageHours	8.00	0.30
tblTripsAndVMT	HaulingTripLength	20.00	7.30
tblTripsAndVMT	HaulingTripLength	20.00	7.30
tblTripsAndVMT	HaulingTripNumber	158.00	316.00
tblTripsAndVMT	HaulingTripNumber	0.00	9,988.00
tblTripsAndVMT	HaulingTripNumber	0.00	148.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.0264	0.2546	0.2055	3.2000e-004	0.0166	0.0134	0.0300	2.9700e-003	0.0127	0.0157	0.0000	28.6748	28.6748	4.3800e-003	0.0000	28.7668
2017	1.7437	9.0538	8.4287	0.0170	1.2032	0.3891	1.5924	0.5041	0.3681	0.8722	0.0000	1,471.8022	1,471.8022	0.1441	0.0000	1,474.8278
2018	3.0817	4.8220	8.6821	0.0180	0.8691	0.1839	1.0530	0.2336	0.1760	0.4096	0.0000	1,444.0538	1,444.0538	0.1146	0.0000	1,446.4601

2019	3.0133	4.4301	8.2445	0.0180	0.8691	0.1609	1.0301	0.2336	0.1540	0.3876	0.0000	1,411.4221	1,411.4221	0.1109	0.0000	1,413.7511
2020	0.4774	0.6414	1.2775	2.8900e-003	0.1596	0.0228	0.1823	0.0424	0.0218	0.0642	0.0000	221.0578	221.0578	0.0174	0.0000	221.4228
Total	**8.3425**	**19.2019**	**26.8383**	**0.0562**	**3.1176**	**0.7701**	**3.8878**	**1.0167**	**0.7326**	**1.7493**	**0.0000**	**4,577.0107**	**4,577.0107**	**0.3913**	**0.0000**	**4,585.2286**

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	12/1/2016	1/11/2017	5	30	
2	Grading	Grading	2/1/2017	9/12/2017	5	160	
3	Paving	Paving	4/1/2017	9/15/2017	5	120	
4	Building Construction	Building Construction	9/1/2017	2/27/2020	5	650	
5	Architectural Coating	Architectural Coating	9/1/2017	2/27/2020	5	650	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 90

Acres of Paving: 0

Residential Indoor: 607,500; Residential Outdoor: 202,500; Non-Residential Indoor: 1,084,493; Non-Residential Outdoor: 361,498

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	5	1.20	78	0.48
Paving	Cement and Mortar Mixers	0	6.00	9	0.56
Demolition	Concrete/Industrial Saws	2	5.30	81	0.73
Building Construction	Generator Sets	2	6.80	84	0.74
Building Construction	Cranes	0	6.00	226	0.29
Building Construction	Forklifts	0	6.00	89	0.20
Demolition	Excavators	1	5.30	162	0.38

Paving	Pavers	0	6.00	125	0.42
Paving	Rollers	0	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	5.00	255	0.40
Grading	Rubber Tired Dozers	2	5.60	255	0.40
Building Construction	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	2.70	97	0.37
Grading	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	1.00	97	0.37
Grading	Excavators	2	4.50	162	0.38
Grading	Graders	2	4.50	174	0.41
Paving	Paving Equipment	1	0.30	130	0.36
Grading	Cranes	2	5.60	226	0.29
Building Construction	Welders	0	8.00	46	0.45
Grading	Forklifts	2	4.90	89	0.20
Grading	Generator Sets	2	4.90	84	0.74
Grading	Air Compressors	2	4.50	78	0.48
Grading	Pumps	2	6.50	84	0.74
Paving	Excavators	1	0.30	162	0.38
Paving	Skid Steer Loaders	1	1.00	64	0.37
Paving	Rough Terrain Forklifts	1	3.00	100	0.40
Paving	Pumps	1	0.30	84	0.74
Building Construction	Aerial Lifts	6	4.30	62	0.31
Building Construction	Rough Terrain Forklifts	6	4.60	100	0.40
Architectural Coating	Generator Sets	3	0.60	84	0.74
Architectural Coating	Forklifts	3	2.50	89	0.20

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	6	15.00	0.00	316.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

Grading	16	40.00	0.00	15,088.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	14	502.00	151.00	9,988.00	12.40	7.30	7.30	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	11	100.00	0.00	148.00	12.40	7.30	7.30	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0126	0.0000	0.0126	1.9000e-003	0.0000	1.9000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0233	0.2192	0.1700	2.1000e-004		0.0130	0.0130		0.0123	0.0123	0.0000	19.4115	19.4115	4.2500e-003	0.0000	19.5008
Total	**0.0233**	**0.2192**	**0.1700**	**2.1000e-004**	**0.0126**	**0.0130**	**0.0255**	**1.9000e-003**	**0.0123**	**0.0142**	**0.0000**	**19.4115**	**19.4115**	**4.2500e-003**	**0.0000**	**19.5008**

