

BUTTERFIELD PARK CONSTRUCTION HEALTH RISK ASSESSMENT

Morgan Hill, California

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Introduction

The purpose of this report is to address the potential construction health risk impacts associated with the construction of the Butterfield Park in Morgan Hill, California. The analysis was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD).¹ The BAAQMD recommends using a 1,000-foot screening radius around a project site for purposes of identifying community health risk from siting a new source of toxic air contaminants (TACs).

Project Description

The project site is in the City of Morgan Hill, located south of Butterfield Boulevard between the UPRR tracks and Monterey Road. The 9.5-acre site is rectangle-shaped and consists of two parcels (APNs 817-06-002 and 817-06-064). The site is currently undeveloped and surrounded by open space and a single-family residential development to the west. Land uses immediately surrounding the project site are zoned as Industrial.

The project proposes to develop a new neighborhood park that totals approximately 9.5 acres. Approximately 2.5-acres would consist of a surface parking lot that would provide 217 parking spaces. The remaining seven acres would be for the city park. The park would include bicycle pump tracks, adult exercise equipment, a baseball field, picnic areas, a building with a public meeting room, concessions and restrooms, grass lawns, a walking path, a surface parking lot and a bio-filtration system installed under the parking lot.

Setting

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

Toxic Air Contaminants

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

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about three-quarters of the cancer risk from TACs (based on the Bay Area average). According to the California Air Resources Board (CARB), diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a

¹ Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2017.

complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by CARB, and are listed as carcinogens either under the State's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

Regulatory Agencies

CARB has adopted and implemented a number of regulations for stationary and mobile sources to reduce emissions of DPM. Several of these regulatory programs affect medium and heavy-duty diesel trucks that represent the bulk of DPM emissions from California highways. These regulations include the solid waste collection vehicle (SWCV) rule, in-use public and utility fleets, and the heavy-duty diesel truck and bus regulations. In 2008, CARB approved a new regulation to reduce emissions of DPM and nitrogen oxides from existing on-road heavy-duty diesel fueled vehicles.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 published California Environmental Quality Act (CEQA) Air Quality Guidelines that are used in this assessment to evaluate air quality impacts of projects.³ The detailed community risk modeling methodology used in this assessment is contained in *Attachment 1*.

Sensitive Receptors

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

Significance Thresholds

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

² Available online: <http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm>. Accessed: November 21, 2014.

³ Bay Area Air Quality Management District. 2017. *BAAQMD CEQA Air Quality Guidelines*. May.

Table 1. Community Risk Significance Thresholds

Health Risks and Hazards	Single Sources Within 1,000-foot Zone of Influence	Combined Sources (Cumulative from all sources within 1,000-foot zone of influence)
Excess Cancer Risk	>10.0 per one million	>100 per one million
Hazard Index	>1.0	>10.0
Incremental annual PM _{2.5}	>0.3 µg/m ³	>0.8 µg/m ³
Note: PM ₁₀ = coarse particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, PM _{2.5} = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less. GHG = greenhouse gases.		

Construction Health Risk Impacts and Mitigation Measures

Project impacts related to increased community risk can occur either by introducing a new sensitive receptor, such as a residential use, in proximity to an existing source of TACs or by introducing a new source of TACs with the potential to adversely affect existing sensitive receptors in the project vicinity. The project would not introduce new residents that are sensitive receptors. Temporary project construction activity, though, would generate dust and equipment exhaust on a temporary basis that could affect nearby sensitive receptors. A construction health risk assessment was prepared to address project construction impacts on the surrounding off-site sensitive receptors. Community risk impacts are addressed by predicting increased lifetime cancer risk, the increase in annual PM_{2.5} concentrations, and computing the Hazard Index (HI) for non-cancer health risks. The methodology for computing community risks impacts is contained in *Attachment 1*.

Construction Community Health Risk Impacts

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known TAC. These exhaust air pollutant emissions would not be considered to contribute substantially to existing or projected air quality violations. Construction exhaust emissions may still pose health risks for sensitive receptors such as surrounding residents. The primary community risk impact issues associated with construction emissions are cancer risk and exposure to PM_{2.5}. Diesel exhaust poses both a potential health and nuisance impact to nearby receptors. A health risk assessment of the project construction activities was conducted that evaluated potential health effects to nearby sensitive receptors from construction emissions of DPM and PM_{2.5}.⁴ This assessment included dispersion modeling to predict the offsite and onsite concentrations resulting from project construction, so that lifetime cancer risks and non-cancer health effects could be evaluated.

CalEEMod Modeling

The California Emissions Estimator Model (CalEEMod) Version 2016.3.2 was used to estimate emissions from construction of the site assuming full build-out of the project. The project land

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

use types and size, and anticipated construction schedule were input to CalEEMod. The model output from CalEEMod is included as *Attachment 2*.

CalEEMod provided annual emissions for construction and estimates emissions 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 based CalEEMod default information. The project applicant did note that construction would begin January 2021.

The proposed project land uses are as follows: seven acres entered as “City Park” and 217 parking spaces entered as “Parking Lot” over 2.5 acres. Since the project site is currently vacant, the demolition phase was removed from the construction phasing. A trenching phase was also included, and it was assumed it would coincide with the grading phase. Construction of the whole project would begin January 2021 and last about 14 months based on CalEEMod defaults. There were an estimated 300 workdays.

The CalEEMod model also provided total annual PM₁₀ exhaust emissions (assumed to be DPM) for the off-road construction equipment and for exhaust emissions from on-road vehicles, with total emissions from all construction stages as 0.1411 tons (282 pounds). The on-road emissions are a result of haul truck travel during demolition and grading activities, worker travel, and vendor deliveries during construction. A trip length of one mile was used for vehicle travel while at or near the construction site to represent localized air emissions. It was assumed that these emissions from on-road vehicles traveling at or near the site would occur at the construction site. Fugitive PM_{2.5} dust emissions were calculated by CalEEMod as 0.0893 tons (179 pounds) for the overall construction period.

Construction Criteria Air Pollutants

In the BAAQMD 2017 CEQA Air Quality Guidelines, BAAQMD identifies screening criteria for the sizes of land use projects that could result in significant air pollutant emissions. Projects that do not exceed the screening size would not generate emission that exceed the BAAQMD significant thresholds for criteria air pollutants. For construction-related impacts, the screening size is identified as 67 acres for city parks. Since the project proposes to develop 9.5 acres of city park, it is concluded that emissions would be below the BAAQMD significant thresholds for construction criteria air pollutants.

Dispersion Modeling

The U.S. EPA ISCST3 dispersion model was used to predict DPM and PM_{2.5} concentrations at existing sensitive receptors (residences) in the vicinity of the project construction area. The ISCST3 dispersion model is a BAAQMD-recommended model for use in modeling these types of emission activities for CEQA projects.⁵ The ISCST3 modeling utilized four area sources to represent the on-site construction emissions; two for DPM exhaust emissions and the other two for fugitive PM_{2.5} dust emissions. These four areas represent the parking lot and the park. To

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

represent the construction equipment exhaust emissions, an emission release height of six meters (19.7 feet) was used for the area source. The elevated source height reflects the height of the equipment exhaust pipes and buoyancy of the exhaust plume. For modeling fugitive PM_{2.5} emissions, a near ground level release height of two meters (6.6 feet) was used for the area source. Emissions from vehicle travel around the project site were included in the modeled area sources. Construction emissions were modeled as occurring daily between 7 a.m. and 4 p.m., when the majority of the construction activity involving equipment usage would occur.

