Appendix C

Air Quality Technical Report

Prepared for
City of Berkeley
Berkeley, California

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AIR QUALITY ENVIRONMENTAL IMPACT REPORT

BAYER CEQA LONG-RANGE DEVELOPMENT PROJECT

BERKELEY, CALIFORNIA

RAMBOLL

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ACRONYMS AND ABBREVIATIONS

AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Air Dispersion Model
AQI	Air Quality Index
ATCM	Air Toxic Control Measure
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BD	Biological Development
bhp	brake horsepower
BMPs	Best Management Practices
CAAQS	California Ambient Air Quality Standards
CalEEMod®	California Emissions Estimator Model
CAP	Criteria Air Pollutant
CARB	California Air Resources Board
CCTC	Cell Culture Technology Center
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
DPM	Diesel Particulate Matter
EIR	Environmental Impact Report
EMFAC	EMission FACtor model
EMISFACT	Variable Emission Factors
GHG	Greenhouse Gas
HI	Hazard Index
HRA	Health Risk Assessment
kW	Kilowatt
lbs	pounds
m^3	cubic meters
MEIR	Maximally Exposed Individual Receptor
$\mu g/m^3$	Microgram Per Cubic Meter
MMBtu	Million British Thermal Units
mph	miles per hour

NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
ng	nanograms
N_2O	Nitrous Oxide
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NSR	New Source Review
OEHHA	California Office of Environmental Health Hazard Assessment
PM	Particulate Matter
$PM_{2.5}$	Fine Particulate Matter Less than 2.5 Micrometers in Aerodynamic Diameter
PM_{10}	Particulate Matter Less than 10 Micrometers in Aerodynamic Diameter
ppb	Parts Per Billion
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
PSD	Prevention of Significant Deterioration
ROG	Reactive Organic Gases
SO_2	Sulfur Dioxide
TAC	Toxic Air Contaminant
T-BACT	Best Available Control Technology for Toxics
TDM	Transportation Demand Management
TOG	Total Organic Gases
tpy	tons per year
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
X/Q	"chi over q"

1. INTRODUCTION

This report discusses the existing air quality conditions in the Proposed Project area, presents the regulatory framework for air quality management, and analyzes the potential for the Proposed Project to affect existing air quality conditions, both regionally and locally, from activities that emit criteria and non-criteria air pollutants. It also analyzes the types and quantities of emissions that would be generated both on a temporary basis from proposed construction activities and over the long term from operation of the Proposed Project. The analysis determines whether those emissions are significant in relation to applicable air quality standards and identifies feasible mitigation measures for significant adverse impacts, if required. This report also includes an analysis of cumulative air quality impacts. Emissions of greenhouse gases (GHGs) and potential impacts on climate change and the city's and state's goals for GHG emissions are discussed in the Greenhouse Gas chapter. The Proposed Project's energy usage characteristics are discussed in the Energy chapter in order to determine whether the Proposed Project could result in any significant energy-related environmental impacts during its construction or operational activities.

The analysis is based on a review of existing air quality conditions in the Bay Area region and air quality regulations administered by the United States Environmental Protection Agency (USEPA), the California Air Resources Board (CARB), and the Bay Area Air Quality Management District (BAAQMD). This analysis includes methodologies identified in BAAQMD's updated California Environmental Quality Act (CEQA) Air Quality Guidelines[1] and its companion documentation. Calculations were prepared to quantitatively assess the air quality contributions of the Proposed Project (see Appendix Tables); this information forms the basis of much of the assessment of air quality impacts presented here.

The Proposed Project development is expected to occur in two phases: an initial 10-year phase followed by a 20-year phase. The 10-year phase (referred to as "Year 10 Project") is expected to be completed by 2032 and the 20-year phase (referred to as "Year 30 Project") is expected to be completed by 2052.

The air quality impact methodologies and approaches to the analysis (described under "Approach to Analysis") are based on these two phases of the Proposed Project analyzed in Year 10 and Year 30. Construction for the first phase of the Proposed Project (Year 10 Project) would occur in years 2024 and 2029 and the construction for the second phase of the Proposed Project (Year 30 Project) would occur in years 2034 and 2049 (see Project Description submitted to the City of Berkeley on October 14th, 2020 for a detailed discussion of the Proposed Project phasing). All the demolition activities will take place as a part of the Year 10 Project in 2024. The operational impacts for the Year 10 and Year 30 analyses are conservatively analysed in the first year of buildout after construction ends (i.e. 2025 for the Year 10 Project and 2035 for the Year 30 Project). Further details on the air quality impact methodologies and approaches to the analyses are presented below.

[1] Bay Area Air Quality Management District (BAAQMD), CEQA Air Quality Guidelines, updated May 2017, http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, accessed September 28, 2020.

2. ENVIRONMENTAL SETTING

2.1 Climate and Meteorology

The climate in the San Francisco Bay Area is mainly characterized by warm dry summers with abundant sunshine and cool moist winters with variable cloudiness. The proximity of the Pacific Ocean and San Francisco Bay has a moderating influence on the area's climate. The major large-scale weather feature controlling the climate is a large high-pressure system located in the eastern Pacific Ocean, known as the Pacific High. The strength and position of the Pacific High varies seasonally. It is strongest and located off the west coast of the United States during summer. Large-scale atmospheric subsidence associated with the Pacific High produces an elevated temperature inversion along the West Coast. The base of this inversion is usually located from 1,000 to 3,000 feet above mean sea level, depending on the warmth of the air column, intensity of subsidence and the prevailing weather conditions. Vertical mixing is often limited to the base of the inversion, trapping air pollutants in the lower atmosphere. Marine air trapped below the base of the inversion is often condensed into fog or stratus clouds by the cool Pacific Ocean. This condition is typical of the warmer months of the year from roughly May through October. Stratus clouds usually form offshore and move into the Bay Area during the evening hours when onshore winds are strongest and solar heating begins to wane. As the land warms the following morning when onshore winds are weakest, the clouds often dissipate, except along the immediate coast. The stratus then redevelops and moves inland late in the day. Otherwise, clear skies and dry conditions prevail during summer.

As winter approaches, the Pacific High becomes weaker and shifts south, allowing both low- and high-pressure systems associated with the polar jet stream to affect the region. Low pressure systems are usually accompanied by frontal systems that produce periods of cloudiness, strong shifting winds, and precipitation. The number of days with precipitation can vary greatly from year to year, resulting in a wide range of annual precipitation totals. High pressure systems are also common in winter and can produce cool stagnant conditions. Radiation fog and haze are common during extended winter periods where high pressure systems influence the weather.

2.2 Ambient Air Quality – Criteria Air Pollutants

As required by the 1970 Federal Clean Air Act, the USEPA initially identified six criteria air pollutants that are pervasive in urban environments and for which state and federal health-based ambient air quality standards have been established. The USEPA calls these pollutants "criteria air pollutants," because it has regulated them by developing specific public-health-based and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead are the six criteria air pollutants originally identified by the USEPA. Since adoption of the 1970 act, subsets of PM have been identified for which permissible levels have been established. These include PM of 10 microns in diameter or less (PM_{10}) and PM of 2.5 microns in diameter or less ($PM_{2.5}$).

BAAQMD is the regional agency with jurisdiction for regulating air quality within the nine-county San Francisco Bay Area Air Basin. The region's air quality monitoring network provides information on ambient concentrations of criteria air pollutants at various locations in the San Francisco Bay Area. **Table 1** presents a five-year summary of the highest annual

criteria air pollutant concentrations, recorded at air quality monitoring stations operated and maintained by BAAQMD in Berkeley and surrounding areas. **Table 1** also compares measured pollutant concentrations with the most stringent applicable ambient air quality standards (state or federal). These concentrations are health-based standards established with an ample margin of safety. To determine attainment with air quality standards, exceedances are assessed on a region-wide basis. Concentrations shown in boldface type indicate only a localized exceedance of the standard.

Table 2 presents the California and Federal Ambient Air Quality Standards for different criteria air pollutants and their respective attainment statuses for San Francisco Bay Area Air Basin. An attainment status shown in boldface type with an 'N' indicates that the San Francisco Bay Area Air Basin has a non-attainment status for the given pollutant.

Table 1: Summary of Berkeley Area Air Quality Monitoring Data (2015-2019) [A]

Pollutant	Most Stringent Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured				
		2015	2016	2017	2018	2019
Ozone						
Maximum 1-Hour Concentration (ppm)	>0.09 [B]	0.091	0.065	0.058	0.059	0.050
Days 1-Hour Standard Exceeded		0	0	0	0	0
Maximum 8-Hour Concentration (ppm)	>0.070 [B,C]	0.064	0.052	0.049	0.049	0.042
Days 8-Hour Standard Exceeded		0	0	0	0	0
Carbon Monoxide (CO)						
Maximum 1-Hour Concentration (ppm)	>20 [B]	4.7	2.5	2.2	2.6	5.6
Days 1-Hour Standard Exceeded		0	0	0	0	0
Maximum 8-Hour Concentration (ppm)	>9.0 [B,C]	2.6	2.2	1.7	2.2	1.3
Days 8-Hour Standard Exceeded		0	0	0	0	0
Suspended Particulates (PM_{10})						
Maximum 24-Hour Concentration ($\mu g/m^3$)	>50 [B]	43	34	**95**	**200**	36
Days 24-Hour Standard Exceeded		0	0	4	2	0
Annual Average ($\mu g/m^3$) [C]	>20 [B]	18.6	15.2	**20.3**	**21.4**	16.5
Suspended Particulates ($PM_{2.5}$)						
Maximum 24-Hour Concentration ($\mu g/m^3$)	>35 [D]	**38.7**	23.9	**52.0**	**165.5**	28.8

Table 1: Summary of Berkeley Area Air Quality Monitoring Data (2015-2019) [A]

Pollutant	Most Stringent Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured				
		2015	2016	2017	2018	2019
Days 24-Hour Standard Exceeded		3	0	7	13	0
Annual Average ($\mu g/m^3$)[C]	>12 [B,D]	10.2	8.7	9.1	11.9	9.4
Nitrogen Dioxide (NO_2)						
Maximum 1-Hour Concentration (ppm)	>0.100 [D]	0.057	0.049	**0.123**	0.073	0.050
Days 1-Hour Standard Exceeded		0	0	1	0	0
Annual Average (ppm)	>0.030 [B]	0.014	0.012	0.016	0.015	0.013

Notes: **Bold** values are in excess of applicable standard; ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter; > = greater than.

[A] Data for all pollutants except PM_{10} are presented for the Berkeley Aquatic Park station for the years between 2017 and 2019. Monitoring at the Berkeley Aquatic Park began on July 1, 2016, with the first complete year of data occurring in 2017. Data for all pollutants except PM_{10} for 2015 and 2016 are presented for the next closest monitoring station, located in Oakland West. Data for PM_{10} concentrations are presented for the San Pablo monitoring station for the years between 2015 and 2019. An exceedance of the standard is not meant to imply non-attainment in the area. No evaluation of USEPA's exceptional event policy has been conducted, and exceedances may be the result of exceptional events (i.e., fires) that impacted local air quality.

[B] State standard, not to be exceeded.

[C] BAAQMD defines annual average as "the yearly average (arithmetic mean) of the readings taken at a given monitoring station" and hence this is a single value for a year, and daily exceedances cannot be reported.

[D] Federal standard, not to be exceeded.

Source: BAAQMD, Bay Area Air Pollution Summary, 2015 – 2019

Table 2: State and Federal Ambient Air Quality Standards and Attainment Status for the San Francisco Bay Area Air Basin

Pollutant	Averaging Time	State (CAAQS [A])		Federal (NAAQS [B])	
		Standard	Attainment Status	Standard	Attainment Status
Ozone	1-hour	0.09 ppm	**N**	NA	See Note C
	8-hour	0.070 ppm	**N**	0.070 ppm [D]	**N**; see Note E
Carbon Monoxide (CO)	1-hour	20 ppm	A	35 ppm	A
	8-hour	9 ppm	A	9 ppm	A
Nitrogen Dioxide (NO_2)	1-hour	0.18 ppm	A	0.100 ppm	A; see Note F
	Annual	0.030 ppm	U	0.053 ppm	A
Sulfur Dioxide (SO_2)	1-hour	0.25 ppm	A	0.075 ppm	U/A; see Note G
	24-hour	0.04 ppm	A	0.14 ppm	U/A; see Note G
	Annual	NA	NA	0.03 ppm	U/A; see Note G

Table 2: State and Federal Ambient Air Quality Standards and Attainment Status for the San Francisco Bay Area Air Basin

Pollutant	Averaging Time	State (CAAQS [A])		Federal (NAAQS [B])	
		Standard	Attainment Status	Standard	Attainment Status
Particulate Matter (PM_{10})	24-hour	50 µg/m^3	**N**	150 µg/m^3	U
	Annual [H]	20 µg/m^3	**N** [I]	NA	NA
Fine Particulate Matter ($PM_{2.5}$)	24-hour	NA	NA	35 µg/m^3	**N**
	Annual	12 µg/m^3	**N** [I]	12 µg/m^3	U/A
Sulfates	24-hour	25 µg/m^3	A	NA	NA
Lead	30-day	1.5 µg/m^3	A	NA	A
	Cal. Quarter	NA	NA	1.5 µg/m^3	A
	Rolling 3-month average	NA	NA	0.15	U; see Note J
Hydrogen Sulfide	1-hour	0.03 ppm	U	NA	NA
Visibility-Reducing Particles	8-hour	See Note K	U	NA	NA

Notes: A = Attainment; CAAQS = California Ambient Air Quality Standards; NAAQS = National Ambient Air Quality Standards; **N** = Non-attainment; U = Unclassified; NA = Not Applicable, no applicable standard; ppm = parts per million; µg/m^3 = micrograms per cubic meter

[A] CAAQS = California ambient air quality standards. CAAQS for ozone, CO (except Lake Tahoe), SO_2 (1-hour and 24-hour), NO_2, PM, and visibility reducing particles are values that are not to be exceeded. All other state standards shown are values not to be -equaled or exceeded.

[B] NAAQS = national ambient air quality standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The 8-hour ozone standard is attained when the 3-year average of the fourth highest daily concentration is 0.070 ppm or less. The 24---hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than the standard. The 24--hour $PM_{2.5}$ standard is attained when the 3-year average of the 98th percentile is less than the standard.

[C] The USEPA revoked the national 1-hour ozone standard on June 15, 2005.

[D] This federal 8--hour ozone standard was approved by USEPA in October 2015 and became effective on December 28, 2015.

[E] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm. An area will meet the standard if the fourth-highest maximum daily 8-hour ozone concentration per year, averaged over three years, is equal to or less than 0.070 ppm. USEPA made recommendations on attainment designations for California by October 1, 2016 and issued final designations on June 4, 2018, classifying the San Francisco Bay Area Air Basin as being in Nonattainment (Federal Register Vol. 83, No. 107, pp. 25776-25848). Nonattainment areas will have until 2020 to 2037 to meet the health standard, with attainment dates varying based on ozone level in the area.

[F] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

[G] On June 2, 2010, the USEPA established a new 1-hour SO2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO2 NAAQS however must continue to be used until one year following USEPA initial designations of the new 1-hour SO2 NAAQS. USEPA classified the San Francisco Bay Area Air Basin as being in Attainment/Unclassifiable in January 2018 (Federal Register Vol. 83, No. 6, pp. 1098-1172).

[H] State standard = annual geometric mean

[I] In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.

Table 2: State and Federal Ambient Air Quality Standards and Attainment Status for the San Francisco Bay Area Air Basin

Pollutant	Averaging Time	State (CAAQS [A])		Federal (NAAQS [B])	
		Standard	Attainment Status	Standard	Attainment Status

[J] National lead standard, rolling 3-month average: final rule signed October 15, 2008. Final designations effective December 31, 2011.
[K] Statewide visibility reducing particle standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10---mile nominal visual range.

Sources: BAAQMD, Standards and Attainment Status, last updated January 5, 2017; USEPA National Ambient Air Quality Standards, last updated December 20, 2016.

2.2.1 Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG, also sometimes referred to as volatile organic compounds [VOCs] by some regulatory agencies) and oxides of nitrogen (NO_x) in the presence of sunlight. The main sources of ROG and NO_x, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases, such as asthma, bronchitis, and emphysema.

According to published data, and as shown in **Table 1** the most stringent applicable standards for ozone (state 1-hour standard of 0.09 parts per million [ppm] and the federal 8-hour standard of 0.070 ppm) were not exceeded in the Berkeley area between 2015 and 2019.

2.2.2 Carbon Monoxide

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue, impair central nervous system function, and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal. As shown in **Table 1**, the more stringent state CO standards were not exceeded between 2015 and 2019. Measurements of CO indicate hourly maximums ranging between 11 and 28 percent of the more stringent state standard, and maximum 8-hour CO levels that are approximately 14 to 29 percent of the allowable 8-hour standard.

2.2.3 Particulate Matter

Particulate matter is a class of air pollutants that consists of a complex mix of solid and liquid airborne particles from human-made and natural sources. Particulate matter is measured in

two size ranges: PM_{10} and $PM_{2.5}$. In the Bay Area, motor vehicles generate about one-half of the San Francisco Bay Area Air Basin's particulates through tailpipe emissions as well as brake pad and tire wear. Wood burning in fireplaces and stoves, industrial facilities, and ground-disturbing activities such as construction are other sources of such fine particulates. These fine particulates are small enough to be inhaled into the deepest parts of the human lung and can cause adverse health effects. According to CARB, studies in the United States and elsewhere "have demonstrated a strong link between elevated particulate levels and premature deaths, hospital admissions, emergency room visits, and asthma attacks," and studies of children's health in California have demonstrated that particle pollution "may significantly reduce lung function growth in children."[2] CARB also reports that statewide attainment of PM standards could prevent thousands of premature deaths, lower hospital admissions for cardiovascular and respiratory disease and asthma-related emergency room visits, and avoid hundreds of thousands of episodes of respiratory illness in California.[3]

Among the criteria pollutants that are regulated, particulates appear to represent a serious ongoing health hazard. As long ago as 1999, BAAQMD was reporting, in its CEQA Air Quality Guidelines, that studies had shown that elevated particulate levels contribute to the death of approximately 200 to 500 people per year in the Bay Area. $PM_{2.5}$ is of particular concern because epidemiological[4] studies have demonstrated that people who live near freeways, especially people who live within 500 feet of freeways or high-traffic roadways, have poorer health outcomes, including increased asthma symptoms and respiratory infections and decreased pulmonary function and lung development in children.[5]

As shown in **Table 1**, the state 24-hour PM_{10} standard of 50 micrograms per cubic meter ($\mu g/m^3$) was exceeded on six monitored occasions between 2015 and 2019 in the Berkeley area. The federal 24-hour $PM_{2.5}$ standard was exceeded on twenty-three monitored occasions between 2015 and 2019. The federal and state annual average $PM_{2.5}$ standards were not exceeded between 2015 and 2019 but the state annual average PM_{10} standard was exceeded in 2017 and 2018. With the recent fires in Northern California in 2017 and 2018, the federal 24-hour $PM_{2.5}$ standard was exceeded on seven days in October 2017 and thirteen days in November 2018.[6] As a result, the Air Quality Index (AQI) in several neighboring counties reached the "very unhealthy" designation, ranging from values of 201 to 300. The USEPA-developed AQI scale is described in detail below. During each of these periods, BAAQMD issued "Spare the Air" alerts and recommended that individuals stay inside with windows closed and refrain from significant outdoor activity. The fires in Northern California have coincided with some, but not all, of the monitoring exceedances in Berkeley. In 2017, three of the seven exceedances in Berkeley occurred during the wildfire event; in 2018, twelve of

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[2] California Air Resources Board (CARB), Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution, November 2007, p. 1.

[3] Ibid.

[4] Epidemiology is a branch of medical science that deals with the incidence, distribution, and control of disease in a population.

[5] San Francisco Department of Public Health (SFDPH), *Assessment and Mitigation of Air Pollutant Health Effect from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review*, May 2008, p. 7.

[6] BAAQMD, Air Monitoring Data, http://www.baaqmd.gov/about-air-quality/current-air-quality/air-monitoring-data?DataViewFormat=monthly&DataView=tech&StartDate=10/24/2017&Parameter=316, accessed September 28, 2020.

the thirteen exceedances in Berkeley occurred during the wildfire event. The values in **Table 1** do not take into account any evaluation of whether some or all of these exceedances qualify under USEPA's exceptional event policy.

2.2.4 Nitrogen Dioxide

NO_2 is a reddish-brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component of the air on high-pollution days, especially in conjunction with high ozone levels. The current state 1-hour standard for NO_2 (0.18 ppm) is being met in the Berkeley area. In 2010, the USEPA implemented a new 1-hour NO_2 standard (0.10 ppm), which is presented in **Table 2**. As shown in **Table 1**, this new federal standard was exceeded on one day in the Berkeley area in between 2015 and 2019. Similar to the discussion above, this evaluation has not taken into account any evaluation of the events under USEPA's exceptional event policy.

2.2.5 Sulfur Dioxide

SO_2 is a colorless, acidic gas with a strong odor. It is produced by the combustion of sulfur-containing fuels such as oil, coal, and diesel. SO_2 has the potential to damage materials and can cause health effects at high concentrations. It can irritate lung tissue and increase the risk of acute and chronic respiratory disease.[7] Pollutant trends suggest that the San Francisco Bay Area Air Basin currently meets and will continue to meet the state standard for SO_2 for the foreseeable future.

In 2010, the USEPA implemented a new 1-hour SO_2 standard, which is presented in **Table 2**, below. The USEPA designated the air basin as an attainment area for SO_2. Similar to the new federal standard for NO_2, the USEPA established requirements for a new monitoring network to measure SO_2 concentrations beginning in January 2013.[8] No additional SO_2 monitors are required for the Bay Area, because BAAQMD's jurisdiction has never been designated as non-attainment for SO_2 and no state implementation plans or maintenance plans have been prepared for SO_2.[9]

2.2.6 Lead

Leaded gasoline (phased out from use in automobiles in the United States beginning in 1973), paint (on older houses, cars), smelters (metal refineries), and manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which put children at special risk. Some

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[7] BAAQMD, CEQA Air Quality Guidelines, May 2017, p. C-16, https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, accessed September 28, 2020.

[8] U.S. Environmental Protection Agency (U.S. EPA), Fact Sheet: Final Decision, Primary National Ambient Air Quality Standard for Sulfur Dioxide, February 2019, accessed September 28, 2020.

[9] BAAQMD, 2017 Air Monitoring Network Plan, July 2018, p. 35, https://www.baaqmd.gov/~/media/files/technical-services/2017_network_plan_20180701-pdf.pdf?la=en, accessed September 28, 2020.

lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline in automobiles was eliminated.

Ambient lead concentrations are monitored only on an as-warranted, site-specific basis in California. On October 15, 2008, the USEPA strengthened the national ambient air quality standard for lead by lowering it from 1.50 µg/m^3 to 0.15 µg/m^3 on a rolling 3-month average. The USEPA revised the monitoring requirements for lead in December 2010.[10] These requirements focus on airports and large urban areas and resulted in an increase in 76 monitors nationally. In the Bay Area, lead monitoring stations are located at Reid-Hillview Airport in San Jose, and at San Carlos Airport which was discontinued as of April 11, 2017.

2.3 Air Quality Index

The USEPA developed the AQI scale to make the public health impacts of air pollution concentrations easily understandable. The AQI, much like an air quality "thermometer," translates daily air pollution concentrations into a number on a scale between 0 and 500, and assigns the number to one of the following six color-coded ranges that rank air quality:

- **Good (Green, AQI = 0 to 50):** Air quality is considered satisfactory, and air pollution poses little or no risk.
- **Moderate (Yellow, AQI = 51 to 100):** Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution. Unusually sensitive people should consider reducing prolonged or heavy outdoor exertion.
- **Unhealthy for Sensitive Groups (Orange, AQI = 101 to 150):** Although the general public is not likely to be affected at this AQI range, people with lung disease as well as older adults and children are at a greater risk from exposure to ozone, whereas persons with heart and lung disease, older adults, and children are at greater risk from the presence of particles in the air. Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged or heavy outdoor exertion.
- **Unhealthy (Red, AQI = 151 to 200):** Everyone may begin to experience some adverse health effects, and members of the sensitive groups may experience more serious effects. Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion.
- **Very Unhealthy (Purple, AQI = 201 to 300):** The rating of "very unhealthy" air quality would trigger a health alert signifying that everyone may experience more serious health effects. Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit outdoor exertion.

[10] U.S. EPA, Fact Sheet: Revisions to Lead Ambient Air Quality Monitoring Requirements, https://www.epa.gov/sites/production/files/2016-03/documents/leadmonitoring_finalrule_factsheet.pdf, accessed September 28, 2020.

- **Hazardous (Maroon, AQI = 301 to 500):** The rating of "hazardous" air quality would trigger health warnings of emergency conditions. The entire population is more likely to be affected. Everyone, especially children, should limit outdoor exertion.

The AQI numbers refer to specific amounts of pollution in the air. They are based on the federal air quality standards for ozone, CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$. In most cases, the federal standard for these air pollutants corresponds to the number 100 on the AQI chart. If the concentration of any of these pollutants rises above its respective standard, the air quality can be unhealthy for the public. In determining the air quality forecast, local air districts, including the Bay Area Air Quality Management District, use the anticipated concentration measurements for each of the major pollutants, convert them into AQI numbers, and determine the highest AQI for each zone in a district.

Readings below 100 on the AQI scale would not typically affect the health of the general public (although readings in the moderate range of 50 to 100 may affect unusually sensitive people). Levels above 300 rarely occur in the United States, and readings above 200 have not occurred in the Bay Area in decades, with the exception of the October 2017, November 2018, and August-September 2020 wildfires.[11] AQI statistics over recent years indicate that air quality in the Bay Area is predominantly in the "Good" or "Moderate" categories and healthy on most days for most people. **Table 3** presents historical air district data for the Berkeley area for the 2015 through 2019 which represents the most recent five years with complete data. As shown in **Table 3**, the Berkeley area experienced air quality at the Purple level (very unhealthy) for one day between 2015 and 2019. Air quality at the Red level (unhealthy) occurred on 11 days exclusively in 2018. The Berkeley area had air quality at the Orange level (unhealthy for sensitive groups) on three days in 2015, seven days in 2017, and one day in 2018.

Table 3: Air Quality Index Statistics for the Berkeley Area [A]

Air Quality Index Levels	Number of Days by Year				
	2015	2016	2017 [B]	2018 [B]	2019
Unhealthy for Sensitive Groups (Orange)	3	0	7	1	0
Unhealthy (Red)	0	0	0	11	0
Very Unhealthy (Purple)	0	0	0	1	0

Notes:

[A] The first full data set for the Berkeley Aquatic Park begins in 2017. All years prior to 2017 are represented by the Oakland West monitoring station.

[B] Six of the seven unhealthy air quality days in 2017 and twelve of the thirteen unhealthy air quality days in 2018 coincided with wildfire events.

Source: BAAQMD, 2019

[11] BAAQMD, https://www.sparetheair.org/understanding-air-quality/reading-the-air-quality-index, accessed September 28, 2020.

2.4 Toxic Air Contaminants and Local Health Risks and Hazards

In addition to criteria air pollutants, individual projects may emit toxic air contaminants (TACs). TACs collectively refer to a diverse group of air pollutants that are capable of causing chronic (i.e., of long duration) and acute (i.e., severe but short-term) adverse effects on human health, including carcinogenic effects.[12] Human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity. Individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

Unlike criteria air pollutants, TACs are not subject to ambient air quality standards but are regulated by BAAQMD using a risk-based approach to determine which sources and pollutants to control as well as the degree of control. A health risk assessment (HRA) is an analysis that estimates human health exposure to toxic substances and, when considered together with information regarding the toxic potency of the substances, provides quantitative estimates of health risks.[13] Diesel PM (DPM), a by-product of diesel fuel combustion, is a major source of TAC. CARB identified DPM as a TAC in 1998, primarily based on evidence demonstrating cancer effects in humans.[14] The estimated cancer risk from exposure to diesel exhaust is much higher than the risk associated with any other TAC routinely measured in the region.

2.4.1 Fine Particulate Matter

Exposures to fine PM ($PM_{2.5}$) are strongly associated with mortality, respiratory diseases, and lung development in children, as well as other end results, such as hospitalization for cardiopulmonary disease.[15] In April 2011, the USEPA published *Policy Assessment for the Particulate Matter Review of the National Ambient Air Quality Standards*. In this document, USEPA staff concludes that the then-current federal annual $PM_{2.5}$ standard of 15 $\mu g/m^3$ should be revised to a level within the range of 13 to 11 $\mu g/m^3$, with evidence strongly supporting a standard within the range of 12 to 11 $\mu g/m^3$. The current California and National annual average ambient air quality standard for $PM_{2.5}$ is 12 $\mu g/m^{3.}$

2.4.2 Toxic Air Contaminants

Certain air pollutants have been classified as TACs because they are known to increase the risk of cancer and/or other serious health effects, ranging from eye irritation to neurological damage. Negative health impacts from nearly 200 TACs have been estimated using toxicity

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[12] "Carcinogenic" indicates that scientific studies have shown that exposure to a substance or mixture of substances at certain levels for some period of time has the potential to promote the formation of cancer.

[13] In general, a health risk assessment is required if the air district concludes that projected emissions of a specific air toxic compound from a proposed new or modified source suggest a potential public health risk. The applicant is then subject to a health risk assessment for the source in question. Such an assessment generally evaluates chronic, long-term effects, estimating the increased risk of cancer as a result of exposure to one or more TACs.

[14] CARB, Fact Sheet: The Toxic Air Contaminant Identification Process: Toxic Air Contaminant Emissions from Diesel-fueled Engines, October 1998.

[15] SFDPH, Assessment and Mitigation of Air Pollutant Health Effects from Intra-Urban Roadways: Guidance for Land Use Planning and Environmental Review, May 2008.

information and methods developed by California's Office of Environmental Health Hazard Assessment (OEHHA)[16]. The Bay Area's air toxics network includes 16 monitoring sites, five of which were established by CARB and are maintained by BAAQMD. The remaining 11 sites are operated by BAAQMD[17].

The stations in the Bay Area's air toxics network measure 10 to 15 TACs, depending on the station. The TACs selected for monitoring are those that traditionally have been found in the highest concentrations in ambient air relative to their toxicity and therefore tend to produce the most significant risk. BAAQMD's active ambient TAC monitoring station nearest to the Proposed Project area is Berkeley Aquatic Park at 1 Bolivar Drive in Berkeley. This monitoring station only has concentrations for a select number of TACs. The nearest monitoring station with more comprehensive TAC monitoring is the CARB monitoring station at 10 Arkansas Street in San Francisco, approximately 9 miles southwest of the Proposed Project site. The ambient concentrations of carcinogenic TACs measured at the Berkeley Aquatic Park and Arkansas Street stations are presented in **Table 4**. These concentrations represent the most recent year of data for each TAC which is either 2016, 2017, or 2018. The estimated cancer risk from a lifetime exposure (70 years) to these substances is also shown in **Table 4**.

Generally, TACs are classified into carcinogens and non-carcinogens, depending on the level of physiological effects associated with the exposure to a pollutant. Carcinogens are TACs with the potential to cause cancer effects. Non-carcinogenic substances typically have a safe level of exposure below which no negative health impacts occur due to exposure. Chronic and acute exposures to non-carcinogens are expressed as a Hazard Index (HI), which is the ratio of expected exposure levels to an acceptable reference exposure level[18].

Table 4: Annual Average Ambient Concentrations of Carcinogenic Toxic Air Contaminants

Substance	Concentration	Cancer Risk per Million [A]
Gaseous TACs (ppb)		
Acetaldehyde [B,E]	0.69	10
Benzene [C,F]	0.22	56
1,3-Butadiene [C,F]	0.013	14
Carbon Tetrachloride [C,F]	0.10	78
Chloroform [C,F]	0.010	0.9
Para-Dichlorobenzene [B]	*	*

[16] Office of Environmental Health Hazard Assessment (OEHHA). Toxic Air Contaminants. https://oehha.ca.gov/air/toxic-air-contaminants, accessed September 28, 2020.

[17] BAAQMD. Toxic Air Contaminants. May 2015. https://www.baaqmd.gov/about-air-quality/research-and-data/emission-inventory/toxic-air-contaminants, accessed September 28, 2020.

[18] BAAQMD, CEQA Air Quality Guidelines, May 2017, https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, accessed September 28, 2020.