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	2.5300e-003	0.0346	0.0271	9.0000e-005	2.4900e-003	4.5000e-004	2.9400e-003	6.7000e-004	4.1000e-004	1.0800e-003	0.0000	7.9396	7.9396	6.0000e-005	0.0000	7.9408
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	6.1000e-004	8.6000e-004	8.3900e-003	2.0000e-005	1.5000e-003	1.0000e-005	1.5100e-003	4.0000e-004	1.0000e-005	4.1000e-004	0.0000	1.3237	1.3237	7.0000e-005	0.0000	1.3252

Total	**3.1400e-003**	**0.0354**	**0.0355**	**1.1000e-004**	**3.9900e-003**	**4.6000e-004**	**4.4500e-003**	**1.0700e-003**	**4.2000e-004**	**1.4900e-003**	**0.0000**	**9.2633**	**9.2633**	**1.3000e-004**	**0.0000**	**9.2660**

3.2 Demolition - 2017

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					4.5700e-003	0.0000	4.5700e-003	6.9000e-004	0.0000	6.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.8700e-003	0.0744	0.0603	8.0000e-005		4.3000e-003	4.3000e-003		4.0900e-003	4.0900e-003	0.0000	6.9942	6.9942	1.5200e-003	0.0000	7.0262
Total	**7.8700e-003**	**0.0744**	**0.0603**	**8.0000e-005**	**4.5700e-003**	**4.3000e-003**	**8.8700e-003**	**6.9000e-004**	**4.0900e-003**	**4.7800e-003**	**0.0000**	**6.9942**	**6.9942**	**1.5200e-003**	**0.0000**	**7.0262**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.2000e-004	0.0113	9.1700e-003	3.0000e-005	2.1800e-003	1.4000e-004	2.3300e-003	5.6000e-004	1.3000e-004	6.9000e-004	0.0000	2.8374	2.8374	2.0000e-005	0.0000	2.8379
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-004	2.8000e-004	2.7300e-003	1.0000e-005	5.5000e-004	0.0000	5.5000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4629	0.4629	2.0000e-005	0.0000	0.4634
Total	**1.0200e-003**	**0.0116**	**0.0119**	**4.0000e-005**	**2.7300e-003**	**1.4000e-004**	**2.8800e-003**	**7.1000e-004**	**1.3000e-004**	**8.4000e-004**	**0.0000**	**3.3004**	**3.3004**	**4.0000e-005**	**0.0000**	**3.3013**

3.3 Grading - 2017

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					0.7290	0.0000	0.7290	0.3769	0.0000	0.3769	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.5183	5.0334	3.3800	4.6700e-003		0.2794	0.2794		0.2643	0.2643	0.0000	420.6656	420.6656	0.0941	0.0000	422.6412
Total	**0.5183**	**5.0334**	**3.3800**	**4.6700e-003**	**0.7290**	**0.2794**	**1.0084**	**0.3769**	**0.2643**	**0.6413**	**0.0000**	**420.6656**	**420.6656**	**0.0941**	**0.0000**	**422.6412**

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	0.1470	2.0176	1.6426	5.6500e-003	0.1275	0.0259	0.1533	0.0350	0.0238	0.0588	0.0000	508.0408	508.0408	3.6900e-003	0.0000	508.1184
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	0.0107	0.0150	0.1454	3.4000e-004	0.0291	2.2000e-004	0.0294	7.7500e-003	2.0000e-004	7.9500e-003	0.0000	24.6901	24.6901	1.2500e-003	0.0000	24.7164
Total	**0.1577**	**2.0326**	**1.7880**	**5.9900e-003**	**0.1566**	**0.0261**	**0.1827**	**0.0428**	**0.0240**	**0.0667**	**0.0000**	**532.7309**	**532.7309**	**4.9400e-003**	**0.0000**	**532.8348**

3.4 Paving - 2017

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	0.0103	0.1141	0.1033	1.5000e-004		6.6800e-003	6.6800e-003		6.2000e-003	6.2000e-003	0.0000	14.0193	14.0193	4.0200e-003	0.0000	14.1037
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0103**	**0.1141**	**0.1033**	**1.5000e-004**		**6.6800e-003**	**6.6800e-003**		**6.2000e-003**	**6.2000e-003**	**0.0000**	**14.0193**	**14.0193**	**4.0200e-003**	**0.0000**	**14.1037**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-003	4.2200e-003	0.0409	9.0000e-005	8.1900e-003	6.0000e-005	8.2600e-003	2.1800e-003	6.0000e-005	2.2400e-003	0.0000	6.9441	6.9441	3.5000e-004	0.0000	6.9515
Total	**3.0000e-003**	**4.2200e-003**	**0.0409**	**9.0000e-005**	**8.1900e-003**	**6.0000e-005**	**8.2600e-003**	**2.1800e-003**	**6.0000e-005**	**2.2400e-003**	**0.0000**	**6.9441**	**6.9441**	**3.5000e-004**	**0.0000**	**6.9515**