The modeling used a five-year data set (2001 - 2005) of hourly meteorological data from San Martin Airport prepared for use with the ISCST3 model by the BAAQMD. The airport is about 5 miles southeast of the project site. Annual DPM and PM_{2.5} concentrations from construction activities in 2019 - 2020 were calculated using the model. DPM and PM_{2.5} concentrations were calculated at nearby residential locations at receptor heights of 1.5 meters (4.9 feet) to represent the breathing heights of the residents living in the nearby single-family homes and mobile homes.

Predicted Increased Cancer Risk and Hazards.

The maximum-modeled annual DPM and PM_{2.5} concentrations, which includes both the DPM and fugitive PM_{2.5} concentrations, were identified at nearby sensitive receptors to find the maximally exposed individuals (MEIs) as shown in Figure 1. The maximum increased cancer risks were calculated using BAAQMD recommended methods and exposure parameters described in *Attachment 1*. Non-cancer health hazards and maximum PM_{2.5} concentrations were also calculated and identified. *Attachment 3* to this report includes the emission calculations used for the construction area source modeling and the cancer risk calculations.

Results of this assessment indicated that the residential construction MEI was located at a single-family residence northwest of the project site as indicated in Figure 1. Table 2 summarizes the maximum cancer risks, PM_{2.5} concentrations, and health hazard indexes for project related construction activities affecting the residential MEI. As seen in Table 2, the construction risk impacts do not exceed the BAAQMD single-source thresholds for cancer risk, PM_{2.5} concentrations, or HI.

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

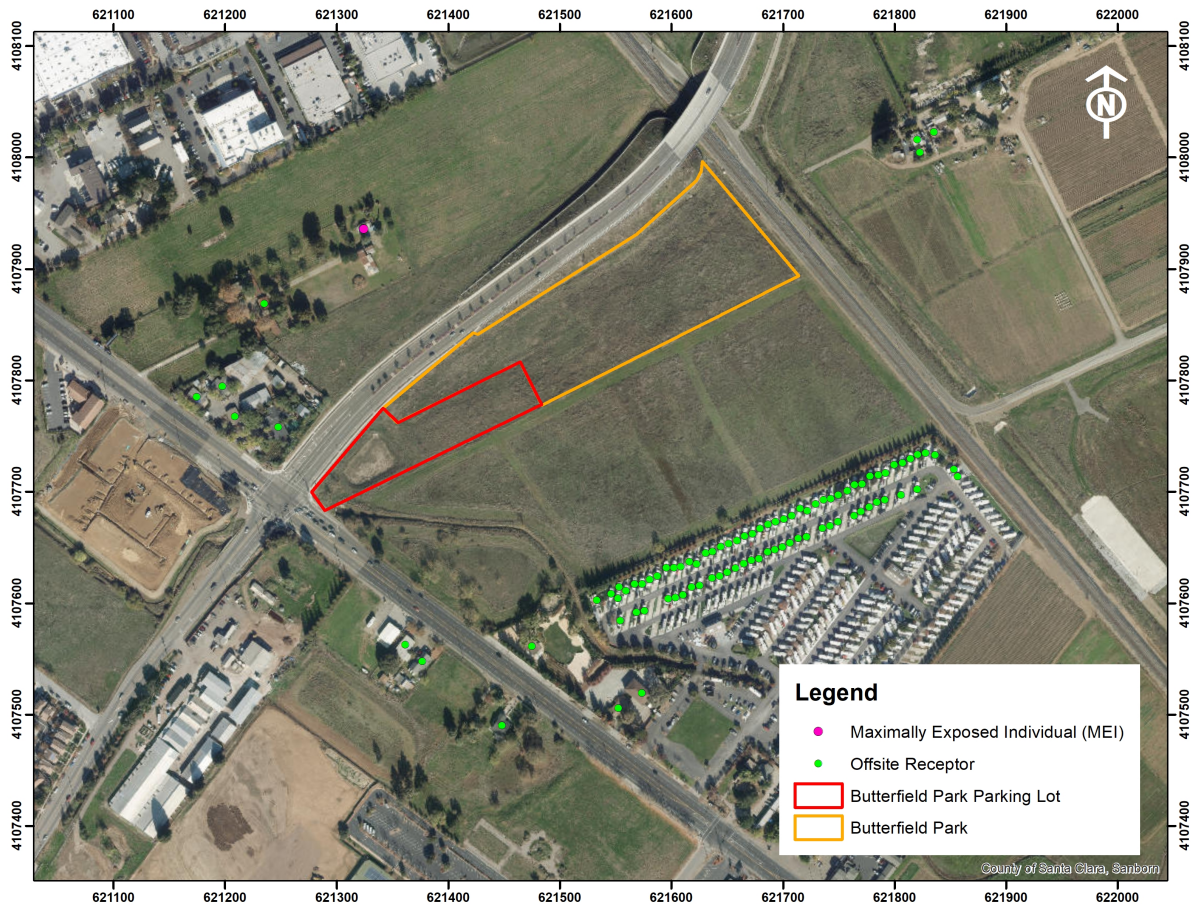


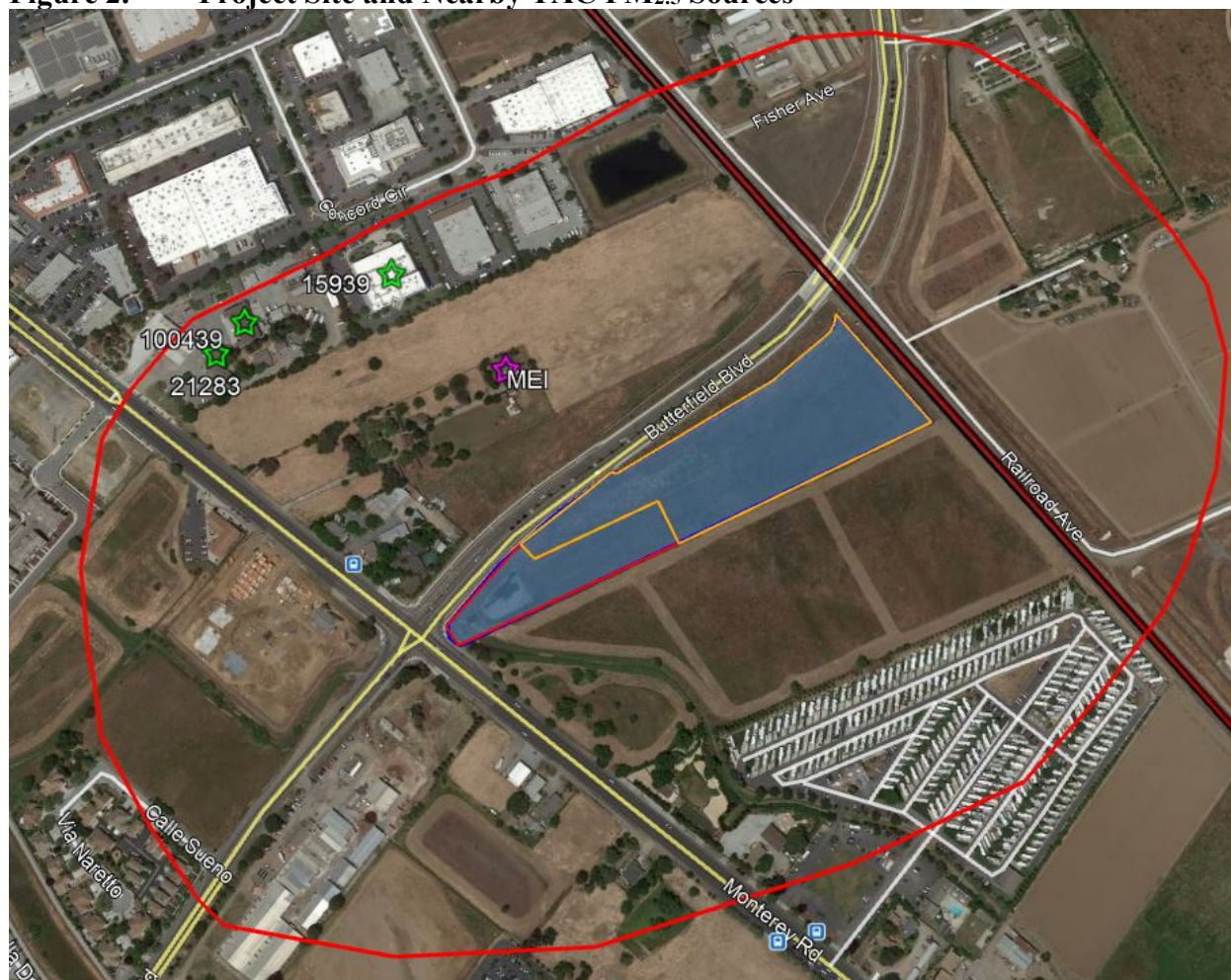
Table 2. Construction Risk Impacts at the Offsite MEI