Table 4: Annual Average Ambient Concentrations of Carcinogenic Toxic Air Contaminants

Substance	Concentration	Cancer Risk per Million [A]
cis-1,3-Dichloropropene [B,F]	0.05	10
trans-1,3-Dichloropropene [B,F]	0.05	10
Ethyl Benzene [B,F]	0.11	3
Ethylene Dibromide [B]	*	*
Ethylene Dichloride [B]	*	*
Formaldehyde [B,E]	1.64	35
Methyl Tertiary-Butyl Ether (MTBE) [B]	*	*
Methylene Chloride [C,F]	0.22	2
Perchloroethylene [C,F]	0.00081	0.1
Trichloroethylene [B,F]	0.010	0.3
Polycyclic Aromatic Hydrocarbons (ng/m^3)		
Benzo(a)pyrene [B]	*	*
Benzo(b)fluoranthene [B]	*	*
Benzo(k)fluoranthene [B]	*	*
Dibenz(a,h)anthracene [B]	*	*
Indeno(1,2,3-cd)pyrene [B]	*	*
Particulate TACs (ng/m^3)		
Arsenic [B,E]	0.92	9
Beryllium [B,E]	0.150	1
Cadmium [B,E]	0.70	9
Chromium (Hexavalent) [B,E]	0.045	19
Lead [B,D]	5.44	0.2
Nickel [B,E]	3.2	2
Total Risk for All TACs		**260**

Abbreviations: TACs = toxic air contaminants; BAAQMD = Bay Area Air Quality Management District; ppb = part per billion; ng/m^3 = nanograms per cubic meter; *= indicates that insufficient or no data were available to determine the value.

Notes:

[A] The potential cancer risk estimates reflect the new risk assessment methodology finalized by the Office of Environmental Health Hazard Assessment on March 6, 2015. Information on the agency's new risk assessment methodology can be found at http://www.oehha.ca.gov/air/hot_spots/hotspots2015.html. Cancer risk values associated with the concentrations measured at the Berkeley Aquatic Park are based on cancer risk values reported for the CARB Monitoring Station at 10 Arkansas Street in San Francisco scaled based on relative concentrations.

[B] Measured at CARB Monitoring Station at 10 Arkansas Street in San Francisco.

[C] Measured at BAAQMD Monitoring Station at the Berkeley Aquatic Park (1 Bolivar Drive in Berkeley).

[D] Most recent data for this TAC is from 2016.

Table 4: Annual Average Ambient Concentrations of Carcinogenic Toxic Air Contaminants		
Substance	**Concentration**	**Cancer Risk per Million [A]**
[E] Most recent data for this TAC is from 2017. [F] Most recent data for this TAC is from 2018.		
Sources: CARB, Ambient Air Toxics Summary – 2020 and https://www.epa.gov/outdoor-air-quality-data/monitor-values-report-hazardous-air-pollutants		

2.4.3 Roadway Related Pollutants

Motor vehicles are responsible for a large share of air pollution, especially in California. Vehicle tailpipe emissions contain diverse forms of particles and gases, and vehicles also contribute to particulates by generating road dust through tire wear. Epidemiological studies[19] have demonstrated that people living close to freeways or busy roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections, and decreased pulmonary function and lung development in children.

2.4.4 Diesel Particulate Matter

As previously stated, CARB identified DPM as a TAC in 1998, primarily based on evidence demonstrating cancer effects in humans. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways. CARB estimated that, as of 2000, the average Bay Area cancer risk from exposure to DPM, based on a population-weighted average ambient DPM concentration, is approximately 480 in 1 million, which is much higher than the risk associated with any other toxic air pollutant routinely measured in the region. The statewide risk from DPM as determined by CARB declined from 750 in 1 million in 1990 to 570 in 1 million in 1995; by 2000, CARB estimated the average statewide cancer risk from DPM at 540 in 1 million.[20,21]

In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. Subsequent regulations approved by CARB apply to new trucks and diesel fuel. With new controls and fuel requirements, a medium-heavy duty or heavy-heavy duty truck built in 2010 or later

[19] Brugge, D., Durant, J. L., & Rioux, C. (2007). Near-highway pollutants in motor vehicle exhaust: a review of epidemiologic evidence of cardiac and pulmonary health risks. Environmental health, 6(1), 23.

[20] CARB, *California Almanac of Emissions and Air Quality* - 2013 Edition, Table 4-16 and Figure 4-18, https://ww2.arb.ca.gov/our-work/programs/resource-center/technical-assistance/air-quality-and-emissions-data/almanac, accessed September 28, 2020.

[21] This calculated cancer risk value from ambient air exposure in the Bay Area can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which for men is more than 40 percent (based on a sampling of 17 regions nationwide), or greater than 400,000 in 1 million, according to the American Cancer Society. American Cancer Society, last revised March 23, 2016, http://www.cancer.org/cancer/cancerbasics/lifetime-probability-of-developing-or-dying-from-cancer, accessed September 28, 2020.

has particulate exhaust emissions that are over 50 times lower than a medium-heavy duty or heavy-heavy duty truck built before 1990.[22] The regulations are anticipated to result in an 80 percent decrease in statewide diesel health risk in 2020 as compared with the diesel risk in 2000.

2.5 Sensitive Receptors

Air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, those with higher rates of respiratory disease, such as asthma and chronic obstructive pulmonary disease, and those with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. BAAQMD defines sensitive receptors as children, adults, and seniors occupying or residing in residential dwellings, schools, daycare centers, hospitals, and senior-care facilities. Workers are not considered sensitive receptors because all employers must follow regulations set forth by the Occupation Safety and Health Administration to ensure the health and well-being of their employees.[23]

The proximity of sensitive receptors to motor vehicles is an air pollution concern, especially in Berkeley where building setbacks are limited, and roadway volumes are higher than most other parts of the Bay Area. Vehicles also contribute to particulates by generating road dust and through tire wear.

Existing areas evaluated in this analysis include a representative sample of known residents living in residential areas (children and adults) in the surrounding neighborhood, and other sensitive receptors (day care centers, schools and nursing homes etc.) located in the surrounding community and along the expected travel routes of employees and delivery trucks. The health risk impact analysis includes locations out to a distance of 1,000 meters from the Proposed Project site, which is conservative because the maximum impacts identified from the Proposed Project would be adjacent to the site. The closest residential receptors are approximately 30 feet to the East of the Proposed Project site. In addition to the residential receptors, other sensitive receptors were identified within 1,000 meters of the Proposed Project Site[24]. Sensitive receptors and their distance from the Proposed Project site include Bright Horizons Daycare (less than 15 feet), Ecole Bilingue de Berkeley (50 feet),[25] Aquatic Park School (700 feet), and a private residence daycare (899 Dwight Crescent, 190

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[22] Pollution Engineering New Clean Diesel Fuel Rules Start, July 2006 and CARB, Methods to Find the Cost-Effectiveness of Funding Air Quality Projects For Evaluating Motor Vehicle Registration Fee Projects and Congestion Mitigation and Air Quality Improvement (CMAQ) Projects, Table 5-A, https://ww2.arb.ca.gov/sites/default/files/2020-06/Congestion_Mitigation_Air%20_Quality_Improvement_Program_cost-effectiveness_methods_may2005.pdf, accessed September 28, 2020.

[23] BAAQMD, Recommended Methods for Screening and Modeling Local Risks and Hazards, May 2011, p. 12, https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/baaqmd-modeling-approach.pdf, accessed September 28, 2020.

feet).[26] In order to ensure that the most conservative scenario is captured in the analysis, daycare centers are evaluated with exposure assumptions for a child between six weeks and 6 years of age. All other existing off-site sensitive receptors are evaluated using residential exposure assumptions consistent with OEHHA Guidance[27].

2.6 Existing Stationary Sources of Air Pollution

BAAQMD's inventory of permitted stationary sources of emissions shows sixteen permitted stationary emission sources for which risk estimates are available that are located within or near the 1,000-foot zone of influence[28] of the Proposed Project site. These sources include Electro-Coatings of California Inc. (a metal processing facility), Henkel US Operations Corporation (a chemical processing/material handling facility), a surface coating facility, several emergency generators located on individual properties such as Verizon Wireless and Seventh Street Properties LLC, two coffee roasting facilities, and a gasoline dispensing facility. All of these sources contribute to the background levels of cancer risk, chronic HI and $PM_{2.5}$ concentration. The screening tool also reports screening-level risk for the Bayer US LLC facility (FAC ID 12071) itself, but Ramboll modeled risks from those existing sources that will be there in Year 10 and Year 30, respectively, for the cumulative impacts assessment for Year 10 and Year 30 based on site-specific parameters to get more realistic estimates of actual cumulative risk impacts in Year 10 and Year 30. Risks from the existing sources are included as a part of Project risks in the cumulative analysis. The stationary sources currently presented at the site are listed below.

The Proposed Project site also has on-site emergency diesel generators and natural gas boilers that emit TACs. The site currently has six diesel generators and the Proposed Project will replace two older existing generators with two new generators by Year 10. By Year 30, all of the current generators will be replaced with three additional new generators, resulting in five generators site-wide in total. The site currently includes three natural gas boilers that will continue to operate throughout the Proposed Project. An additional boiler will be installed in Year 10 to meet the steam consumption demand in future. There is an ammonia refrigeration system (in B62) at the site that operates as a closed system.[29]

Finally, the facility is permitted to use isopropyl alcohol as a cleaning agent. While the facility uses many other chemicals on-site, these are not used in significant volumes that would

[26] While not a sensitive receptor consistent with BAAQMD CEQA Guidelines, Ramboll evaluated the health impacts to those participating in the weekly Dance Jam. Health impacts are well below the significance thresholds.

[27] Office of Environmental Health Hazard Assessment (OEHHA), Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments, February 2015, http://www.oehha.ca.gov/air/hot_spots/pdf/HRAguidefinal.pdf, accessed September 28, 2020.

[28] For assessing community risks and hazards, an area of influence, i.e., a 1,000-foot radius distance buffer around the project site boundary, is recommended. The air district recommends that any proposed project that includes the siting of a new source or receptor assess associated impacts within 1,000 feet, taking into account both individual and nearby cumulative sources.

[29] The refrigeration system in B62 uses ammonia as the heat exchange medium that absorbs heat from glycol in order for the glycol to be cold for production processes. The concept of closed loop operation is that there is an unchanged volume of ammonia that circulates through refrigeration equipment and associated piping within B62 without more ammonia being added or removed. Since it's a closed pressurized system, emissions are limited to minor potential leaks from the 16 process components (pumps, valves, flanges, etc.) in the system.

require permits with BAAQMD. More information on the Proposed Project stationary sources are provided in the "Methodology – Operational Emissions" section.

2.7 Major Roadways Contributing to Air Pollution

The BAAQMD CEQA guidelines recommend a 1,000-foot radius around the Project property boundary when assessing community risks and hazards.[30] This analysis conservatively includes roadway and major highway sources within a larger 1,000-meter radius. Ashby Avenue, Dwight Way, San Pablo Avenue, and University Avenue are arterial roadways in the existing local roadway system within 1,000 meters of the Proposed Project site that carry at least 10,000 vehicles in annual average daily traffic based on data provided by the transportation consultant.[31,32] Additionally, Interstate 80 runs to the west of the Proposed Project site and is within 1,000 meters of the Proposed Project site boundary. Traffic from arterial roadways and Interstate 80 contributes to concentrations of $PM_{2.5}$, DPM, and organic gases emitted from motor vehicles near the street level. Aside from the surrounding major roadways, the only other area of mobile-source activity or otherwise "non-permitted" sources (e.g., railyards, trucking distribution facilities, and high-volume fueling stations) located within 1,000 meters of the Proposed Project site is Union Pacific Railroad right-of way to the west of the site.

[30] Bay Area Air Quality Management District (BAAQMD). 2017. California Environmental Quality Act, Air Quality Guidelines. May. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

[31] Fehr & Peers, Bayer Berkeley Project – Transportation Findings. September 29, 2020.

[32] BAAQMD, Recommended Methods for Screening and Modeling Local Risks and Hazards, May 2011, p. 12. According to the air district, roads with less than 10,000 vehicles per day do not pose a significant health impact even in combination with other nearby sources. Thus, only arterial roadways with greater than 10,000 vehicles per day were included in this analysis.

3. REGULATORY FRAMEWORK

3.1 Federal Regulations

3.1.1 Federal Clean Air Act

The 1970 Clean Air Act (last amended in 1990) requires that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants are planned to be controlled in order to achieve all standards by the deadlines specified in the act. These ambient air quality standards are intended to protect the public health and welfare, and they specify the concentration of pollutants (with an ample margin of safety) to which the public can be exposed without adverse health effects. They are designed in consideration of those segments of the public most susceptible to respiratory distress, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above ambient air quality standards without observing adverse health effects.

The current attainment status for the San Francisco Bay Area Air Basin, with respect to federal standards, is summarized in **Table 2**. In general, the air basin experiences low concentrations of most pollutants when compared to federal standards, except for PM (PM_{10} and $PM_{2.5}$) and NO_2, for which standards are exceeded periodically, typically during wildfire events (see **Table 1**).

3.1.2 Emission Standards for New Off-Road Equipment

Before 1994, there were no standards to limit the amount of emissions from off-road equipment. In 1994, USEPA established emission standards for hydrocarbons, NO_x, CO, and PM to regulate new pieces of off-road equipment. These emission standards came to be known as Tier 1. Since that time, increasingly more stringent Tier 2, Tier 3, and Tier 4 (interim and final) standards were adopted by USEPA, as well as by CARB. Each adopted emission standard was phased in over time. New engines built in and after 2015 across all horsepower sizes must meet Tier 4 final emission standards. In other words, new manufactured engines cannot exceed the emissions established for Tier 4 final emissions standards.

3.1.3 Federal New Source Performance Standards

The USEPA has promulgated National Emission Standards for Hazardous Air Pollutants (NESHAP) from three major source categories: industrial boilers, commercial and institutional boilers, and process heaters. The final emission standards for control of mercury, hydrogen chloride, PM (as a surrogate for non-mercury metals), and CO (as a surrogate for organic hazardous emissions) from coal-fired, biomass-fired, and liquid-fired major source boilers are based on the maximum achievable control technology. In addition, all major source boilers and process heaters are subject to a work practice standard to periodically conduct tune-ups of the boiler or process heater.[33]

[33] USEPA. National Emissions Standard for Hazardous Air Pollutants for Major Sources: Industrial, Commercial and Institutional Boilers and Process Heaters. November 2015. https://www.govinfo.gov/content/pkg/FR-2015-11-20/pdf/2015-29186.pdf, accessed October 8, 2020.

The existing boilers are subject to 40 C.F.R Part 63 Subpart DDDDD (Emissions Limit for New or Reconstructed Boilers and Process Heaters) and would comply with the emissions limit set forth for CO and filterable PM.

3.2 State Regulations

3.2.1 California Clean Air Act

Although the Federal Clean Air Act established NAAQS, individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established, and because of the unique meteorological problems in California, there is considerable diversity between the state and national ambient air quality standards, as shown in **Table 2**. California ambient standards are at least as protective as national ambient standards and are often more stringent.

In 1988, California passed the California Clean Air Act (California Health and Safety Code sections 39600 et seq.), which, like its federal counterpart, required the designation of areas as attainment or non-attainment, but based these designations on state ambient air quality standards rather than the federal standards. As indicated in **Table 2**, the San Francisco Bay Area Air Basin is designated as "non-attainment" for state ozone, PM_{10}, and $PM_{2.5}$ standards, and as "attainment" or "unclassified" for other pollutants.

3.2.2 Tanner Air Toxics Act and Air Toxics Hot Spots Information and Assessment Act

TACs in California are primarily regulated through the Tanner Air Toxics Act (Assembly Bill 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (Assembly Bill 2588), also known as the Hot Spots Act. Assembly Bill 1807 created a program with a two-step process of risk identification followed by risk management. TAC emissions are identified from a variety of sources (risk identification), after which an airborne toxic control measure (ATCM) is developed (risk management). CARB has twenty-six mobile and stationary source ATCMs.[34] The following ATCMs are applicable for the Proposed Project:

1) ATCM 13 CCR § 2485 to limit diesel-fueled commercial motor vehicle idling

2) ATCM 17 CCR § 93116 for DPM from portable engines rated at 50 HP or greater

Assembly Bill 2588 requires facilities to report the type and quantity of specified toxics released into the air by stationary sources. Based on the Proposed Project's emissions, the facility would not be subject to AB2588 reporting requirements. To date, CARB has identified 21 TACs in addition to adopting USEPA's list of hazardous air pollutants as TACs.

3.2.3 California Air Resources Board's In-Use Off-Road Diesel-Fueled Fleets Regulation

In 2007, CARB adopted a regulation to reduce diesel PM and NO_x emissions from in-use off-road heavy-duty diesel vehicles in California.[35] The regulation imposes limits on vehicle idling and requires fleets to reduce emissions by retiring, replacing, repowering, or installing exhaust retrofits to older engines. In December 2010, major amendments were made to the

[34] CARB. Airborne Toxic Control Measures. Available at: https://ww2.arb.ca.gov/resources/documents/airborne-toxic-control-measures. Accessed November 2020.

[35] California Code of Regulations, title 13, sections 2449, 2449.1, 2449.2, and 2449.3.

regulation, including a delay of the first performance standards compliance date to no earlier than January 1, 2014.

3.3 Regional Regulations and Plans

3.3.1 Bay Area Air Quality Management District

BAAQMD is the regional agency with jurisdiction over the nine-county region located in the San Francisco Bay Area Air Basin. The Association of Bay Area Governments, Metropolitan Transportation Commission, county transportation agencies, cities and counties, and various non-governmental organizations also participate in the efforts to improve air quality through a variety of programs. These programs include the adoption of regulations and policies, as well as implementation of extensive education and public outreach programs. BAAQMD is responsible for attaining and maintaining air quality in the region within federal and state air quality standards. Specifically, BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the region and to develop and implement strategies to attain the applicable federal and state standards.

BAAQMD does not have authority to regulate emissions from motor vehicles. Specific rules and regulations adopted by BAAQMD limit the emissions that can be generated by various stationary sources and identify specific pollution reduction measures that must be implemented in association with various activities. These rules regulate not only emissions of the six criteria air pollutants, but TAC emissions sources are also subject to these rules and are regulated through the district's permitting process and standards of operation.

Through this permitting process, including an annual permit review, BAAQMD monitors the generation of stationary emissions and uses this information in developing its air quality plans. Any sources of stationary emissions constructed as part of the Proposed Project would be subject to BAAQMD's Rules and Regulations. Both federal and state ozone plans rely heavily on stationary source control measures set forth in BAAQMD's Rules and Regulations.

In accordance with its *Engineering Division Policy and Procedure Manual*,[36] BAAQMD requires implementation of best available control technology for toxics and would deny an authority to construct or a permit to operate for any new or modified source of TACs that exceeds a cancer risk of 10 in 1 million or a chronic or acute hazard index of 1.0. The permitting process under BAAQMD's Regulation 2, Rule 5 requires a health risk screening analysis, the results of which are posted on BAAQMD's website.

[36] BAAQMD, *Engineering Division Policy and Procedure Manual*, September 2015, http://www.baaqmd.gov/~/media/files/engineering/policy_and_procedures/engineering-policy-and-procedure-manual.pdf?la=en, accessed September 28, 2020.

3.3.1.1 BAAQMD CEQA Air Quality Guidelines

BAAQMD developed quantitative thresholds of significance for its California Environmental Quality Act Air Quality Guidelines in 2010.[37,38] BAAQMD published its latest (as of December 2020) version of its CEQA Guidelines (BAAQMD CEQA Guidelines) in May 2017.[39] The 2017 BAAQMD CEQA Guidelines provide BAAQMD-recommended procedures for evaluating potential air quality impacts during the environmental review process consistent with CEQA requirements.

The guidelines specify recommended thresholds of significance for construction and operational criterial air pollutants and precursor emissions, GHG emissions, and risks and hazards associated with TACs from an individual project and cumulative impact. These thresholds are outlined below.

The operational-related thresholds for criteria air pollutants are maximum annual emissions of 10 tons per year (tpy) for ROG, NO_x, and $PM_{2.5}$ and 15 tpy for PM_{10}. The average daily thresholds are 54 pounds per day (lb/day) for ROG, NO_x, and $PM_{2.5}$ and 82 lb/day for PM_{10}. The average daily thresholds apply to both operational-related emissions and construction-related emissions, except that the PM thresholds apply only to exhaust emissions for construction. BAAQMD also lists Construction Best Management Practices to control construction $PM_{10}/PM_{2.5}$ fugitive dust emissions as a threshold of significance. The guidelines also specify thresholds for carbon monoxide 9.0 ppm as an 8-hour average concentration and 20.0 ppm as a 1-hour average concentration.

Health risk impact thresholds for individual projects and cumulative project are specified below:

Single Source Impacts

- An excess lifetime cancer risk level of more than 10 in one million;
- A noncancer chronic HI greater than 1.0;
- An incremental increase in the annual average $PM_{2.5}$ concentration of greater than 0.3 $\mu g/m^3$.

Cumulative Thresholds

- An excess lifetime cancer risk level of more than 100 in one million;
- A noncancer chronic HI greater than 10.0; and
- An annual average $PM_{2.5}$ concentration of greater than 0.8 $\mu g/m^3$.

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[37] BAAQMD, CEQA Air Quality Guidelines, May 2010, http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/%20Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx, accessed September 28, 2020.

[38] BAAQMD, CEQA Air Quality Guidelines, Updated May 2011, http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx?la=en, accessed September 28, 2020.

[39] BAAQMD, CEQA Air Quality Guidelines Update, 2017, http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, accessed September 28, 2020.

Alternatively, a project can demonstrate compliance with a qualified community risk reduction plan rather than evaluating health risks associated with the project. This option is not available for the Proposed Project since the City of Berkeley has not adopted a community risk reduction plan. Therefore, a detailed HRA, incorporating conservative assumptions, was conducted for the Proposed Project and demonstrates that the impacts associated with the Proposed Project are less than significant.

3.3.1.2 2017 Bay Area Clean Air Plan

BAAQMD adopted the *Bay Area Clean Air Plan: Spare the Air, Cool the Climate* on April 19, 2017, to provide a regional strategy to improve Bay Area air quality and meet public health goals.[40] The control strategy described in the 2017 Bay Area Clean Air Plan includes a wide range of control measures designed to reduce emissions and lower ambient concentrations of harmful pollutants, safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, and reduce GHG emissions to protect the climate.

The 2017 Bay Area Clean Air Plan addresses four categories of pollutants: ground-level ozone and its key precursors, ROG and NO_x; PM, primarily $PM_{2.5}$, and precursors to secondary $PM_{2.5}$; air toxics; and GHGs. The control measures are categorized based on the economic sector framework including stationary sources, transportation, energy, buildings, agriculture, natural and working lands, waste management, and water measures.

3.3.1.3 Particulate Matter Plan

To fulfil federal air quality planning requirements, BAAQMD adopted a $PM_{2.5}$ emissions inventory for year 2010 at a public hearing on November 7, 2012. The 2017 Bay Area Clean Air Plan also included several measures for reducing PM emissions from stationary sources and wood burning. On January 9, 2013, USEPA issued a final rule determining that the Bay Area has attained the 24-hour $PM_{2.5}$ national ambient air quality standard, suspending federal State Implementation Plan planning requirements for the San Francisco Bay Area Air Basin.[41] Despite this USEPA action, the air basin will continue to be designated as non-attainment for the national 24-hour $PM_{2.5}$ standard until BAAQMD submits a re-designation request and a maintenance plan to USEPA, and USEPA approves the proposed re-designation.

3.3.1.4 2001 Ozone Attainment Plan

BAAQMD adopted the *Bay Area Ozone Attainment Plan* in 2001 in response to USEPA's finding that the Bay Area had failed to attain the NAAQS for ozone. The plan includes a

[40] BAAQMD, *2017 Bay Area Clean Air Plan: Spare the Air, Cool the Climate. A Blueprint for Clean Air and Climate Protection in the Bay Area*, April 19, 2017, http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en, accessed September 28, 2020.

[41] U.S. EPA, Determination of Attainment for the San Francisco Bay Area Nonattainment Area for the 2006 Fine Particle Standard; California; Determination Regarding Applicability of Clean Air Act Requirements, January 9, 2013, https://www.federalregister.gov/documents/2013/01/09/2013-00170/determination-of-attainment-for-the-san-francisco-bay-area-nonattainment-area-for-the-2006-fine, accessed September 28, 2020.

control strategy for ozone and its precursors to ensure a reduction in emissions from stationary sources, mobile sources, and the transportation sector.[42]

3.3.1.5 Regulation 2, Rule 1

The purpose of Regulation 2 set forth by BAAQMD is to provide an orderly procedure for the review of new sources of air pollution and for the modification and operation of existing sources and associated air pollution control devices, through the issuance of authorities to construct and permits to operate.[43] Rule 1 specifies permitting exemptions and presents definitions that apply to all other rules within Regulation 2. Additionally, Rule 1 outlines standards and administrative requirements related to permits and applications and specifies applicable manuals of procedures. Section 2-1-113, Subsection 2.12 also contains permitting exemptions for laboratories located in a building where the total laboratory floor space within the building is less than 25,000 square feet, or the total number of fume hoods within the building is less than 50, provided that Responsible Laboratory Management Practices, as defined in Section 2-1-224, are used. New laboratory facilities constructed as a part of the Proposed Project will be exempt from permitting as there will be fewer than 50 total fume hoods in each laboratory building.

3.3.1.6 Regulation 2, Rule 2

BAAQMD implements the New Source Review (NSR) provisions of the federal and California Clean Air Acts and the no net increase requirements of the California Health and Safety Code through Regulation 2, Rule 2. This rule includes NSR related definitions and outlines standards including Best Available Control Technology (BACT), offset, and Prevention of Significant Deterioration (PSD) requirements. Administrative and monitoring requirements and applicable manuals of procedures are also outlined in this rule.[44]

3.3.1.7 Regulation 2, Rule 5

BAAQMD regulates back-up emergency generators, fire pumps, and other sources of TACs through its New Source Review (Regulation 2, Rule 5) permitting process.[45] Although emergency generators are intended to be used only during periods of power outages, monthly testing of each generator is required; however, BAAQMD limits testing to no more than 50 hours per year. Each emergency generator installed is assumed to meet a minimum of Tier 2 emission standards (before control measures). As part of the permitting process, BAAQMD limits the total excess cancer risk from any facility to no more than 10 per million population for any permits that are applied for within a two-year period and would require

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[42] BAAQMD, Revised San Francisco Bay Area Ozone Attainment Plan for the 1-Hour National Ozone Standard, adopted October 24, 2001, http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2001-ozone-attainment-plan/oap_2001.pdf, accessed September 28, 2020.

[43] BAAQMD, Regulation 2, Permits; Rule 1 General Permit Requirements, adopted January 1, 1980, https://www.baaqmd.gov/~/media/dotgov/files/rules/regulation-2-rule-1/documents/20171206_fr_0201-pdf.pdf?la=en, accessed October 8, 2020.

[44] BAAQMD, Regulation 2, Rule 2: New Source Review, adopted December 19, 2012 https://www.baaqmd.gov/~/media/dotgov/files/rules/regulation-2-rule-2/documents/20171206_fr_0202-pdf.pdf?la=en, accessed October 8,2020.

[45] BAAQMD, Regulation 2, Permits; Rule 5, New Source Review of Toxic Air Contaminants, December 2016, https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-2-rule-5-new-source-review-of-toxic-air-contaminants/documents/rg0205_120716-pdf.pdf?la=en, accessed September 28, 2020.

any source that would result in an excess cancer risk greater than 1 per million to install BACT for toxics (T-BACT).

3.3.1.8 Regulation 8, Rule 16

BAAQMD limits emissions from solvent cleaning operations through Regulation 8, Rule 16. This rule limits the amount of VOC emissions to the atmosphere through the adoption of emissions control devices on vapor solvent cleaning equipment. The rule also sets standards for proper maintenance, storage and disposal of solvents. The rule includes record-keeping requirements in Section 501 that applies to wipe-cleaning operations.[46]

3.3.1.9 Regulation 9, Rule 7

BAAQMD regulations limit the air pollution emissions of NO_x and CO from both existing and new industrial, institutional, and commercial boilers, steam generators and process heaters through Regulation 9, Rule 7.[47] Boilers with a heat input ranging from 10 to less than 20 million British Thermal Units (MMBtu)/hour have a NO_x emission limit of 15 ppm (dry at 3% oxygen) and CO emission limit of 400 parts per million by volume (ppmv) (dry at 3% oxygen). Boilers with heat input larger than 20 MMBtu/hour but less than 75 MMBtu/hour have a NO_x limit of 9 ppm (dry at 3% oxygen) and CO limit of 400 ppmv (dry at 3% oxygen). Regulation 9, Rule 7 is applicable to the three existing boilers (one 14.7 MMBtu/hour and two 37.8 MMBtu/hour boilers) and the additional boiler (15.9 MMBtu/hour) that will be included in Year 10 and continue to operate through at least Year 30.

3.4 Local Regulations and Plans[48]

3.4.1 City of Berkeley General Plan

The environmental management element of the City of Berkeley's General Plan[49] includes Policy EM-18, Regional Air Quality Action. This policy states that the City of Berkeley will work with BAAQMD and other regional agencies to:

- Improve air quality through pollution prevention methods;
- Ensure enforcement of air emission standards;
- Reduce local and regional traffic (the single largest source of air pollution in the city) and promote regional transit;

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[46] BAAQMD, Regulation 8, Rule 16: Organic Compounds Solvent Cleaning Operations, adopted March 7, 1979 https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-16-solvent-cleaning-operations/documents/rg0816.pdf?la=en, accessed October 8,2020.

[47] BAAQMD, Regulation 9, Permits; Rule 7, Nitrogen Oxides and Carbon Monoxide from Industrial, Institution, and Commercial Boilers, Steam Generators and Process Heaters, adopted September 16, 2002, https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-7-nitrogen-oxides-and-carbon-monoxide-from-industrial-institutional-and-commercial-boiler/documents/rg0907.pdf?la=en, accessed October 8,2020.

[48] The Bayer project site is subject to a 1992 Development Agreement that vests Bayer into many laws as they existed in 1992. Inclusion of local frameworks below is not intended to provide a legal opinion as to whether a given modern ordinance or other regulation is applicable except as expressly noted.

[49] City of Berkeley. 2002. General Plan. Available online at: https://www.cityofberkeley.info/uploadedFiles/Planning_(new_site_map_walk-through)/Level_3_-_General/GPliteEnvironmental_Management_policies.pdf, accessed September 28, 2020.

- Promote regional air pollution prevention plans for business and industry;
- Promote strategies to reduce particulate pollution from residential fireplaces and wood-burning stoves; and
- Locate parking appropriately and provide adequate signage to reduce unnecessary "circling" and searching for parking.

3.4.2 City of Berkeley Natural Gas Prohibition

The Berkeley City Council passed an ordinance prohibiting natural gas infrastructure (e.g. gas hook-ups) in any new building (City of Berkeley, 2020).50 This ordinance prohibits natural gas infrastructure that is typically used to provide water and space heating, cooking, and other uses in buildings of all types including residential and non-residential buildings. The City of Berkeley suggests that building electrification is the substitution to gas appliances (furnaces, water heaters, cooking ranges and stoves, dryers, etc.) with lean, safe, and highly efficient all-electric alternatives. The Natural Gas Prohibition Ordinance does not impose an absolute prohibition and does not apply where "it is not physically feasible to construct the building without Natural Gas Infrastructure." Separately, there is an exception where natural gas usage is in the public interest and is necessary to the health, safety, and welfare of the public. The Proposed Project envisions natural gas usage only for the manufacturing lab facilities, the production buildings, and the natural gas boilers, and not for administration, maintenance, and warehouse facilities. The prohibition of natural gas usage in the Proposed Project is not technologically feasible in manufacturing laboratory operations and production buildings and requiring its ban in these facilities would materially and adversely affect the biopharmaceutical manufacturing process and the production of medicines. More specifically, an electrically powered alternative is not available that would allow project operations to meet the Biosafety Level-2 and other strict protocols and contamination performance standards necessary for cell therapy and other biopharmaceutical processes envisioned under the Proposed Project. Manufacturing lab facilities and production buildings would therefore be exempt under the Natural Gas Prohibition Ordinance (as well as the terms of the Development Agreement, which vests the site into older City ordinances).

[50] City of Berkeley. 2020. Prohibition of Natural Gas Infrastructure in New Buildings. Ordinance No. 7672-N.S. https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/2019-07-23%20Item%20C%20Prohibiting%20Natural%20Gas%20Infrastructure.pdf, accessed October 6, 2020.

4. IMPACTS AND MITIGATION MEASURES

4.1 Significance Thresholds

Consistent with Appendix G of the California CEQA Guidelines, for the impacts analyzed in this section, the Proposed Project would have a significant impact related to air quality if it were to:

- conflict with or obstruct implementation of the applicable air quality plan;
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard;
- expose sensitive receptors to substantial pollutant concentrations; or
- result in other emissions (such as those leading to odours) adversely affecting a substantial number of people.