3.5 Building Construction - 2017

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	0.0768	0.7963	0.7736	1.2200e-003		0.0450	0.0450		0.0431	0.0431	0.0000	110.0753	110.0753	0.0244	0.0000	110.5879
Total	**0.0768**	**0.7963**	**0.7736**	**1.2200e-003**		**0.0450**	**0.0450**		**0.0431**	**0.0431**	**0.0000**	**110.0753**	**110.0753**	**0.0244**	**0.0000**	**110.5879**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.3000e-003	0.0732	0.1165	1.9000e-004	0.0242	8.5000e-004	0.0250	6.0500e-003	7.8000e-004	6.8300e-003	0.0000	16.8983	16.8983	1.4000e-004	0.0000	16.9012
Vendor	0.0675	0.5805	0.8089	1.5400e-003	0.0419	8.4000e-003	0.0503	0.0120	7.7200e-003	0.0197	0.0000	138.0058	138.0058	1.0700e-003	0.0000	138.0283
Worker	0.0719	0.1013	0.9808	2.2800e-003	0.1965	1.5000e-003	0.1980	0.0523	1.3800e-003	0.0537	0.0000	166.5503	166.5503	8.4600e-003	0.0000	166.7279
Total	**0.1478**	**0.7549**	**1.9063**	**4.0100e-003**	**0.2626**	**0.0108**	**0.2734**	**0.0703**	**9.8800e-003**	**0.0802**	**0.0000**	**321.4543**	**321.4543**	**9.6700e-003**	**0.0000**	**321.6573**

3.5 Building Construction - 2018

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	0.2003	2.1134	2.3242	3.7100e-003		0.1096	0.1096		0.1055	0.1055	0.0000	330.7488	330.7488	0.0730	0.0000	332.2813
Total	**0.2003**	**2.1134**	**2.3242**	**3.7100e-003**		**0.1096**	**0.1096**		**0.1055**	**0.1055**	**0.0000**	**330.7488**	**330.7488**	**0.0730**	**0.0000**	**332.2813**

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	0.0229	0.2030	0.3374	5.7000e-004	0.0262	2.5400e-003	0.0288	6.8100e-003	2.3400e-003	9.1400e-003	0.0000	50.3957	50.3957	4.3000e-004	0.0000	50.4046
Vendor	0.1855	1.5948	2.3123	4.6700e-003	0.1272	0.0236	0.1508	0.0365	0.0217	0.0582	0.0000	411.5118	411.5118	3.1900e-003	0.0000	411.5788
Worker	0.1961	0.2766	2.6703	6.9000e-003	0.5965	4.4100e-003	0.6009	0.1586	4.0700e-003	0.1627	0.0000	486.6406	486.6406	0.0236	0.0000	487.1359
Total	**0.4045**	**2.0744**	**5.3199**	**0.0121**	**0.7499**	**0.0305**	**0.7805**	**0.2019**	**0.0281**	**0.2300**	**0.0000**	**948.5480**	**948.5480**	**0.0272**	**0.0000**	**949.1193**

3.5 Building Construction - 2019

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	0.1797	1.9555	2.3161	3.7100e-003		0.0943	0.0943		0.0908	0.0908	0.0000	327.4485	327.4485	0.0719	0.0000	328.9578
Total	**0.1797**	**1.9555**	**2.3161**	**3.7100e-003**		**0.0943**	**0.0943**		**0.0908**	**0.0908**	**0.0000**	**327.4485**	**327.4485**	**0.0719**	**0.0000**	**328.9578**

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	0.0208	0.1881	0.3244	5.7000e-004	0.0262	2.5000e-003	0.0288	6.8100e-003	2.3000e-003	9.1100e-003	0.0000	49.5289	49.5289	4.3000e-004	0.0000	49.5378
Vendor	0.1683	1.4557	2.1923	4.6600e-003	0.1272	0.0219	0.1491	0.0365	0.0202	0.0566	0.0000	404.3553	404.3553	3.1200e-003	0.0000	404.4208
Worker	0.1792	0.2518	2.4271	6.9000e-003	0.5965	4.3200e-003	0.6008	0.1586	4.0000e-003	0.1626	0.0000	469.1122	469.1122	0.0219	0.0000	469.5724
Total	**0.3683**	**1.8955**	**4.9437**	**0.0121**	**0.7499**	**0.0287**	**0.7786**	**0.2019**	**0.0265**	**0.2284**	**0.0000**	**922.9964**	**922.9964**	**0.0255**	**0.0000**	**923.5310**

3.5 Building Construction - 2020

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	0.0266	0.2928	0.3720	6.0000e-004		0.0132	0.0132		0.0127	0.0127	0.0000	51.9944	51.9944	0.0114	0.0000	52.2344
Total	**0.0266**	**0.2928**	**0.3720**	**6.0000e-004**		**0.0132**	**0.0132**		**0.0127**	**0.0127**	**0.0000**	**51.9944**	**51.9944**	**0.0114**	**0.0000**	**52.2344**