Source	Cancer Risk (per million)	Annual PM _{2.5} (µg/m ³)	Hazard Index
Project Construction	7.2 (infant)	0.07	0.01
<i>BAAQMD Single-Source Threshold</i>	<i>>10.0</i>	<i>>0.3</i>	<i>>1.0</i>
<i>Significant?</i>	<i>No</i>	<i>No</i>	<i>No</i>

Cumulative Impact on Off-Site MEI

Community health risk assessments typically look at all substantial sources of TACs located within 1,000 feet of project sites. These sources include highways, busy surface streets, and stationary sources identified by BAAQMD. A review of the area shows that Monterey Road and Butterfield Boulevard may have traffic that exceeds 10,000 vehicles per day. All other nearby streets are assumed to have less than 10,000 vehicles per day. A review of BAAQMD's stationary source Google Earth map tool identified three sources with the potential to affect the project site. The project is also near a rail line. Figure 2 shows the sources affecting the project site. Details of the modeling and community risk calculations are included in *Attachment 4*.

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



Local Roadways – Monterey Road & Butterfield Road

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

The calculator uses EMFAC2011 emission rates for the year 2014. In addition, a new version of the emissions factor model, EMFAC2014 is available. This version predicts lower emission rates. An adjustment factor of 0.5 was developed by comparing emission rates of total organic gases (TOG) for running exhaust and running losses developed using EMFAC2011 for year 2014 and those from EMFAC2014 for 2018. The predicted cancer risk was then adjusted using a factor of 1.3744 to account for new OEHHA guidance. This factor was provided by BAAQMD for use with their CEQA screening tools that are used to predict cancer risk.

The ADT on Monterey Road was estimated to be 25,000 vehicles and the ADT on Butterfield Road was estimated to be 10,000 vehicles. The BAAQMD *Roadway Screening Analysis Calculator* for Santa Clara County was used for these roadways. Monterey Road was identified as a north-south roadway with the MEI east of the roadway. Butterfield Boulevard was identified as an east-west roadway with the MEI north of the roadway. Estimated risk values for the roadway upon the Construction MEI is listed in Table 4. Note that BAAQMD has found that non-cancer hazards from all local roadways would be below a Hazard Index of 0.03.

Stationary Sources

Permitted stationary sources of air pollution near the project site were identified using BAAQMD's *Stationary Source Risk & Hazard Analysis Tool*. This mapping tool uses Google Earth and identified the location of three possible stationary source and their estimated risk and hazard impacts. A Stationary Source Information Form (SSIF) containing the identified sources was prepared and submitted to BAAQMD. They provided updated risk levels, emissions and adjustments to account for new OEHHA guidance.⁶ The stationary sources were identified as a gas dispensing facility, generator, and unknown generic source with a PM_{2.5} concentration. Each source was adjusted for distance using either the BAAQMD *Gasoline Dispensing Facility (GDF) Distance Multiplier Tool*, *Diesel Internal Combustion (IC) Engine Distance Multiplier Tool*, and *Generic Distance Multiplier Tool*. All risks are summarized in Table 3.

Railroad Emissions

The Union Pacific Rail Road (UPRR) line runs immediately adjacent to the site on the east side. This rail line is used by trains for passenger and freight service. Along this portion of the rail line there are six Caltrain passenger trains during the weekdays that run along this line between 6 a.m. and 8 p.m. There are also two Amtrak-Coast Starlight daily passenger trains using this line.

⁶ Correspondence with Areana Flores, BAAQMD, 27 June 2019.

In addition to the passenger trains, there are up to six UPRR freight trains that also use this rail line on a daily basis.⁷

A past analysis calculated that receptors located about 100 feet from the center of the rail line would have a 7.7 in on million increased cancer risk.⁸ To account for the OEHHA guidance, this cancer risk was adjusted using the factor of 1.3744. The adjusted cancer risk at 100 feet would then be 10.6 in one million. Note that the off-site MEI is approximately 900 feet away from the rail line. Therefore, the calculated cancer risk at MEI would be less than 10.6 per million. The PM_{2.5} and HI would also be less than 0.01 µg/m³ and 0.03, respectively.

Cumulative Health Risk Impact at Off-Site MEI

Table 3 reports both the project and cumulative community risk impacts at the sensitive receptor most affected by construction (i.e. the MEI). Without mitigation, the project would have a *less-than-significant* impact with respect to community risk caused by project construction activities, since the maximum cancer risk, annual PM_{2.5} concentration, and HI do not exceed their single-source thresholds. The combined annual cancer risk, PM_{2.5} concentration, and Hazard risk values, which includes unmitigated and mitigated, would not exceed the cumulative threshold. Therefore, the project would also have a *less-than-significant* impact regarding the cumulative risk within the area.

Table 3. Impacts from Combined Sources at Off-Site MEI

Source	Cancer Risk (per million)	Annual PM _{2.5} (µg/m ³)	Hazard Index
Project Construction	7.2 (infant)	0.07	0.01
UPRR Railroad	<10.6	<0.01	<0.03
Monterey Road (ADT ~25,000) at 800 feet east	1.3	0.04	<0.03
Butterfield Boulevard (ADT ~10,000) at	1.1	0.03	<0.03
Cal Fire Morgan Hill Headquarters (Plant # 2128, generator) at 750 feet	0.01	<0.01	<0.01
CA Department of Forestry & Fire Station (Plant #100439, Gas Dispensing Facility) at 750 feet	<0.1		<0.01
U.S. Technical Ceramics, Inc. (Plant #15939, generator) at 350 feet	0.5	<0.01	<0.01
Combined Sources	<20.8 (infant)	<0.17	<0.13
BAAQMD Cumulative Source Threshold	>100	>0.8	>10.0
Significant?	No	No	No

⁷ Metropolitan Transportation Commission, 2006. *Bay Area Regional Rail Plan, Technical Memorandum 4a, Conditions, Configuration & Traffic on Existing System*, November 15.

⁸ Illingworth & Rodkin, 2014. *Spring 2014 General Plan Amendments Draft TAC and GHG Emissions Assessment*. August.