4.2 Approach to Analysis

As stated in the CEQA Guidelines[51], the Proposed Project would result in two types of potential air quality impacts: impacts from construction activities and impacts from project operations due to increased vehicle travel, new stationary sources (e.g., new emergency standby diesel generators or solvent cleaning), and increased lab operations.

Each of these types of direct impacts is, in turn, separated into impacts from criteria air pollutant emissions, which are generally regional in nature, and impacts associated with exposure to $PM_{2.5}$ and TACs, which are localized health impacts expressed in terms of exposure to $PM_{2.5}$ concentrations, probability of developing cancer per 100 in 1 million persons exposed to TAC concentrations, and non-cancer chronic HI. The assessment of criteria air pollutant impacts addresses the second and third bulleted significance thresholds identified above. The assessment of exposure to $PM_{2.5}$ concentrations and localized health risk addresses the fourth bulleted significance threshold identified above.

The air quality analysis conducted for this impact assessment uses emission factors, models, and tools distributed by a variety of agencies, including CARB, the California Air Pollution Officers Association, OEHHA, and the USEPA. Additionally, the analysis includes methodologies identified in the BAAQMD CEQA Air Quality Guidelines (May 2017).

4.2.1 Proposed Project

The Proposed Project is seeking to modify Bayer HealthCare LLC's (referred to as "Bayer") long-range development plan for its pharmaceutical manufacturing campus in West Berkeley. The City of Berkeley and then Miles Inc. (now Bayer) entered into a 30-year Development Agreement (DA) in 1992 that planned for long-term development and investment in one of the earliest biopharmaceutical manufacturing facilities. The total square feet of development approved by the City of Berkeley in the existing development agreement was 1,886,000 square feet. The Proposed Project contemplates approximately 1,738,000 square feet of development, thereby reducing planned building space by about 148,000 square feet.

[51] BAAQMD, CEQA Air Quality Guidelines, May 2010, http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/%20Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx, accessed September 28, 2020.

Figure 1 shows the location of the Proposed Project and the parcel distribution across the site. **Figure 2** shows the extent of the area studied for air quality impacts.

The Proposed Project site is comprised of approximately forty-six (46) acres and is roughly bounded by the Union Pacific Railroad right-of-way to the west, Seventh Street to the east, Grayson Street to the south, and Dwight Way to the north together with a separate parking lot, which is located on a portion of the block between Dwight, Seventh, Parker and Sixth Streets. There are three contiguous parcels near the corner of Carleton and Seventh Streets which are not owned by Bayer. The Proposed Project site houses biopharmaceutical operations with supporting office and other ancillary uses, and includes two primary areas:

- North Properties: 800 Dwight Way, North of Carleton Street, which is the site included in the 1992 Development Agreement, known as the "North Properties" and
- South Properties: 801 Grayson Street, South of Carleton Street, known as the "South Properties"

The existing Project site consists of approximately 1,087,000 square feet divided between the North Properties (567,000 square feet) and the South Properties (520,000 square feet). This existing space represents a partial buildout of space previously approved for the Proposed Project site, where the City of Berkeley approved a total of 1,886,000 square feet of development. The existing Project site's building space is divided into six different land uses, including production space, manufacturing labs, warehouse space, administrative offices, utility facilities, and maintenance facilities. The administration buildings provide offices for management and support functions, conference rooms, etc. The manufacturing laboratories provide areas in which research into production and manufacturing technologies can be accomplished. Maintenance provides areas to conduct necessary repairs, replacement and preventive maintenance activities in support of site operations. Production uses may include pilot plants, production facilities and fill and finishing facilities. Utility buildings are used to house monitored water distillation operations, electrical equipment and steam generation equipment. Warehouse area is used to hold products for distribution on-site and off-site.

The total square footage of development for the CEQA Baseline analysis accounts for the approved development contemplated under the 1992 DA on the North Properties, consisting of 1,346,000 sq ft of development, existing development on the South Properties, consisting of 520,000 sq ft of development. The total square footage analyzed in the Baseline scenario is 1,866,000 sq ft. across the entire Bayer Project site.

Construction for the Year 10 Project is expected to begin in 2024 with the demolition of some existing buildings in the A-North, C-North and A-South locations of the Proposed Project area including buildings B28, B28A, B57, SC-6, B56A, B56B, B56, B84 and B85. This demolition phase will be followed by construction of new buildings in A-North, C-North, A-South and C-South locations. The first phase of construction is expected to end by 2024 and the first year of operations for the newly constructed buildings will be 2025. Conservatively, the air quality impact analysis assumes that the year of full buildout for the Year 10 Project is 2025, even though the second phase of construction for the Year 10 Project is not expected to begin until 2029. The second phase of construction includes construction in the A-North and B-North locations, and construction is expected to last less than a year ending in 2029.

The Year 10 Project buildout includes development of the Biological Development (BD) Production Buildings, consolidation of administration buildings, expansion of the existing B80 warehouse, expansion of utilities buildings and construction of a parking garage in the C-South location. Further information on the buildings to be construction in Year 10 Buildout are provided in Appendix A, Table CON-1.

Construction for the Year 30 Project is expected to begin as early as 2034. The Year 30 Project construction does not include any demolition as all demolition activities will be completed as a part of Year 10 Project construction. The first phase of construction for the Year 30 Project is expected to end by 2034 and the first year of operations for the newly constructed building is 2035 which is also the year of full buildout for the air quality analysis. The first phase includes construction in the A-North and D-North properties such as expansion of the BD production building, construction of the Technology Development Center, construction of the Hub building, and parking garage. The second phase of construction is expected to begin and end in 2049 and it includes construction in the A-North, B-North and A-South properties. The second phase of construction includes expansion of the BD production building, further development of the Technology Development Center, construction of the Cell Culture Technology Center (CCTC) buildings and administration buildings. During construction of each subsequent parcel, the previously constructed parcels are assumed to be operational (e.g., the parcels that would be constructed in 2024 are assumed to be operational during construction in 2029). Therefore, the analysis adds together the construction emissions of parcels constructed in the Year 30 construction phase with operational emissions of the parcels constructed in the Year 10 construction phase. To be conservative, all Year 10 operational emissions are assumed to start in 2025 as soon as construction in 2024 ends, despite the fact that some parcels will not be constructed until 2029. Similarly, Year 30 operational emissions are assumed to start in 2035, despite some construction occurring in 2049. As noted earlier, all construction is frontloaded for the purposes of the analysis of emissions and risks to ensure a health-protective analysis.

4.3 Air Quality Plan

The applicable air quality plan is BAAQMD's 2017 Bay Area Clean Air Plan. Consistency with the 2017 Bay Area Clean Air Plan can be determined if the Proposed Project supports the goals of the plan, includes applicable control measures from the plan, and would not disrupt or hinder implementation of any control measures from the plan. Consistency with the 2017 Bay Area Clean Air Plan is the basis for determining whether the Proposed Project would conflict with or obstruct implementation of an applicable air quality plan, the first bulleted significance criterion previously identified.

4.4 Criteria Air Pollutants

As described above under "Regulatory Framework," the San Francisco Bay Area Air Basin experiences low concentrations of most pollutants when compared to federal or state standards and is designated as either in attainment or unclassified for most criteria pollutants, with the exception of ozone, $PM_{2.5}$, and PM_{10}, for which these pollutants are designated as non-attainment for either the state or federal standards.

By definition, regional air pollution is largely a cumulative impact in that no single project is sufficient in size to, by itself, result in non-attainment of air quality standards. Instead, a project's individual emissions are considered to contribute to the existing, cumulative air quality conditions. According to the BAAQMD CEQA guidelines, if a project's contribution to

cumulative air quality conditions is considerable, then the project's impact on air quality would be considered significant.[52]

Table 5 identifies quantitative criteria air pollutant significance thresholds published by BAAQMD and adopted by the City of Berkeley. The table is followed by a discussion of each threshold. Projects that would result in criteria pollutant emissions below these significance thresholds would not violate an air quality standard, contribute substantially to an air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants within the air basin. Both of these thresholds (average daily and maximum annual) apply to operational emissions from a given project. Construction emissions are assessed solely with respect to the average daily thresholds, pursuant to BAAQMD's guidance, because of the temporary nature of construction-related emissions.[53]

Table 5: Criteria Air Pollutant Thresholds

Pollutant	Construction	Operations	
	Average Daily Emissions (lbs per day)[A]	Average Daily Emissions (lbs per day)	Maximum Annual Emissions (tons per year)
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (exhaust only)	82	15
$PM_{2.5}$	54 (exhaust only)	54	10
Fugitive Dust		Construction dust ordinance or other best management practices to control fugitive dust emissions	

Notes:
[A] PM thresholds for construction are only based on exhaust emissions and do not include fugitive emissions as dust.

Source: BAAQMD, CEQA Air Quality Guidelines, May 2017

The thresholds of significance for criteria air pollutants are based on substantial evidence presented in Appendix D of the 2017 BAAQMD CEQA Air Quality Guidelines and 2009 Revised Draft Options and Justification Report concerning CEQA thresholds.[54]

[52] BAAQMD, CEQA Air Quality Guidelines, May 2017, http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, accessed September 28, 2020.

[53] Ibid., p. 8-2.

[54] BAAQMD, CEQA Air Quality Guidelines, May 2017, pp. 2-1 to 2-3 and Appendix D; BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, pp. 16-17.

The potential for a project to result in a cumulatively considerable net increase in criteria air pollutants that may contribute to an existing or projected air quality violation is based on the emissions limits for stationary sources set by the California and Federal Clean Air Acts. To ensure that new stationary sources do not cause or contribute to a violation of an air quality standard, BAAQMD's Regulation 2, Rule 2 requires that any new source that emits criteria air pollutants above a specified emissions limit must offset those emissions. For ozone precursors such as ROG and NO_x, the offset emissions level is an annual average of 10 tons per year (or 54 lbs/day).[55] These levels represent emissions below which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants that could result in increased health effects.

The Federal NSR program was created under the Federal Clean Air Act to ensure that stationary sources of air pollution are constructed in a manner that is consistent with attainment of federal health-based ambient air quality standards. For PM_{10} and $PM_{2.5}$, the emissions limit under the NSR program is 15 tons per year (82 lbs/day) and 10 tpy (54 lbs/day), respectively. These emissions limits represent levels below which a source alone is not expected to have a significant impact on air quality.[56]

Although the regulations specified above apply to new or modified stationary sources, land use development projects generate ROG, NO_x, PM_{10}, and $PM_{2.5}$ emissions as a result of increases in vehicle trips, energy use, architectural coating, laboratory sources and construction activities. Therefore, the identified thresholds can be applied to the construction and operational phases of land use projects. Those projects that would result in emissions below these thresholds would not be considered to contribute to an existing or projected air quality violation or result in a considerable net increase in ozone precursors or PM.

Fugitive dust emissions are typically generated during construction phases. Studies have shown that the application of best management practices at construction sites significantly controls fugitive dust,[57] and individual measures have been shown to reduce fugitive dust by anywhere from 30 to 90 percent.[58] BAAQMD has identified eight best management practices to control fugitive dust emissions from construction activities.[59] The Proposed Project would be subject to the requirements of the BAAQMD best management practices, which is the basis for determining the significance of air quality impacts from fugitive dust emissions.

Total construction emissions by phase were calculated using methods consistent with the latest version of California Emissions Estimator Model (CalEEMod®) (version 2016.3.2), and total emissions were divided by the number of construction days by phase to derive average daily emissions for comparison against applicable significance thresholds.

Construction emissions would be generated by many different construction sources, including off-road construction equipment (such as forklifts, loaders, backhoes, pavers, and cranes)

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[55] BAAQMD, Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance, October 2009, p. 17.

[56] Ibid, p. 16.

[57] Western Regional Air Partnership, WRAP Fugitive Dust Handbook, September 7, 2006, wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf, accessed September 28, 2020.

[58] BAAQMD, Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance, October 2009, p. 27.

[59] BAAQMD, CEQA Air Quality Guidelines, May 2017, p. 8-4, 8-5.

and on-road trucks. The predominant source of emissions of NO_x, PM_{10}, and $PM_{2.5}$ would be off-road equipment. The predominant source of ROG emissions would be architectural coating off-gassing emissions.

Since the construction activities and operational activities of some of the newly constructed buildings are expected to overlap, the air quality analysis accounts for operational emissions that would occur simultaneously with construction. This allows for an analysis of the total emissions that would occur from construction activities and simultaneous operations during a one-year period.

4.5 Other Criteria Pollutants

Regional concentrations of CO and SO_2 in the Bay Area have not exceeded the state standards for over two decades. The primary source of CO emissions from development projects is vehicle traffic. Construction-related SO_2 emissions represent a negligible portion of the total basin-wide emissions, and construction-related CO emissions represent less than 5 percent of the Bay Area total basin-wide CO emissions[60]. As discussed previously, the Bay Area is in attainment for both CO and SO_2. Furthermore, BAAQMD has demonstrated, based on modeling, that to exceed the California ambient air quality standard of 9.0 ppm (8-hour average) or 20.0 ppm (1-hour average) for CO, project traffic in addition to existing traffic would need to exceed 44,000 vehicles per hour at affected intersections (or 24,000 vehicles per hour where vertical and/or horizontal mixing is limited[61]). The transportation analysis[62] concluded that the Proposed Project would generate less than 25 peak hour trips. Since the Peak hour trip is very small compared to the 44,000 vehicles per hour threshold for CO, the Proposed Project will not have any cumulative considerable impact. Therefore, given the Bay Area's attainment status and the limited CO and SO_2 emissions that could result from the Proposed Project, the Proposed Project would not result in a cumulatively considerable net increase in CO or SO_2, and a quantitative analysis is not required.

4.6 Local Health Risks and Hazards

In addition to criteria air pollutants, individual projects may emit TACs. These include TACs from vehicles, construction equipment, demolition, and operations. These potential sources of TACs are discussed in this section.

Asbestos-containing material have historically been used in construction. BAAQMD requires notification of any planned substantial reconstruction of demolition of buildings, and that notification begins the assessment of the need for asbestos control. Any on-site buildings with asbestos-containing material (>1% asbestos by weight, area, or count) will be demolished in accordance with BAAQMD Regulation 11, Rule 2[63] to minimize airborne TAC emissions. While all commercial buildings may contain asbestos, buildings that were constructed prior to 1980 are more likely to have asbestos-containing material. Buildings at

[60] BAAQMD. Bay Area Emissions Inventory Summary Report: Criteria Air Pollutants. May 2014. Available at: https://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Emission%20Inventory/BY2011_CAPSummary.ashx?la=en&la=env

[61] Such as a tunnel, underpass or urban canyon between buildings where free flow of air currents can be impeded.

[62] Fehr & Peers, Bayer Berkeley Project – Transportation Findings. September 29, 2020

[63] BAAQMD, Regulation 11, Hazardous Pollutants; Rule 2 Asbestos Demolition, Renovation, and Manufacturing, adopted December 15, 1976, https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-11-rule-2-asbestos-demolition-renovation-and-manufacturing/documents/rg1102.pdf?la=en, accessed October 14, 2020.

the Proposed Project site that were constructed prior to 1980 and will be demolished as part of the Proposed Project include B28, B28A, B56, B56A, B56B, B57, B84, B85, and SC-6. Due to the extensive regulation on the demolition of buildings that may contain asbestos-containing materials, this topic is not further discussed in this section.

As part of the environmental review for the Proposed Project, an HRA was conducted to provide quantitative estimates of health risks from exposures to TACs as a result of the Proposed Project in Year 10 and Year 30. The results are summarized below and are detailed in Appendix C tables. The HRA examines all sensitive receptors within 1,000 meters of the Proposed Project boundary. The HRA results were based on the latest (2015) guidance by the OEHHA.[64] Air pollution dispersion modeling was used to identify areas with elevated air pollutant concentrations and higher exposures.

As previously stated, the Proposed Project area is surrounded by several sensitive receptors including daycare centers, schools and residences. Exposure assumptions used in the HRA for sensitive receptors were based on OEHHA Guidance[65], as detailed in **Appendix C, Table HRA-4**.

The Proposed Project would be considered to have a significant health risk impact if it would contribute to $PM_{2.5}$ concentrations above 0.3 µg/m^3 or if it would result in an excess cancer risk greater than 10.0 per million persons exposed or if it would result in a non-cancer chronic hazard index above 1. The 0.3 µg/m^3 $PM_{2.5}$ concentration, the excess cancer risk of 10.0 per million persons exposed, and the non-cancer chronic hazard index of 1 are the levels below which BAAQMD considers new sources not to make a considerable contribution to cumulative health risks.[66]

4.7 Cumulative Impacts

As discussed above, the contribution of a project's individual air emissions to regional air quality impacts is, by its nature, a cumulative effect. Emissions from past, present, and future projects in the vicinity of the Proposed Project also have or will contribute to adverse regional air quality impacts on a cumulative basis. No single project by itself would be sufficient in size to result in non-attainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative air quality conditions.[67] As described above, the project-level thresholds for criteria air pollutants are based on levels at which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants. Therefore, if a project's emissions are below the project-level thresholds, the project would not be considered to result in a considerable contribution to cumulative regional air quality impacts.

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[64] Office of Environmental Health Hazard Assessment (OEHHA), Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments, February 2015, http://www.oehha.ca.gov/air/hot_spots/pdf/HRAguidefinal.pdf, accessed September 28, 2020.

[65] OEHHA, Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments, February 2015, Chapter 8, http://www.oehha.ca.gov/air/hot_spots/pdf/HRAguidefinal.pdf, accessed September 28, 2020.

[66] BAAQMD, CEQA Air Quality Guidelines, May 2017, http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, accessed September 28, 2020.

[67] Ibid, p. 2-1.

Similarly, the HRA takes into account the cumulative contribution of localized health risks to sensitive receptors from sources within a 1,000 foot zone of influence from the Proposed Project area, as well as the Proposed Project's sources. However, unlike criteria air pollutants, health risks are localized impacts in that beyond 1,000 feet from an emission source, pollutant levels tend to return to background levels. Thus, cumulative health risks are typically assessed based on cumulative emissions sources within 1,000 feet of a project site. The cumulative impacts are compared against thresholds of excess cancer risk impact of 100 in a million, non-cancer chronic hazard index of 10 and maximum annual $PM_{2.5}$ concentration of 0.8 µg/$m^{3.}$

4.8 Odour Impacts

For odours, BAAQMD recommends that potential impacts be evaluated if a potential source of objectionable odours is proposed at a location near existing sensitive receptors or if sensitive receptors are proposed to be located near an existing source of objectionable odours. The first step in assessing potential odour impacts is to gather and disclose applicable information regarding the characteristics of the buffer zone between the sensitive receptor(s) and the odour source(s), local meteorological conditions, and the nature of the odour source. Consideration of such parameters assists in evaluating the potential for odour impacts as a result of the proposed Project.

Potential sources of objectionable odours include, but are not limited to:

- Wastewater treatment plants;
- Landfills
- Confined animal facilities
- Composting stations
- Refineries
- Chemical plants

The impact of an existing odour source on surrounding sensitive receptors should also be considered. Lead agencies may identify the number of confirmed complaints received for that specific odour source. BAAQMD recommends comparing the odour parameters (i.e., distance and wind direction) associated with the odour complaints that have been filed with those of the Proposed Project.[68]

[68] BAAQMD, 2017a. *CEQA Air Quality Guidelines.* Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en May 2017.

4.9 Impact Evaluation

4.9.1 Impact AQ-1

The Proposed Project would not conflict with implementation of the 2017 Bay Area Clean Air Plan. (Less than Significant)

The most recently adopted air quality plan for the San Francisco Bay Area Air Basin is the 2017 Bay Area Clean Air Plan.[69] The 2017 Bay Area Clean Air Plan is a road map that demonstrates how the Bay Area will, in accordance with the requirements of the California Clean Air Act, implement all feasible measures to reduce ozone precursors (ROG and NO_x) and reduce transport of ozone and its precursors to neighboring air basins. It also provides a climate and air pollution control strategy to reduce ozone, PM, toxic air contaminants, and GHGs that builds upon existing regional, state and national programs. In determining consistency with the 2017 Bay Area Clean Air Plan, this analysis considers whether the Proposed Project would (1) support the primary goals of the 2017 Bay Area Clean Air Plan, (2) include applicable control measures from the 2017 Bay Area Clean Air Plan, and (3) avoid disrupting or hindering implementation of control measures identified in the 2017 Bay Area Clean Air Plan.

The goals of the 2017 Bay Area Clean Air Plan are to protect air quality and health at the regional and local scale and protect the climate. Since climate change is addressed in another report, this section addresses only the air quality and health aspects of the 2017 Bay Area Clean Air Plan. Air quality protection and the safeguarding of public health from harmful air pollutants is accomplished through meeting state and national ambient air quality standards. To meet these goals, the 2017 Bay Area Clean Air Plan recommends specific control measures and actions to reduce emissions and decrease concentrations of harmful air pollutants. To this end, the 2017 Bay Area Clean Air Plan includes 85 control measures aimed at reducing air pollutants in the air basin.[70] These control measures are grouped into various categories: stationary source sector, transportation sector, buildings sector, energy sector, agriculture sector, natural and working lands sector, waste sector, and water sector. Only those sectors relevant to the Proposed Project are discussed in this section. The 2017 Bay Area Clean Air Plan recognizes that, to a great extent, community design[71] dictates individual travel modes and that a key long-term control strategy to reduce emissions of criteria pollutants and toxic air contaminants from motor vehicles is to channel future Bay Area growth into mixed use pedestrian-friendly communities served by a range of viable transportation options where goods and services meet the day-to-day needs of residents and workers.

The control measures identified in the 2017 Bay Area Clean Air Plan that are most applicable to the Proposed Project are associated with the transportation, building, and energy sectors. The Proposed Project would develop a transportation demand management program that

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[69] BAAQMD, *2017 Bay Area Clean Air Plan*, April 19, 2017, http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en, accessed September 28, 2020.

[70] BAAQMD, *2017 Bay Area Clean Air Plan*, Table 5-13.

[71] For people who live (and/or work) in low-density, car-oriented developments, the motor vehicle is often the only viable transportation option. In such situations, even the most robust strategy to promote alternative modes of travel can have, at best, only a very modest effect. In contrast, compact communities with a mixture of land uses make it much easier to walk, cycle, or take transit for at least some daily trips.

would include measures that promote the use of transit (Control Measures TR3 and TR4) and walking or bicycling (Control Measure TR9) as viable options to privately owned vehicles. Other transportation-related features that would be included with the Proposed Project include car-share parking spaces (Control Measure TR8) and existing electric charger infrastructure. Building sector related features of the Proposed Project include no natural gas usage in buildings other than manufacturing laboratories and production (Control Measure BL2), consistent with the City of Berkeley's Ordinance on Prohibition of Natural Gas Infrastructure in New Buildings.

Transportation sector control measures that are identified in the 2017 Bay Area Clean Air Plan and would be incorporated into the Proposed Project include bicycle parking (Control Measure TR9) and a transportation demand management program (Control Measure TR2). Through its Transportation Demand Management (TDM) Program, Bayer currently funds the West Berkeley BART Shuttle, which runs from the Ashby BART Station and the Bayer site and is used by approximately 120 people daily. In addition to shuttle services, the program reduces single-occupancy vehicle use through a combination of pretax benefits, bicycle commuting incentives, and telecommuting options for qualified employment positions (Control Measure TR1 and TR2). The program would continue to be implemented under the Proposed Project. Therefore, the Proposed Project would include applicable control measures identified in the 2017 Bay Area Clean Air Plan and would support the primary goals of the 2017 Bay Area Clean Air Plan.

For the reasons described above, the Proposed Project would not interfere with implementation of the 2017 Bay Area Clean Air Plan, and because the Proposed Project would be consistent with the applicable air quality plan that demonstrates how the region will improve ambient air quality and achieve the state and federal ambient air quality standards, this impact would be less than significant and no mitigation measures are necessary.

4.9.2 Impact AQ-2a

During construction, the Proposed Project would not generate fugitive dust and criteria air pollutants which would result in a cumulatively considerable net increase in criteria air pollutants. (Less than Significant)

During the Proposed Project's construction period, construction activities would result in emissions of ozone precursors and PM in the form of dust (fugitive dust) and exhaust (e.g., vehicle tailpipe emissions), as discussed below in more detail. Emissions of ozone precursors and PM are primarily a result of the combustion of fuel from on-road and off-road vehicles. However, ROGs are also emitted from activities that involve paint, other types of architectural coatings, or asphalt paving.

As previously noted, the Proposed Project development is expected to occur in two phases: an initial 10-year phase followed by a 20-year phase. The 10-year phase (referred to as "Year 10 Project") is expected primarily occur in 2024, with a second sub-phase of construction in 2029. All demolition for the Proposed Project would occur in 2024. The 20-year phase (referred to as "Year 30 Project") is expected to primarily occur in 2034, with a second sub-phase of construction occurring in 2049.

The components of each phase of the construction operations would include site preparation, grading, and placement of foundations for structures; fabrication of structures; and exterior and interior work. Demolition is only set to occur as part of the initial 10-year phase and is

assumed to be completed before the start of any other construction activity. Demolition and construction activities would require the use of heavy trucks, graders, material loaders, dozers, forklifts, cranes, and other mobile and stationary construction equipment. Because the Proposed Project site is already level, the only truck hauling associated with the Proposed Project is during the demolition subphases.

4.9.2.1 Fugitive Dust

Project-related demolition, excavation, grading, and other construction activities may cause wind-blown dust that could contribute PM to the local atmosphere. Despite the established federal standards for air pollutants and ongoing implementation of state and regional air quality control plans, air pollutants continue to have impacts on human health throughout the country. Dust can be an irritant causing watering eyes or irritation to the lungs, nose, and throat. Depending on exposure, adverse health effects can occur due to PM in general as well as specific contaminants, such as lead or asbestos that may be constituents of dust.

Dust which is generated during demolition and construction activities primarily constitutes PM_{10}, with smaller amounts of $PM_{2.5}$. Even though most of the dust will settle down in or near the Proposed Project area, sensitive receptors near the Proposed Project site could still be exposed to small particulates that remain in the atmosphere. Sensitive individuals including those that may be living nearby or attending nearby daycare centers or schools could be exposed to fugitive dust from construction sources. Although construction emissions from the Proposed Project are temporary in duration, the Project will comply with Construction Best Management Practices dust control measures and procedures set forth by BAAQMD (Basic Construction Mitigation Measures BAAQMD, Table 8-2 and Table 8-3)[72], and repeated below. Bayer will implement these measures as a part of the Project and the City can enforce these requirements.

The Project will implement the following measures to ensure that potential dust-related construction air quality impacts of the Proposed Project would be less than significant.

a. Water all exposed areas (e.g. parking areas, graded areas, unpaved access roads) twice a day.

b. Maintain a minimum soil moisture of 12% in exposed areas by maintaining proper watering frequency.

c. Cover all haul trucks carrying sand, soil or other loose material.

d. Suspend excavation, grading and/or demolition activities when average wind speed exceeds 20 miles per hour.

e. Pave all roadways, driveways and sidewalks as soon as possible. Lay building pads as soon as grading is completed, unless seeding or soil binders are used.

f. Install wind breaks (e.g., trees, fences) on the windward side(s) of actively disturbed areas of construction with a maximum 50 percent air porosity.

[72] BAAQMD, CEQA Guidelines Table 8-2 and Table 8-3 Basic Construction Mitigation Measures. https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, accessed October 5, 2020.

g. Use a power vacuum to sweep and remove any mud or dirt-track next to public streets, if visible soil material is carried onto the streets.

h. Limit vehicle speeds on unpaved roads to 15 miles per hour (mph).

i. Minimize idling time for all engines by shutting engines when not in use or limiting idling time to a maximum of 5 minutes.[73] Provide clear signage for construction workers at all access points.

j. Properly tune and maintain construction equipment in accordance with manufacturer's specifications. Check all equipment against a certified visible emissions calculator.

k. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints

l. Install vegetative ground cover in disturbed areas as soon as possible and water appropriately until vegetation is established.

m. Limit simultaneous occurrence of excavation, grading, and ground-disturbing construction activities.

n. Install water washers to wash all trucks and equipment prior to leaving site.

o. Treat site access to a distance of 100 feet from the paved road with a 6 to 12-inch compacted layer of wood chip, mulch or gravel

p. Install sandbag or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.

q. Minimize idling time of diesel-powered construction vehicles to two minutes

r. Develop a plan demonstrating that off-road equipment (more than 50

s. horsepower) used for construction would achieve a project wide fleet-average 20 percent NOX reduction and 45 percent PM reduction compared to the most recent ARB fleet average. These include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.

t. Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., Regulation 8, Rule 3: Architectural Coatings).

u. All construction equipment, diesel trucks, and generators be equipped with Best Available Control Technology for emission reductions of NOx and PM.

v. All contractors use equipment that meets CARB's most recent certification standard for off-road heavy-duty diesel engines

[73] 13 CCR. 2485. Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. https://govt.westlaw.com/calregs/Document/I6DACC2EF0D6441DDA5B788DFEDCD1A22?viewType=FullText&originationContext=documenttoc&transitionType=StatuteNavigator&contextData=(sc.Default), accessed September 28, 2020.

4.9.2.2 Criteria Air Pollutants

Methodology – Construction Emissions

Construction-related emissions of criteria air pollutants were calculated using methods consistent with the latest CalEEMod® emissions calculator model (version 2016.3.2) developed for the California Air Pollution Control Officers Association.[74] Emissions were calculated outside of CalEEMod® using equivalent methods that account for overlapping construction components of the Proposed Project's construction schedule. The analysis used the default construction schedule, off-road equipment types, off-road equipment hours, and construction trip generation from CalEEMod® for each component of each phase of the construction program. All PM_{10} emissions from On-Site Exhaust were conservatively assumed to be DPM. **Figure 3** shows the modeled demolition sources, **Figure 4** shows the modeled construction sources for Year 10 Construction, and **Figure 5** shows the modeled construction sources for Year 30 Construction. The air quality analysis used default horsepower and load factors represented in the CalEEMod® model as assumptions for each phase of the construction program.

Off-road construction equipment engines are assumed to be primarily Tier 4 Final. To be conservative in case it is not feasible for Bayer to obtain all Tier 4 Final equipment during the Year 10 Construction, 10% of equipment hours during Year 10 Construction are assumed to have Tier 2 engines. All the construction equipment for Year 30 construction are assumed to be Tier 4 equipment.

ARB has certified off-road diesel engine emission standards that require all equipment manufactured after January 1, 2015, to have Tier 4 Final engines. As is typical with the upgrading of new equipment requirements, there is a lag between the manufacture of upgraded equipment and the incorporation of that equipment into construction fleets. There are several rules in California that require the incorporation of cleaner construction equipment in larger fleets of construction equipment.[75] CalEEMod® 2016.3.2., incorporates OFFROAD2011 emission factors, which project new equipment uptake in construction fleets for calendar years 1990, 2000, 2010 through 2035, and 2040. Bayer has committed to using only Tier 4 Final engines in their Year 10 and Year 30 construction fleets where available. In order to grant some flexibility in case some equipment is not available with a Tier 4 Final engine for Year 10 construction, emissions were modeled with 10% of equipment hours using Tier 2 engines. Bayer has committed to using exclusively Tier 4 Final equipment in their construction projects by 2035. As a result, the Year 30 Project construction equipment fleet is assumed to be 100% Tier 4 Final engines.

On-road haul truck traffic would consist of removal of demolition materials from the site. Approximately 24,900 cubic yards of demolition materials would be hauled away from the entire site during the demolition subphases for the Year 10 construction resulting in a maximum of 67 round trips per day (134 one-way trips). The demolition debris haul trips were allocated to the demolition subphase of the construction program. Additionally, material/vendor trips are assumed to occur during each building construction subphase

[74] On August 5, 2013, the BAAQMD notified the public via its website that all future CEQA analysis of criteria pollutant emissions should be conducted using CalEEMod®. However, this notification is no longer posted.

[75] California Air Resources Board (CARB). Guide to Off-Road Vehicle & Equipment Regulations. Available at: https://ww3.arb.ca.gov/msprog/offroadzone/pdfs/offroad_booklet.pdf

based on CalEEMod® default activity assumptions for each land use amount for a maximum of 68 one-way trips per day during construction of D-North in 2034. The average daily construction trips (workers, vendor and hauling) is 207 one-way trips per day for Year 10 Construction and 205 one-way trips per day for Year 30 Construction. Because more specific information is not known, CalEEMod® default trip lengths are assumed.