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	3.2400e-003	0.0265	0.0516	9.0000e-005	0.0236	4.0000e-004	0.0240	5.8600e-003	3.7000e-004	6.2300e-003	0.0000	7.7893	7.7893	7.0000e-005	0.0000	7.7908
Vendor	0.0255	0.1996	0.3420	7.5000e-004	0.0205	3.1500e-003	0.0236	5.8700e-003	2.9000e-003	8.7700e-003	0.0000	63.5803	63.5803	4.9000e-004	0.0000	63.5905

Worker	0.0268	0.0373	0.3601	1.1100e-003	0.0960	6.9000e-004	0.0967	0.0255	6.4000e-004	0.0262	0.0000	72.4554	72.4554	3.3100e-003	0.0000	72.5250
Total	**0.0556**	**0.2633**	**0.7537**	**1.9500e-003**	**0.1401**	**4.2400e-003**	**0.1443**	**0.0373**	**3.9100e-003**	**0.0412**	**0.0000**	**143.8251**	**143.8251**	**3.8700e-003**	**0.0000**	**143.9063**

3.6 Architectural Coating - 2017

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	0.7782					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0284	0.2111	0.1674	2.5000e-004		0.0165	0.0165		0.0160	0.0160	0.0000	22.1903	22.1903	3.3600e-003	0.0000	22.2609
Total	**0.8066**	**0.2111**	**0.1674**	**2.5000e-004**		**0.0165**	**0.0165**		**0.0160**	**0.0160**	**0.0000**	**22.1903**	**22.1903**	**3.3600e-003**	**0.0000**	**22.2609**

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	1.2000e-004	1.0800e-003	1.7300e-003	0.0000	3.6000e-004	1.0000e-005	3.7000e-004	9.0000e-005	1.0000e-005	1.0000e-004	0.0000	0.2504	0.2504	0.0000	0.0000	0.2504
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	0.0143	0.0202	0.1954	4.5000e-004	0.0392	3.0000e-004	0.0395	0.0104	2.8000e-004	0.0107	0.0000	33.1774	33.1774	1.6800e-003	0.0000	33.2127
Total	**0.0145**	**0.0213**	**0.1971**	**4.5000e-004**	**0.0395**	**3.1000e-004**	**0.0398**	**0.0105**	**2.9000e-004**	**0.0108**	**0.0000**	**33.4277**	**33.4277**	**1.6800e-003**	**0.0000**	**33.4632**

3.6 Architectural Coating - 2018

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	2.3618					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0757	0.5761	0.5009	7.7000e-004		0.0428	0.0428		0.0416	0.0416	0.0000	67.0699	67.0699	9.7000e-003	0.0000	67.2737
Total	**2.4375**	**0.5761**	**0.5009**	**7.7000e-004**		**0.0428**	**0.0428**		**0.0416**	**0.0416**	**0.0000**	**67.0699**	**67.0699**	**9.7000e-003**	**0.0000**	**67.2737**

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	3.4000e-004	3.0100e-003	5.0000e-003	1.0000e-005	3.9000e-004	4.0000e-005	4.3000e-004	1.0000e-004	3.0000e-005	1.4000e-004	0.0000	0.7468	0.7468	1.0000e-005	0.0000	0.7469
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	0.0391	0.0551	0.5319	1.3800e-003	0.1188	8.8000e-004	0.1197	0.0316	8.1000e-004	0.0324	0.0000	96.9404	96.9404	4.7000e-003	0.0000	97.0390
Total	**0.0394**	**0.0581**	**0.5369**	**1.3900e-003**	**0.1192**	**9.2000e-004**	**0.1201**	**0.0317**	**8.4000e-004**	**0.0326**	**0.0000**	**97.6871**	**97.6871**	**4.7100e-003**	**0.0000**	**97.7859**

3.6 Architectural Coating - 2019

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	2.3618					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0675	0.5261	0.4964	7.7000e-004		0.0370	0.0370		0.0360	0.0360	0.0000	66.7947	66.7947	9.2100e-003	0.0000	66.9880
Total	**2.4292**	**0.5261**	**0.4964**	**7.7000e-004**		**0.0370**	**0.0370**		**0.0360**	**0.0360**	**0.0000**	**66.7947**	**66.7947**	**9.2100e-003**	**0.0000**	**66.9880**

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	3.1000e-004	2.7900e-003	4.8100e-003	1.0000e-005	3.9000e-004	4.0000e-005	4.3000e-004	1.0000e-004	3.0000e-005	1.3000e-004	0.0000	0.7339	0.7339	1.0000e-005	0.0000	0.7340
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	0.0357	0.0502	0.4835	1.3700e-003	0.1188	8.6000e-004	0.1197	0.0316	8.0000e-004	0.0324	0.0000	93.4486	93.4486	4.3700e-003	0.0000	93.5403
Total	**0.0360**	**0.0529**	**0.4883**	**1.3800e-003**	**0.1192**	**9.0000e-004**	**0.1201**	**0.0317**	**8.3000e-004**	**0.0325**	**0.0000**	**94.1826**	**94.1826**	**4.3800e-003**	**0.0000**	**94.2744**