Supporting Documentation

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

Attachment 2 includes the CalEEMod output for project construction.

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

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

Attachment 1: Health Risk Calculation Methodology

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 2015.⁹ 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.¹⁰ This HRA used the 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.¹¹ 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 and duration of exposure. 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 for residential exposures, 95th percentile breathing rates are used for the third trimester and infant exposures, and 80th percentile breathing rates for child and adult exposures. For children at

⁹ 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.

¹⁰ CARB, 2015. *Risk Management Guidance for Stationary Sources of Air Toxics*. July 23.

¹¹ BAAQMD, 2016. *BAAQMD Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines*. December 2016.

schools and daycare facilities, BAAQMD recommends using the 95th percentile breathing rates. Additionally, CARB and the BAAQMD recommend the use of a residential exposure duration of 30 years for sources with long-term emissions (e.g., roadways). For workers, assumed to be adults, a 25-year exposure period is recommended by the BAAQMD.

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

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

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

Where:

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

ASF = Age sensitivity factor for specified age group

ED = Exposure duration (years)

AT = Averaging time for lifetime cancer risk (years)

FAH = Fraction of time spent at home (unitless)

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

Where:

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

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

A = Inhalation absorption factor

EF = Exposure frequency (days/year)

10⁻⁶ = Conversion factor

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

Parameter	Exposure Type →	Infant		Child		Adult
	Age Range →	3 rd Trimester	0<2	2 < 9	2 < 16	16 - 30
DPM Cancer Potency Factor (mg/kg-day) ⁻¹		1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
Daily Breathing Rate (L/kg-day) 80 th Percentile Rate		273	758	631	572	261
Daily Breathing Rate (L/kg-day) 95 th Percentile Rate		361	1,090	861	745	335
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

Non-Cancer Hazards

Potential non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). OEHHA has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The total HI is calculated as the sum of the HIs for each TAC evaluated and the total HI is compared to the BAAQMD significance thresholds to determine whether a significant non-cancer health impact from a project would occur.

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

Annual PM_{2.5} Concentrations

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

Attachment 2: CalEEMod Modeling Output

Butterfield Park Morgan Hill - TAC - Santa Clara County, Annual

Butterfield Park Morgan Hill - TAC
Santa Clara County, Annual

1.0 Project Characteristics**1.1 Land Usage**

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	217.00	Space	2.50	86,800.00	0
City Park	7.00	Acre	7.00	304,920.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	58
Climate Zone	3			Operational Year	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MW hr)	290	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - PG&E 2020 290 CO2 intensity factor

Land Use - Butterfield Morgan Hill Park, seven acres of track and field area. 2.5-acres surface parking lot with approximately 217 parking spaces based PD from 7.1.2019

Construction Phase - Default construction schedule, no demolition assumed, assuming trenching would occur consecutively with grading. Provided info for dates: construction would start January 21 to December 21

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

[illegible]

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					
2021	0.2974	2.9762	2.4671	4.4500e-003	0.1770	0.1349	0.3119	0.0892	0.1263	0.2155	0.0000	390.5837	390.5837	0.0866	0.0000	392.7473
2022	0.0342	0.1200	0.1592	2.5000e-004	3.5000e-004	6.2200e-003	6.5700e-003	9.0000e-005	5.7800e-003	5.8800e-003	0.0000	21.9374	21.9374	6.3300e-003	0.0000	22.0957
Maximum	0.2974	2.9762	2.4671	4.4500e-003	0.1770	0.1349	0.3119	0.0892	0.1263	0.2155	0.0000	390.5837	390.5837	0.0866	0.0000	392.7473

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					
2021	0.1237	2.4018	2.6645	4.4500e-003	0.0913	0.1192	0.2105	0.0246	0.1192	0.1437	0.0000	390.5833	390.5833	0.0865	0.0000	392.7470
2022	0.0276	0.1211	0.1852	2.5000e-004	3.5000e-004	6.7400e-003	7.1000e-003	9.0000e-005	6.7400e-003	6.8400e-003	0.0000	21.9374	21.9374	6.3300e-003	0.0000	22.0957
Maximum	0.1237	2.4018	2.6645	4.4500e-003	0.0913	0.1192	0.2105	0.0246	0.1192	0.1437	0.0000	390.5833	390.5833	0.0865	0.0000	392.7470

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	54.39	18.52	-8.51	0.00	48.33	10.75	31.68	72.36	4.70	31.98	0.00	0.00	0.00	0.01	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
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1	1-1-2021	3-31-2021	0.9414	0.6282
2	4-1-2021	6-30-2021	0.7735	0.6295
3	7-1-2021	9-30-2021	0.7820	0.6364
4	10-1-2021	12-31-2021	0.7757	0.6308
5	1-1-2022	3-31-2022	0.1559	0.1504
		Highest	0.9414	0.6364

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2021	1/14/2021	5	10	
2	Grading	Grading	1/15/2021	2/11/2021	5	20	
3	Trenching	Trenching	1/15/2021	2/11/2021	5	20	
4	Park Construction	Building Construction	2/12/2021	12/30/2021	5	230	
5	Paving	Paving	12/31/2021	1/27/2022	5	20	
6	Architectural Coating	Architectural Coating	1/28/2022	2/24/2022	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 2.5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 5,208

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40

Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Park Construction	Cranes	1	7.00	231	0.29
Park Construction	Forklifts	3	8.00	89	0.20
Park Construction	Generator Sets	1	8.00	84	0.74
Park Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Park Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48
Trenching	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Trenching	Excavators	1	7.00	158	0.38

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
Site Preparation	7	18.00	2.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	2.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Park Construction	9	165.00	64.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	33.00	0.00	0.00	1.00	1.00	1.00	LD_Mix	HDT_Mix	HHDT
Trenching	2	5.00	2.00	0.00	1.00	1.00	1.00	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

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2021

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					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0194	0.2025	0.1058	1.9000e-004		0.0102	0.0102		9.4000e-003	9.4000e-003	0.0000	16.7179	16.7179	5.4100e-003	0.0000	16.8530
Total	0.0194	0.2025	0.1058	1.9000e-004	0.0903	0.0102	0.1006	0.0497	9.4000e-003	0.0591	0.0000	16.7179	16.7179	5.4100e-003	0.0000	16.8530

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	2.0000e-005	6.4000e-004	1.7000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0795	0.0795	1.0000e-005	0.0000	0.0797
Worker	9.0000e-005	4.0000e-005	5.3000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0707	0.0707	0.0000	0.0000	0.0708
Total	1.1000e-004	6.8000e-004	7.0000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.1502	0.1502	1.0000e-005	0.0000	0.1505

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Fugitive Dust					0.0407	0.0000	0.0407	0.0112	0.0000	0.0112	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.6600e-003	0.0953	0.1148	1.9000e-004		4.7300e-003	4.7300e-003		4.7300e-003	4.7300e-003	0.0000	16.7178	16.7178	5.4100e-003	0.0000	16.8530
Total	4.6600e-003	0.0953	0.1148	1.9000e-004	0.0407	4.7300e-003	0.0454	0.0112	4.7300e-003	0.0159	0.0000	16.7178	16.7178	5.4100e-003	0.0000	16.8530

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	2.0000e-005	6.4000e-004	1.7000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0795	0.0795	1.0000e-005	0.0000	0.0797
Worker	9.0000e-005	4.0000e-005	5.3000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0707	0.0707	0.0000	0.0000	0.0708
Total	1.1000e-004	6.8000e-004	7.0000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.1502	0.1502	1.0000e-005	0.0000	0.1505