Construction of the Proposed Project would occur in two phases over a period of twenty-five years or longer, and buildings constructed in a given phase of construction would be occupied after completion of that phase. The Year 10 Construction phase is assumed to occur in both 2024 and 2029, with construction of each individual parcel lasting no more than 12 months. The Year 30 Construction phase is assumed to occur in 2034 and 2049, with each individual parcel of construction also lasting no more than 12 months. During construction of each subsequent parcel, the previous parcels are assumed to be operational (e.g., the parcels that would be constructed 2024 are assumed to be operational during construction in 2029). Therefore, the analysis adds together the construction emissions of parcels constructed in the Year 30 construction phase with operational emissions of the parcels constructed in the Year 10 construction phase. To be conservative, Year 10 operational emissions are assumed to start in 2025 as soon as construction in 2024 ends, despite some parcels not being constructed until 2029. Similarly, Year 30 operational emissions are assumed to start in 2035, despite some construction occurring in 2049.

The phases of the construction activities may not be undertaken exactly as laid out here. The analysis results are considered conservative (i.e., high end) estimates because they assume construction would occur as early as possible, but on-road emissions are expected to decrease over time as the on-road fleet incorporates newer, lower-emitting engines. Construction fleets are getting cleaner, and are classified by engine Tier, where the higher the Tier number, the cleaner the engine. Tier 4 is now the cleanest available off-road construction engine. While construction will endeavor to include only Tier 4 construction equipment, the commercial availability of Tier 4 equipment is uncertain. Accordingly, the construction assessment assumed a combination of Tier 2 and Tier 4 fleets for construction for the Year 10 construction. Only Tier 4 equipment is assumed for Year 30 construction, as this is well after the date that only Tier 4 off-road equipment may be sold. **Tables CON-1 through CON-7 in Appendix A** provide detailed input values for emissions calculations.

Methodology – Operational Emissions

Since the Proposed Project operations would be phased in at the completion of each construction phase, operational emissions are considered in addition to construction emissions in the evaluation of Impact AQ-1. A discussion of operational impacts at Proposed Project build-out is included under Impact AQ-2.

The Proposed Project would generate operational emissions from a variety of sources, including area sources (consumer products, architectural coatings, landscaping, manufacturing laboratory material usage), building energy use, mobile sources (daily automobile and truck trips), and stationary sources (diesel emergency generators, natural gas boilers, solvent cleanup). **Table OP-1 in Appendix B** contains a summary of the different land uses analyzed in the CEQA Baseline, Year 10 Project, and Year 30 Project operations.

Area source (consumer products, area architectural coatings, landscaping equipment, and manufacturing laboratory material usage) and building energy emissions (electricity and

natural gas) were calculated using methodologies consistent with CalEEMod® model based on the type and size of land uses associated with the Proposed Project. Only the administration/office buildings are expected to have VOC emissions from consumer products. The consumer products VOC emission factor for the office land use was updated from the 2008 statewide emission factor to a more recent statewide 2017 VOC emission factors. Parking lots are expected to have VOC emissions from degreasers for general purposes. Emissions were also estimated for landscaping equipment using CalEEMod® default information and square footage for CEQA Baseline, Year 10 Project, and Year 30 Project operations. Architectural coating VOC emissions occur due to re-application of interior and exterior surface area with paints. The VOC emissions are shown in Appendix B, **Tables OP2 – OP5.**

Building electricity and natural gas usage rates for the CEQA Baseline, Year 10 Project, and Year 30 Project buildings are presented in Appendix B, **Table OP-6**. CEQA Baseline electricity and natural gas usage rates were based on historical usage data provided by Bayer. These historical rates were converted to energy usage per square foot for each land use type based on existing square footage at the Proposed Project site. The CEQA Baseline energy estimate was calculated based on the energy use by land use type per square foot multiplied by the total square footage (construction area plus additional area under the existing development agreement) of each land use type analyzed in the CEQA Baseline scenario. The energy use rate for the total constructed area previously constructed does not account for 2019 Title 24 standards, but the additional area under the existing DA incorporates 2019 Title 24 standards. Natural gas usage for the utility land use alone was calculated based on total natural gas combustion for existing boilers. Further details on the existing and proposed natural gas usage rates are provided below. Parking lighting energy use rates were based on CalEEMod® default estimates since site-level parking energy usage rates were not available.

Year 10 Project and Year 30 Project electricity and natural gas usage rates were calculated by assuming a 5% increase in energy use per square foot rates relative to CEQA Baseline. This 5% increase in energy usage is over and above the two-year annual energy (purchased electricity and natural gas) usage for 2016 – 2017[76]. This is a conservative basis upon which to estimate increases, as the total energy consumed in 2017 was the highest level of energy consumption recorded in the past 5 years. The energy usage dropped after 2017 due to the demolition of energy-intensive production buildings in 2018. While newer buildings are more energy efficient as a result of the California Energy Commission (CEC) standards, the 5% increase also reflects the overall site-level increase in energy usage due to an expected increase in number of employees and increase in production capacity and research density. However, factoring in the reductions due to 2019 Title 24 standards, consistent with the CEC, a reduction of 10.7% in electricity usage and 1% in natural gas usage would be expected, even when incorporating the 105% increase from CEQA Baseline usage. As a result, there is a net decrease in electricity and natural gas usage for the Year 10 Project and

[76] The total electricity purchased was 196.9 MMBtu/year in 2016 and 200.2 MMBtu/year in 2017, representing a 1.6% increase in electricity consumption. The total natural gas purchased was 2030 MM Gal/year in 2016 and 2128 MM Gal/year in 2017 representing a 4.8% increase in consumption between the two years. Based on these estimates, the increase in energy usage was conservatively assumed to be about 5%.

Year 30 Project. CalEEMod® default enclosed parking structure lighting rates do not incorporate the 2019 Title 24 standards and these rates were reduced by 35% to reflect the 2019 Title 24 standards.[77,78,79]

Since the City of Berkeley has banned the use of natural gas in any newly constructed commercial or residential building (though as discussed in **Section 3.4.2**, manufacturing laboratory, and production are excluded), all the new administration, maintenance, and warehouse buildings are not expected to have natural gas consumption in the Year 10 Project and Year 30 Project; electric appliances will be installed in these all buildings to supply the required energy. The electricity usage for the Year 10 Project and Year 30 Project account for the increase in electricity use due to switching from natural gas to electric appliances. The methodology used to account for the electricity increase due to switching from natural gas is approximated by assuming a one-to-one conversion of energy in MMBTU.

Energy use emission factors are provided in Appendix B, **Table OP-7**, and energy related emissions are provided in Appendix B, **Table OP-8.**

Mobile-source emissions would result from vehicle trips (automobile and truck) associated with the Proposed Project and mobile emissions were calculated using EMission FACtor model (EMFAC) 2017 emission factors for operational years 2025 and 2035 for the Year 10 Project and Year 30 Project, respectively. Operational emissions for the vehicle trips provided by Fehr & Peers[80] were based on net new trips (i.e., vehicle trips from CEQA Baseline were subtracted from estimated vehicle trips associated with the Proposed Project, as shown in Appendix B, **Table OP-9** and **Table OP-10**). Mobile emissions for entrained road dust are based on Alameda County specific silt loadings as shown in Appendix B, **Table OP-11**.[81] **Figure 11** shows the modeled operational traffic routes used in modeling operational mobile-source emissions.

Potential emissions from emergency diesel generators (stationary sources) were estimated based on emission factors from manufacturer specification sheets. Existing operations include six emergency generators ranging in size from 125 kilowatts (kW) to 2,000 kW. Bayer indicated that two of the existing generators would be replaced with two new 2,000 kW diesel generators in Year 10. The remaining four existing generators would be replaced with three new 2,000 kW generators in Year 30. BAAQMD has published the Diesel Free By '33 initiative which proposes to eliminate diesel usage by end of 2033. The new generators

[77] Reduction in enclosed parking structure lighting rate was calculated based on lighting power density values (in Watts per square foot) for "Parking Garage Building" in Table 140.6-B of the 2016 and 2019 Building Energy Efficiency Standards.

[78] CEC, 2016 Building Energy Efficiency Standards for Residential and Nonresidential Buildings, June 2015. https://ww2.energy.ca.gov/2015publications/CEC-400-2015-037/CEC-400-2015-037-CMF.pdf, accessed November 2020.

[79] CEC, 2019 Building Energy Efficiency Standards for Residential and Nonresidential Buildings, December 2018. https://ww2.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf, accessed November 2020.

[80] Fehr & Peers, Bayer Berkeley Project – Transportation Findings. September 29, 2020

[81] CARB, Miscellaneous Process Methodology 7.9, Entrained Road Travel, Paved Road Dust, revised April 2014, https://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2016.pdf, accessed September 28, 2020.

to be installed in Year 30 were conservatively assumed to be diesel fueled even though Bayer may commit to other sources of backup power.[82] Hours of operation for existing emergency generators were based on permit limits and it was assumed that annual non-emergency operation would be limited to 50 hours, as stated in the Airborne Toxic Control Measure for Stationary Toxic Compression Ignition Engines (Section 93115,Title 17, CCR). **Figure 6, Figure 7, and Figure 8** show the locations of the generators for the CEQA Baseline, Year 10 Project, and Year 30 Project generators, respectively. Emissions from the existing generators (CEQA Baseline) were subtracted from emissions from the proposed Year 10 Project and Year 30 Project generators to obtain net emissions from the Proposed Project. **Tables OP-12 and OP-13** in Appendix B contains more information on the generators and emissions.

Emissions from natural gas boilers were estimated based on the boiler capacity, the total annual operating hours and natural gas consumption rates. The site currently includes three natural gas boilers, one boiler with a capacity of 14.7 MMBtu/hour (350 brake horsepower [bhp]) located in B44 and two boilers of capacity 37.8 MMBtu/hour (900 bhp) located in B63. The 350 bhp boiler has a utilization rate of 50% and the 900 bhp boilers have a utilization rate of 25%. The site also has two smaller boilers located in B28A that are 0.334 MMBtu/hour and 3.25 MMBtu/hour. These boilers provide heating to the building. These two boilers are exempt from BAAQMD permitting due to their size and capacity. The two smaller boilers were not included in the HRA as the impacts from these boilers are relatively minor. **Figure 9** shows the location of the existing boilers. The existing boilers will continue to operate for the Year 10 Project and Year 30 Project. The steam consumption for the Year 10 Project and Year 30 Projected are expected to increase by roughly 17% compared to existing permitted levels. In the Year 10 Project, an additional 400 bhp boiler would be added in order to accommodate this increase in usage. The 17% increase in steam usage is based on the increase in engine horsepower by 400 BHP from the current configuration which operates one 350 HP boiler and two 900 HP boiler to service the site with a boiler efficiency of 80%, plus other ancillary gas usage.[83] **Figure 10** show the locations of boilers in the Year 10 Project and Year 30 Project. The utilization rates and emissions for the boilers are shown in Appendix B, **Table OP-14** and **Table OP-15** for the CEQA Baseline, Year 10 Project, and Year 30 Project operations.

Bayer also anticipates a small increase in IPA usage. As a conservative estimate, manufacturing lab related emissions for Year 10 and Year 30 are assumed to be at the permit limit of 54,200 lb VOC/year. Production space is increasing under the Proposed Project, however, there are chemical reduction elements incorporated into Bayer's Proposed Project operations that would ultimately reduce chemical usage associated with the Proposed Project production. As a result, even with an increase in production space, a decrease in volatile chemical usage in the production area is anticipated for the Proposed Project. Therefore, this analysis does not anticipate increased volatile chemical usage or emissions in either the laboratories or production areas.

[82] BAAQMD. Diesel Free by '33. https://dieselfree33.baaqmd.gov/, accessed October 2020.

[83] The 17% increase in natural gas usage is calculated as the increase in BHP rating for all boilers based on the total BHP rating for the existing boilers (2,150 BHP) and proposed increase in rating for Boilers in Year 10 and Year 30 (2,550 BHP) with a boiler efficiency of 80% as ((2550 – 2150)/2150)*0.8 =~15%. The increase in natural gas usage also includes other ancillary gas usage.

4.9.2.3 Proposed Project

Table 6 presents construction-related emissions that would result from the Proposed Project, calculated in terms of average daily emissions for the construction period. The maximum average daily emission rate during construction of the Proposed Project is compared to significance thresholds to establish a significance determination.

Construction emissions include emissions from both off-road construction equipment and on-road construction vehicles, including haul trucks and vendor/worker trips. Construction of any single phase of the Proposed Project's construction phasing program would result in emissions of ROG, NO_x, PM_{10}, and $PM_{2.5}$ that would be below the thresholds of significance when considered alone. Emissions from overlapping phases of the construction program were calculated by summing the average daily emissions from each active phase during that time span. As shown in **Table 6**, construction-related emissions during each phase of the construction program, including the overlap of phases, would be less than significant. Additionally, if the maximum daily construction emissions for ROG, NO_x, PM_{10}, and $PM_{2.5}$ were converted into annual emissions in units of tons per year, results would still be below significance thresholds.

Table 6: Emissions from the Proposed Project During Construction

Project [A]	Year	Average Daily Emissions (lb/day) [B]			
		ROG	NO_x	PM_{10} [C]	$PM_{2.5}$ [C]
Year 10 Construction	2024	13	7.8	0.53	0.30
	2029	3.8	1.2	0.063	0.044
Year 30 Construction	2034	5.7	3.4	0.34	0.15
	2049	18	5.7	0.27	0.14
Significance Threshold		*54*	*54*	*82*	*54*
Above Threshold?		No	No	No	No

Notes:

[A] Construction emissions for each Project were estimated using default CalEEMod® activity assumptions based on Proposed Project acreage. The construction years were determined based on expected start of operation of each building.

[B] Average daily emissions are calculated from values listed Appendix A, Tables CON-8 and CON-9 by summing all emissions in the given phase of the construction program and dividing by 260 workdays per year.

[C] PM emissions shown include exhaust emissions only. Fugitive dust emissions are addressed by the BAAQMD Construction Best Management Practices (BMPs) and were not quantified.

Source: Ramboll, 2020, Tables CON-8 and CON-9 in Appendix A.

Specifically, **Table 6** indicates that the maximum average daily emissions for the Year 10 Project and Year 30 Project construction would be 18 lbs/day for ROG, 7.8 lbs/day for NO_x,

0.53 lbs/day for PM_{10}, and 0.30 lbs/day for $PM_{2.5}$, each of which is below the respective thresholds of 54 lbs/day for ROG, NO_x, and $PM_{2.5}$ and 82 lbs/day for PM_{10}.

Therefore, criteria pollutant emissions generated from the Proposed Project during construction would be a less-than-significant air quality impact.

4.9.3 Impact AQ-2b:

At Project build-out, the operation of the Proposed Project would not result in a cumulatively considerable net increase in criteria air pollutants for which the project region is in non-attainment under an applicable federal or state ambient air quality standard. (Less than Significant)

Operation of the Proposed Project would have the potential to create air quality impacts, which would be associated primarily with mobile, area, stationary, and energy sources. Motor vehicle traffic would include daily visitor, delivery truck, and employee trips. Area sources include landscaping equipment, architectural coatings and the associated off-gassing during reapplication, and consumer products (e.g., solvents, cleaning supplies, cosmetics, toiletries). Stationary sources include emergency diesel generators, boilers and solvent cleaning. Energy sources include natural gas combustion for space and water heating and electricity usage. Each of these sources was taken into account in calculating the Proposed Project's long-term operational emissions.

Operational emissions at Proposed Project build-out were quantified consistent with the methodology identified in Section 4.8.1.2 (Impact AQ-1) for Year 10 Project and Year 30 Project. The operational emissions at the two build-out years for the Proposed Project are discussed below.

4.9.3.1 Proposed Project

The daily and annual increase in emissions associated with Year 10 Project and Year 30 Project operations are shown in **Table 7** for ROG (precursor of ozone), NO_x (precursor of ozone), PM_{10}, and $PM_{2.5}$ with results showing the contribution by source. As shown in **Table 7**, the average daily incremental project emissions for Year 10 Project operations and Year 30 Project operations are below the baseline emissions, except for $PM_{2.5}$ emissions and PM_{10} emissions for Year 30 Project operations which are approximately 0.73 lbs/day of $PM_{2.5}$ for Year 10 Project operations, 1.9 lbs/day of $PM_{2.5}$ for Year 30 Project operations, and 2.8 lbs/day of PM_{10} emissions for Year 30 Project operations. These emissions are well below the respective BAAQMD CEQA significance thresholds of 54 lbs/day for ROG, NO_x, and $PM_{2.5}$ and 82 lbs/day for PM_{10}. The maximum annual incremental project operational emissions for Year 10 Project and Year 30 Project operations are also below the respective BAAQMD CEQA significance thresholds of 10 tpy for ROG, NO_x, and $PM_{2.5}$ and 15 tpy for PM_{10}. Since most of Proposed Project operational emissions for the Year 10 Project and Year 30 Project are below the baseline year, their respective incremental emissions are negative due to the overall decrease in square footage, as well as the decrease in emission factors for mobile sources over-time.

Table 7: Incremental Operational Project Emissions – Year 10 Project and Year 30 Project

Emissions Source	Average Daily Emissions (lb/day)[A,B,C]			
	ROG	NO_x	PM_{10}	$PM_{2.5}$ [D]
Year 10 Project Emissions				
Net Architectural Coating Emissions	-2.0	0	0	0
Net Consumer Product Emissions	-0.57	0	0	0
Net Manufacturing Lab Emissions	54	0	0	0
Net Landscaping Emissions	-3.3E-04	-3.3E-04	-1.1E-04	-1.1E-04
Net Building Natural Gas Use Emissions (excl. Boilers)	-0.87	-7.9	-0.60	-0.60
Net Boiler Natural Gas Use Emissions	2.1	19	2.9	2.9
Net Generator Emissions	0.19	7.7	-0.16	-0.16
Net On-Road Fugitive Dust Emissions	0	0	-2.9	-0.43
Net On-Road Exhaust Emissions	-7.0	-25	-1.7	-1.0
Net Year 10 Project Daily Emissions (lb/day)	*46*	*-6.7*	*-2.5*	*0.66*
Net Year 10 Project Annual Emissions (tons/year)	*8.4*	*-1.2*	*-0.46*	*0.12*
Daily Significance Threshold (lb/day)	***54***	***54***	***82***	***54***
Year 10 Project Above Daily Threshold?	No	No	No	No
Annual Significance Threshold (tons/yr)	***10***	***10***	***15***	***10***
Year 10 Project Above Annual Threshold?	No	No	No	No
Year 30 Project Emissions				
Net Architectural Coating	-0.36	0	0	0
Net Consumer Products	0.65	0	0	0

Net Manufacturing Lab Emissions	54	0	0	0
Net Landscaping	4.4E-04	5.5E-05	0	0
Net Building Energy Use (excl. Boilers)	-0.79	-7.2	-0.54	-0.54
Net Boiler Natural Gas Use Emissions	2.1	19	2.9	2.9
Net Generator Emissions	0.045	2.2	-0.30	-0.30
Net On-Road Fugitive Dust	0	0	0.79	0.12
Net On-Road Exhaust	-8.0	-20	-0.11	-0.34
Net Year 30 Project Daily Emissions (lb/day)	*48*	*-6.5*	*2.7*	*1.8*
Net Year 30 Project Annual Emissions (tons/year)	*8.7*	*-1.2*	*0.49*	*0.32*
Daily Significance Threshold (lb/day)	***54***	***54***	***82***	***54***
Year 30 Project Above Daily Threshold?	No	No	No	No
Annual Significance Threshold (tons/yr)	***10***	***10***	***15***	***10***
Year 30 Project Above Annual Threshold?	No	No	No	No

Notes:

[A] Emissions estimated using CalEEMod® version 2016.3.2.

[B] Operational Criteria Air Pollutant (CAP) emissions were estimated for the Year 10 Project in 2025 and for the Year 30 Project in 2035. On-road emission factors assuming an average fleet in 2025 were used as a conservative assumption, since fleets generally become cleaner over time. Operations during all other years (while construction would still be taking place) would have less emissions than the Year 10 Project and Year 30 Project incremental emissions presented above, since only a fraction of the Proposed Project would be operational prior to full build-out.

[C] Average daily emissions were calculated assuming 365 days of operation per year.

[D] $PM_{2.5}$ are assumed to be equivalent to PM_{10} emissions for the emergency generators.

Source: Ramboll, 2020, Table OP-16 in Appendix B.

In Year 10, there is a net decrease in NO_x, and PM_{10} emissions, and a net increase in ROG and $PM_{2.5}$ emissions. The small net increase in $PM_{2.5}$ emissions is primarily due to the increase in emissions from natural gas boilers and the lower decrease in on-road emissions relative to other pollutants. The net increase in ROG emissions is due to the conservative assumption that the manufacturing lab related VOC emissions will be at the permit limit, even though there is an expected decrease in IPA usage due to the production technologies.

The increase in total ROG emissions in Year 10 are still below significance thresholds. In Year 30, there is a net decrease in NO_x emissions, and a small net increase in both PM_{10} and $PM_{2.5}$ emissions. There is also an overall increase in estimated ROG emissions in Year 30. CAP emissions from boilers are higher in Year 30 than the CEQA Baseline, leading to a net increase in ROG, NO_x, PM_{10}, and $PM_{2.5}$ emissions. However, CAP emissions from traffic exhaust and evaporation are lower in Year 30, leading to a substantial net decrease in ROG and NO_x emissions. The overall small increase in PM_{10} and $PM_{2.5}$ emissions is mainly due to increase in on-road fugitive dust, tire wear, and brake wear emissions due to a higher traffic volumes. While EMFAC2017 projects a reduction in mobile exhaust- and evaporation-based emission rates over time, emission rates from brake wear and tire wear are relatively constant over time. Additionally, fugitive road dust emission rates are assumed to be constant for the CEQA Baseline, Year 10 and Year 30 scenarios. As a result, ROG and NOx emissions decrease because the reduction in emission factors over time outweighs the increase in trip generation, while PM_{10} and $PM_{2.5}$ emissions increase. Similar to Year 10, the main reason for overall increase in ROG emissions is due to the conservative assumption that manufacturing lab related VOC emissions will be at the permit limit, however the increase in ROG emissions are still below the significance thresholds.

Therefore, because the Proposed Project's incremental emissions would be below the operational significance criteria, the Proposed Project would have a less-than-significant air quality impacts.

4.9.4 Impact AQ-3

Construction and operation of the Proposed Project would not generate toxic air contaminants, including DPM, at levels which would expose sensitive receptors to substantial pollutant concentrations. (Less than Significant)

Construction activities, such as demolition, site preparation, grading, building construction, paving, and architectural coating, would affect localized air quality during the construction phases of the Proposed Project. Short-term emissions from construction equipment during these site preparation activities would include directly emitted PM ($PM_{2.5}$ and PM_{10}) and TACs such as DPM. Additionally, the long-term emissions from operation of the Proposed Project such as mobile, laboratory, and stationary sources, as described under Impact AQ-1 and Impact AQ-2, would include PM ($PM_{2.5}$) and TACs such as DPM and some compounds or variations of ROGs. The generation of these short- and long-term emissions could potentially expose sensitive receptors to substantial pollutant concentrations of TACs, resulting in a localized health risk. Therefore, an HRA was conducted for the Proposed Project to evaluate the potential health risks to nearby residents resulting from project implementation.

4.9.4.1 Methodology

In general, an HRA is used to determine if chemicals pose a significant risk to human health and, if so, under what circumstances. For the Proposed Project, an HRA was conducted in order to identify maximum off-site health risks due to inhalation of $PM_{2.5}$ and TACs. The HRA prepared for the Proposed Project estimates health impacts associated with $PM_{2.5}$ and TACs, consistent with BAAQMD guidance.[84] Detailed inputs and methods used for this analysis are provided in Appendix C, **Tables HRA-1 to HRA-11.**

[84] BAAQMD, CEQA Air Quality Guidelines, May 2017.

Near-field air dispersion modeling of TACs and $PM_{2.5}$ emissions from Proposed Project sources was conducted using USEPA's American Meteorological Society/Environmental Protection Agency Regulatory Air Dispersion Model (AERMOD) air dispersion model (version 19191). This model requires inputs such as source parameters, meteorological parameters, topography information, and receptor parameters. Concentrations of $PM_{2.5}$ and TACs were estimated at nearby sensitive receptors, including residences, schools/daycare facilities, senior care facilities, and in-patient medical centers.[85] Construction off-road equipment emissions are modeled as an area source covering the parcel under construction. On-road construction trucks (vendor and haul trucks) are not included in the modeling since there are only a maximum of 84 trucks per day for the maximum construction scenario. BAAQMD's Recommended Methods for Screening and Modeling Local Risks and Hazards[86] considers fewer than 500 trucks per day to be a minor, low-impact source. Operational traffic sources were modeled as adjacent volume sources along the major roadways identified by the traffic consultant. Model parameters for traffic sources are based on the 2020 San Francisco Community Risk Reduction Plan[87] modeling defaults for passenger carsAs mentioned in the Transportation Analysis memo[88], the project is expected to generate mostly passenger vehicle trips, with some pedestrian, bike, transit and heavy duty truck trip. Since project specific fleet information was not available, , the traffic fleet is assumed to be equivalent to the default fleet for Alameda county, as predicted by EMFAC2017. Emergency generators and boilers were modeled as point sources, with source parameters based on equipment-specific information, where available. Emergency generators and boilers that did not have project-specific information relied on the 2020 San Francisco Community Risk Reduction Plan defaults for standby generators and sources with incomplete modeling information for default modeling parameters.

While Bayer does not anticipate an increase in isopropyl alcohol (IPA) usage in laboratory/production/warehouse space as a result of the Proposed Project, in an overabundance of caution, this analysis presumes that Bayer may emit IPA under the Project at the permitted limit. To estimate health impacts associated with IPA usage, Bayer provided IPA usage under baseline conditions based on average actual usage of IPA at the Bayer facilities in 2015 for laboratory/production/warehouse buildings that remained operational in 2020. The total IPA usage was assumed to be distributed across each lab building based on percent breakdowns provided by Bayer. The total VOC emissions in Year 10 and Year 30 is set equal to the permit limit, as Bayer is not seeking a reduction to IPA usage as part of the

[85] On November 9, 2005, the USEPA promulgated final revisions to the Federal Guideline on Air Quality Models, in which it recommended that AERMOD be used for dispersion modeling evaluations of criteria air pollutant and toxic air pollutant emissions from typical industrial facilities. USEPA Preferred/Recommended Models, AERMOD Modeling System, https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models, accessed September 28, 2020.

[86] BAAQMD, Recommended Methods for Screening and Modeling Local Risks and Hazards, May 2012, http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20Modeling%20Approach.ashx, accessed September 28, 2020.

[87] San Francisco Planning Department, San Francisco Citywide Health Risk Assessment: Technical Support Documentation. February 2020. Available online at: San Francisco Citywide Health Risk Assessment Technical Support Document (sfdph.org)

[88] Fehr & Peers, Bayer Berkeley Project – Transportation Findings. September 29, 2020

Proposed Project. **Figure 12** shows the locations of laboratory spaces that are modeled as part of the IPA usage health risk assessment. The modeled emission rates are presented in **Table HRA-1f**.

Ammonia usage is also not expected to increase with the Proposed project as stated in Section 2.6. Since the ammonia refrigeration system is a closed pressurized system, emissions are limited to minor potential leaks from the process components (pumps, valves, flanges, etc.) in the system, as a result of which risks are expected to be negligible.

All modeled source parameters are outlined in Appendix C, **Table HRA-2**.

These concentrations were then used in combination with toxicity and exposure information to estimate inhalation health risks following the most recent BAAQMD Recommended Methods for Screening and Modeling Local Risks and Hazards. The exposure parameters were obtained using risk assessment guidelines from the California Environmental Protection Agency[89] and BAAQMD.[90] Exposure parameters include daily breathing rate, exposure time, exposure frequency, exposure duration, average time, and inhalation intake factors. Daily breathing rates for residents reflect default breathing rates from Cal/EPA 2015 as follows: 95th percentile 24-hour daily breathing rate for age 3rd trimester and 0-<2 years; 80th percentile 24-hour daily breathing rate for age 2-<16 years; and 80th percentile 24-hour daily breathing rate for age 16-30 years.[91] Daily breathing rates for daycare children assumes 2 hour moderate intensity and 6 hour light intensity activity. The fraction of time spent at home is conservatively assumed to be 1 (i.e., 24 hours/day) for all age bins except Age 16-30 Years. The fraction of time spent at home is assumed to be 0.73 for Ages 16-30 Years. The exposure frequency for residents reflects default residential exposure frequency from Cal/EPA 2015. The exposure frequency for daycare reflects default worker exposure frequency from Cal/EPA 2015, assuming a daycare child is at the daycare center when the parents are at work. Age sensitivity factors account for an "anticipated special sensitivity to carcinogens" of infants and children as recommended in the OEHHA Technical Support Document and current OEHHA Guidance. This approach is consistent with the cancer risk adjustment factor calculations recommended by BAAQMD. To estimate excess lifetime health impacts, a 30-year lifetime exposure was assumed, consistent with OEHHA Guidance. **Table HRA-2 to HRA-4** in Appendix C provides more details of the AERMOD modeling inputs, toxics analysis, and exposure parameters.

The health risk analysis for construction sources estimated DPM and $PM_{2.5}$ from off-road equipment estimated using methods and emission factors consistent with CalEEMod®. For operational traffic sources, DPM, speciated total organic gas (TOG), and $PM_{2.5}$ concentrations

[89] OEHHA, Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessment, February 2015, https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0, accessed September 28, 2020.

[90] BAAQMD, Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines, January 2010, http://www.baaqmd.gov/~/media/Files/Engineering/Air%20Toxics%20Programs/hrsa_guidelines.ashx, accessed September 28, 2020.

[91] Cal/EPA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

are based on data generated using EMFAC2017 operational project vehicle traffic.[92] Operational emissions from the emergency standby generators were based on calculations using emission rates in the manufacturer's specification sheets. Emissions of TACs from boilers were estimated using AP-42 emission factors for natural gas combustion, assuming 8,760 hours of operation per year at maximum heat input rate, with a utilization rate to reflect actual usage.[93] Laboratory IPA emissions were estimated based on IPA throughput by building, hours of operation, and days of operation provided by Bayer. Emission rates for each source are included in **Tables HRA-1a** through **HRA-1f**.

DPM, TOG, and $PM_{2.5}$ emissions rates (**Table HRA-1**) were multiplied by unit dispersion factors generated in AERMOD to predict the maximum DPM, TOG, and $PM_{2.5}$ concentrations, respectively, at any receptor. DPM and speciated TOG concentrations were then used to determine excess lifetime cancer risk and chronic non-cancer health index based on the HRA methodology published by the OEHHA Guidance. Further details on the source parameters are provided in **Table HRA-2** in Appendix C.

The DPM and $PM_{2.5}$ concentrations for each phase of construction, were modeled separately by year of construction, to account for emissions specific to construction activities occurring in specific time periods. Construction modeling used the allowable construction workday from 7 am to 7 pm for all construction related activities.

Operational on-road traffic, emergency generator emissions, boilers, and laboratory IPA usage were also modeled to determine pollutant concentrations at off-site receptors.

The roadways traveled on during Proposed Project operations were provided by Fehr & Peers. These roadways were modelled as volume sources located on the centerline of the roadway, representing two directional traffic where applicable (one-way roads modeled by same methodology). The roadway width and associated center-to-center distance of volume sources and initial lateral dimension were based on the number of lanes. Each lane was assigned a width of 3.7 meters (12 feet) with an additional 6 meters added based on guidance. Actual volume source dimensions were adjusted to ensure even spacing of volume sources between intersections. The release height was assumed to be 1.7 meters, representing passenger cars rather than trucks. The initial vertical dimension was calculated based on haul road guidance. The road segments were modelled with unit emissions (so-called "chi over q" [X/Q] method) with a diurnal traffic pattern from a regional traffic study[94] applied using the Variable Emission Factors (EMISFACT) option in AERMOD.

The emergency generators were modeled during all hours outside of 7:30 am to 3:30 pm, consistent with BAAQMD permits which prevent operation of generators during school hours. The boilers were assumed to operate any time of the day and were modeled 24 hours per day.

Emergency generators and boilers were modeled as point sources using the specific release parameters for the sources when available. For the Year 10 Project and Year 30 Project where the specific release parameters for emergency generators were not available, default

[92] Only certain compounds, or species, of total organic gases are also TACs.

[93] USEPA, AP-42 Chapter 1-4. Natural Gas Combustion, https://www3.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf, accessed October 1, 2020.

[94] Provided by Fehr & Peers.

release parameters for diesel generators from BAAQMD were applied. Both the emergency generators and boiler models included downwash details specific to the building layouts in those specific years. The Baseline, Year 10, and Year 30 scenarios have different layouts of generators, boilers, and buildings on-site. As such, AERMOD was used to analyze each site layout scenario. The Baseline, Year 10, and Year 30 scenarios each have their own unique AERMOD files that reflect the layout for each scenario.