3.6 Architectural Coating - 2020

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	0.3801					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	9.8200e-003	0.0775	0.0793	1.2000e-004		5.1700e-003	5.1700e-003		5.0200e-003	5.0200e-003	0.0000	10.6895	10.6895	1.4200e-003	0.0000	10.7194
Total	**0.3899**	**0.0775**	**0.0793**	**1.2000e-004**		**5.1700e-003**	**5.1700e-003**		**5.0200e-003**	**5.0200e-003**	**0.0000**	**10.6895**	**10.6895**	**1.4200e-003**	**0.0000**	**10.7194**

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	5.0000e-005	3.9000e-004	7.6000e-004	0.0000	3.5000e-004	1.0000e-005	3.6000e-004	9.0000e-005	1.0000e-005	9.0000e-005	0.0000	0.1154	0.1154	0.0000	0.0000	0.1154
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	5.3400e-003	7.4300e-003	0.0717	2.2000e-004	0.0191	1.4000e-004	0.0193	5.0800e-003	1.3000e-004	5.2100e-003	0.0000	14.4334	14.4334	6.6000e-004	0.0000	14.4472
Total	**5.3900e-003**	**7.8200e-003**	**0.0725**	**2.2000e-004**	**0.0195**	**1.5000e-004**	**0.0196**	**5.1700e-003**	**1.4000e-004**	**5.3000e-003**	**0.0000**	**14.5488**	**14.5488**	**6.6000e-004**	**0.0000**	**14.5627**

Attachment 2: 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.[7] 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.[8] This HRA used the recent 2015 OEHHA risk assessment guidelines and CARB guidance. While the OEHHA guidelines use substantially more conservative assumptions than the current Bay Area Air Quality Management District (BAAQMD) guidelines, BAAQMD has not formally adopted recommended procedures for applying the newest OEHHA guidelines. BAAQMD is in the process of developing new guidance and has developed proposed HRA Guidelines as part of the proposed amendments to Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants.[9] Exposure parameters from the OEHHA guidelines and newly proposed BAAQMD HRA Guidelines were used in this evaluation.

Cancer Risk

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

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

[7] 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.

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

[9] BAAQMD, 2016. *Workshop Report. Proposed Amendments to Air District Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants. Appendix C. Proposed Air District HRA Guidelines*. January 2016.

recommend the use of a 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. BAAQMD recommends using these FAH factors for residential exposures.

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 < 16	16 - 30
DPM Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$		1.10E+00	1.10E+00	1.10E+00	1.10E+00
Daily Breathing Rate (L/kg-day)*		361	1,090	572	261
Inhalation Absorption Factor		1	1	1	1
Averaging Time (years)		70	70	70	70
Exposure Duration (years)		0.25	2	14	14
Exposure Frequency (days/year)		350	350	350	350
Age Sensitivity Factor		10	10	3	1
Fraction of Time at Home		0.85	0.72	0.72	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 3: Stationary Source Inquiry Form and Risk Modeling Calculations for the Adobe Generators and Fire Pump Engines

Bay Area Air Quality Management District
Risk & Hazard Stationary Source Inquiry Form

This form is required when users request stationary source data from BAAQMD. This form is to be used with the BAAQMD's Google Earth stationary source screening tables.

For guidance on conducting a risk & hazard screening, including for roadways & freeways, refer to the District's Risk & Hazard Analysis flow chart.

Table A: Requestor Contact Information	
Contact Name:	Josh Carman
Affiliation:	Illingworth & Rodkin, Inc.
Phone:	707-794-0400
Email:	jcarman@illingworthrodkin.com
Date of Request	4/20/2016
Project Name:	Museum Place
Address:	Park Ave and Market
City:	San Jose
County:	Santa Clara
Type (residential, commercial, mixed use, industrial, etc.):	Residential Mixed-Use
Project size (# of units, or building square feet):	300 DU, 155 hotel rooms, 177k sf office, 60k sf museum expansion
Comments:	

For Air District assistance, the following steps must be completed:

Complete all the contact and project information requested in Table A. Incomplete forms will not be processed. Please include a project site map.

Download and install the free program Google Earth, http://www.google.com/earth/download/ge/, and then download the county specific Google Earth stationary source application files from the District's website, http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx. The small points on the map represent stationary sources permitted by the District (Map A on right). These permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc. Click on a point to view the source's Information Table, including the name, location, and preliminary estimated cancer risk, hazard index, and PM2.5 concentration.

Find the project site in Google Earth by inputting the site's address in the Google Earth search box.

Using the Google Earth ruler function, measure the distance in feet between the project's fenceline and the stationary source's fenceline for all the sources that are within 1,000 feet of the project's fenceline. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm that the source is within 1,000 feet of the project. Please report any mapping errors to the District (District contact information in Step 9).

If the stationary source is within 1,000 feet of the project's fenceline and the stationary source's information table does not list the cancer risk, hazard index, and PM2.5 concentration, and instead says to "Contact District Staff", list the stationary source information in Table B Section 1 below.