3.3 Grading - 2021

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					0.0655	0.0000	0.0655	0.0337	0.0000	0.0337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0229	0.2474	0.1586	3.0000e-004		0.0116	0.0116		0.0107	0.0107	0.0000	26.0537	26.0537	8.4300e-003	0.0000	26.2644

Total	0.0229	0.2474	0.1586	3.0000e-004	0.0655	0.0116	0.0771	0.0337	0.0107	0.0443	0.0000	26.0537	26.0537	8.4300e-003	0.0000	26.2644
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Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	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	3.0000e-005	1.2700e-003	3.4000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1590	0.1590	1.0000e-005	0.0000	0.1594
Worker	1.5000e-004	7.0000e-005	8.9000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1178	0.1178	0.0000	0.0000	0.1180
Total	1.8000e-004	1.3400e-003	1.2300e-003	0.0000	1.3000e-004	0.0000	1.3000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.2769	0.2769	1.0000e-005	0.0000	0.2774

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					0.0295	0.0000	0.0295	7.5800e-003	0.0000	7.5800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.2600e-003	0.1484	0.1899	3.0000e-004		7.5600e-003	7.5600e-003		7.5600e-003	7.5600e-003	0.0000	26.0537	26.0537	8.4300e-003	0.0000	26.2643
Total	7.2600e-003	0.1484	0.1899	3.0000e-004	0.0295	7.5600e-003	0.0371	7.5800e-003	7.5600e-003	0.0151	0.0000	26.0537	26.0537	8.4300e-003	0.0000	26.2643

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	3.0000e-005	1.2700e-003	3.4000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1590	0.1590	1.0000e-005	0.0000	0.1594
Worker	1.5000e-004	7.0000e-005	8.9000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1178	0.1178	0.0000	0.0000	0.1180
Total	1.8000e-004	1.3400e-003	1.2300e-003	0.0000	1.3000e-004	0.0000	1.3000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.2769	0.2769	1.0000e-005	0.0000	0.2774

3.4 Trenching - 2021

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	3.6500e-003	0.0355	0.0485	7.0000e-005		1.8900e-003	1.8900e-003		1.7400e-003	1.7400e-003	0.0000	6.3691	6.3691	2.0600e-003	0.0000	6.4206
Total	3.6500e-003	0.0355	0.0485	7.0000e-005		1.8900e-003	1.8900e-003		1.7400e-003	1.7400e-003	0.0000	6.3691	6.3691	2.0600e-003	0.0000	6.4206

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	3.0000e-005	1.2700e-003	3.4000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1590	0.1590	1.0000e-005	0.0000	0.1594
Worker	5.0000e-005	2.0000e-005	3.0000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0393	0.0393	0.0000	0.0000	0.0393
Total	8.0000e-005	1.2900e-003	6.4000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.1983	0.1983	1.0000e-005	0.0000	0.1987

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	1.7800e-003	0.0367	0.0549	7.0000e-005		2.1000e-003	2.1000e-003		2.1000e-003	2.1000e-003	0.0000	6.3691	6.3691	2.0600e-003	0.0000	6.4206
Total	1.7800e-003	0.0367	0.0549	7.0000e-005		2.1000e-003	2.1000e-003		2.1000e-003	2.1000e-003	0.0000	6.3691	6.3691	2.0600e-003	0.0000	6.4206

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	3.0000e-005	1.2700e-003	3.4000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1590	0.1590	1.0000e-005	0.0000	0.1594
Worker	5.0000e-005	2.0000e-005	3.0000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0393	0.0393	0.0000	0.0000	0.0393
Total	8.0000e-005	1.2900e-003	6.4000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.1983	0.1983	1.0000e-005	0.0000	0.1987

3.5 Park Construction - 2021

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	0.2186	2.0047	1.9062	3.1000e-003		0.1102	0.1102		0.1037	0.1037	0.0000	266.3829	266.3829	0.0643	0.0000	267.9895
Total	0.2186	2.0047	1.9062	3.1000e-003		0.1102	0.1102		0.1037	0.1037	0.0000	266.3829	266.3829	0.0643	0.0000	267.9895

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	0.0124	0.4679	0.1260	6.1000e-004	6.8000e-003	3.9000e-004	7.1900e-003	1.9800e-003	3.8000e-004	2.3600e-003	0.0000	58.5210	58.5210	5.4300e-003	0.0000	58.6568
Worker	0.0192	8.4800e-003	0.1121	1.7000e-004	0.0141	1.9000e-004	0.0143	3.7700e-003	1.7000e-004	3.9500e-003	0.0000	14.9067	14.9067	5.9000e-004	0.0000	14.9213
Total	0.0316	0.4764	0.2382	7.8000e-004	0.0209	5.8000e-004	0.0215	5.7500e-003	5.5000e-004	6.3100e-003	0.0000	73.4277	73.4277	6.0200e-003	0.0000	73.5781

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	0.0775	1.6360	2.0555	3.1000e-003		0.1039	0.1039		0.1039	0.1039	0.0000	266.3826	266.3826	0.0643	0.0000	267.9892
Total	0.0775	1.6360	2.0555	3.1000e-003		0.1039	0.1039		0.1039	0.1039	0.0000	266.3826	266.3826	0.0643	0.0000	267.9892

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	0.0124	0.4679	0.1260	6.1000e-004	6.8000e-003	3.9000e-004	7.1900e-003	1.9800e-003	3.8000e-004	2.3600e-003	0.0000	58.5210	58.5210	5.4300e-003	0.0000	58.6568
Worker	0.0192	8.4800e-003	0.1121	1.7000e-004	0.0141	1.9000e-004	0.0143	3.7700e-003	1.7000e-004	3.9500e-003	0.0000	14.9067	14.9067	5.9000e-004	0.0000	14.9213
Total	0.0316	0.4764	0.2382	7.8000e-004	0.0209	5.8000e-004	0.0215	5.7500e-003	5.5000e-004	6.3100e-003	0.0000	73.4277	73.4277	6.0200e-003	0.0000	73.5781

3.6 Paving - 2021

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	6.3000e-004	6.4600e-003	7.3300e-003	1.0000e-005		3.4000e-004	3.4000e-004		3.1000e-004	3.1000e-004	0.0000	1.0012	1.0012	3.2000e-004	0.0000	1.0093

Paving	1.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	7.9000e-004	6.4600e-003	7.3300e-003	1.0000e-005		3.4000e-004	3.4000e-004		3.1000e-004	3.1000e-004	0.0000	1.0012	1.0012	3.2000e-004	0.0000	1.0093

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	0.0000	4.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	5.8900e-003	5.8900e-003	0.0000	0.0000	5.9000e-003
Total	1.0000e-005	0.0000	4.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	5.8900e-003	5.8900e-003	0.0000	0.0000	5.9000e-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					
Off-Road	2.8000e-004	5.6500e-003	8.6500e-003	1.0000e-005		3.0000e-004	3.0000e-004		3.0000e-004	3.0000e-004	0.0000	1.0012	1.0012	3.2000e-004	0.0000	1.0093
Paving	1.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	4.4000e-004	5.6500e-003	8.6500e-003	1.0000e-005		3.0000e-004	3.0000e-004		3.0000e-004	3.0000e-004	0.0000	1.0012	1.0012	3.2000e-004	0.0000	1.0093

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	1.0000e-005	0.0000	4.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	5.8900e-003	5.8900e-003	0.0000	0.0000	5.9000e-003
Total	1.0000e-005	0.0000	4.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	5.8900e-003	5.8900e-003	0.0000	0.0000	5.9000e-003