Laboratory IPA usage was modeled as area sources on laboratory building rooftops. Seven buildings were identified in the baseline case as using IPA; eight buildings were identified in the Proposed Project for IPA emissions. Each building rooftop was modeled as an area source with the release height set to the building height. The buildings modeled for laboratory IPA usage emissions are shown in **Figure 12**.

The excess cancer risk, non-cancer chronic HI and $PM_{2.5}$ concentrations from all sources as well as the excess cancer risk from the sum of all existing emissions sources for each receptor point were then determined.

Children in off-site daycare centers were conservatively assumed to be present at one location for the first six years of the Proposed Project for both the Year 10 Project and Year 30 Project starting at six weeks of age.[95] The locations of modeled off-site receptors are presented in **Figure 2**.

$PM_{2.5}$ concentrations and non-cancer chronic health index are evaluated on an annual average basis. However, excess cancer risk is evaluated based on lifetime exposure to pollutant concentrations; therefore, the analysis evaluated excess cancer risk as a result of exposure to both construction and operational emissions together. The exposure parameters and inhalation factors for the Year 10 Project and Year 30 Project are the same, and health risk results for both the projects are presented below.

4.9.4.2 Health Impacts from Year 10 Project Construction and Operation at Off-Site Residents:

The maximum estimated excess lifetime cancer risk from all Year 10 Project sources (assuming a residential receptor was born during construction and exposed to Proposed Project-related emissions for 30 years) at off-site residential locations is presented for the Proposed Project in **Table 8**. The off-site residential receptors are conservatively assumed to be exposed to operational emissions from Year 10 Project buildout conditions for 29 years, even though the Year 30 Project buildout conditions could become fully operational and replace these conditions within the first ten years. In reality, it is most likely that a receptor would be exposed to Year 10 buildout conditions followed by Year 30 buildout conditions when Year 30 operations resume. However, for purposes of this analysis, each buildout condition is conservatively analyzed assuming maximum exposure over a Year 30 time period to ensure that the maximum potential impacts are presented. As shown in **Table 8**, exposure to Proposed Project air emissions results in health impacts of a total excess cancer risk at the maximally exposed individual sensitive residential receptor of 1.3 in a million,

[95] OEHHA Guidance recommends evaluating health impacts for children at daycare facilities from 0 to 6 years. However, California daycares are not permitted to enroll children younger than six weeks of age. For more information, a summary of California state requirements for daycare centers at https://www.daycare.com/california/

which is well below 10 in a million, the BAAQMD threshold of significance for individual projects. Therefore, the Proposed Project would result in a less-than-significant impact.

The maximum estimated $PM_{2.5}$ concentrations from all Year 10 Project sources at off-site residents are also presented for the Proposed Project in **Table 8**. As shown in **Table 8**, emissions from the Proposed Project would result in a $PM_{2.5}$ concentration at the maximally exposed individual sensitive receptor of 0.17 µg/m^3. This is below 0.3 µg/m^3, the BAAQMD threshold of significance for individual projects. Therefore, this would be a less-than-significant impact.

The maximum estimated excess chronic non-cancer hazard index and non-cancer acute hazard index from all Year 10 Project sources at off-site residents are also presented for the Proposed Project in **Table 8**. As shown in **Table 8**, emissions from the Proposed Project would result in a chronic HI at the maximally exposed individual sensitive receptor of 0.0060 and an acute HI of 0.061. These are both below 1.0, the BAAQMD threshold of significance for individual projects. Therefore, this would be a less-than-significant impact.

Table 8: Lifetime Health Impacts from the Proposed Project at Maximally Exposed Off-Site Resident for Year 10 Project

Source		Lifetime Excess Cancer Risk (in a million) [A]	$PM_{2.5}$ Concentration (µg/m^3) [B]	Chronic HI (unitless) [C]	Acute HI (unitless)
Construction	Demolition	0.031	0.0017	2.1E-04	--
	Year 10 Construction	0.90	0.0058	7.0E-04	--
Emergency Generators [D]		0.30	-0.0016	-3.3E-04	--
Boilers [D]		0.094	0.16	0.0052	0.0068
Net Traffic [D]		-0.0031	-2.8E-05	-6.2E-07	-6.0E-06
Lab IPA Usage [E]		--	--	2.6E-04	0.054
Total		1.3	0.17	0.0060	0.061
BAAQMD Thresholds		*10*	*0.3*	*1.0*	*1.0*
Significant?		No	No	No	No

Notes:

[A] Lifetime excess cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year period, beginning during the first year of construction. Thus, the risk assessment takes into account a receptor living near the Proposed Project site beginning during construction and continuing through operations. The cancer risks were estimated using the equations specified in Tables HRA-5 through HRA-9 in Appendix C.

[B] The Maximum Annual Project $PM_{2.5}$ Concentration is the sum of the maximum annual $PM_{2.5}$ concentration that would be attributable to construction emissions and the maximum annual $PM_{2.5}$ concentration that would be attributable to operational emissions. To be conservative, impacts from construction are conservatively added to impacts from operation. Since operations would overlap with several of the construction phases, the potential overlap has been accounted for.

[C] The Maximum Annual Project chronic hazard index is the sum of the maximum annual chronic hazard index that would be attributable to construction emissions and the maximum annual chronic hazard index that would be attributable to operational emissions. To be conservative, impacts from construction are conservatively added to impacts from operation. Since operations would overlap with several of the construction phases, the potential overlap has been accounted for.

[D] The impacts from the emergency generators and boilers would be the impacts from the Proposed Project's activity minus the impacts from the CEQA Baseline activity. Traffic volumes modeled are incremental from the CEQA Baseline, so the baseline activity is not explicitly subtracted here.

[E] The impacts from the Lab IPA Usage would be the impacts from the Proposed Project activity, assuming operations up to the full permit limit across existing and Proposed Project buildings, minus the CEQA Baseline activity, which is based on actual, historical usage at existing buildings.

Source: Ramboll, 2020; **Table HRA-9** in Appendix C.

4.9.4.3 Health Impacts from Year 10 Project Construction and Operation at Off-Site Daycare Children:

The maximum estimated excess lifetime cancer risk from all Year 10 Project sources at off-site daycare locations (assuming a child enters daycare at six weeks old at the start of construction and is exposed to Proposed Project emissions until age six) is presented for the Proposed Project in **Table 9**. As shown in **Table 9**, exposure to Proposed Project air emissions results in a total excess cancer risk at the maximally exposed child in a daycare center of 3.6 in a million, which is well below 10 in a million, the BAAQMD threshold of significance for individual projects. Therefore, the Proposed Project would result in a less-than-significant impact.

The maximum estimated $PM_{2.5}$ concentrations from all Year 10 sources at off-site daycare are also presented for the Proposed Project in **Table 9.** To ensure the maximum individual year is captured for the purposes of $PM_{2.5}$ exposure, the daycare child was conservatively assumed to be exposed to all years of construction and operation, although they would only be present for approximately six years total. As shown in **Table 9,** emissions from the Proposed Project would result in a $PM_{2.5}$ concentration at the maximally exposed individual sensitive receptor of 0.14 $\mu g/m^3$ for the Proposed Project. This is below 0.3 $\mu g/m^3$, the BAAQMD threshold of significance for individual projects. Therefore, this would be a less-than-significant impact.

The maximum estimated excess chronic non-cancer and acute non-cancer hazard index from all Year 10 Project sources at off-site residents are also presented for the Proposed Project in **Table 9**. To ensure the maximum individual year is captured for the purposes of chronic non-cancer exposure, the daycare child was conservatively assumed to be exposed to all years of construction and operation, although they would only be present for approximately

six years total. As shown in **Table 9**, emissions from the Proposed Project would result in a chronic HI at the maximally exposed individual sensitive receptor of 0.0042 and an acute HI of 0.043. These are both below 1.0, the BAAQMD threshold of significance for individual projects. Therefore, this would be a less-than-significant impact.

Table 9: Lifetime Health Impacts from the Proposed Project at Maximally Exposed Off-Site Daycare Children for Year 10 Project

Source		Lifetime Excess Cancer Risk (in a million) [A]	$PM_{2.5}$ Concentration ($\mu g/m^3$) [B]	Chronic HI (unitless) [C]	Acute HI (unitless)
Construction	Demolition	0.19	0.0014	1.8E-04	--
	Year 10 Construction	3.2	0.0084	0.0013	--
Emergency Generators [D]		-0.013	-0.010	-0.0019	--
Boilers [D]		0.17	0.14	0.0045	0.0079
Net Traffic [D]		-0.0018	-4.3E-05	-9.6E-07	-1.1E-05
Lab IPA Usage [E]		--	--	1.5E-04	0.035
Total		3.6	0.14	0.0042	0.043
BAAQMD Thresholds		*10*	*0.3*	*1.0*	*1.0*
Significant?		No	No	No	No

Notes:

[A] Lifetime excess cancer risk from construction and operations are combined since cancer risk is evaluated over an approximately six-year period, beginning during the first year of construction. Thus, the risk assessment takes into account a receptor living near and going to daycare near the Proposed Project site beginning during construction and continuing through operations. The cancer risks were estimated using the equation specified in Tables HRA-5 through HRA-9 in Appendix C.

[B] The Maximum Annual Project $PM_{2.5}$ Concentration is the sum of the maximum annual $PM_{2.5}$ concentration that would be attributable to construction emissions and the maximum annual $PM_{2.5}$ concentration that would be attributable to operational emissions. To be conservative, impacts from construction are conservatively added to impacts from operation. Since operations would overlap with several of the construction phases, the potential overlap has been accounted for.

[C] The Maximum Annual Project chronic hazard index is the sum of the maximum annual chronic hazard index that would be attributable to construction emissions and the maximum annual chronic hazard index that would be attributable to operational emissions. To be conservative, impacts from construction are conservatively added to impacts from operation. Since operations would overlap with several of the construction phases, the potential overlap has been accounted for.

[D] The impacts from the emergency generators and boilers would be the impacts from the Proposed Project's activity minus the impacts from the CEQA baseline activity. Traffic volumes modelled are incremental from the CEQA Baseline, so the baseline activity is not explicitly subtracted here.

[E] The impacts from the Lab IPA Usage would be the impacts from the Proposed Project activity, assuming operations up to the full permit limit across existing and Proposed Project buildings, minus the CEQA Baseline activity, which is based on actual, historical usage at existing buildings.

Source: Ramboll, 2020; **Table HRA-9** in Appendix C.

4.9.4.4 Health Impacts from Year 30 Project Construction and Operation at Off-Site Residents:

The maximum estimated excess lifetime cancer risk from all Year 30 Project sources at off-site residential locations (assuming a resident was born during construction and exposed to project-related emissions for 30 years) is presented for the Proposed Project in **Table 10**. As shown in **Table 10**, exposure to Proposed Project air emissions results in a total excess cancer risk at the maximally exposed individual sensitive residential receptor of -0.17 in a million, which is well below 10 in a million, the BAAQMD threshold of significance for individual projects. Therefore, the Proposed Project would result in a less-than-significant impact.

The maximum estimated $PM_{2.5}$ concentrations from all Year 30 Project sources at off-site residents are also presented for the Proposed Project in **Table 10**. As shown in **Table 10**, emissions from the Proposed Project would result in $PM_{2.5}$ concentrations at the maximally exposed individual sensitive receptor of 0.16 µg/m^3. This is below 0.3 µg/m^3, the BAAQMD threshold of significance for individual projects. Therefore, this would be a less-than-significant impact.

The maximum estimated excess chronic non-cancer and acute non-cancer hazard index from all Year 30 Project sources at off-site residents are also presented for the Proposed Project in **Table 10**. As shown in **Table 10**, emissions from the Proposed Project would result in a chronic HI at the maximally exposed individual sensitive receptor of 0.0052 and an acute HI of 0.070. These are both below 1.0, the BAAQMD threshold of significance for individual projects. Therefore, this would be a less-than-significant impact.

Table 10: Lifetime Health Impacts from the Proposed Project at Maximally Exposed Off-Site Resident for Year 30 Project

Source	Lifetime Excess Cancer Risk (in a million) [A]	$PM_{2.5}$ Concentration (µg/m^3) [B]	Chronic HI (unitless) [C]	Acute HI (unitless)
Year 30 Construction	0.049	0.0085	8.9E-04	--
Emergency Generators [D]	-0.32	-0.0041	-7.0E-04	--
Boilers [D]	0.11	0.15	0.0047	0.017
Net Traffic [D]	5.3E-04	7.4E-06	1.2E-07	-3.5E-06
Lab IPA Usage [E]	--	--	3.0E-04	0.052
Total	-0.17	0.16	0.0052	0.070
BAAQMD Thresholds	*10*	*0.3*	*1.0*	*1.0*
Significant?	No	No	No	No

Notes:

[A] Lifetime excess cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year period, beginning during the first year of construction. Thus, the risk assessment takes into account a receptor living near the Proposed Project site beginning during construction and continuing through operations. The cancer risks were estimated using the equation specified in Tables HRA-5 through HRA-9 in Appendix C.

[B] The Maximum Annual Project $PM_{2.5}$ Concentration is the sum of the maximum annual $PM_{2.5}$ concentration that would be attributable to construction emissions and the maximum annual $PM_{2.5}$ concentration that would be attributable to operational emissions. To be conservative, impacts from construction are conservatively added to impacts from operation. Since operations would overlap with several of the construction phases, the potential overlap has been accounted for.

[C] The Maximum Annual Project chronic hazard index is the sum of the maximum annual chronic hazard index that would be attributable to construction emissions and the maximum annual chronic hazard index that would be attributable to operational emissions. To be conservative, impacts from construction are conservatively added to impacts from operation. Since operations would overlap with several of the construction phases, the potential overlap has been accounted for.

[D] The impacts from the emergency generators and boilers would be the impacts from the Proposed Project's activity minus the impacts from the CEQA baseline activity. Traffic volumes modelled are incremental from the CEQA baseline, so the baseline activity is not explicitly subtracted here.

[E] The impacts from the Lab IPA Usage would be the impacts from the Proposed Project activity, assuming operations up to the full permit limit across existing and Proposed Project buildings, minus the CEQA Baseline activity, which is based on actual, historical usage at existing buildings.

Source: Ramboll, 2020; **Table HRA-10** in Appendix C.

4.9.4.5 Impacts from Year 30 Project Construction and Operation at Off-Site Daycare Children:

The maximum estimated excess lifetime cancer risk from all Year 30 Project sources at off-site daycare locations (assuming a child enters daycare at six weeks old at the start of construction and is exposed to Project emissions until age six) is presented for the Proposed Project in **Table 11**. As shown in **Table 11,** exposure to Proposed Project air emissions results in a total excess cancer risk at the maximally exposed child at a daycare center of -0.33 in a million, which is well below 10 in a million, the BAAQMD threshold of significance for individual projects. Therefore, the Proposed Project would result in a less-than-significant impact.

The maximum estimated $PM_{2.5}$ concentrations from all Year 30 Project sources at off-site daycare centers are also presented for the Proposed Project in **Table 11**. To ensure the maximum individual year is captured for the purposes of $PM_{2.5}$ exposure, the daycare child was conservatively assumed to be exposed to all year of construction and operation, although they would only be present for approximately six years total. As shown in **Table 11**, emissions from the Proposed Project would result in $PM_{2.5}$ concentrations at the maximally exposed individual sensitive receptor of 0.08 $\mu g/m^3$. This is below 0.3 $\mu g/m^3$, the BAAQMD threshold of significance for individual projects. Therefore, this would be a less-than-significant impact.

The maximum estimated excess chronic non-cancer and acute non-cancer hazard index from all Year 30 Project sources at off-site residents are also presented for the Proposed Project in **Table 11.** To ensure the maximum individual year is captured for the purposes of chronic non-cancer exposure, the daycare child was conservatively assumed to be exposed to any year of construction and operation, although they would only be present for approximately

six years total. As shown in **Table 11**, emissions from the Proposed Project would result in a chronic HI at the maximally exposed individual sensitive receptor of 0.0017 and an acute HI of 0.043. These are both below 1.0, the BAAQMD threshold of significance for individual projects. Therefore, this would be a less-than-significant impact.

Table 11: Lifetime Health Impacts from the Proposed Project at Maximally Exposed Off-Site Daycare Children for Year 30 Project

Source	Lifetime Excess Cancer Risk (in a million) [A]	$PM_{2.5}$ Concentration ($\mu g/m^3$) [B]	Chronic HI (unitless) [C]	Acute HI (unitless)
Year 30 Construction	0.014	0.010	1.3E-04	--
Emergency Generators [D]	-0.36	-0.010	-3.9E-04	--
Boilers[D]	0.0085	0.083	0.0018	0.0095
Net Traffic [D]	1.4E-04	-3.2E-05	1.8E-07	-7.0E-06
Lab IPA Usage [E]	--	--	1.5E-04	0.034
Total	-0.33	0.083	0.0017	0.043
BAAQMD Thresholds	*10*	*0.3*	*1.0*	*1.0*
Significant?	No	No	No	No

Notes:

[A] Lifetime excess cancer risk from construction and operations are combined since cancer risk is evaluated over an approximately six-year period, beginning during the first year of construction. Thus, the risk assessment takes into account a receptor living near and going to daycare near the Proposed Project site beginning during construction and continuing through operations. The cancer risks were estimated using the equation specified in Tables HRA-5 through HRA-9 in Appendix C.

[B] The Maximum Annual Project $PM_{2.5}$ Concentration is the sum of the maximum annual $PM_{2.5}$ concentration that would be attributable to construction emissions and the maximum annual $PM_{2.5}$ concentration that would be attributable to operational emissions. To be conservative, impacts from construction are conservatively added to impacts from operation. Since operations would overlap with several of the construction phases, the potential overlap has been accounted for.

[C] The Maximum Annual Project chronic hazard index is the sum of the maximum annual chronic hazard index that would be attributable to construction emissions and the maximum annual chronic hazard index that would be attributable to operational emissions. To be conservative, impacts from construction are conservatively added to impacts from operation. Since operations would overlap with several of the construction phases, the potential overlap has been accounted for.

[D] The impacts from the emergency generators and boilers would be the impacts from the Proposed Project's activity minus the impacts from the CEQA baseline. Traffic volumes modelled are incremental from the CEQA baseline, so the baseline activity is not explicitly subtracted here.

[E] The impacts from the Lab IPA Usage would be the impacts from the Proposed Project activity, assuming operations up to the full permit limit across existing and Proposed Project buildings, minus the CEQA Baseline activity, which is based on actual, historical usage at existing buildings.

Source: Ramboll, 2020; **Table HRA-10** in Appendix C.

4.9.5 Impact AQ-4

Construction and operation of the Proposed Project would not locate sensitive receptors near existing sources of objectionable odors or construct any sources of objectionable odors. (Less than Significant)

The occurrence and severity of potential odor impacts depends on numerous factors. The nature, frequency, and intensity of the source, the wind speeds and direction, and the sensitivity of the receiving location each contribute to the intensity of the impact. While offensive odors rarely cause any physical harm, they can be unpleasant and cause distress among the public and generate citizen complaints. BAAQMD describes that odor sources of concern in its CEQA guidelines include wastewater treatment plants, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, fiberglass manufacturing facilities, auto body shops, rendering plants, and coffee roasting facilities. Facilities that are regulated by CalRecycle (e.g., landfills, composting facilities) are required to have Odor Impact Minimization Plans in place to mitigate potential odor impacts. None of these source types are proposed as part of the Proposed Project, and thus the Project does not anticipate any odor impacts.

The Proposed Project does not involve the location of any new sensitive receptors.

During construction, diesel exhaust from construction equipment would generate some odors. However, construction-related odors would be temporary and would not persist upon construction completion. Therefore, odor impacts from operation and construction would be less than significant.

The Proposed Project would have a less than significant impact with respect to generating odor.

4.10 Cumulative Impacts

This section discusses the cumulative impacts to air quality that could result from the Proposed Project in conjunction with past, present, and reasonably foreseeable future projects. The geographic scope of analysis for cumulative air quality construction impacts varies depending on the specific impact. For regional criteria air pollutants, the cumulative area includes the San Francisco Bay Area Air Basin. For toxic air contaminants, it includes reasonably foreseeable projects within approximately 1,000 feet of the Proposed Project site consistent with BAAQMD CEQA guidance.

Impact C-AQ-1:

The Proposed Project, in combination with past, present, and reasonably foreseeable future development in the project area, would not contribute to cumulative regional air quality impacts. (Less than Significant)

The contribution of a project's individual air emissions to regional air quality impacts is, by its nature, a cumulative effect. Emissions from past, present, and future projects in the region also have or will contribute to adverse regional air quality impacts on a cumulative basis. No single project by itself would be sufficient in size to result in non-attainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative air quality conditions.[96] As described above, the project-level thresholds for

[96] BAAQMD, CEQA Air Quality Guidelines, May 2017, p. 2-1.

criteria air pollutants are based on levels by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants. Therefore, because the Proposed Project's emissions do not exceed the project-level thresholds, the Proposed Project would not result in a considerable contribution to cumulative regional air quality impacts. Therefore, this impact would be less than significant.

Impact C-AQ-2:

The Proposed Project, in combination with past, present, and reasonably foreseeable future development in the project area, would not contribute to cumulative health risk impacts on sensitive receptors. (Less than Significant)

The HRA takes into account the cumulative contribution of existing localized health risks to sensitive receptors from sources included in the vicinity of the Proposed Project area plus the Proposed Project's sources.

BAAQMD's CEQA guidelines state that a project would have a cumulative significant impact if the aggregated total of all past, present and foreseeable future sources located within a 1,000 foot radius from the fenceline of the project or receptor, plus the contribution from the project results in an excess cancer risk impact of more than 100 in a million, a chronic HI or acute HI greater than 10, or an annual $PM_{2.5}$ concentration above 0.8 µg/m^3.

TAC and $PM_{2.5}$ emissions generated from sources within 1,000 feet of the Proposed Project site include freeways, high volume roadways, trucks, stationary sources, railways, etc.

The cumulative risks and $PM_{2.5}$ concentrations are presented in **Tables 12 and 13**. Cumulative health risks, chronic HI, acute HI, and $PM_{2.5}$ concentrations are determined by summing the background risks from cumulative projects, and project risks. The cumulative health risks were assessed for the maximally exposed individual receptors of each health risk category: lifetime excess cancer risk, chronic HI, acute HI, and $PM_{2.5}$ concentration. For each Project scenario and risk category, the cumulative risks were reported for the receptor with the maximum impact from the Project. These receptors occur at different locations for the different risk categories depending on the distance to the major sources contributing to risks, and exposure scenarios for a particular receptor. The maximum exposed individual receptors (MEIRs) were determined based on Year 10 Project and Year 30 Project impacts. The cumulative traffic impacts were modeled based on the cumulative traffic impacts for 2032 and 2053 provided by Fehr & Peers[97]. The excess cancer risk impacts from cumulative traffic sources for residential receptors were modeled with residential exposure for a lifetime of 30 years based on exposure factors in OEHHA, and separately for daycare centers with exposure assumptions for a child between six weeks and 6 years of age. Further details on the cumulative traffic modeling are provided in Appendix D **Tables C-HRA-1 to Table C-HRA-3**. Risk impacts for the existing railroads were estimated using BAAQMD's rail source raster files for cancer risk and $PM_{2.5}$ concentrations.[98] Risk impacts for the existing stationary sources were obtained from the Permitted Stationary Source Risks and Hazards Screening

[97] Fehr & Peers, Bayer Berkeley Project – Transportation Findings. September 29, 2020

[98] BAAQMD raster tools received by Ramboll through personal communication with Areana Flores from BAAQMD on April 20, 2018. Available online at: https://www.dropbox.com/sh/r0d12b66m4scwlc/AADpA16Bsv1-9A5zIH3L9EAza?dl=0

Tools from BAAQMD and scaled based on the distance to the closest receptors reported in Section 2.5 of this report using the BAAQMD Health Risk Calculator 4.0 in order to obtain the risk at the project MEIRs.[99, 100] The MEIRs for the Year 10 Project would have a cumulative lifetime excess cancer risk of 38 in a million, a chronic HI of 0.019, an acute HI of 0.18, and a $PM_{2.5}$ concentration of 0.77 µg/m^3. The MEIRs for the Year 30 Project would have a cumulative lifetime excess cancer risk of 26 in a million, a chronic HI of 0.018, an acute HI of 0.18, and a $PM_{2.5}$ concentration of 0.76 µg/m^3. Both Year 10 Project and Year 30 Project impacts would be below the significance thresholds. Therefore, the Proposed Project plus background $PM_{2.5}$ concentrations and cumulative development projects would not result in significant cumulative $PM_{2.5}$ impacts and the Proposed Project would not contribute considerably to a significant cumulative air quality impact. Therefore, no mitigation measures are necessary.

[99] BAAQMD Permitted Stationary Source Risk and Hazards tool. Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65, accessed September 2020

[100] BAAQMD. Health Risk Calculator Beta 4.0. Available at: https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools accessed October 2020

Table 12: Cumulative Lifetime Cancer Risk, Chronic and Acute Hazards and $PM_{2.5}$ Concentration Contributions from the Proposed Project at Maximally Exposed sensitive Receptors For Year 10 Project

Emission Source	Lifetime Cancer Risk (in a million) [A,B]	Chronic Non-Cancer Hazard Index [A,C]	Acute Non-Cancer Hazard Index [A,B]	$PM_{2.5}$ Concentration ($\mu g/m^3$) [A,C]
Project Operational and Construction, and Existing Sources [D]	6.8	0.015	0.17	0.42
Subtotal, Project and Existing Bayer Impacts	**6.8**	**0.015**	**0.17**	**0.42**
Existing Stationary Sources [E]				
Uncommon Grounds, LLC (Facility #1574)	0.0058	0	N/A	0.014
Consolidated Printers, Inc (Facility #2970)	0.0045	0	N/A	0.015
Electro-Coatings of California Inc (Facility #4449)	18	0	N/A	0
Fifth & Potter Street Assoc (Facility #14949)	0.68	0.0012	N/A	8.0E-04
2929 Seventh Street LLC (Facility #15509)	0.048	0	N/A	0
Seventh Street Properties II (Facility #15697)	0.12	4.0E-04	N/A	0
Verizon Wireless (Oakland W/Berkeley) (Facility #17271)	0.24	0	N/A	4.0E-04
Seventh Street properties II (Facility #18531)	0.014	0	N/A	0

Wareham Development (Facility #18581)	0.068	0	N/A	0
Henkel US Operations Corporation (Facility #19522)	0.010	0	N/A	0.28
DSM Biomedical (Facility #20956)	0.16	0	N/A	0
Ruby's Roast, LLC (Facility #21809)	5.8E-04	8.6E-06	N/A	0.0025
Seventh Street Properties VII, LLC (Facility #22870)	0.087	4.0E-04	N/A	0
AGC Biologics Incorporated (Facility #23177)	0.0076	0	N/A	0.014
Agenus West, LLC (Facility #23417)	0.062	0	N/A	0
APRO LLC dba United Pacific #AD2204 (Facility #112401)	0.40	0.0018	N/A	0
Subtotal, Background Sources	**20**	**0.0038**	**0**	**0.33**
Existing Mobile Sources [F,G]				
Railway Sources	11	N/A	N/A	0.013
Highway and Major Roadway Sources	0.78	4.3E-04	0.0060	0.017
Subtotal, Mobile Sources	**11**	**4.3E-04**	**0.0060**	**0.031**
Total Cumulative Impact	**38**	**0.019**	**0.18**	**0.77**
BAAQMD Thresholds	**100**	**10**	**10**	**0.80**
Significant?	No	No	No	No

Notes:

[A] To assess the cumulative impacts, receptors for Cancer Risk Impact, Chronic Non-Cancer Hazard Index, Acute Non-Cancer Hazard Index, and Annual $PM_{2.5}$ Concentration were chosen based on the highest overall Year 30 Project impact for each category.

[B] This receptor is a daycare child.

[C] This receptor is an off-site resident.

[D] Cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year period, beginning during the first year of construction. Thus, the risk takes into account a receptor living near the Project site beginning during construction and continuing through operations. The cancer risks were estimated using the equation specified in Tables HRA-5 through HRA-11 in Appendix C. The MEIRs for the Year 10 Project will be exposed to construction risks from the Year 30 Project. The Year 30 Project construction risks are not included in this analysis, though these risks would not cause an increase in cumulative risk for the Year 10 MEIRs that would exceed the BAAQMD Significance Thresholds. The Project risks presented here includes risks from all the sources that will be operational in Year 10 including sources that are a part of the Baseline condition that will continue to operate on site after the Year 10 Project buildout, as well as new sources constructed as a part of Year 10 Project.

[E] Consistent with BAAQMD guidance, all stationary source facilities within approximately 1,000 feet of the MEIR locations were included as per the BAAQMD Stationary Source Screening Analysis Tool. Facility information was obtained from the Permitted Stationary Source Risks. Only sources identified through this tool which are approximately <1,000 feet from the MEIR locations are shown here.

[F] Health impacts from existing Railway Sources are estimated using BAAQMD rail source raster files for cancer risks and $PM_{2.5}$.

[G] Health impacts from existing Highway and Major Roadway Sources were estimated based on total No Project traffic volumes in 2032 provided by Fehr & Peers. The No Project traffic volumes are based on estimated background values, calculated as the difference between the baseline and existing traffic volumes, extrapolated to 2032 assuming annual traffic increases estimated by the Alameda CTC model. Impacts from all Highways and Major roadways within 1,000 feet from the Proposed Project were estimated.

Sources: Ramboll, 2020; **Tables C-HRA-1** – **Table C-HRA-6** in Appendix D; BAAQMD Stationary Source Tool; BAAQMD Raster Files

Table 13: Cumulative Lifetime Cancer Risk, Chronic and Acute Hazards and $PM_{2.5}$ Concentration Contributions from the Proposed Project at the Maximally Exposed Receptors for Year 30 Project

Emission Source	Lifetime Cancer Risk (in a million) [A,B]	Chronic Non-Cancer Hazard Index [A,B]	Acute Non-Cancer Hazard Index [A,B]	$PM_{2.5}$ Concentration ($\mu g/m^3$) [A,B]
Project Operational and Construction, and Existing Sources [C]	1.8	0.014	0.18	0.40
Subtotal, Project and Existing Bayer Impacts	**1.8**	**0.014**	**0.18**	**0.40**
Existing Stationary Sources [D]				
Uncommon Grounds, LLC (Facility #1574)	0.010	0	N/A	0.014
Consolidated Printers, Inc (Facility #2970)	0.0026	0	N/A	0.015
Electro-Coatings of California Inc (Facility #4449)	10	0	N/A	0
Fifth & Potter Street Assoc (Facility #14949)	0.68	0.0012	N/A	8.0E-04
2929 Seventh Street LLC (Facility #15509)	0.048	0	N/A	0
Seventh Street Properties II (Facility #15697)	0.12	4.0E-04	N/A	0
Verizon Wireless (Oakland W/Berkeley) (Facility #17271)	0.36	0	N/A	4.0E-04

Seventh Street properties II (Facility #18531)	0.022	0	N/A	0
Wareham Development (Facility #18581)	0.068	0	N/A	0
Henkel US Operations Corporation (Facility #19522)	0.010	0	N/A	0.28
DSM Biomedical (Facility #20956)	0.32	0	N/A	0
Ruby's Roast, LLC (Facility #21809)	3.7E-04	7.8E-06	N/A	0.0025
Seventh Street Properties VII, LLC (Facility #22870)	0.11	4.0E-04	N/A	0
AGC Biologics Incorporated (Facility #23177)	0.013	0	N/A	0.014
Agenus West, LLC (Facility #23417)	0.16	0	N/A	0
APRO LLC dba United Pacific #AD2204 (Facility #112401)	0.40	0.0018	N/A	0
Subtotal, Background Sources	**13**	**0.0038**	**0**	**0.33**
Existing Mobile Sources [D,F]				
Railway Sources	11	N/A	N/A	0.013
Highway and Major Roadway Sources	0.47	3.5E-04	0.0047	0.021
Subtotal, Mobile Sources	**11**	**3.5E-04**	**0.0047**	**0.034**

Total Cumulative Impact	**26**	**0.018**	**0.18**	**0.76**
BAAQMD Thresholds	100	10	10	0.80
Significant?	No	No	No	No

Notes:

[A] To assess the cumulative impacts, receptors for Cancer Risk Impact, Chronic Non-Cancer Hazard Index, Acute Non-Cancer Hazard Index, and Annual $PM_{2.5}$ Concentration were chosen based on the highest overall Year 30 Project impact for each category.

[B] This receptor is an off-site resident.

[C] Cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year period, beginning during the first year of construction. Thus, the risk takes into account a receptor living near the Project site beginning during construction and continuing through operations. The cancer risks were estimated using the equation specified in Tables HRA-5 through HRA-11 in Appendix C. The Project risks presented here includes risks from all the sources that will be operational in Year 30 including sources that are a part of the Baseline condition that will continue to operate on site after the Year 30 Project buildout, sources included as a part of Year 10 Project and newly constructed sources in Year 30.