Note that a small percentage of the stationary sources have Health Risk Screening Assessment (HRSA) data INSTEAD of screening level data. These sources will be noted by an asterisk next to the Plant Name (Map B on right). If HRSA values are presented, these values have already been modeled and cannot be adjusted further.

Email this completed form to District staff (Step 9). District staff will provide the most recent risk, hazard, and PM2.5 data that are available for the source(s). If this information or data are not available, source emissions data will be provided. Staff will respond to inquiries within three weeks.

Note that a public records request received for the same stationary source information will cancel the processing of your SSIF request.

Submit forms, maps, and questions to Alison Kirk at 415-749-5169, or akirk@baaqmd.gov .

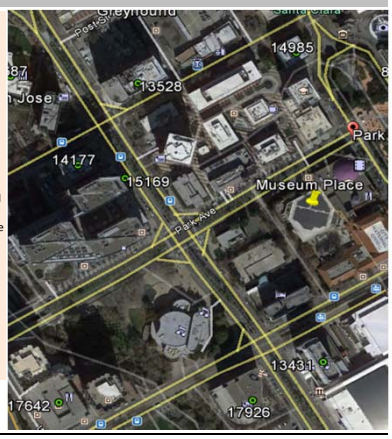


Table B: Stationary Sources within 1,000 feet of Receptor that say "Contact District Staff"

Table B Section 1: Requestor fills out these columns based on Google Earth data | **Table B Section 2: BAAQMD returns form with additional information in these columns as needed**

Distance from Receptor (feet)	Plant # or Gas Dispensary #	Facility Name	Street Address	2011 Screening Level Cancer Risk (1)	2011 Screening Level Hazard Index (1)	2011 Screening Level PM2.5 (1)	2013 Screening Level Cancer Risk (1)	2013 Screening Level Hazard Index (1)	2013 Screening Level PM2.5 (1)	Distance to Threshold Cancer Risk	Multiplier	Distance Adjusted PM2.5 Level
800 NW	14177	PG&E	111 Almaden Blvd	78.34	0.028	0.029	6.335	0.0024	0.008			
600 NW	15169	Adobe Systems	151 Almaden Blvd	2.04	0.038	0.004	243.9	0.0827	0.309			
700 NW	13528	Pacific Bell	95 S Almaden Blvd	116.89	0.089	0.25	81.75	0.04	0.1			
500 N	14985	Wells Fargo Bank	121 Park Center Plaza	71.25	0.025	0.016	3.1	0.0009	0.004			
850 NE	13605	Calpine Corp	50 W San Fernando St	0	0	0						
600 NE	8556	Fairmont Hotel	170 S Market	62.81	0.147	0.002	16.3	9.75E-03	0.0207			
950 NE	19298	DataPipe Inc	150 S. 1st	487.11	0.172	0.863	48.80	0.025	0.062			
950 E	15031	US General Services Administration	280 S 1st	10.54	0.004	0.082	3.16	0.001	0.086			
500 SE	15125	San Jose Marriott Hotel	301 S Market	15.03	0.005	0.003	0.07	0.001	0.000			
650 S	2060	Dept Convention & Cultural Affairs	W San Carlos	3.76	0.003	0.949						
450 S	13431	San Jose Hilton & Towers	300 Almaden Blvd	75.3	0.027	0.017	6.27	0.002	0.008			
600 SW	17926	Boston Properties	303 Almaden	27.43	0.010	0.049	15.69	0.005	0.016			

Footnotes:

1. These Cancer Risk, Hazard Index, and PM2.5 columns represent the rows in the Google Earth Plant Information Table that say "Contact District Staff" (Map A above). BAAQMD will return this form to you with this screening level information entered in these columns.
2. Each plant may have multiple permits and sources.
3. Fuel codes: 98 = diesel, 189 = Natural Gas.
4. Permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc.
5. If a Health Risk Screening Assessment (HRSA) was completed for the source, the application number will be listed here.
6. The date that the HRSA was completed.
7. Engineer who completed the HRSA. For District purposes only.
8. All HRSA completed before 1/5/2010 need to be multiplied by an age sensitivity factor of 1.7.
9. The HRSA "Chronic Health" number represents the Hazard Index.
10. Further information about common sources:
    a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
    b. The risk from natural gas boilers used for space heating when <25 MM BTU/hr would have an estimated cancer risk of one in a million or less, and a chronic hazard index of 0.003 or less. To be conservative, requestor should assume the cancer risk is 1 in a million and the hazard index is 0.003 for these sources.
    c. BAAQMD Reg 11 Rule 16 required that all co-residential (sharing a wall, floor, ceiling or is in the same building as a residential unit) dry cleaners cease use of perc on July 1, 2010. Therefore, there is no cancer risk, hazard or PM2.5 concentrations from co-residential dry cleaning businesses in the BAAQMD.
    d. Non co-residential dry cleaners must phase out use of perc by Jan. 1, 2023. Therefore, the risk from these dry cleaners does not need to be factored in over a 70-year period, but instead should reflect the number of years perc use will continue after the project's residents or other sensitive receptors (such as students, patients, etc) take occupancy.
    e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Mulitplier worksheet.
    f. Unless otherwise noted, exempt sources are considered insignificant. See BAAQMD Reg 2 Rule 1 for a list of exempt sources.
    g. This spray booth is considered to be insignificant.