3.6 Paving - 2022

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	0.0105	0.1057	0.1385	2.2000e-004		5.4000e-003	5.4000e-003		4.9600e-003	4.9600e-003	0.0000	19.0262	19.0262	6.1500e-003	0.0000	19.1800
Paving	3.1100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0136	0.1057	0.1385	2.2000e-004		5.4000e-003	5.4000e-003		4.9600e-003	4.9600e-003	0.0000	19.0262	19.0262	6.1500e-003	0.0000	19.1800

Unmitigated Construction Off-Site

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

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	6.0000e-005	7.6000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1080	0.1080	0.0000	0.0000	0.1081
Total	1.3000e-004	6.0000e-005	7.6000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1080	0.1080	0.0000	0.0000	0.1081

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	5.3300e-003	0.1073	0.1643	2.2000e-004		5.7900e-003	5.7900e-003		5.7900e-003	5.7900e-003	0.0000	19.0262	19.0262	6.1500e-003	0.0000	19.1800
Paving	3.1100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	8.4400e-003	0.1073	0.1643	2.2000e-004		5.7900e-003	5.7900e-003		5.7900e-003	5.7900e-003	0.0000	19.0262	19.0262	6.1500e-003	0.0000	19.1800

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	1.3000e-004	6.0000e-005	7.6000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1080	0.1080	0.0000	0.0000	0.1081
Total	1.3000e-004	6.0000e-005	7.6000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1080	0.1080	0.0000	0.0000	0.1081

3.7 Architectural Coating - 2022

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	0.0181					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0500e-003	0.0141	0.0181	3.0000e-005		8.2000e-004	8.2000e-004		8.2000e-004	8.2000e-004	0.0000	2.5533	2.5533	1.7000e-004	0.0000	2.5574
Total	0.0202	0.0141	0.0181	3.0000e-005		8.2000e-004	8.2000e-004		8.2000e-004	8.2000e-004	0.0000	2.5533	2.5533	1.7000e-004	0.0000	2.5574

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	3.1000e-004	1.3000e-004	1.7700e-003	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2500	0.2500	1.0000e-005	0.0000	0.2502
Total	3.1000e-004	1.3000e-004	1.7700e-003	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2500	0.2500	1.0000e-005	0.0000	0.2502

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0181					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.9000e-004	0.0136	0.0183	3.0000e-005		9.5000e-004	9.5000e-004		9.5000e-004	9.5000e-004	0.0000	2.5533	2.5533	1.7000e-004	0.0000	2.5574
Total	0.0187	0.0136	0.0183	3.0000e-005		9.5000e-004	9.5000e-004		9.5000e-004	9.5000e-004	0.0000	2.5533	2.5533	1.7000e-004	0.0000	2.5574

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	3.1000e-004	1.3000e-004	1.7700e-003	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2500	0.2500	1.0000e-005	0.0000	0.2502
Total	3.1000e-004	1.3000e-004	1.7700e-003	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2500	0.2500	1.0000e-005	0.0000	0.2502

Attachment 3: Construction Health Risk Calculations

Butterfield Park, Morgan Hill, CA

DPM Construction Emissions and Modeling Emission Rates - Unmitigated

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions			Modeled Area (m ²)	DPM Emission Rate (g/s/m ²)
				(lb/yr)	(lb/hr)	(g/s)		
2021-2022	Park Construction	0.1069	CON1_DPM	213.7	0.06507	8.20E-03	28,427	2.88E-07
	Parking Lot Construction	0.0342	CON2_DPM	68.5	0.02085	2.63E-03	9,109	2.88E-07
		0.1411					37,536	
Total		0.1411		282	0.0859	0.0108		

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

PM2.5 Fugitive Dust Construction Emissions for Modeling - Unmitigated

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	PM2.5 Emissions			Modeled Area (m ²)	PM2.5 Emission Rate g/s/m ²
				(lb/yr)	(lb/hr)	(g/s)		
2021-2022	Park Construction	CON1_FUG	0.0676	135.2	0.04117	5.19E-03	28,427	1.82E-07
	Parking Lot Construction	CON2_FUG	0.0217	43.3	0.01319	1.66E-03	9,109	1.82E-07
			0.0893				37,536	
Total			0.0893	178.6	0.0544	0.0068		

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

Butterfield Park, Morgan Hill, CA - Construction Health Impact Summary

Maximum Impacts at MEI Location - Unmitigated

Emissions Year	Maximum Concentrations					
	Exhaust PM10/DPM (µg/m ³)	Fugitive PM2.5 (µg/m ³)	Cancer Risk (per million)		Hazard Index (-)	Maximum Annual PM2.5 Concentration (µg/m ³)
			Infant/Child	Adult		
2021-2022	0.0407	0.0267	7.2	0.1	0.008	0.07

Butterfield Park, Morgan Hill, CA - Construction Impacts - Without Mitigation
Maximum DPM Cancer Risk and PM2.5 Calculations From Construction
Impacts at Off-Site MEI Location - 1.5 meter receptor height

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

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

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

Where: C_{air} = concentration in air (µg/m³)
 DBR = daily breathing rate (L/kg body weight-day)
 A = Inhalation absorption factor
 EF = Exposure frequency (days/year)
 10⁻⁶ = Conversion factor

Values

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

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

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Exposure Year	Exposure Duration (years)	Age	Infant/Child - Exposure Information			Infant/Child Cancer Risk (per million)	Adult - Exposure Information			Adult Cancer Risk (per million)	Maximum	
			DPM Conc (ug/m3)		Age Sensitivity		Modeled		Age Sensitivity			
			Year	Annual	Factor		Year	Annual	Factor		Fugitive PM2.5	Total PM2.5
0	0.25	-0.25 - 0*	2021-2022	0.0407	10	0.55	2021-2022	0.0407	-	-	0.0267	0.067
1	1	0 - 1	2021-2022	0.0407	10	6.69	2021-2022	0.0407	1	0.12		
2	1	1 - 2	2023	0.0000	10	0.00	2023	0.0000	1	0.00		
3	1	2 - 3	2024	0.0000	3	0.00	2024	0.0000	1	0.00		
4	1	3 - 4	2025	0.0000	3	0.00	2025	0.0000	1	0.00		
5	1	4 - 5	2026	0.0000	3	0.00	2026	0.0000	1	0.00		
6	1	5 - 6	2027	0.0000	3	0.00	2027	0.0000	1	0.00		
7	1	6 - 7	2028	0.0000	3	0.00	2028	0.0000	1	0.00		
8	1	7 - 8	2029	0.0000	3	0.00	2029	0.0000	1	0.00		
9	1	8 - 9	2030	0.0000	3	0.00	2030	0.0000	1	0.00		
10	1	9 - 10	2031	0.0000	3	0.00	2031	0.0000	1	0.00		
11	1	10 - 11	2032	0.0000	3	0.00	2032	0.0000	1	0.00		
12	1	11 - 12	2033	0.0000	3	0.00	2033	0.0000	1	0.00		
13	1	12 - 13	2034	0.0000	3	0.00	2034	0.0000	1	0.00		
14	1	13 - 14	2035	0.0000	3	0.00	2035	0.0000	1	0.00		
15	1	14 - 15	2036	0.0000	3	0.00	2036	0.0000	1	0.00		
16	1	15 - 16	2037	0.0000	3	0.00	2037	0.0000	1	0.00		
17	1	16-17	2038	0.0000	1	0.00	2038	0.0000	1	0.00		
18	1	17-18	2039	0.0000	1	0.00	2039	0.0000	1	0.00		
19	1	18-19	2040	0.0000	1	0.00	2040	0.0000	1	0.00		
20	1	19-20	2041	0.0000	1	0.00	2041	0.0000	1	0.00		
21	1	20-21	2042	0.0000	1	0.00	2042	0.0000	1	0.00		
22	1	21-22	2043	0.0000	1	0.00	2043	0.0000	1	0.00		
23	1	22-23	2044	0.0000	1	0.00	2044	0.0000	1	0.00		
24	1	23-24	2045	0.0000	1	0.00	2045	0.0000	1	0.00		
25	1	24-25	2046	0.0000	1	0.00	2046	0.0000	1	0.00		
26	1	25-26	2047	0.0000	1	0.00	2047	0.0000	1	0.00		
27	1	26-27	2048	0.0000	1	0.00	2048	0.0000	1	0.00		
28	1	27-28	2049	0.0000	1	0.00	2049	0.0000	1	0.00		
29	1	28-29	2050	0.0000	1	0.00	2050	0.0000	1	0.00		
30	1	29-30	2051	0.0000	1	0.00	2051	0.0000	1	0.00		
Total Increased Cancer Risk						7.2				0.12		