[D] Consistent with BAAQMD guidance, all stationary source facilities within approximately 1,000 feet of the MEIR locations were included as per the BAAQMD Stationary Source Screening Analysis Tool. Facility information was obtained from the Permitted Stationary Source Risks. Only sources identified through this tool which are approximately <1,000 feet from the MEIR locations are shown here.

[E] Health impacts from existing Railway Sources are estimated using BAAQMD rail source raster files for cancer risks and $PM_{2.5}$.

[F] Health impacts from existing Highway and Major Roadway Sources were estimated based on total No Project traffic volumes in 2052 provided by Fehr & Peers. The No Project traffic volumes are based on estimated background values, calculated as the difference between the baseline and existing traffic volumes, extrapolated to 2052 assuming annual traffic increases estimated by the Alameda CTC model. Impacts from all Highways and Major roadways within 1,000 feet from the Proposed Project were estimated.

Sources: Ramboll, 2020; **Tables C-HRA-1** – **Table C-HRA-6** in Appendix D; BAAQMD Stationary Source Tool; BAAQMD Raster Files

APPENDIX A

Table CON-1
Land Use Breakdown for Construction and Demolition Area
Bayer CEQA Long-Range Development
Berkeley, California

Buildings to be Demolished

Location	Buildings[1]	Demolished By	Square Footage (ft^2)	Acreage (acre)
Demolition				
A-North	B28, B28A, B57, SC-6	2025	120,693	1.2
C-North	B56A, B56B, B56	2025	21,719	0.45
A-South	B84, B85	2025	126,500	1.5

Buildings to be Constructed

Location	Building[1]	Usage Type	CalEEMod® Land Use	Buildout Year	Square Footage (ft^2)
Year 10 Buildout					
A-North	Laboratories	Laboratory	Research & Development	2025	19,000
	Maintenance	Maintenance	General Light Industry	2030	10,000
	Parker Visitor Center[2]	Administration	General Office Building	2025	1,500
	BD Building 1	Production	Manufacturing	2025	34,018
	BD Building 2	Production	Manufacturing	2025	46,744
	BD Building 3	Production	Manufacturing	2025	39,238
	Utility Expansion	Utility	General Heavy Industry	2025	10,000
B-North	Shell 4/5	Production	Manufacturing	2030	80,000
C-North	Parker Visitor Center	Administration	General Office Building	2025	4,500
A-South	B80 Warehouse Expansion	Warehouse	Refrigerated Warehouse - No Rail	2025	15,317
	Labs near B83	Laboratory	Research & Development	2025	50,000
	Offices near B83	Administration	General Office Building	2025	50,000
C-South	B80 Warehouse Expansion	Warehouse	Refrigerated Warehouse - No Rail	2025	7,683
	Parking Garage	Parking	Enclosed Parking with Elevator	2025	312,200

Table CON-1
Land Use Breakdown for Construction and Demolition Area
Bayer CEQA Long-Range Development
Berkeley, California

Buildings to be Constructed

Location	Building[1]	Usage Type	CalEEMod® Land Use	Buildout Year	Square Footage (ft^2)
Year 30 Buildout					
A-North	Hub Building	Administration	General Office Building	2035	20,000
	BD Expansion (2035)	Production	Manufacturing	2035	50,000
	BD Expansion (2050)	Production	Manufacturing	2050	50,000
	Technology Development (2035)	Production	Manufacturing	2035	45,000
	Technology Development (2050)	Production	Manufacturing	2050	45,000
B-North	Shell 6/7	Production	Manufacturing	2050	80,000
	Shell 8/9	Production	Manufacturing	2050	80,000
	Shell 10/11	Production	Manufacturing	2050	80,000
D-North	Parking Garage	Parking	Enclosed Parking with Elevator	2035	414,780
A-South	Labs near B83	Laboratory	Research & Development	2050	50,000
	Offices near B83	Administration	General Office Building	2050	50,000

Notes:

1. Land uses and square footages are based on information provided by Bayer.
2. This administration building in A-North is a part of the parker visitor center and is conservatively assumed to be roughly 1,500 sq ft.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CAPCOA - California Air Pollution Control Officers Association
CEQA - California Environmental Quality Act
ft - feet

Reference:

CAPCOA. 2017. CALifornia Emissions Estimator MODel. Available at: http://www.caleemod.com

RAMBOLL

Table CON-2
Construction Schedules
Bayer CEQA Long-Range Development
Berkeley, California

Year 10 Construction Schedule[1]

Location	Phase	Start	End	Days[2]	Parcel Acreage	Operational Year[3]
A-North	Demolition	1/22/2024	2/18/2024	20	1.2	N/A
	Construction (2025)	2/19/2024	12/31/2024	226	1.3	2025
	Construction (2030)	7/25/2029	12/31/2029	113	0.082	2030
B-North	Construction	7/25/2029	12/31/2029	113	0.79	2030
C-North	Demolition	7/10/2024	7/24/2024	10	0.45	N/A
	Construction	7/25/2024	12/31/2024	113	0.21	2025
A-South	Demolition	1/22/2024	2/18/2024	20	1.5	N/A
	Construction	2/19/2024	12/31/2024	226	1.1	2025
C-South	Construction	2/19/2024	12/31/2024	226	1.3	2025

Year 30 Construction Schedule[1]

Location	Phase	Start	End	Days[2]	Parcel Acreage	Operational Year[3]
A-North	Construction (2035)	7/26/2034	12/31/2034	113	1.0	2035
	Construction (2050)	7/27/2049	12/31/2049	113	0.60	2050
B-North	Construction	1/18/2049	12/31/2049	249	2.4	2050
D-North	Construction	2/17/2034	12/31/2034	226	1.2	2035
A-South	Construction	7/27/2049	12/31/2049	113	0.55	2050

Notes:

1. The construction schedule was estimated assuming that construction is completed on December 31st of the year before operation is expected to occur. Proposed operational years were provided on a per-building basis by Bayer.
2. The number of days of construction for each phase were determined using CalEEMod® default assumptions.
3. The Air Quality analysis conservatively assumes that the full buildout year of operations is 2025 for the Year 10 scenario and 2035 for the Year 30 scenario. The actual buildout years are 2032 for the Year 10 scenario and 2052 for the Year 30 scenario based on the DA expiration. Based on information from Bayer, the latest construction is conservatively assumed to end by January 1, 2050. Throughout the construction analysis, we use the earliest possible buildout date to conservatively estimate construction emissions since mobile sources of emissions become cleaner over time consistent with EMFAC2017.

Table CON-3
Construction Equipment
Bayer CEQA Long-Range Development
Berkeley, California

Location	Buildout Year	Construction Subphase	Equipment	CalEEMod Equipment	Number	Daily Usage (hours/day)	Horsepower	Utilization[3]
Year 10 Equipment Usage[1,2]								
A-North	N/A	Demolition	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
C-North	N/A	Demolition	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
A-South	N/A	Demolition	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
A-North	2025	Site Preparation	Graders	Graders	1	8	187	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
		Grading	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
		Building Construction	Cranes	Cranes	1	4	231	100%
			Forklifts	Forklifts	2	6	89	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	8	97	100%
		Architectural Coating	Air Compressors	Air Compressors	1	6	78	100%
		Paving	Pavers	Pavers	1	7	130	100%
			Cement and Mortar Mixers	Cement and Mortar Mixers	4	6	9	100%
			Rollers	Rollers	1	7	80	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	7	97	100%
	2030	Site Preparation	Graders	Graders	1	8	187	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
		Grading	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
		Building Construction	Cranes	Cranes	1	4	231	100%
			Forklifts	Forklifts	2	6	89	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	8	97	100%
		Architectural Coating	Air Compressors	Air Compressors	1	6	78	100%
		Paving	Pavers	Pavers	1	7	130	100%
			Cement and Mortar Mixers	Cement and Mortar Mixers	4	6	9	100%
			Rollers	Rollers	1	7	80	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	7	97	100%
B-North	2030	Site Preparation	Graders	Graders	1	8	187	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
		Grading	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
		Building Construction	Cranes	Cranes	1	4	231	100%
			Forklifts	Forklifts	2	6	89	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	8	97	100%
		Architectural Coating	Air Compressors	Air Compressors	1	6	78	100%
		Paving	Pavers	Pavers	1	7	130	100%
			Cement and Mortar Mixers	Cement and Mortar Mixers	4	6	9	100%
			Rollers	Rollers	1	7	80	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	7	97	100%
C-North	2025	Site Preparation	Graders	Graders	1	8	187	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
		Grading	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
		Building Construction	Cranes	Cranes	1	4	231	100%
			Forklifts	Forklifts	2	6	89	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	8	97	100%
		Architectural Coating	Air Compressors	Air Compressors	1	6	78	100%
		Paving	Pavers	Pavers	1	7	130	100%
			Cement and Mortar Mixers	Cement and Mortar Mixers	4	6	9	100%
			Rollers	Rollers	1	7	80	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	7	97	100%

Table CON-3
Construction Equipment
Bayer CEQA Long-Range Development
Berkeley, California

Location	Buildout Year	Construction Subphase	Equipment	CalEEMod Equipment	Number	Daily Usage (hours/day)	Horsepower	Utilization[3]
A-South	2025	Site Preparation	Graders	Graders	1	8	187	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
		Grading	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
		Building Construction	Cranes	Cranes	1	4	231	100%
			Forklifts	Forklifts	2	6	89	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	8	97	100%
		Architectural Coating	Air Compressors	Air Compressors	1	6	78	100%
		Paving	Pavers	Pavers	1	7	130	100%
			Cement and Mortar Mixers	Cement and Mortar Mixers	4	6	9	100%
			Rollers	Rollers	1	7	80	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	7	97	100%
C-South	2025	Site Preparation	Graders	Graders	1	8	187	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
		Grading	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
		Building Construction	Cranes	Cranes	1	4	231	100%
			Forklifts	Forklifts	2	6	89	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	8	97	100%
		Architectural Coating	Air Compressors	Air Compressors	1	6	78	100%
		Paving	Pavers	Pavers	1	7	130	100%
			Cement and Mortar Mixers	Cement and Mortar Mixers	4	6	9	100%
			Rollers	Rollers	1	7	80	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	7	97	100%
A-North	2035	Site Preparation	Graders	Graders	1	8	187	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
		Grading	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
		Building Construction	Cranes	Cranes	1	4	231	100%
			Forklifts	Forklifts	2	6	89	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	8	97	100%
		Architectural Coating	Air Compressors	Air Compressors	1	6	78	100%
		Paving	Pavers	Pavers	1	7	130	100%
			Cement and Mortar Mixers	Cement and Mortar Mixers	4	6	9	100%
			Rollers	Rollers	1	7	80	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	7	97	100%
Year 30 Equipment Usage[1,4]								
A-North	2050	Site Preparation	Graders	Graders	1	8	187	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
		Grading	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
		Building Construction	Cranes	Cranes	1	4	231	100%
			Forklifts	Forklifts	2	6	89	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	8	97	100%
		Architectural Coating	Air Compressors	Air Compressors	1	6	78	100%
		Paving	Pavers	Pavers	1	7	130	100%
			Cement and Mortar Mixers	Cement and Mortar Mixers	4	6	9	100%
			Rollers	Rollers	1	7	80	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	7	97	100%
B-North	2050	Site Preparation	Graders	Graders	1	8	187	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
			Rubber Tired Dozers	Rubber Tired Dozers	1	7	247	100%
		Grading	Rubber Tired Dozers	Rubber Tired Dozers	1	6	247	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	7	97	100%
			Graders	Graders	1	6	187	100%
		Building Construction	Cranes	Cranes	1	6	231	100%
			Forklifts	Forklifts	1	6	89	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	6	97	100%
			Welders	Welders	3	8	46	100%
			Generator Sets	Generator Sets	1	8	84	100%
		Architectural Coating	Air Compressors	Air Compressors	1	6	78	100%
		Paving	Pavers	Pavers	1	6	130	100%
			Cement and Mortar Mixers	Cement and Mortar Mixers	1	6	9	100%
			Rollers	Rollers	1	7	80	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
			Paving Equipment	Paving Equipment	1	8	132	100%

Table CON-3
Construction Equipment
Bayer CEQA Long-Range Development
Berkeley, California

Location	Buildout Year	Construction Subphase	Equipment	CalEEMod Equipment	Number	Daily Usage (hours/day)	Horsepower	Utilization[3]
D-North	2035	Site Preparation	Graders	Graders	1	8	187	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
		Grading	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
		Building Construction	Cranes	Cranes	1	4	231	100%
			Forklifts	Forklifts	2	6	89	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	8	97	100%
		Architectural Coating	Air Compressors	Air Compressors	1	6	78	100%
		Paving	Pavers	Pavers	1	7	130	100%
			Cement and Mortar Mixers	Cement and Mortar Mixers	4	6	9	100%
			Rollers	Rollers	1	7	80	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	7	97	100%
A-South	2050	Site Preparation	Graders	Graders	1	8	187	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	8	97	100%
		Grading	Rubber Tired Dozers	Rubber Tired Dozers	1	1	247	100%
			Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	81	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	97	100%
		Building Construction	Cranes	Cranes	1	4	231	100%
			Forklifts	Forklifts	2	6	89	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	8	97	100%
		Architectural Coating	Air Compressors	Air Compressors	1	6	78	100%
		Paving	Pavers	Pavers	1	7	130	100%
			Cement and Mortar Mixers	Cement and Mortar Mixers	4	6	9	100%
			Rollers	Rollers	1	7	80	100%
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	1	7	97	100%

Notes:

1. The construction equipment assumptions, number of construction equipment, daily usage, and equipment horsepower are based on CalEEMod® Appendix D, based on the acreage for each parcel location.
2. All off-road construction equipment for Year 10 will likely have Tier 4 Final engines. However, in the case that Tier 4 Final equipment would not be available for all equipment, the construction analysis for Year 10 conservatively assumed that 90% of the construction equipment will be Tier 4 Final engines and 10% Tier 2 engines.
3. All the construction equipment are conservatively assumed to operate 100% of the subphase.
4. All off-road equipment for Year 30 construction is assumed to have a Tier 4 Final engine.

Table CON-4
Construction Trips
Bayer CEQA Long-Range Development
Berkeley, California

Phase	Subphase	Year	Trips (one way trips/subphase)			Trip Lengths[4] (miles/one way trip)		
			Worker Trips[1]	Vendor Trips[2]	Hauling Trips[3]	Worker Trips	Vendor Trips	Hauling Trips
Demolition								
A-North Demolition	Demolition	2024	200	0	559	11	7.3	20
C-North Demolition	Demolition	2024	100	0	101	11	7.3	20
A-South Demolition	Demolition	2024	200	0	586	11	7.3	20
Year 10 Construction								
A-North Construction (2025)	Site Preparation	2024	10	0	0	11	7.3	20
	Grading	2024	40	0	0	11	7.3	20
	Building Construction	2024	12,200	5,000	0	11	7.3	20
	Paving	2024	180	0	0	11	7.3	20
	Architectural Coating	2024	120	0	0	11	7.3	20
A-North Construction (2030)	Site Preparation	2029	5	0	0	11	7.3	20
	Grading	2029	20	0	0	11	7.3	20
	Building Construction	2029	400	200	0	11	7.3	20
	Paving	2029	90	0	0	11	7.3	20
	Architectural Coating	2029	5	0	0	11	7.3	20
B-North Construction	Site Preparation	2029	5	0	0	11	7.3	20
	Grading	2029	20	0	0	11	7.3	20
	Building Construction	2029	3,400	1,300	0	11	7.3	20
	Paving	2029	90	0	0	11	7.3	20
	Architectural Coating	2029	35	0	0	11	7.3	20
C-North Construction	Site Preparation	2024	5	0	0	11	7.3	20
	Grading	2024	20	0	0	11	7.3	20
	Building Construction	2024	100	100	0	11	7.3	20
	Paving	2024	90	0	0	11	7.3	20
	Architectural Coating	2024	0	0	0	11	7.3	20
A-South Construction	Site Preparation	2024	10	0	0	11	7.3	20
	Grading	2024	40	0	0	11	7.3	20
	Building Construction	2024	7,600	3,800	0	11	7.3	20
	Paving	2024	180	0	0	11	7.3	20
	Architectural Coating	2024	80	0	0	11	7.3	20
C-South Construction	Site Preparation	2024	10	0	0	11	7.3	20
	Grading	2024	40	0	0	11	7.3	20
	Building Construction	2024	26,800	10,400	0	11	7.3	20
	Paving	2024	180	0	0	11	7.3	20
	Architectural Coating	2024	270	0	0	11	7.3	20

Table CON-4
Construction Trips
Bayer CEQA Long-Range Development
Berkeley, California

Phase	Subphase	Year	Trips (one way trips/subphase)			Trip Lengths[4] (miles/one way trip)		
			Worker Trips[1]	Vendor Trips[2]	Hauling Trips[3]	Worker Trips	Vendor Trips	Hauling Trips
Year 30 Construction								
A-North Construction (2035)	Site Preparation	2034	5	0	0	11	7.3	20
	Grading	2034	20	0	0	11	7.3	20
	Building Construction	2034	4,600	1,900	0	11	7.3	20
	Paving	2034	90	0	0	11	7.3	20
	Architectural Coating	2034	45	0	0	11	7.3	20
A-North Construction (2050)	Site Preparation	2049	5	0	0	11	7.3	20
	Grading	2049	20	0	0	11	7.3	20
	Building Construction	2049	4,000	1,600	0	11	7.3	20
	Paving	2049	90	0	0	11	7.3	20
	Architectural Coating	2049	40	0	0	11	7.3	20
B-North Construction	Site Preparation	2049	24	0	0	11	7.3	20
	Grading	2049	48	0	0	11	7.3	20
	Building Construction	2049	22,220	8,580	0	11	7.3	20
	Paving	2049	130	0	0	11	7.3	20
	Architectural Coating	2049	200	0	0	11	7.3	20
D-North Construction	Site Preparation	2034	10	0	0	11	7.3	20
	Grading	2034	40	0	0	11	7.3	20
	Building Construction	2034	34,800	13,600	0	11	7.3	20
	Paving	2034	180	0	0	11	7.3	20
	Architectural Coating	2034	350	0	0	11	7.3	20
A-South Construction	Site Preparation	2049	5	0	0	11	7.3	20
	Grading	2049	20	0	0	11	7.3	20
	Building Construction	2049	3,200	1,600	0	11	7.3	20
	Paving	2049	90	0	0	11	7.3	20
	Architectural Coating	2049	30	0	0	11	7.3	20

Notes:

1. Worker trips for all construction phases except building construction and architectural coating is based on 1.25 workers per equipment in that phase, resulting in one roundtrip per worker. For building construction workers, the trip number is estimated using the trip generation rate from a survey conducted by SMAQMD. Architectural coating worker trips are 20% of building construction phase trips.
2. Vendor trips are only associated with building construction and are based on the land uses and trip rate indicated in the survey conducted by SMAQMD.
3. Haul trips for the demolition phase are estimated based on CalEEMod® default methodology based on the demolished building square footage. Since the Project site is currently flat, there are no excavation activities expected; so there will be no haul trips associated with the grading and excavation phases.
4. Trip lengths for worker, vendor, and hauling trips are estimated based on CalEEMod® default methodology.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CAPCOA - California Air Pollution Control Officers Association
SMAQMD - South Coast Air Quality Management District
ft - feet

Reference:

CAPCOA. 2017. CALifornia Emissions Estimator MODel. Available at: http://www.caleemod.com

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Table CON-5a
On-Road Emission Factors
Bayer CEQA Long-Range Development
Berkeley, California

Year	Pollutant	Process[1]	Units	Fleet[2]		
				Worker	Vendor	Hauling
2024	CH_4	Idle Exhaust	g/trip	0	0.013	0.024
		Running Exhaust	g/mile	0.0026	0.016	0.030
		Start Exhaust	g/trip	0.055	0.0034	2.0E-07
	CO_2	Idle Exhaust	g/trip	0	578	1,083
		Running Exhaust	g/mile	274	1,208	1,374
		Start Exhaust	g/trip	58	3.4	0.044
	N_2O	Idle Exhaust	g/trip	0	0.091	0.17
		Running Exhaust	g/mile	0.0050	0.18	0.22
		Start Exhaust	g/trip	0.027	0.0027	4.2E-06
	NOx	Idle Exhaust	g/trip	0	2.9	5.5
		Running Exhaust	g/mile	0.047	2.0	2.6
		Start Exhaust	g/trip	0.21	2.1	2.3
	PM_{10}	Idle Exhaust	g/trip	0	0.0013	0.0023
		Brake Wear	g/mile	0.037	0.10	0.061
		Tire Wear	g/mile	0.0080	0.024	0.036
		Running Exhaust	g/mile	0.0015	0.016	0.025
		Start Exhaust	g/trip	0.0018	3.8E-05	2.7E-07
	PM_{25}	Idle Exhaust	g/trip	0	0.0013	0.0022
		Brake Wear	g/mile	0.016	0.041	0.026
		Tire Wear	g/mile	0.0020	0.0060	0.0089
		Running Exhaust	g/mile	0.0013	0.015	0.024
		Start Exhaust	g/trip	0.0017	3.5E-05	2.5E-07
	ROG	Diurnal Evaporative	g/trip	0.050	1.3E-04	1.4E-06
		Hot Soak Evaporative	g/trip	0.12	0.0069	7.2E-05
		Idle Exhaust	g/trip	0	0.23	0.45
		Resting Evaporative Loss	g/trip	0.049	7.6E-05	9.4E-07
		Running Exhaust	g/mile	0.010	0.019	0.024
		Running Loss Evaporative	g/mile	0.048	0.0068	3.1E-05
		Start Exhaust	g/trip	0.25	0.018	1.1E-06
2029	CH_4	Idle Exhaust	g/trip	0	0.013	0.023
		Running Exhaust	g/mile	0.0015	0.015	0.030
		Start Exhaust	g/trip	0.038	0.0027	1.9E-07
	CO_2	Idle Exhaust	g/trip	0	519	971
		Running Exhaust	g/mile	246	1,093	1,227
		Start Exhaust	g/trip	52	2.8	0.034
	N_2O	Idle Exhaust	g/trip	0	0.082	0.15
		Running Exhaust	g/mile	0.0037	0.16	0.19
		Start Exhaust	g/trip	0.022	0.0024	1.9E-06
	NOx	Idle Exhaust	g/trip	0	2.8	5.3
		Running Exhaust	g/mile	0.029	2.0	2.5
		Start Exhaust	g/trip	0.16	2.1	2.3
	PM_{10}	Idle Exhaust	g/trip	0	0.0011	0.0021
		Brake Wear	g/mile	0.037	0.10	0.061
		Tire Wear	g/mile	0.0080	0.024	0.036
		Running Exhaust	g/mile	0.0011	0.016	0.024
		Start Exhaust	g/trip	0.0015	3.3E-05	2.4E-07
	PM_{25}	Idle Exhaust	g/trip	0	0.0011	0.0020
		Brake Wear	g/mile	0.016	0.041	0.026
		Tire Wear	g/mile	0.0020	0.0060	0.0089
		Running Exhaust	g/mile	0.0010	0.015	0.023
		Start Exhaust	g/trip	0.0013	3.1E-05	2.2E-07

Table CON-5a
On-Road Emission Factors
Bayer CEQA Long-Range Development
Berkeley, California

Year	Pollutant	Process[1]	Units	Fleet[2]		
				Worker	Vendor	Hauling
2029	ROG	Diurnal Evaporative	g/trip	0.037	9.3E-05	9.5E-07
		Hot Soak Evaporative	g/trip	0.088	0.0051	4.8E-05
		Idle Exhaust	g/trip	0	0.23	0.44
		Resting Evaporative Loss	g/trip	0.039	6.0E-05	6.6E-07
		Running Exhaust	g/mile	0.0056	0.017	0.023
		Running Loss Evaporative	g/mile	0.040	0.0051	2.1E-05
		Start Exhaust	g/trip	0.17	0.014	1.0E-06
2034	CH_4	Idle Exhaust	g/trip	0	0.013	0.024
		Running Exhaust	g/mile	0.0010	0.015	0.029
		Start Exhaust	g/trip	0.028	0.0025	1.9E-07
	CO_2	Idle Exhaust	g/trip	0	480	896
		Running Exhaust	g/mile	231	1,010	1,116
		Start Exhaust	g/trip	48	2.5	0.030
	N_2O	Idle Exhaust	g/trip	0	0.075	0.14
		Running Exhaust	g/mile	0.0032	0.15	0.18
		Start Exhaust	g/trip	0.020	0.0024	2.3E-07
	NOx	Idle Exhaust	g/trip	0	2.8	5.3
		Running Exhaust	g/mile	0.021	2.0	2.5
		Start Exhaust	g/trip	0.13	2.1	2.3
	PM_{10}	Idle Exhaust	g/trip	0	0.0010	0.0020
		Brake Wear	g/mile	0.037	0.10	0.061
		Tire Wear	g/mile	0.0080	0.024	0.036
		Running Exhaust	g/mile	8.0E-04	0.015	0.024
		Start Exhaust	g/trip	0.0011	3.3E-05	2.9E-07
	PM_{25}	Idle Exhaust	g/trip	0	0.0010	0.0019
		Brake Wear	g/mile	0.016	0.041	0.026
		Tire Wear	g/mile	0.0020	0.0060	0.0089
		Running Exhaust	g/mile	7.2E-04	0.015	0.023
		Start Exhaust	g/trip	0.0010	3.0E-05	2.7E-07
	ROG	Diurnal Evaporative	g/trip	0.028	8.1E-05	8.2E-07
		Hot Soak Evaporative	g/trip	0.065	0.0043	4.1E-05
		Idle Exhaust	g/trip	0	0.23	0.44
		Resting Evaporative Loss	g/trip	0.029	5.6E-05	5.8E-07
		Running Exhaust	g/mile	0.0034	0.017	0.023
		Running Loss Evaporative	g/mile	0.033	0.0042	1.7E-05
		Start Exhaust	g/trip	0.12	0.012	9.8E-07
2049	CH_4	Idle Exhaust	g/trip	0	0.013	0.024
		Running Exhaust	g/mile	6.2E-04	0.013	0.026
		Start Exhaust	g/trip	0.019	0.0025	0
	CO_2	Idle Exhaust	g/trip	0	452	847
		Running Exhaust	g/mile	219	926	1,017
		Start Exhaust	g/trip	44	2.3	0.027
	N_2O	Idle Exhaust	g/trip	0	0.071	0.13
		Running Exhaust	g/mile	0.0030	0.14	0.16
		Start Exhaust	g/trip	0.019	0.0036	7.2E-05
	NOx	Idle Exhaust	g/trip	0	2.8	5.4
		Running Exhaust	g/mile	0.017	1.9	2.4
		Start Exhaust	g/trip	0.12	2.1	2.3
	PM_{10}	Idle Exhaust	g/trip	0	0.0010	0.0019
		Brake Wear	g/mile	0.037	0.10	0.061
		Tire Wear	g/mile	0.0080	0.024	0.036

Table CON-5a
On-Road Emission Factors
Bayer CEQA Long-Range Development
Berkeley, California

Year	Pollutant	Process[1]	Units	Fleet[2]		
				Worker	Vendor	Hauling
2049	PM10	Running Exhaust	g/mile	5.1E-04	0.015	0.023
		Start Exhaust	g/trip	6.5E-04	3.5E-05	3.4E-07
	PM_{25}	Idle Exhaust	g/trip	0	0.0010	0.0019
		Brake Wear	g/mile	0.016	0.041	0.026
		Tire Wear	g/mile	0.0020	0.0060	0.0090
		Running Exhaust	g/mile	4.6E-04	0.014	0.022
		Start Exhaust	g/trip	5.8E-04	3.2E-05	3.1E-07
	ROG	Diurnal Evaporative	g/trip	0.015	8.0E-05	8.2E-07
		Hot Soak Evaporative	g/trip	0.036	0.0039	4.0E-05
		Idle Exhaust	g/trip	0	0.23	0.45
		Resting Evaporative Loss	g/trip	0.017	5.7E-05	5.8E-07
		Running Exhaust	g/mile	0.0018	0.016	0.022
		Running Loss Evaporative	g/mile	0.025	0.0041	1.6E-05
		Start Exhaust	g/trip	0.069	0.012	0

Notes:

1. Mobile emission factors are estimated using EMFAC2017 for the year of construction activity.
2. Construction fleets were defined consistent with CalEEMod® 2016.3.2. assumptions. The worker fleet is assumed to be 50% LDA, 25% LDT1, and 25% LDT2. The vendor fleet is assumed to be 50% MHDT and 50% HHDT. The hauling fleet is assumed to be 100% HHDT.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
HHDT - heavy heavy duty trucks
LDA - light duty auto
LDT - light duty trucks
MHDT - medium heavy duty truck
N_2O - nitrous oxide
NOx - oxides of nitrogen
PM_{10} - particulate matter less than 10 micrometers in diameter
PM_{25} - particulate matter less than 2.5 micrometers in diameter
ROG - reactive organic gases

References:

California Air Resources Board (ARB) 2017. EMFAC2017. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools

CON-5b
Off-Road Emission Factors
Bayer CEQA Long-Range Development
Berkeley, California

Year	Equipment	Tier 4 Final Emission Factor[1] (g/bhp-hr)					Tier 2 Emission Factor[1] (g/bhp-hr)				
		ROG	NO_x	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
2024	Excavators	0.060	0.26	0.0080	0.0080	476	0.17	1.3	0.065	0.060	476
	Rubber Tired Dozers	0.060	0.26	0.0080	0.0080	478	0.12	4.1	0.088	0.088	478
	Concrete/Industrial Saws	0.060	0.26	0.0080	0.0080	569	0.23	2.3	0.11	0.11	569
	Tractors/Loaders/Backhoes	0.060	0.26	0.0080	0.0080	481	0.23	2.3	0.11	0.10	481
	Graders	0.060	0.26	0.0080	0.0080	477	0.12	3.1	0.088	0.088	477
	Scrapers	0.060	0.26	0.0080	0.0080	477	0.12	2.5	0.088	0.088	477
	Cranes	0.060	0.26	0.0080	0.0080	477	0.12	3.0	0.088	0.088	477
	Forklifts	0.060	0.26	0.0080	0.0080	475	0.23	2.8	0.16	0.15	475
	Welders	0.12	2.8	0.0080	0.0080	570	0.29	3.8	0.13	0.13	570
	Generator Sets	0.060	0.26	0.0080	0.0080	569	0.23	2.3	0.10	0.10	569
	Pavers	0.060	0.26	0.0080	0.0080	476	0.19	1.8	0.084	0.078	476
	Cement and Mortar Mixers	0.12	2.8	0.0080	0.0080	570	0.29	4.1	0.16	0.16	570
	Rollers	0.060	0.26	0.0080	0.0080	478	0.23	2.8	0.15	0.14	478
	Paving Equipment	0.060	0.26	0.0080	0.0080	474	0.19	1.8	0.086	0.079	474
	Air Compressors	0.060	0.26	0.0080	0.0080	569	0.23	2.5	0.12	0.12	569
2029	Excavators	0.060	0.26	0.0080	0.0080	476	0.16	1.2	0.057	0.052	476
	Rubber Tired Dozers	0.060	0.26	0.0080	0.0080	478	0.12	3.8	0.088	0.088	478
	Concrete/Industrial Saws	0.060	0.26	0.0080	0.0080	569	0.23	2.2	0.089	0.089	569
	Tractors/Loaders/Backhoes	0.060	0.26	0.0080	0.0080	481	0.21	2.1	0.085	0.079	481
	Graders	0.060	0.26	0.0080	0.0080	477	0.12	2.6	0.082	0.076	477
	Scrapers	0.060	0.26	0.0080	0.0080	476	0.12	2.1	0.081	0.074	476
	Cranes	0.060	0.26	0.0080	0.0080	477	0.12	2.7	0.088	0.088	477
	Forklifts	0.060	0.26	0.0080	0.0080	475	0.23	2.6	0.14	0.13	475
	Welders	0.12	2.8	0.0080	0.0080	570	0.29	3.7	0.11	0.11	570
	Generator Sets	0.060	0.26	0.0080	0.0080	569	0.23	2.2	0.087	0.087	569
	Pavers	0.060	0.26	0.0080	0.0080	476	0.18	1.6	0.077	0.071	476
	Cement and Mortar Mixers	0.12	2.8	0.0080	0.0080	570	0.29	4.1	0.16	0.16	570
	Rollers	0.060	0.26	0.0080	0.0080	478	0.23	2.7	0.14	0.12	478
	Paving Equipment	0.060	0.26	0.0080	0.0080	474	0.18	1.5	0.075	0.069	474
	Air Compressors	0.060	0.26	0.0080	0.0080	569	0.23	2.3	0.10	0.10	569

CON-5b
Off-Road Emission Factors
Bayer CEQA Long-Range Development
Berkeley, California

Year	Equipment	Tier 4 Final Emission Factor[1] (g/bhp-hr)					Tier 2 Emission Factor[1] (g/bhp-hr)				
		ROG	NO_x	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
2034	Excavators	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Rubber Tired Dozers	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Concrete/Industrial Saws	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Tractors/Loaders/Backhoes	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Graders	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Scrapers	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Cranes	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Forklifts	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Welders	0.12	2.8	0.0080	0.0080	569	--	--	--	--	--
	Generator Sets	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Pavers	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Cement and Mortar Mixers	0.12	2.8	0.0080	0.0080	570	--	--	--	--	--
	Rollers	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Paving Equipment	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Air Compressors	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
2049	Excavators	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Rubber Tired Dozers	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Concrete/Industrial Saws	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Tractors/Loaders/Backhoes	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Graders	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Scrapers	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Cranes	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Forklifts	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Welders	0.12	2.8	0.0080	0.0080	569	--	--	--	--	--
	Generator Sets	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Pavers	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Cement and Mortar Mixers	0.12	2.8	0.0080	0.0080	570	--	--	--	--	--
	Rollers	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Paving Equipment	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--
	Air Compressors	0.060	0.26	0.0080	0.0080	569	--	--	--	--	--

Notes:

1. All off-road construction equipment for Year 10 will likely have Tier 4 Final engines. However, in the case that Tier 4 Final equipment would not be available for all equipment, the construction analysis for Year 10 conservatively assumed that 90% of the construction equipment will have Tier 4 Final engines and 10% will have Tier 2 engines. If the equipment emission factors exceed the standards according to OFFROAD databases based on type, size, and year, then the CalEEMod® default emission factors were used in place of the Tier 2 or Tier 4 Final standards. Therefore, emission factors for each equipment type in each year are shown in this table. All off-road equipment for Year 30 construction is assumed to have a Tier 4 Final or cleaner engine.