Date last updated:
3/12/12

BAY AREA AIR QUALITY MANAGEMENT DISTRICT Printed: APR 26, 2016
DETAIL POLLUTANTS - ABATED
MOST RECENT P/O APPROVED (2015)

Adobe Systems, Inc (P# 15169)

S#	SOURCE NAME / MATERIAL / SOURCE CODE	THROUGHPUT	DATE	POLLUTANT	CODE	LBS/DAY
1	Emergency Standby Diesel Generator Set					
	C22BG098					
				Benzene	41	1.16E-03
				Formaldehyde	124	9.63E-05
				Organics (other, including	990	5.62E-02
				Arsenic (all)	1030	1.01E-06
				Beryllium (all) pollutant	1040	5.94E-07
				Cadmium	1070	2.53E-06
				Chromium (hexavalent)	1095	5.24E-08
				Lead (all) pollutant	1140	2.15E-06
				Manganese	1160	3.37E-06
				Nickel pollutant	1180	4.10E-05
				Mercury (all) pollutant	1190	7.17E-07
				Diesel Engine Exhaust Part	1350	5.86E-02
				PAH's (non-speciated)	1840	5.35E-06
				Nitrous Oxide (N2O)	2030	3.12E-04
				Nitrogen Oxides (part not	2990	8.20E-01
				Sulfur Dioxide (SO2)	3990	3.80E-04
				Carbon Monoxide (CO) pollu	4990	1.78E-01
				Carbon Dioxide, non-biogen	6960	3.90E+01
				Methane (CH4)	6970	1.56E-03
2	Emergency Standby Diesel Generator Set					
	C22BG098					
				Organics (other, including	990	1.20E-01
				Arsenic (all)	1030	1.26E-06
				Beryllium (all) pollutant	1040	7.41E-07
				Cadmium	1070	3.16E-06
				Chromium (hexavalent)	1095	6.54E-08
				Lead (all) pollutant	1140	2.68E-06
				Manganese	1160	4.21E-06
				Nickel pollutant	1180	5.12E-05
				Mercury (all) pollutant	1190	8.94E-07
				Diesel Engine Exhaust Part	1350	6.72E-02
				PAH's (non-speciated)	1840	6.67E-06
				Nitrous Oxide (N2O)	2030	3.89E-04
				Nitrogen Oxides (part not	2990	1.50E+00
				Sulfur Dioxide (SO2)	3990	4.74E-04

Carbon Monoxide (CO) pollu 4990 3.23E-01
Carbon Dioxide, non-biogen 6960 4.86E+01
Methane (CH4) 6970 1.95E-03

3 Emergency Standby Diesel Fire Pump Engine
C24AG098
Organics (other, including 990 5.52E-03
Arsenic (all) 1030 8.10E-08
Beryllium (all) pollutant 1040 4.75E-08
Cadmium 1070 2.03E-07
Chromium (hexavalent) 1095 4.19E-09
Lead (all) pollutant 1140 1.72E-07
Manganese 1160 2.70E-07
Nickel pollutant 1180 3.28E-06
Mercury (all) pollutant 1190 5.73E-08
Diesel Engine Exhaust Part 1350 3.10E-03
PAH's (non-speciated) 1840 4.28E-07
Nitrous Oxide (N2O) 2030 2.49E-05
Nitrogen Oxides (part not 2990 6.93E-02
Sulfur Dioxide (SO2) 3990 3.04E-05
Carbon Monoxide (CO) pollu 4990 1.49E-02
Carbon Dioxide, non-biogen 6960 3.12E+00
Methane (CH4) 6970 1.25E-04

4 Emergency Standby Diesel Generator Set
C22BG098
Organics (other, including 990 9.58E-02
Arsenic (all) 1030 1.01E-06
Beryllium (all) pollutant 1040 5.94E-07
Cadmium 1070 2.53E-06
Chromium (hexavalent) 1095 5.24E-08
Lead (all) pollutant 1140 2.15E-06
Manganese 1160 3.37E-06
Nickel pollutant 1180 4.10E-05
Mercury (all) pollutant 1190 7.17E-07
Diesel Engine Exhaust Part 1350 5.39E-02
PAH's (non-speciated) 1840 5.35E-06
Nitrous Oxide (N2O) 2030 3.12E-04
Nitrogen Oxides (part not 2990 1.20E+00
Sulfur Dioxide (SO2) 3990 3.80E-04
Carbon Monoxide (CO) pollu 4990 2.59E-01
Carbon Dioxide, non-biogen 6960 3.90E+01
Methane (CH4) 6970 1.56E-03