* Third trimester of pregnancy

Attachment 4: Screening Community Risk Calculations

Bay Area Air Quality Management District

Roadway Screening Analysis Calculator

County specific tables containing estimates of risk and hazard impacts from roadways in the Bay Area.

INSTRUCTIONS:

Input the site-specific characteristics of your project by using the drop down menu in the "Search Parameter" box. We recommend that this analysis be used for roadways with 10,000 ADT and above.

- County: Select the County where the project is located. The calculator is only applicable for projects within the nine Bay Area counties.
- Roadway Direction: Select the orientation that best matches the roadway. If the roadway orientation is neither clearly north-south nor east-west, use the highest values predicted from either orientation.
- Side of the Roadway: Identify on which side of the roadway the project is located.
- Distance from Roadway: Enter the distance in feet from the nearest edge of the roadway to the project site. The calculator estimates values for distances greater than 10 feet and less than 1000 feet. For distances greater than 1000 feet, the user can choose to extrapolate values using a distribution curve or apply 1000 feet values for greater distances.
- Annual Average Daily Traffic (ADT): Enter the annual average daily traffic on the roadway. These data may be collected from the city or the county (if the area is unincorporated).

When the user has completed the data entries, the screening level PM2.5 annual average concentration and the cancer risk results will appear in the Results Box on the right. Please note that the roadway tool is not applicable for California State Highways and the District refers the user to the Highway Screening Analysis Tool at <http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx>.

Notes and References listed below the Search Boxes

Search Parameters

County

Santa Clara

Roadway Direction

East-West

Side of the Roadway

North

Distance from Roadway

350

feet

Annual Average Daily Traffic (ADT)

10,000

Results

Santa Clara County

EAST-WEST DIRECTIONAL ROADWAY

PM2.5 annual average

0.029

($\mu\text{g}/\text{m}^3$)

Cancer Risk

1.56

(per million)

Butterfield Boulevard

Data for Santa Clara County based on meteorological data collected from San Jose Airport in 1997

Adjusted for 2015
OEHHa and EMFAC2014
for 2018

1.07

(per million)

Note that EMFAC2014 predicts DSL PM2.5 aggregate rates in 2018 that are 46% of EMFAC2011 for 2014. TOG gasoline rates are 56% of EMFAC2011 year 2014 rates. This is for light- and medium-duty vehicles traveling at 30 mph for Bay Area

Notes and References:

- 1. Emissions were developed using EMFAC2011 for fleet mix in 2014 assuming 10,000 ADT and includes impacts from diesel and gasoline vehicle exhaust, brake and tire wear, and resuspended dust.
- 2. Roadways were modeled using CALINE4 Cal3qcr air dispersion model assuming a source length of one kilometer. Meteorological data used to estimate the screening values are noted at the bottom of the "Results" box.
- 3. Cancer risks were estimated for 70 year lifetime exposure starting in 2014 that includes sensitivity values for early life exposures and OEHHa toxicity values adopted in 2013.

Bay Area Air Quality Management District

Roadway Screening Analysis Calculator

County specific tables containing estimates of risk and hazard impacts from roadways in the Bay Area.

INSTRUCTIONS:

Input the site-specific characteristics of your project by using the drop down menu in the "Search Parameter" box. We recommend that this analysis be used for roadways with 10,000 ADT and above.

- County: Select the County where the project is located. The calculator is only applicable for projects within the nine Bay Area counties.
- Roadway Direction: Select the orientation that best matches the roadway. If the roadway orientation is neither clearly north-south nor east-west, use the highest values predicted from either orientation.
- Side of the Roadway: Identify on which side of the roadway the project is located.
- Distance from Roadway: Enter the distance in feet from the nearest edge of the roadway to the project site. The calculator estimates values for distances greater than 10 feet and less than 1000 feet. For distances greater than 1000 feet, the user can choose to extrapolate values using a distribution curve or apply 1000 feet values for greater distances.
- Annual Average Daily Traffic (ADT): Enter the annual average daily traffic on the roadway. These data may be collected from the city or the county (if the area is unincorporated).

When the user has completed the data entries, the screening level PM2.5 annual average concentration and the cancer risk results will appear in the Results Box on the right. Please note that the roadway tool is not applicable for California State Highways and the District refers the user to the Highway Screening Analysis Tool at <http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx>.

Notes and References listed below the Search Boxes

Search Parameters

County

Santa Clara

Roadway Direction

North-South

Side of the Roadway

East

Distance from Roadway

800

feet

Annual Average Daily Traffic (ADT)

25,000

Results

Santa Clara County

NORTH-SOUTH DIRECTIONAL ROADWAY

PM2.5 annual average

0.042

($\mu\text{g}/\text{m}^3$)

Cancer Risk

1.85

(per million)

Monterey Road

Data for Santa Clara County based on meteorological data collected from San Jose Airport in 1997

Adjusted for 2015
OEHHa and EMFAC2014
for 2018

1.27

(per million)

Note that EMFAC2014 predicts DSL PM2.5 aggregate rates in 2018 that are 46% of EMFAC2011 for 2014. TOG gasoline rates are 56% of EMFAC2011 year 2014 rates. This is for light- and medium-duty vehicles traveling at 30 mph for Bay Area

Notes and References:

- 1. Emissions were developed using EMFAC2011 for fleet mix in 2014 assuming 10,000 ADT and includes impacts from diesel and gasoline vehicle exhaust, brake and tire wear, and resuspended dust.
- 2. Roadways were modeled using CALINE4 Cal3qcr air dispersion model assuming a source length of one kilometer. Meteorological data used to estimate the screening values are noted at the bottom of the "Results" box.
- 3. Cancer risks were estimated for 70 year lifetime exposure starting in 2014 that includes sensitivity values for early life exposures and OEHHa toxicity values adopted in 2013.



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.