Table CON-6
Entrained Roadway Dust
Bayer CEQA Long-Range Development
Berkeley, California

Road Dust Equation[1]

E [lb/VMT] = k*(sL)^0.91 * (W)^1.02 * (1-P/4N)

Parameters	Value
k = particle size multiplier for particle size range	
PM_{10} (lb/VMT)	0.0022
$PM_{2.5}$ (lb/VMT)	3.3E-04
sL = roadway silt loading [grams per square meter - g/m^2]	0.038
W = average weight of vehicles traveling the road [tons]	2.4
P = number of "wet" days in county with at least 0.01 in of precipitation during the annual averaging period	61
N = number of days in the averaging period	365

Entrained Road Dust Emission Factors	
PM_{10} Emission Factor [g/VMT]	0.12
$PM_{2.5}$ Emission Factor [g/VMT]	0.018

Notes:

1. Road dust equation and parameters are from the California Air Resources Board's (ARB) 2018 Miscellaneous Process Methodology 7.9 for Entrained Road Travel, Paved Road Dust. The silt loading emission factor conservatively assumes all roads are major roadways, even though most of the routes are freeways. The number of "wet" days for Alameda county is from ARB 2018. This is slightly lower than the default from CalEEMod® Appendix D Table 1.1 (63 days), which was based on older historic data and would result in slightly lower emissions. Other parameters (average weight of vehicles, size multipliers) are from ARB 2018. $PM_{2.5}$ is assumed to be 15% of PM_{10} based on paved road dust sampling in California (ARB Speciation Profile #471), which is a more representative fraction than provided in the older AP-42 fugitive dust methodology as discussed in ARB 2018 (page 10).

Abbreviations:

ARB - California Air Resources Board
CalEEMod® - California Emissions Estimator Model
EMFAC - EMission FACtor Model
g - gram
lb - pound
$PM_{2.5}$ - particulate matter less than 2.5 microns
PM_{10} - particulate matter less than 10 microns
VMT - vehicle miles traveled

References:

California ARB. 2018. Miscellaneous Processes Methodologies - Paved Entrained Road Dust. Available online at: https://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2018.pdf

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2016.3.2. Available online at http://www.caleemod.com/

Table CON-7
Project Construction Architectural Coating Emissions
Bayer CEQA Long-Range Development
Berkeley, California

Inputs[1]

Parameter		Input	Units
Surface Area to Floor Area Ratio		2.0	--
Painted Area in Parking Structures		6%	--
Application Rate		100%	--
Fraction of Surface Area	Interior Surfaces	75%	--
	Exterior Shell	25%	--
Indoor Paint VOC Content		100	g/L
Outdoor Paint VOC Content		150	g/L

Emissions

Location	Building	Usage Type	Year of Construction Activity	Square Footage[2] (square feet)	Building Surface Area (square feet)	Architectural Coating VOC emissions[3] (lb)
Year 10 Buildout						
A-North	Laboratories	Laboratory	2024	19,000	38,000	198
	Maintenance	Maintenance	2029	10,000	20,000	104
	Parker Visitor Center	Administration	2024	1,500	3,000	16
	BD Building 1	Production	2024	34,018	68,036	355
	BD Building 2	Production	2024	46,744	93,489	488
	BD Building 3	Production	2024	39,238	78,476	409
	Utility Expansion	Utility	2024	10,000	20,000	104
B-North	Shell 4/5	Production	2029	80,000	160,000	834
C-North	Parker Visitor Center	Administration	2024	4,500	9,000	47
A-South	B80 Warehouse Expansion	Warehouse	2024	15,317	30,634	160
	Labs near B83	Laboratory	2024	50,000	100,000	522
	Offices near B83	Administration	2024	50,000	100,000	522
C-South	B80 Warehouse Expansion	Warehouse	2024	7,683	15,366	80
	Parking Garage	Parking	2024	312,200	18,732	130
Year 30 Buildout						
A-North	Hub Building	Administration	2034	20,000	40,000	209
	BD Expansion (2035)	Production	2034	50,000	100,000	522
	BD Expansion (2050)	Production	2049	50,000	100,000	522
	Technology Development (2035)	Production	2034	45,000	90,000	469
	Technology Development (2050)	Production	2049	45,000	90,000	469
B-North	Shell 6/7	Production	2049	80,000	160,000	834
	Shell 8/9	Production	2049	80,000	160,000	834
	Shell 10/11	Production	2049	80,000	160,000	834
D-North	Parking Garage	Parking	2034	414,780	24,887	173
A-South	Labs near B83	Laboratory	2049	50,000	100,000	522
	Offices near B83	Administration	2049	50,000	100,000	522

Notes:

1. Inputs and assumptions are consistent with CalEEMod® 2016.3.2. for Alameda county.
2. Project square footage is based on Table CON-1, provided by Bayer.
3. Uses CalEEMod® assumption that 1 gallon of paint covers 180 square feet and that building area is assumed to be 75% indoors and 25% outdoors for all land uses other than parking. For parking land uses, the building area was assumed to be 100% outdoors.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
EF - Emission Factor
g - grams
L - liter
lb - pound
VOC - Volatile Organic Compound

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2016.3.2. Available online at http://www.caleemod.com/

Table CON-8
Year 10 Project Construction CAP and GHG Emissions
Bayer CEQA Long-Range Development
Berkeley, California

Construction and Demolition Emissions by Location and Phase - Year 10

Location	Emissions Year	Phase	Source	Total Construction Emissions[1]				GHG Emissions[2]
				ROG	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
				lb/yr				MT/yr
A-North	2024	Demolition	On-Site Exhaust	3.4	21	0.78	0.76	10
			Mobile Exhaust	1.6	74	3.2	1.6	17.33
			Fugitive Dust[3]	--	--	3.5	0.52	--
	2024	Construction (2025)	On-Site Exhaust	38	253	9.3	8.9	110
			Mobile Exhaust	35	237	25	11	87
			Fugitive Dust	--	--	45	6.7	--
			Architectural Coating	1,570	--	--	--	--
	2029	Construction (2030)	On-Site Exhaust	19	121	4.3	4.1	55
			Mobile Exhaust	1.1	9.0	1.0	0.43	3.2
			Fugitive Dust	--	--	1.8	0.28	--
			Architectural Coating	104	--	--	--	--
B-North	2029	Construction	On-Site Exhaust	19	121	4.3	4.1	55
			Mobile Exhaust	7.6	59	6.7	2.9	21
			Fugitive Dust	--	--	12	1.9	--
			Architectural Coating	834	--	--	--	--
C-North	2024	Demolition	On-Site Exhaust	1.7	11	0.39	0.38	5.2
			Mobile Exhaust	0.45	13	0.65	0.31	3.31
			Fugitive Dust	--	--	0.80	0.12	--
	2024	Construction	On-Site Exhaust	19	127	4.6	4.5	55
			Mobile Exhaust	0.62	4.7	0.46	0.20	1.6
			Fugitive Dust	--	--	0.79	0.12	--
			Architectural Coating	47	--	--	--	--
A-South	2024	Demolition	On-Site Exhaust	3.4	21	0.78	0.76	10
			Mobile Exhaust	1.7	77	3.4	1.6	18.14
			Fugitive Dust	--	--	3.6	0.54	--
	2024	Construction	On-Site Exhaust	38	253	9.3	8.9	110
			Mobile Exhaust	23	178	17	7.5	61
			Fugitive Dust	--	--	29	4.4	--
			Architectural Coating	1,203	--	--	--	--
C-South	2024	Construction	On-Site Exhaust	38	253	9.3	8.9	110
			Mobile Exhaust	77	495	53	23	185
			Fugitive Dust	--	--	97	14	--
			Architectural Coating	210	--	--	--	--

Table CON-8
Year 10 Project Construction CAP and GHG Emissions
Bayer CEQA Long-Range Development
Berkeley, California

Summary of Construction Emissions - Year 10

Year	Average Daily CAP Emissions[4]				Total GHG Emissions
	ROG	NO_x	PM_{10}	$PM_{2.5}$	
	lb/day				MT CO_2e/yr
2024	13	7.8	0.53	0.30	785
2029	3.8	1.2	0.063	0.044	135
BAAQMD CEQA Threshold[5]	54	54	82	54	--

Notes:

1. Construction emissions were estimated with methodology equivalent to CalEEMod® 2016.3.2. Paving off-gassing emissions are not included because CalEEMod® default methodology only includes paving emissions for parking lots and not parking structures.
2. Greenhouse gas emissions are estimated assuming global warming potentials consistent with ARB MRR guidance.
3. Fugitive dust from demolition are based on CalEEMod® 2016.3.2 default emissions which include emissions from site removal of debris and onsite truck traffic on paved/unpaved roads. Consistent with BAAQMD guidelines, sources of fugitive dust emissions include construction related activities such as soil disturbance, grading, and material hauling emissions. The construction activities proposed for the site does not include any structural dismemberment, grading equipment passes or bulldozing activities.
4. Daily emissions are conservatively averaged over 260 days (one calendar year, not including weekends).
5. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. Fugitive emissions sources are excluded from comparison to this threshold. The BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutants
CEQA - California Environmental Quality Act
GHG - Greenhouse Gases
MRR - Mandatory GHG Reporting Regulation
ROG - reactive organic gases
NO_x - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns

Reference:

California Emissions Estimator Model (CalEEMod). 2016. CAPCOA. Available online at: http://www.caleemod.com

California Environmental Quality Act (CEQA) Guidelines. 2017. Bay Area Air Quality Management District (BAAQMD). May. Available online at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

ARB. 2018. Mandatory Greenhouse Gas Reporting Regulation (MRR). Available online at: https://ww2.arb.ca.gov/mrr-regulation

Table CON-9
Year 30 Project Construction CAP and GHG Emissions
Bayer CEQA Long-Range Development
Berkeley, California

Construction Emissions by Location and Phase - Year 30

Location	Emissions Year	Phase	Source	Total Construction Emissions[1]				GHG Emissions[2]
				ROG	NO_x	PM_{10}	$PM_{2.5}$	CO_2e
				lb/yr				MT/yr
A-North	2034	Construction (2035)	On-Site Exhaust	15	69	2.0	2.0	65
			Mobile Exhaust	8.2	84	9.3	4.0	28
			Fugitive Dust[3]	--	--	17	2.6	--
			Architectural Coating	1,200	--	--	--	--
	2049	Construction (2050)	On-Site Exhaust	15	69	2.0	2.0	65
			Mobile Exhaust	5.3	70	8.0	3.4	22
			Fugitive Dust	--	--	15	2.2	--
			Architectural Coating	991	--	--	--	--
B-North	2049	Construction	On-Site Exhaust	68	834	7.1	7.1	231
			Mobile Exhaust	29	376	43	18	120
			Fugitive Dust	--	--	80	12	--
			Architectural Coating	2,503	--	--	--	--
D-North	2034	Construction	On-Site Exhaust	30	138	4.0	4.0	130
			Mobile Exhaust	61	603	68	29	202
			Fugitive Dust	--	--	125	19	--
			Architectural Coating	173	--	--	--	--
A-South	2049	Construction	On-Site Exhaust	15	69	2.0	2.0	65
			Mobile Exhaust	4.5	70	7.1	3.0	20
			Fugitive Dust	--	--	12	1.9	--
			Architectural Coating	1,043	--	--	--	--

Summary of Construction Emissions - Year 30

Year	Average Daily CAP Emissions[4]				Total GHG Emissions
	ROG	NO_x	PM_{10}	$PM_{2.5}$	
	lb/day				MT CO_2e/yr
2034	5.7	3.4	0.32	0.15	425
2049	18	5.7	0.27	0.14	523
BAAQMD CEQA Threshold[5]	54	54	82	54	--

Table CON-9
Year 30 Project Construction CAP and GHG Emissions
Bayer CEQA Long-Range Development
Berkeley, California

Notes:

1. Construction emissions were estimated with methodology equivalent to CalEEMod® 2016.3.2. Paving off-gassing emissions are not included because CalEEMod® default methodology only includes paving emissions for parking lots and not parking structures.
2. Greenhouse gas emissions are estimated assuming global warming potentials consistent with ARB MRR guidance.
3. Fugitive dust from demolition are based on CalEEMod® 2016.3.2 default emissions which include emissions from site removal of debris and onsite truck traffic on paved/unpaved roads. Consistent with BAAQMD guidelines, sources of fugitive dust emissions include construction related activities such as soil disturbance, grading, and material hauling emissions. The construction activities proposed for the site does not include any structural dismemberment, grading equipment passes or bulldozing activities.
4. Daily emissions are conservatively averaged over 260 days (one calendar year, not including weekends).
5. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. Fugitive emissions sources are excluded from comparison to this threshold. The BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutants
CEQA - California Environmental Quality Act
GHG - Greenhouse Gases
MRR - Mandatory GHG Reporting Regulation
ROG - reactive organic gases
NO_x - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns

Reference:

California Emissions Estimator Model (CalEEMod). 2016. CAPCOA. Available online at: http://www.caleemod.com

California Environmental Quality Act (CEQA) Guidelines. 2017. Bay Area Air Quality Management District (BAAQMD). May. Available online at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

ARB. 2018. Mandatory Greenhouse Gas Reporting Regulation (MRR). Available online at: https://ww2.arb.ca.gov/mrr-regulation

APPENDIX B

Table OP-1
Land Use Summary for CEQA Baseline and Proposed Project
Bayer CEQA Long Range Development Project
Berkeley, California

Land Use[1]	CalEEMod® Land Use	Constructed Area			Additional Area Under DA			Total Area		
		Size	Units	Total Square Footage (sf)	Size	Units	Total Square Footage (sf)	Size	Units	Total Square Footage (sf)
CEQA Baseline (2020)[2]										
Administration	General Office Building	232	ksf	231,770	12	ksf	12,455	244	ksf	244,225
Manufacturing Labs	Research & Development	281	ksf	281,377	134	ksf	134,455	416	ksf	415,832
Maintenance	General Light Industry	37	ksf	36,500	0.5	ksf	455	37	ksf	36,955
Production	Manufacturing	760	ksf	760,143	33	ksf	33,455	794	ksf	793,598
Warehouse	Refrigerated Warehouse - No Rail	295	ksf	295,194	0.5	ksf	455	296	ksf	295,649
Utility	General Heavy Industry	79	ksf	79,288	0.5	ksf	455	80	ksf	79,743
Parking[3]	Parking Lot	1,720	spaces	767,120	0	spaces	0	1,720	spaces	767,120
Parking[3]	Enclosed Parking with Elevator	0	spaces	0	0	spaces	0	0	spaces	0
Total CEQA Baseline Square Footage (Excluding Parking)										**1,866,000**
Project - Year 10[4]										
Administration	General Office Building							214	ksf	214,000
Manufacturing Labs	Research & Development							180	ksf	180,000
Maintenance	General Light Industry							18	ksf	18,000
Production	Manufacturing							548	ksf	548,000
Warehouse	Refrigerated Warehouse - No Rail							157	ksf	157,000
Utility	General Heavy Industry							71	ksf	71,000
Parking	Parking Lot							370	spaces	165,020
Parking	Enclosed Parking with Elevator							830	spaces	370,180
Total Project - Year 10 Square Footage (Excluding Parking)										**1,188,000**
Project - Year 30[4]										
Administration	General Office Building							284	ksf	284,000
Manufacturing Labs	Research & Development							230	ksf	230,000
Maintenance	General Light Industry							18	ksf	18,000
Production	Manufacturing							978	ksf	978,000
Warehouse	Refrigerated Warehouse - No Rail							157	ksf	157,000
Utility	General Heavy Industry							71	ksf	71,000
Parking	Parking Lot							70	spaces	31,220
Parking	Enclosed Parking with Elevator							1,750	spaces	780,500
Total Project - Year 30 Square Footage (Excluding Parking)										**1,738,000**

Notes:

1. Land types for the Project were provided by Bayer, based on Table in Section C.2 of the Project Description.
2. Square footage for the CEQA baseline accounts for the approved development contemplated under the 1992 DA on the North Properties, consisting of 1,346,000 sf of development, and existing development on the South Properties, consisting of 520,000 sf of development provided by Bayer. The total square footage analyzed in the baseline scenario is 1,866,000 sf across the entire Bayer project site.
3. Parking is listed in the existing and proposed DA as a separate land use category, but is treated for purposes of environmental review as an ancillary use to the primary land uses.
4. Land use square footage for Year 10 and Year 30 operations were obtained from the land use summary table in Section C.1 of the Project Description, provided by Bayer.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CEQA - California Environmental Quality Act
ksf - 1,000 square feet
sf - square feet

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Table OP-2
Architectural Coating Emissions for CEQA Baseline and Project Operations
Bayer CEQA Long Range Development Project
Berkeley, California

Inputs[1]

Parameter		Input
Surface Area to Floor Area Ratio (Non-Residential)		2.0
Painted Area in Parking Structures		6%
Fraction of Surface Area	Interior Surfaces	75%
	Exterior Shell	25%

Land Use	CalEEMod® Land Use	Floor Area (sf)	Building Surface Area (sf)	Re-Application Rate[2]	Indoor Paint VOC EF[3] (g/L)	Outdoor Paint VOC EF[3] (g/L)	Architectural Coating VOC Emissions[4] (lb/yr)
CEQA Baseline							
Administration	General Office Building	244,225	488,449	10%	100	150	255
Manufacturing Labs	Research & Development	415,832	831,663	10%	100	150	434
Maintenance	General Light Industry	36,955	73,909	10%	100	150	39
Production	Manufacturing	793,598	1,587,195	10%	100	150	828
Warehouse	Refrigerated Warehouse - No Rail	295,649	591,297	10%	100	150	308
Utility	General Heavy Industry	79,743	159,485	10%	100	150	83
Parking	Parking Lot	767,120	46,027	10%	0	150	32
Parking	Enclosed Parking with Elevator	0	0	10%	0	150	0
						Total CEQA Baseline Emissions	**1,978**
Project - Year 10							
Administration	General Office Building	214,000	428,000	10%	100	150	223
Manufacturing Labs	Research & Development	180,000	360,000	10%	100	150	188
Maintenance	General Light Industry	18,000	36,000	10%	100	150	19
Production	Manufacturing	548,000	1,096,000	10%	100	150	572
Warehouse	Refrigerated Warehouse - No Rail	157,000	314,000	10%	100	150	164
Utility	General Heavy Industry	71,000	142,000	10%	100	150	74
Parking	Parking Lot	165,020	9,901	10%	0	150	6.9
Parking	Enclosed Parking with Elevator	370,180	22,211	10%	0	150	15
						Total Project - Year 10 Emissions	**1,261**
Project - Year 30							
Administration	General Office Building	284,000	568,000	10%	100	150	296
Manufacturing Labs	Research & Development	230,000	460,000	10%	100	150	240
Maintenance	General Light Industry	18,000	36,000	10%	100	150	19
Production	Manufacturing	978,000	1,956,000	10%	100	150	1,020
Warehouse	Refrigerated Warehouse - No Rail	157,000	314,000	10%	100	150	164
Utility	General Heavy Industry	71,000	142,000	10%	100	150	74
Parking	Parking Lot	31,220	1,873	10%	0	150	1.3
Parking	Enclosed Parking with Elevator	780,500	46,830	10%	0	150	33
						Total Project - Year 30 Emissions	**1,847**

Notes:

1. Consistent with CalEEMod® Appendix A, non-residential building surface area is assumed to be 2 times the floor area. The parking painted area is assumed to be 6% of the total surface area for surface lots. Building area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod®. Parking garages are assumed to have no indoor surfaces.
2. Consistent with CalEEMod® Appendix A, 10% of all surfaces are assumed to be coated (re-painted) each year.
3. Based on BAAQMD Regulation 8 Rule 3 paint VOC regulations, 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings.
4. Uses CalEEMod® Appendix A assumption that 1 gallon of paint covers 180 square feet. The CalEEMod® Appendix A assumption that the fraction of surface area is 0.75 for interior surfaces and 0.25 for exterior surfaces is also used.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
EF - emission factor
g - grams
L - liters
lb - pound
sf - square feet
VOC - volatile organic compound
yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2016.3.2. Available online at http://www.caleemod.com/

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Table OP-3
Consumer Product Emissions for CEQA Baseline and Project Operations
Bayer CEQA Long Range Development Project
Berkeley, California

Land Use[1]	CalEEMod® Land Use	Building (or Parking) Area (sf)	Consumer Products VOC EF[2] (lb/sf/day)	Days per Year	Consumer Products VOC Emissions[2] (lb/yr)
CEQA Baseline					
Administration	General Office Building	244,225	1.6E-05	365	1,432
Parking[3]	Parking Lot	767,120	3.5E-07	365	99
				Total CEQA Baseline Emissions	**1,531**
Project - Year 10					
Administration	General Office Building	214,000	1.6E-05	365	1,255
Parking[3]	Parking Lot	165,020	3.5E-07	365	21
Parking[3]	Enclosed Parking with Elevator	370,180	3.5E-07	365	48
				Total Project - Year 10 Emissions	**1,324**
Project - Year 30					
Administration	General Office Building	284,000	1.6E-05	365	1,665
Parking[3]	Parking Lot	31,220	3.5E-07	365	4.0
Parking[3]	Enclosed Parking with Elevator	780,500	3.5E-07	365	101
				Total Project - Year 30 Emissions	**1,770**

Notes:

1. Only the administration buildings and parking are expected to have VOC emissions from consumer products. Consumer product VOC emissions from all other land use types are negligible. Manufacturing lab related VOC emissions are estimated in Table OP-4.
2. The consumer products VOC EF for the office land use was derived using methodology consistent with CalEEMod® but updated with statewide 2017 VOC emission factors. The CalEEMod® default emissions factor assumes 2008 statewide VOC inventory and building square footage. An updated VOC inventory for 2017 was taken from the ARB and 2017 population estimates based on the State of California's Department of Finance demographic projections were used to estimate a statewide VOC EF for 2017.
3. Consumer product VOC EF for parking is taken from CalEEMod® 2016.3.2. This default takes into account degreaser use in parking areas. Statewide VOC emissions data from degreasers used for general purposes was obtained from the 2015 CARB Emissions Inventory.

Abbreviations:

ARB - Air Resources Board
CalEEMod® - California Emissions Estimator Model
CEQA - California Environmental Quality Act
EF - emission factor
lb - pound
sf - square feet
VOC - volatile organic compound
yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2016.3.2. Available online at http://www.caleemod.com/

California Air Resources Board (CARB). 2015. Statewide Solvent Evaporation from Consumer Products. Available online at: https://www.arb.ca.gov/app/emsinv/emseic_query.php?F_YR=2015&F_DIV=-4&F_SEASON=A&SP=2009&SPN=2009_Almanac&F_AREA=CA&F_EICSUM=510

Table OP-4
Manufacturing Lab Emissions for CEQA Baseline and Project Operations
Bayer CEQA Long Range Development Project
Berkeley, California

Month	Total VOC Generated[1] (lb)	Waste VOC[1] (lb)	Net VOC Emitted[2] (lb)
CEQA Baseline			
January	3,830	1,137	2,693
February	3,421	368	3,053
March	3,999	1,075	2,924
April	3,551	537	3,014
May	2,915	0	2,915
June	3,791	736	3,055
July	3,434	591	2,843
August	3,587	161	3,426
September	2,881	775	2,106
October	3,898	497	3,401
November	2,782	465	2,318
December	2,813	190	2,623
CEQA Baseline Emissions[1] (lb/yr)			**34,372**
Project Emissions, Year 10[3] (lb/yr)			**54,200**
Project Emissions, Year 30[3] (lb/yr)			**54,200**

Notes:

1. Total VOC generated and waste VOC quantities were provided by Bayer for 2017, 2018 and 2019. The CEQA Baseline emissions is the average emissions for these three years.

2. Net VOC emissions are calculated as the difference between total VOC generated and the amount of waste VOC.
3. Manufacturing lab related emissions for Year 10 and Year 30 are conservatively assumed to be at the permit limit of 54,200 lb VOC/year.

Abbreviations:

CEQA - California Environmental Quality Act
lb - pound
VOC - volatile organic compound
yr - year

Table OP-5
Landscaping Emissions for CEQA Baseline and Project Operations
Bayer CEQA Long Range Development Project
Berkeley, California

Land use	Emissions from Landscaping Equipment[1]			
	ROG	NOx	PM_{10}	$PM_{2.5}$
	(tons/yr)			
CEQA Baseline	0.0031	3.1E-04	1.2E-04	1.2E-04
Project - Year 10	0.0015	1.4E-04	6.0E-05	6.0E-05
Project - Year 30	0.0021	2.1E-04	8.0E-05	8.0E-05

Notes:

1. Landscape emissions calculated using CalEEMod® 2016.3.2 based on information regarding building square footage and acreage, shown in Appendix D.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
NO_x - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
yr - year

References:

CalEEMod® Version 2016.3.2 Available Online at: http://www.caleemod.com

Table OP-6
Energy Usage for CEQA Baseline and Project Operations
Bayer CEQA Long Range Development Project
Berkeley, California

Land Use	CalEEMod® Land Use	Total Constructed Area (sf)[1]	Additional Area Under DA (sf)	Annual Natural Gas Use (MMBtu/yr)
CEQA Baseline[1]				
Administration	General Office Building	231,770	12,455	10,221
Manufacturing Labs	Research & Development	281,377	134,455	23,256
Maintenance	General Light Industry	36,500	455	774
Production	Manufacturing	760,143	33,455	0
Warehouse	Refrigerated Warehouse - No Rail	295,194	455	6,195
Utility[2]	General Heavy Industry	79,288	455	228,386
Parking	Parking Lot	767,120	0	0
Parking	Enclosed Parking with Elevator	0	0	0
			CEQA Baseline Usage[1]	268,832

Land Use	CalEEMod® Land Use	Total Area (sf)	Annual Natural Gas Use[4] (MMBtu/yr)
Project - Year 10[3]			
Administration	General Office Building	214,000	0
Manufacturing Labs	Research & Development	180,000	10,498
Maintenance[5]	General Light Industry	18,000	678
Production	Manufacturing	548,000	0
Warehouse	Refrigerated Warehouse - No Rail	157,000	0
Utility[2]	General Heavy Industry	71,000	368,040
Parking	Parking Lot	165,020	0
Parking	Enclosed Parking with Elevator	370,180	0
		Total Project - Year 10 Usage[3]	379,217

Land Use[1]	CalEEMod® Land Use	Total Area (sf)	Annual Natural Gas Use[4] (MMBtu/yr)
Project - Year 30[4]			
Administration	General Office Building	284,000	0
Manufacturing Labs	Research & Development	230,000	13,415
Maintenance[5]	General Light Industry	18,000	678
Production	Manufacturing	978,000	0
Warehouse	Refrigerated Warehouse - No Rail	157,000	0
Utility[2]	General Heavy Industry	71,000	368,040
Parking	Parking Lot	31,220	0
Parking	Enclosed Parking with Elevator	780,500	0
		Total Project - Year 30 Usage[3]	382,133

Table OP-6
Energy Usage for CEQA Baseline and Project Operations
Bayer CEQA Long Range Development Project
Berkeley, California

Notes:

1. Current site-level natural gas usage rates were provided by Bayer. Natural gas use rates per square feet by land use type were calculated by dividing the total natural gas usage rate per land use type by the square footage of existing building area for each land use category. The CEQA baseline usage was then calculated as the product of natural gas usage per square feet multiplied by the total square footage by land use type analyzed in the CEQA baseline. Natural gas usage rate for the total constructed area does not account for 2019 Title 24 reductions, but the additional area under the existing DA incorporates 2019 Title 24 reductions.
2. The CEQA Baseline annual natural gas usage rate for the Utility land use type was calculated based on the total natural gas consumption from the existing boilers based on utilization rates provided by Bayer. The existing natural gas boilers will continue to operate through Year 10 and Year 30. See Table OP-15 for natural gas energy usage calculations. The boilers are housed in Buildings B63 and B44 which are the only utility buildings that consume natural gas. All other utility buildings have zero natural gas usage. The Project will include an additional Boiler of size 400 BHP included as a part of Year 10 operations, installed in building B46.
3. We would expect natural gas usage for Year 10 and Year 30 to increase by 5% for all land use types except Utility, all things being equal. The increase in usage is applied to the natural gas use rate per square footage. However, factoring in the reductions due to 2019 Title 24 Impact Analysis, consistent with the California Energy Commission (CEC), we would expect a reduction of 1% in natural gas usage, above the 105% increase from baseline usage. As a result, the there is a net decrease in natural gas usage for Year 10 and Year 30.
4. The City of Berkeley has banned the use of natural gas in any newly constructed commercial or residential building (manufacturing is excluded). All the new administration, maintenance and warehouse buildings are not expected to have natural gas consumption in Year 10 and Year 30, and all the natural gas devices will be replaced with electric appliances.
5. The existing B47 maintenance building alone will continue to use natural gas usage. All new maintenance buildings are replacing natural gas with electricity.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CEC - California Energy Commission
CEQA - California Environmental Quality Act
MMBtu - million British Thermal Units
sf - square feet

References:

CalEEMod® Version 2016.3.2 Available Online at: http://www.caleemod.com
California Energy Commission. 2019. Building Energy Efficiency Standards for Residential and Nonresidential Buildings. Available online at: https://www.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf
California Energy Commission. 2019. Impact Analysis for 2019 Energy Efficiency Standards. Available online at: https://ww2.energy.ca.gov/title24/2019standards/post_adoption/
City of Berkeley. Ordinance No 7,672-N.S. Chapter 12.80. Prohibition of Natural Gas Infrastructure in New Buildings. Available online at: https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/2019-07-23%20Item%20C%20Prohibiting%20Natural%20Gas%20Infrastructure.pdf

Table OP-7
Energy Usage Emission Factors
Bayer CEQA Long Range Development Project
Berkeley, California

Criteria Air Pollutant Energy Emission Factors - Natural Gas[1]

Land Use Type	ROG	NO_x	PM_{10}	$PM_{2.5}$	Units
Nonresidential	0.011	0.10	0.0075	0.0075	lb/MMBtu

Notes:

1. Natural gas use emission factors from Table 8.2 of CalEEMod® User's Guide Appendix D.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
lb - pound(s)
MMBtu - million British Thermal Units
NO_x - nitrogen oxides
PM_{10} - particulate matter smaller than 10 microns in diameter
$PM_{2.5}$ - particulate matter smaller than 2.5 microns in diameter
ROG - reactive organic gases

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2016.3.2. Available online at http://www.caleemod.com/

Table OP-8
Energy Usage Emissions for CEQA Baseline and Project Operations
Bayer CEQA Long Range Development Project
Berkeley, California

Location	Land Use Type	Natural Gas Combustion Emissions[1,2]			
		ROG	NO_x	PM_{10}	$PM_{2.5}$
		(tons/yr)			
CEQA Baseline					
Administration	General Office Building	0.055	0.50	0.038	0.038
Manufacturing Labs	Research & Development	0.13	1.1	0.087	0.087
Maintenance	General Light Industry	0.0042	0.038	0.0029	0.0029
Production	Manufacturing	0	0	0	0
Warehouse	Refrigerated Warehouse - No Rail	0.033	0.30	0.023	0.023
Utility	General Heavy Industry	0.62	1.4	0.85	0.85
Parking	Parking Lot	0	0	0	0
Parking	Enclosed Parking with Elevator	0	0	0	0
Total CEQA Baseline Emissions		**0.83**	**3.4**	**1.0**	**1.0**
Project - Year 10					
Administration	General Office Building	0	0	0	0
Manufacturing Labs	Research & Development	0.057	0.51	0.039	0.039
Maintenance	General Light Industry	0.0021	0.019	0.0015	0.0015
Production	Manufacturing	0	0	0	0
Warehouse	Refrigerated Warehouse - No Rail	0	0	0	0
Utility	General Heavy Industry	1.0	4.8	1.4	1.4
Parking	Parking Lot	0	0	0	0
Parking	Enclosed Parking with Elevator	0	0	0	0
Total Emissions (Year 10)		**1.1**	**5.4**	**1.4**	**1.4**
Project - Year 30					
Administration	General Office Building	0	0	0	0
Manufacturing Labs	Research & Development	0.072	0.66	0.050	0.050
Maintenance	General Light Industry	0.0021	0.019	0.0015	0.0015
Production	Manufacturing	0	0	0	0
Warehouse	Refrigerated Warehouse - No Rail	0	0	0	0
Utility	General Heavy Industry	1.0	4.8	1.4	1.4
Parking	Parking Lot	0	0	0	0
Parking	Enclosed Parking with Elevator	0	0	0	0
Total Emissions (Year 30)		**1.1**	**5.5**	**1.4**	**1.4**

Table OP-8
Energy Usage Emissions for CEQA Baseline and Project Operations
Bayer CEQA Long Range Development Project
Berkeley, California

Project Emissions[3]	Natural Gas Emissions			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
	(tons/yr)			
Total Year - 10 Project Emissions	0.22	2.0	0.41	0.41
Total Year - 30 Project Emissions	0.23	2.1	0.42	0.42

Notes:

1. CAP emissions are calculated from natural gas use only and not from electricity use (since they are only directly emitted from natural gas combustion).