5 Emergency Standby Diesel Fire Pump Engine
C24AG098
Organics (other, including 990 2.50E-02
Arsenic (all) 1030 2.75E-07
Beryllium (all) pollutant 1040 1.61E-07
Cadmium 1070 6.87E-07

Chromium (hexavalent) 1095 1.42E-08
Lead (all) pollutant 1140 5.83E-07
Manganese 1160 9.15E-07
Nickel pollutant 1180 1.11E-05
Mercury (all) pollutant 1190 1.94E-07
Diesel Engine Exhaust Part 1350 1.41E-02
PAH's (non-speciated) 1840 1.45E-06
Nitrous Oxide (N2O) 2030 8.46E-05
Nitrogen Oxides (part not 2990 3.14E-01
Sulfur Dioxide (SO2) 3990 1.03E-04
Carbon Monoxide (CO) pollu 4990 6.76E-02
Carbon Dioxide, non-biogen 6960 1.06E+01
Methane (CH4) 6970 4.23E-04

6 Emergency Standby Diesel Fire Pump Engine

C24AG098

Organics (other, including 990 1.26E-03
Arsenic (all) 1030 1.38E-07
Beryllium (all) pollutant 1040 8.10E-08
Cadmium 1070 3.46E-07
Chromium (hexavalent) 1095 7.15E-09
Lead (all) pollutant 1140 2.93E-07
Manganese 1160 4.60E-07
Nickel pollutant 1180 5.59E-06
Mercury (all) pollutant 1190 9.77E-08
Diesel Engine Exhaust Part 1350 2.04E-03
PAH's (non-speciated) 1840 7.29E-07
Nitrous Oxide (N2O) 2030 4.25E-05
Nitrogen Oxides (part not 2990 4.55E-02
Sulfur Dioxide (SO2) 3990 5.18E-05
Carbon Monoxide (CO) pollu 4990 6.01E-03
Carbon Dioxide, non-biogen 6960 5.32E+00
Methane (CH4) 6970 2.13E-04

PLANT TOTAL:

lbs/day Pollutant

3.79E-06 Arsenic (all) (1030)
1.16E-03 Benzene (41)
2.22E-06 Beryllium (all) pollutant (1040)
9.47E-06 Cadmium (1070)
1.46E+02 Carbon Dioxide, non-biogenic CO2 (6960)
8.49E-01 Carbon Monoxide (CO) pollutant (4990)
1.96E-07 Chromium (hexavalent) (1095)
1.99E-01 Diesel Engine Exhaust Particulate Matter (1350)
9.63E-05 Formaldehyde (124)
8.03E-06 Lead (all) pollutant (1140)
1.26E-05 Manganese (1160)

2.68E-06 Mercury (all) pollutant (1190)
5.82E-03 Methane (CH4) (6970)
1.53E-04 Nickel pollutant (1180)
3.95E+00 Nitrogen Oxides (part not spec elsewhere) (2990)
1.16E-03 Nitrous Oxide (N2O) (2030)
3.03E-01 Organics (other, including CH4) (990)
2.00E-05 PAH's (non-speciated) (1840)
1.42E-03 Sulfur Dioxide (SO2) (3990)

Museum Place, San Jose, CA - AERMOD Modeling Parameters
BAAQMD Plant #15169 - Adobe Systems, Inc.

DPM Emission Rates			
	Annual	DPM Emissions	
	Operation	Daily*	Annual
Source Type	(hr)	(lb/day)	(lb/yr)
Generators & Fire Pumps (total)	-	0.199	72.64

* From BAAQMD permit inventory

Modeling Information		
Model:	AERMOD	
Source	Generators	
Source Type	Point	
Distance to Residences (ft)	various - minimum distance to generator = 535 feet	
Receptor Height (m)	1.5 meters (ground level)	
Meteorological Data	2006-2010 BAAQMD San Jose Airport data	
Point Source Stack Parameters		
Generator engine size (hp)	unknown	
Stack Height (ft)	6	
Stack Diameter** (ft)	0.25	
Stack Exit Velocity** (ft/sec)	164	
Exhaust Temperature** (F)	656	
Annual Emission Rate (lb/year)	72.64	from BAAQMD inventory data
Hourly Emission Rate (lb/hr)	8.29E-03	

** BAAQMD default generator parameters

Museum Place, San Jose, CA - DPM Cancer Risks From Plant 15169 Diesel Engines
Maximum DPM Cancer Risk at Project Site
Ground Floor Level

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

	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 =	0.85	0.72	0.72	0.73

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

MEI Cancer Risk From Emergency Generator Operation
First Floor Receptors (1.5 meter receptor height)

Exposure Duration (years)	Age	Age Sensitivity Factor	DPM Annual Conc (ug/m3)	DPM Cancer Risk (per million)
0.25	-0.25 - 0*	10	0.0134	0.15
2	1 - 2	10	0.0134	3.17
14	3 - 16	3	0.0134	3.49
14	17 - 30	1	0.0134	0.54
Total Increased Cancer Risk				**7.4**

* Third trimester of pregnancy