[Click here for guidance on conducting risk & hazard screening, including roadways & freeways, refer to the District's Risk & Hazard Analysis flow chart.](#)

[Click here for District's Recommended Methods for Screening and Modeling Local Risks and Hazards document.](#)

Table A: Requester Contact Information

Date of Request	6/21/2019
Contact Name	Mimi McNamara
Affiliation	Illingworth & Rodkin, Inc.
Phone	707-753-4561
Email	mimcnamara@illingworthrodkin.com
Project Name	Hill
Address	Northern parcels of 15200 Monterey Road
City	Morgan Hill
County	Santa Clara
Type (residential, commercial, mixed use, industrial, etc.)	Park
Project Size (# of units or building square feet)	14 acres
Comments:	

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

1. Complete all the contact and project information requested in **Table A**. Incomplete forms will not be processed. Please include a project site map.
2. 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 PM_{2.5} concentration.
3. Find the project site in Google Earth by inputting the site's address in the Google Earth search box.
4. Identify stationary sources within at least a 1000ft radius of project site. 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 the source's address location. Please report any mapping errors to the District.
5. List the stationary source information in **Table B** blue section only.
6. Note that a small percentage of the stationary sources have Health Risk Screening Assessment (HRS) data INSTEAD of screening level data. These sources will be noted by an asterisk next to the Plant Name (Map B on right). If HRS data values are presented, these values have already been modeled and cannot be adjusted further.
7. Email this completed form to District staff. District staff will provide the most recent risk, hazard, and PM_{2.5} 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 Areana Flores at 415-749-4616, or aflores@baaqmd.gov

Table B: Google Earth data

Distance from Receptor (feet) or MEI ¹	FACID (Plant No.)	FNAME	FSTREET	Cancer Risk ²	Hazard Risk ²	PM _{2.5} ²	Source No. ³	Type of Source ⁴	Fuel Code ⁵	Status/Comments
TBD	21283	CAL Fire Morgan Hill Headquarters	15670 Monterey Road			0.001768		Generator		Emissions file attached. Used Health Risk Tool to retrieve risk values.
TBD	100439	CA Dept Forestry & Fire Station	15670 Monterey St	0.11620529	0.00057368			Gas Dispensing Facility		Max throughput for 2019: 940,000 gallons/year Emissions file attached. Used Health Risk Tool to retrieve risk values.
TBD	15939	US Technical Ceramics Inc	15400 Concord Circle	2.12245023	0.0044165	0.002655		Generator		

Footnotes:

1. Maximally exposed individual
2. These Cancer Risk, Hazard Index, and PM_{2.5} columns represent the values in the Google Earth Plant Information Table.
3. Each plant may have multiple permits and sources.
4. Permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc.
5. Fuel codes: 98 = diesel, 189 = Natural Gas.
6. If a Health Risk Screening Assessment (HRS) was completed for the source, the application number will be listed here.
7. The date that the HRS was completed.
8. Engineer who completed the HRS. For District purposes only.
9. All HRS completed before 1/5/2010 need to be multiplied by an age sensitivity factor of 1.7.
10. The HRS "Chronic Health" number represents the Hazard Index.
11. 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 1.0.
 - 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 PM_{2.5} 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
 - e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Multiplier 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:
03/13/2018



BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Risk & Hazard Stationary Source Inquiry Form

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This form is to be used with the BAAQMD's Google Earth stationary source screening tables.

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[Click here for District's Recommended Methods for Screening and Modeling Local Risks and Hazards document.](#)

Table A: Requester Contact Information

Date of Request	6/21/2019
Contact Name	Mimi McNamara
Affiliation	Hillingworth & Rodkin, Inc.
Phone	707-753-4561
Email	mmcnamara@hillingworthrodkin.com
Project Name	Hill
Address	Northern parcels of 15200 Monterey Road
City	Morgan Hill
County	Santa Clara
Type (residential, commercial, mixed use, industrial, etc.)	Park
Project Size (# of units or building square feet)	14 acres
Comments:	

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

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7. Email this completed form to District staff. 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.

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Submit forms, maps, and questions to Areana Flores at 415-749-4616, or alflores@baaqmd.gov

Table B: Google Earth data

Distance from Receptor (feet) or MI ¹	FACID (Plant No.)	FNAME	FSTREET	Cancer Risk ²	Hazard Risk ²	PM _{2.5} ²	Source No. ³	Type of Source ⁴	Fuel Code ⁵	Status/Comments	Distance Adjustment	Cancer Risk	Hazard Risk	PM _{2.5}
750	21283	CAL Fire Morgan Hill Headquarters	15670 Monterey Road			0.001768		Generator		Emissions file attached. Used Health Risk Tool to retrieve risk values.	Beta Calculator			
750	100439	CA Dept Forestry & Fire Station	15670 Monterey St	0.11620529	0.00057368			Gas Dispensing Facility		Max throughput for 2019: 940,000 gallons/year	2.31E-02	0.003	0.000	
350	15939	U S Technical Ceramics Inc	15400 Concord Circle	2.12245023	0.0044165	0.002655		Generator		Emissions file attached. Used Health Risk Tool to retrieve risk values.	Beta Calculator			

Footnotes:

1. Maximally exposed individual
2. These Cancer Risk, Hazard Index, and PM2.5 columns represent the values in the Google Earth Plant Information Table.
3. Each plant may have multiple permits and sources.
4. Permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc.
5. Fuel codes: 98 = diesel, 189 = Natural Gas.
6. If a Health Risk Screening Assessment (HRS) was completed for the source, the application number will be listed here.
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10. The HRS "Chronic Health" number represents the Hazard Index.
11. 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
 - 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.
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 - e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Multiplier 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:
03/13/2018

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
 DETAIL POLLUTANTS - ABATED
 MOST RECENT P/O APPROVED (2018)

Printed: JUN 26, 2019

U S Technical Ceramics Inc (P# 15939)

S#	SOURCE NAME	SOURCE CODE			
MATERIAL		DATE	POLLUTANT	CODE	LBS/DAY
THROUGHPUT					
1	Emergency Generator				
	C2250098				
	Benzene			41	2.37E-04
	Formaldehyde			124	1.96E-05
	Organics (other, including			990	1.15E-02
	Arsenic (all)			1030	2.07E-07
	Beryllium (all) pollutant			1040	1.21E-07
	Cadmium			1070	5.16E-07
	Chromium (hexavalent)			1095	1.07E-08
	Lead (all) pollutant			1140	4.38E-07
	Manganese			1160	6.87E-07
	Nickel pollutant			1180	8.36E-06
	Mercury (all) pollutant			1190	1.46E-07
	Diesel Engine Exhaust Part			1350	1.57E-03
	PAH's (non-speciated)			1840	1.09E-06
	Nitrous Oxide (N2O)			2030	6.35E-05
	Nitrogen Oxides (part not			2990	6.14E-02
	Sulfur Dioxide (SO2)			3990	7.75E-05
	Carbon Monoxide (CO) pollu			4990	2.05E-02
	Carbon Dioxide, non-biogen			6960	7.95E+00
	Methane (CH4)			6970	3.18E-04

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
 DETAIL POLLUTANTS - ABATED
 MOST RECENT P/O APPROVED (2019)

Printed: JUN 26, 2019

CAL Fire Morgan Hill Headquarters (P# 21283)

S#	SOURCE NAME	SOURCE CODE			
MATERIAL		DATE	POLLUTANT	CODE	LBS/DAY
THROUGHPUT					
1	Emergency Standby LPG Generator Set				
	C22AF160				
	Organics (other, including			990	4.11E-03
	Particulates (part not spe			1990	9.36E-04
	Nitrous Oxide (N2O)			2030	1.06E-04
	Nitrogen Oxides (part not			2990	3.42E-03
	Sulfur Dioxide (SO2)			3990	2.38E-04
	Carbon Monoxide (CO) pollu			4990	1.37E-02
	Carbon Dioxide, non-biogen			6960	1.40E+01
	Methane (CH4)			6970	5.30E-04