2. Emissions are calculated based on energy use, shown in Table OP-6, and energy emission factors, shown in Table OP-7 for all land use types expect Utility. For Utility, emissions are based on CAP emissions from boilers, as presented in Table OP-15.
3. Project emissions are calculated as the Year 10 or Year 30 emissions minus the CEQA baseline emissions.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutants
NO_x - nitrogen oxides
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM - particulate matter
ROG - reactive organic gases
yr - year
PM_{10} - particulate matter less than 10 microns in diameter

References:

California Emissions Estimator Model (CalEEMod®). Available online at http://www.caleemod.com/

Table OP-9
Fleet Mix Assumptions
Bayer CEQA Long Range Development Project
Berkeley, California

CEQA Baseline

Vehicle Type	Percentage of Fleet Mix[1]	% by Fuel Type[1]			
		Gas	Diesel	Natural Gas	Electric
HHDT	4.3%	0.058%	99%	0.79%	0%
LDA	56%	96%	1.1%	0%	2.4%
LDT1	5.4%	100%	0.035%	0%	0.36%
LDT2	18%	99%	0.62%	0%	0.49%
LHDT1	2.2%	62%	38%	0%	0%
LHDT2	0.50%	39%	61%	0%	0%
MCY	0.52%	100%	0%	0%	0%
MDV	11%	97%	2.3%	0%	0.23%
MH	0.067%	76%	24%	0%	0%
MHDT	2.2%	9%	91%	0%	0%
OBUS	0.14%	53%	47%	0%	0%
SBUS	0.030%	27%	73%	0%	0%
UBUS	0.19%	0.64%	87%	11%	1.3%

Project - Year 10

Vehicle Type	Percentage of Fleet Mix[1]	% by Fuel Type[1]			
		Gas	Diesel	Natural Gas	Electric
HHDT	4.6%	0.044%	99%	0.89%	0%
LDA	56%	95%	1.1%	0%	4.1%
LDT1	5.4%	98%	0.022%	0%	1.6%
LDT2	17%	98%	0.83%	0%	1.4%
LHDT1	2.1%	56%	44%	0%	0%
LHDT2	0.53%	34%	66%	0%	0%
MCY	0.51%	100%	0%	0%	0%
MDV	11%	96%	2.9%	0%	1.4%
MH	0.067%	73%	27%	0%	0%
MHDT	2.4%	8%	92%	0%	0%
OBUS	0.13%	44%	56%	0%	0%
SBUS	0.035%	39%	61%	0%	0%
UBUS	0.18%	0.64%	81%	19%	0.00017%

Table OP-9
Fleet Mix Assumptions
Bayer CEQA Long Range Development Project
Berkeley, California

Project - Year 30

Vehicle Type	Percentage of Fleet Mix[1]	% by Fuel Type[1]			
		Gas	Diesel	Natural Gas	Electric
HHDT	5.0%	0.038%	99%	0.89%	0%
LDA	56%	93%	1.1%	0%	5.9%
LDT1	5.4%	97%	0.013%	0%	3.4%
LDT2	17%	96%	0.97%	0%	2.8%
LHDT1	2.1%	52%	48%	0%	0%
LHDT2	0.55%	29%	71%	0%	0%
MCY	0.49%	100%	0%	0%	0%
MDV	11%	94%	3.3%	0%	3.2%
MH	0.068%	70%	30%	0%	0%
MHDT	2.6%	8%	92%	0%	0%
OBUS	0.13%	35%	65%	0%	0%
SBUS	0.043%	54%	46%	0%	0%
UBUS	0.16%	0.64%	71%	29%	0%

Notes:

1. Fleet mixes and percentages by fuel type are calculated based on EMFAC2017 vehicle miles traveled projections for Alameda County.

Abbreviations:

CEQA - California Environmental Quality Act
EMFAC2017 - EMission FACtor model
HHDT - heavy-heavy duty truck
LDA - light-duty automobile
LDT1 - light-duty truck (smaller)
LDT2 - light-duty truck (larger)
LHDT1 - light-heavy-duty truck (smaller)
LHDT2 - light-heavy-duty truck (larger)
MCY - motorcycle
MDV - medium-duty truck
MH - motor home
MHDT - medium heavy-duty truck
OBUS - other bus
PRRA - public reuse and recycling area
SBUS - school bus
UBUS - urban bus

References:

ARB. 2017. Emission FACtors Model, 2017 (EMFAC2017). Available online at: https://www.arb.ca.gov/emfac/

Table OP-10
Mobile Emissions
Bayer CEQA Long Range Development Project
Berkeley, California

Inputs

Trip Rates[1]	CEQA Baseline	4,570 trips/day
	Project - Year 10	3,620 trips/day
	Project - Year 30	4,830 trips/day
Average Trip length[2]		11.6 mi/trip

Emission Factors

Scenario	**Emission Factor Units[4]**	**Mobile Emission Factors[3]**			
		ROG	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
CEQA Baseline	g/mi	0.043	0.37	0.058	0.027
	g/trip	1.0	0.66	0.0025	0.0024
Project - Year 10	g/mi	0.023	0.21	0.054	0.023
	g/trip	0.70	0.60	0.0017	0.0015
Project - Year 30	g/mi	0.017	0.19	0.054	0.022
	g/trip	0.44	0.56	0.0010	0.00096

Emissions

Scenario	**Mobile Emissions (ton/yr)**			
	ROG	**NOx**	**PM_{10}**	**$PM_{2.5}$**
CEQA Baseline	2.7	9.1	1.2	0.57
Project - Year 10	1.4	4.5	0.91	0.39
Project - Year 30	1.2	5.4	1.2	0.51

RAMBOLL

Table OP-10
Mobile Emissions
Bayer CEQA Long Range Development Project
Berkeley, California

Net Emissions

Scenario	Mobile Emissions			
	ROG	NOx	PM_{10}	$PM_{2.5}$
Total Year - 10 Project Emissions	-1.3	-4.6	-0.32	-0.18
Total Year - 30 Project Emissions	-1.5	-3.7	-0.019	-0.063

Notes:

1. Trip rates were provided by the Fehr & Peers, as outlined in the Transportation Memo.
2. The average trip length is based on CalEEMod® default estimates for Alameda County.
3. Emission factors were estimated using EMFAC2017 for Alameda County.
4. Emission factors from EMFAC with units of g/vehicle/day were converted to g/trip by scaling by the ratio of the total number of vehicles divided by the total number of trips for each vehicle class, fuel type, and year.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutant
EMFAC2017 - California Air Resources Board EMission FACtor model
g - gallon(s)
mi - mile
NO_x - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases

References:

California Emissions Estimator Model (CalEEMod®). Available online at http://www.caleemod.com/

Table OP-11
On-Road Fugitive Dust Emissions from Existing Conditions and Project Operations
Bayer CEQA Long Range Development Project
Berkeley, California

Road Dust Equation[1]

E = k*(sL)^0.91 * (W)^1.02 * (1-P/4N)

Parameter[2]	**Value**
E = annual average emission factor in the same units as k	[calculated]
k = particle size multiplier for particle size range and units of interest	
PM_{10} (lb/VMT)	0.0022
$PM_{2.5}$ (lb/VMT)	3.3E-04
sL = road surface silt loading (grams per square meter) (g/m^2)	0.038
W = average weight (tons) of all the vehicles traveling the road	2.4
P = number of "wet" days with at least 0.01 in of precipitation during averaging period[3]	61
N number of days in the averaging period	365

CEQA Baseline VMT	19,349,380
Project - Year 10 VMT	15,327,080
Project - Year 30 VMT	20,450,220

Scenario	**Fugitive PM_{10}**	**Fugitive $PM_{2.5}$**	**Units**
Emission Factor	2.6E-04	3.9E-05	lb/VMT
CEQA Baseline Emissions	2.5	0.38	tons/year
Project - Year 10 Emissions	2.0	0.30	tons/year
Project - Year 30 Emissions	2.7	0.40	tons/year

Notes:

1. Road dust equation and parameters are from the California Air Resources Board's (ARB) 2018 Miscellaneous Process Methodology 7.9 for Entrained Road Travel, Paved Road Dust. The silt loading emission factor conservatively assumes all roads are major roadways. The number of "wet" days for Alameda county is from ARB 2018. This is slightly lower than the default from CalEEMod® Appendix D Table 1.1 (63 days), which was based on older historic data and would result in slightly lower emissions. Other parameters (average weight of vehicles, size multipliers) are from ARB 2018. $PM_{2.5}$ is assumed to be 15% of PM_{10} based on paved road dust sampling in California (ARB Speciation Profile #471), which is a more representative fraction than provided in the older AP-42 fugitive dust methodology as discussed in ARB 2018 (page 10)
2. VMT is estimated based on trip generation as provided by the Fehr & Peers, as outlined in the Transportation Memo.

Abbreviations:

ARB - Air Resources Board
CalEEMod® - California Emissions Estimator Model
EMFAC - EMission FACtor Model
lb - pounds
$PM_{2.5}$ - particulate matter less than 2.5 microns
VMT - vehicle miles traveled

References:

California ARB. 2018. Miscellaneous Processes Methodologies - Paved Entrained Road Dust. Available online at: https://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2018.pdf
USEPA. 1996. AP 42. Compilation of Air Pollutant Emission Factors, Volume 1. Fifth Edition. Chapter 13.2.1, Paved Roads. Available online at: http://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf.

Table OP-12
Generator Information and Emission Factors
Bayer CEQA Long Range Development Project
Berkeley, California

Generator Information and Emission Factors

Name	Generator Size Range		Generator Building	Fuel Consumption[1] (gal/hr)	Operating Hours[2] (hr/yr)	Emission Factors[3,4,5] (g/bhp-hr)				
	kW	bhp				ROG	CO	NO_x	SO_2	PM
CEQA Baseline										
9098X01	125	192	B54	8.0	20	0.16	0.75	2.8	0.0040	0.15
9098X05	600	890	B57	45	20	0.064	0.64	8.6	0.0048	0.086
9098X06	2,000	2,841	B61	145	50	0.18	0.84	12	0.0049	0.070
9098X07	2,000	2,682	B61	136	50	0.21	0.40	6.2	0.0048	0.090
9098X14	2,000	2,848	B61	133	50	0.15	0.41	5.8	0.0045	0.080
9098X17	350	519	B28/B28A	27	50	0.054	4.5	6.7	0.0050	1.3
Year 10										
9098X01	125	192	B54	8.0	20	0.16	0.75	2.8	0.0040	0.15
9098X06	2,000	2,841	B61	145	50	0.18	0.84	12	0.0049	0.070
9098X07	2,000	2,682	B61	136	50	0.21	0.40	6.2	0.0048	0.090
9098X14	2,000	2,848	B61	133	50	0.15	0.41	5.8	0.0045	0.080
Proposed Gen 1	2,000	2,937	B82	138	50	0.12	0.30	5.5	0.0045	0.025
Proposed Gen 2	2,000	2,937	B82	138	50	0.12	0.30	5.5	0.0045	0.025
Year 30										
Proposed Gen 3	2,000	2,937	B82	138	50	0.12	0.30	5.5	0.0045	0.025
Proposed Gen 4	2,000	2,937	B82	138	50	0.12	0.30	5.5	0.0045	0.025
Proposed Gen 5	2,000	2,937	B61	138	50	0.12	0.30	5.5	0.0045	0.025
Proposed Gen 6	2,000	2,937	B61	138	50	0.12	0.30	5.5	0.0045	0.025
Proposed Gen 7	2,000	2,937	B61	138	50	0.12	0.30	5.5	0.0045	0.025

Notes

1. Fuel consumption values are for CEQA baseline are obtained from facility data and represent fuel consumption at 100% load. Fuel consumption rates for the proposed generators are based on equipment manufacture sheets.
2. Annual operating hours for the existing generators are obtained from the BAAQMD permit for the Bayer facility. Operating hours for the proposed generators are based on BAAQMD's permit limit of 50 hours per year for testing and maintenance operations.
3. Emission factors for PM, NMHC+NO_x, NMHC, NO_x, and CO are from manufacturer specification sheets and/or initial permit applications for the listed generator models.

Table OP-12
Generator Information and Emission Factors
Bayer CEQA Long Range Development Project
Berkeley, California

Notes cont'd

4. Ramboll assumed that 95% of the NMHC+NO_x emissions would be NO_x and the remaining 5% NMHC based on BAAQMD guidance.
5. SO_2 emission factor based on MDAQMD guidance and is equivalent to the diesel fuel sulfur content California regulatory standard of 15 ppm.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CARB - California Air Resources Board
CO - carbon monoxide
EPA - United States Environmental protection Agency
g - grams
gal - gallon
bhp - brake horsepower
hr - hour
HHV - high heating value
kg - kilograms
kW - kilowatts
MDAQMD - Mojave Desert Air Quality Management District
MMR - Mandatory Reporting Rule
NMHC - non-methane hydrocarbon
NO_x - nitrogen oxides
PM - particulate matter
SO_2 - sulfur dioxide
TOG total organic gases
yr - year

References

BAAQMD guidance available at: http://www.baaqmd.gov/pmt/bactworkbook/default.htm

EPA Mandatory Reporting Rule (MRR), 40 CFR 98, Table C-1 & C-2. Accessed online at: https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=1436db1e1e4f6e1ddff3037fbc0c969a&mc=true&n=sp40.23.98.c&r=SUBPART&ty=HTML.

MDAQMD guidance available at: http://mdaqmd.ca.gov/home/showdocument?id=722

BAAQMD. 2004. CARB Emission Factors for CI Diesel Engines - Percent HC in Relation to NMHC + NO_x.

California Air Resources Board Non-road Diesel Engine Certification Tier Chart. Available online at: https://ww2.arb.ca.gov/resources/documents/non-road-diesel-engine-certification-tier-chart

USEPA. 2010. Conversion Factors for Hydrocarbon Emission Components, NR-002d. EPA-420-R-10-015. July. Available online at: https://nepis.epa.gov/Exe/ZyPDF.cgi/P1002KA8.PDF?Dockey=P1002KA8.PDF

Table OP-13
Generator Emissions for CEQA Baseline and Project Operations
Bayer CEQA Long Range Development Project
Berkeley, California

Generator Emissions[1]

Name	Emissions (tons/yr)				
	ROG	CO	NO_x	SO_2	PM
CEQA Baseline					
9098X01	6.8E-04	0.0032	0.012	1.7E-05	6.3E-04
9098X05	0.0013	0.013	0.17	9.4E-05	0.0017
9098X06	0.028	0.13	1.8	7.6E-04	0.011
9098X07	0.032	0.059	0.92	7.1E-04	0.013
9098X14	0.024	0.064	0.91	7.0E-04	0.013
9098X17	0.0015	0.13	0.19	1.4E-04	0.036
Total	0.087	0.40	4.0	0.0024	0.075
Year 10					
9098X01	6.8E-04	0.0032	0.012	1.7E-05	6.3E-04
9098X06	0.028	0.13	1.8	7.6E-04	0.011
9098X07	0.032	0.059	0.92	7.1E-04	0.013
9098X14	0.024	0.064	0.91	7.0E-04	0.013
NewGen1	0.019	0.049	0.88	7.2E-04	0.0040
NewGen2	0.019	0.049	0.88	7.2E-04	0.0040
Total	0.12	0.36	5.4	0.0036	0.046
Year 30					
NewGen1	0.019	0.049	0.88	7.2E-04	0.0040
NewGen2	0.019	0.049	0.88	7.2E-04	0.0040
NewGen3	0.019	0.049	0.88	7.2E-04	0.0040
NewGen4	0.019	0.049	0.88	7.2E-04	0.0040
NewGen5	0.019	0.049	0.88	7.2E-04	0.0040
Total	0.10	0.24	4.4	0.0036	0.020

Notes

1. Generator emissions are calculated based on the generator information and emission factors in Table OP-12.

Abbreviations:

CEQA - California Environmental Quality Act
CO - carbon monoxide
NO_x - nitrogen oxides
PM - particulate matter
SO_2 - sulfur dioxide
yr - year

Table OP-14
Emission Factors for Natural Gas Boilers
Bayer CEQA Long Range Development Project
Berkeley, California

Boiler Information and Emission Factors

Capacity (MMBtu/hour)[1]	Size	Name	Emissions Factor (lb/MMScf)[2,3]				
	BHP		ROG	CO	NO_x	SO_2	PM
CEQA Baseline							
14.7	350	S34	5.5	29	19	0.60	7.6
37.8	900	S10	5.5	262	10	0.60	7.6
37.8	900	S11	5.5	262	10	0.60	7.6
Year 10 and Year 30							
14.7	350	S34	5.5	29	19	0.60	7.6
37.8	900	S10	5.5	262	10	0.60	7.6
37.8	900	S11	5.5	262	10	0.60	7.6
15.94	400	NEW	5.5	84	50	0.60	7.6

Notes

1. The capacity and size of each existing boiler was obtained from the BAAQMD permits for the Bayer facility. The capacity and size of the proposed boiler (NEW) was estimated by Bayer based on steam production requirements for Year 10 and Year 30. The site also currently includes two smaller boilers (3.25 MMBTU/hour and 0.334 MMBTU/hour) to supply heating to building B28. The natural gas consumed by these boilers to supply heating to building B28 is included in the building energy usage calculations as shown in Table OP-6. Building natural combustion emissions are estimated based on CalEEMod® 2016.3.2 default emission factors which are generally more conservative, as shown in Table OP-7. These two boilers will be relocated to building B82 in Year 10.

2. Emission factors for NOx and CO were obtained from the manufacturer specification sheet and BAAQMD Engineering Evaluation for the existing boilers S10, S11 and S34. NO_x and CO emission factors for the proposed boiler (NEW) were obtained from AP-42 and assumes the boiler will have low NO_x burners. Emission factors for POC, PM, and SO_2 were obtained from AP-42 Chapter 1.4, Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion. Note that USEPA AP-42 emission factors are consistent with BAAQMD Permit Handbook Guidance.

Table OP-14
Emission Factors for Natural Gas Boilers
Bayer CEQA Long Range Development Project
Berkeley, California

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
bhp - brake horsepower
CEQA - California Environmental Quality Act
CO - carbon monoxide
EPA - United States Environmental protection Agency
g - grams
hr - hour
MMBTU - million British thermal unit
NO_x - nitrogen oxides
PM - particulate matter
SO_2 - sulfur dioxide
ROG - reactive organic gases
yr - year

References

BAAQMD guidance available at: http://www.baaqmd.gov/pmt/bactworkbook/default.htm
USEPA. AP-42 Chapter 1.4 Natural Gas Combustion. Available at: https://www3.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf

Table OP-15
Boiler Emissions for CEQA Baseline and Project Operations
Bayer CEQA Long Range Development Project
Berkeley, California

Boiler Emissions[1]:

Capacity (MMBtu/hour)	Name	Heat Content (Btu/scf)	Utilization (%)	Operating Hours (hr/yr)	Fuel Consumed (scf/year)	Emissions (tons/year)				
						ROG	CO	NO_x	SO_2	PM
CEQA Baseline										
14.7	S34	1,020	50%	8,760	63,123,529	0.17	0.92	0.60	0.019	0.24
37.8	S10	1,020	25%	8,760	80,392,157	0.22	11	0.41	0.024	0.31
37.8	S11	1,020	25%	8,760	80,392,157	0.22	11	0.41	0.024	0.31
					Total	0.62	22	1.4	0.067	0.85
Project - Year 10										
14.7	S34	1,020	50%	8,760	63,123,529	0.17	0.92	0.60	0.019	0.24
37.8	S10	1,020	25%	8,760	80,392,157	0.22	11	0.41	0.024	0.31
37.8	S11	1,020	25%	8,760	80,392,157	0.22	11	0.41	0.024	0.31
15.94	NEW	1,020	100%	8,760	136,916,120	0.38	5.8	3.4	0.041	0.52
					Total	0.99	28	4.8	0.11	1.4
Project - Year 30										
14.7	S34	1,020	50%	8,760	63,123,529	0.17	0.92	0.60	0.019	0.24
37.8	S10	1,020	25%	8,760	80,392,157	0.22	11	0.41	0.024	0.31
37.8	S11	1,020	25%	8,760	80,392,157	0.22	11	0.41	0.024	0.31
15.94	NEW	1,020	100%	8,760	136,916,120	0.38	5.8	3.4	0.041	0.52
					Total	0.99	28	4.8	0.11	1.4

Notes

1. Boiler emissions are calculated based on the boiler information and emission factors in Table OP-14. The existing boilers S10, S11 and S34 will remain in operation through Year 10 and Year 30, and thus emissions from these three boilers remain the same. In Year 10, a fourth boiler (NEW) will be added to B46 and it is assumed to operate at the same capacity in Year 30, thus emissions for Year 10 and Year 30 are constant.

Abbreviations:

btu - British thermal unit
CalEEMod® - California Emissions Estimator Model®
CEQA - California Environmental Quality Act
CO - carbon monoxide
hr - hour
MMBTU - million british thermal unit
NO_x - nitrogen oxides
PM - particulate matter
scf -standard cubic feet
SO_2 - sulfur dioxide
ROG - reactive organic gases
yr - year

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Table OP-16
Summary of Operational CAP Emissions
Bayer CEQA Long Range Development Project
Berkeley, California

Emissions Source	Total CAP Emissions[1] (ton/year)				Total CAP Emissions[1] (lb/day)[2]			
	ROG	NO_x	PM_{10}	$PM_{2.5}$	ROG	NO_x	PM_{10}	$PM_{2.5}$
CEQA Baseline								
Architectural Coating	0.99	--	--	--	5.4	--	--	--
Consumer Products	0.77	--	--	--	4.2	--	--	--
Lab Emissions	17	--	--	--	94	--	--	--
Landscaping	0.0031	3.1E-04	1.2E-04	1.2E-04	0.017	0.0017	6.6E-04	6.6E-04
Building Natural Gas Use[3]	0.22	2.0	0.15	0.15	1.2	11	0.83	0.83
On-Road Fugitive Dust	--	--	2.5	0.38	--	--	14	2.1
On-Road Exhaust	2.7	9.1	1.2	0.57	15	50	6.8	3.1
Emergency Generators	0.087	4.0	0.075	0.075	0.48	22	0.41	0.41
Boilers	0.62	1.4	0.85	0.85	3.4	7.8	4.7	4.7
Total Emissions	**23**	**17**	**4.8**	**2.0**	**124**	**91**	**26**	**11**
Project - Year 10								
Architectural Coating	0.63	--	--	--	3.5	--	--	--
Consumer Products	0.66	--	--	--	3.6	--	--	--
Manufacturing Labs	27	--	--	--	148	--	--	--
Landscaping	0.0015	1.4E-04	6.0E-05	6.0E-05	0.0079	7.7E-04	3.3E-04	3.3E-04
Building Natural Gas Use[3]	0.059	0.53	0.041	0.041	0.32	2.9	0.22	0.22
On-Road Fugitive Dust	--	--	2.0	0.30	--	--	11	1.6
On-Road Exhaust	1.4	4.5	0.91	0.39	7.7	25	5.0	2.1
Emergency Generators	0.12	5.4	0.046	0.046	0.67	30	0.25	0.25
Boilers	0.99	4.8	1.4	1.4	5.4	27	7.5	7.5
Total Emissions	**31**	**15**	**4.4**	**2.1**	**170**	**84**	**24**	**12**
Project - Year 30								
Architectural Coating	0.92	--	--	--	5.1	--	--	--
Consumer Products	0.89	--	--	--	4.8	--	--	--
Manufacturing Labs	27	--	--	--	148	--	--	--
Landscaping	0.0021	2.1E-04	8.0E-05	8.0E-05	0.012	0.0012	4.4E-04	4.4E-04
Building Natural Gas Use[3]	0.074	0.68	0.051	0.051	0.41	3.7	0.28	0.28
On-Road Fugitive Dust	--	--	2.7	0.40	--	--	15	2.2
On-Road Exhaust	1.2	5.4	1.2	0.51	6.7	30	6.6	2.8
Emergency Generators	0.095	4.4	0.020	0.020	0.52	24	0.11	0.11
Boilers	0.99	4.8	1.4	1.4	5.4	27	7.5	7.5
Total Emissions	**31**	**15**	**5.3**	**2.4**	**172**	**84**	**29**	**13**

Table OP-16
Summary of Operational CAP Emissions
Bayer CEQA Long Range Development Project
Berkeley, California

Project Emissions	CAP Emissions[1]							
	(ton/year)				(lb/day)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$	ROG	NO_x	PM_{10}	$PM_{2.5}$
Total Year - 10 Project Emissions	8.4	-1.2	-0.46	0.12	46	-6.7	-2.5	0.66
Total Year - 30 Project Emissions	8.7	-1.2	0.49	0.32	48	-6.5	2.7	1.8
BAAQMD CEQA Thresholds[4]	10	10	15	10	54	54	82	54

Notes:

1. Operational emissions were estimated with methodology equivalent to CalEEMod® 2016.3.2 based on site-specific information.
2. Daily emissions are conservatively averaged over 365 days.
3. Emissions for natural gas usage represents emissions from the building energy usage. Natural gas usage rate for the utility boilers are reported separately.
4. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. Fugitive emissions sources are excluded from comparison to this threshold.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model®
CAP - Criteria Air Pollutants
CEQA - California Environmental Quality Act
ROG - reactive organic gases
NO_x - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns

APPENDIX C

Table HRA-1a
Modeled Construction Emissions
Bayer CEQA Long-Range Development
Berkeley, California

Location	Phase	Year	Construction Emissions[1]	
			DPM	$PM_{2.5}$
			g/s	
Year 10 Construction and Demolition				
A-North	Demolition	2024	2.2E-05	2.2E-05
	Construction (2025)	2024	2.7E-04	2.6E-04
	Construction (2030)	2029	1.2E-04	1.2E-04
B-North	Construction	2029	1.2E-04	1.2E-04
C-North	Demolition	2024	1.1E-05	1.1E-05
	Construction	2024	1.3E-04	1.3E-04
A-South	Demolition	2024	2.2E-05	2.2E-05
	Construction	2024	2.7E-04	2.6E-04
C-South	Construction	2024	2.7E-04	2.6E-04
Year 30 Construction				
A-North	Construction (2035)	2034	5.8E-05	5.8E-05
	Construction (2050)	2049	5.8E-05	5.8E-05
B-North	Construction	2049	2.1E-04	2.1E-04
D-North	Construction	2034	1.2E-04	1.2E-04
A-South	Construction	2049	5.8E-05	5.8E-05

Notes:

1. Construction TAC emissions were estimated from on-site off-road emissions. On-road emissions were not included in the HRA because the traffic volumes estimated by CalEEMod® default methodology do not exceed the screening levels recommended by BAAQMD (i.e., more than 5,000 vehicles per day and 500 trucks per day) and can be considered minor sources (BAAQMD 2011).

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutants
CEQA - California Environmental Quality Act
DPM - diesel particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns

Reference:

California Emissions Estimator Model (CalEEMod®). 2016. CAPCOA. Available online at: http://www.caleemod.com

California Environmental Quality Act (CEQA) Guidelines. 2017. Bay Area Air Quality Management District (BAAQMD). May. Available online at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

Recommended Methods for Screening and Modeling Local Risks and Hazards. 2011. BAAQMD. May. Available online at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/baaqmd-modeling-approach.pdf

Table HRA-1b
Modeled Boiler Emissions
Bayer CEQA Long Range Development Project
Berkeley, California

Boiler Usage	Baseline			Year 10 Project				Year 30 Project			
	S34	S10	S11	S34	S10	S11	NEW	S34	S10	S11	NEW
Capacity (MMBtu/hour)	15	38	38	15	38	38	16	15	38	38	16
Annual Fuel Consumption (MMSCF/yr)	63	80	80	63	80	80	137	63	80	80	137
Hourly Fuel Consumption (MMSCF/hr)	0.014	0.037	0.037	0.014	0.037	0.037	0.016	0.014	0.037	0.037	0.016

Pollutant		Emission Factor[1,2]	Modeled Emission Rate for Cancer Risk, Chronic HI, and $PM_{2.5}$ (g/s)										
			Baseline			Year 10 Project				Year 30 Project			
CAS	Name	(lb/MMSCF)	S34	S10	S11	S34	S10	S11	NEW	S34	S10	S11	NEW
71-43-2	Benzene	0.0021	1.9E-06	2.4E-06	2.4E-06	1.9E-06	2.4E-06	2.4E-06	4.1E-06	1.9E-06	2.4E-06	2.4E-06	4.1E-06
50-00-0	Formaldehyde	0.075	6.8E-05	8.7E-05	8.7E-05	6.8E-05	8.7E-05	8.7E-05	1.5E-04	6.8E-05	8.7E-05	8.7E-05	1.5E-04
110-54-3	n-Hexane	1.8	0.0016	0.0021	0.0021	0.0016	0.0021	0.0021	0.0035	0.0016	0.0021	0.0021	0.0035
91-20-3	Napthalene	6.1E-04	5.5E-07	7.1E-07	7.1E-07	5.5E-07	7.1E-07	7.1E-07	1.2E-06	5.5E-07	7.1E-07	7.1E-07	1.2E-06
108-88-3	Toluene	0.0034	3.1E-06	3.9E-06	3.9E-06	3.1E-06	3.9E-06	3.9E-06	6.7E-06	3.1E-06	3.9E-06	3.9E-06	6.7E-06
--	PAH (as benzo(a)pyrene-equivalents)	1.3E-05	1.2E-08	1.6E-08	1.6E-08	1.2E-08	1.6E-08	1.6E-08	2.7E-08	1.2E-08	1.6E-08	1.6E-08	2.7E-08
7440-38-2	Arsenic	2.0E-04	1.8E-07	2.3E-07	2.3E-07	1.8E-07	2.3E-07	2.3E-07	3.9E-07	1.8E-07	2.3E-07	2.3E-07	3.9E-07
7440-41-7	Beryllium	1.2E-05	1.1E-08	1.4E-08	1.4E-08	1.1E-08	1.4E-08	1.4E-08	2.4E-08	1.1E-08	1.4E-08	1.4E-08	2.4E-08
7440-43-9	Cadmium	0.0011	1.0E-06	1.3E-06	1.3E-06	1.0E-06	1.3E-06	1.3E-06	2.2E-06	1.0E-06	1.3E-06	1.3E-06	2.2E-06
7440-50-8	Copper	8.5E-04	7.7E-07	9.8E-07	9.8E-07	7.7E-07	9.8E-07	9.8E-07	1.7E-06	7.7E-07	9.8E-07	9.8E-07	1.7E-06
7439-96-5	Manganese	3.8E-04	3.5E-07	4.4E-07	4.4E-07	3.5E-07	4.4E-07	4.4E-07	7.5E-07	3.5E-07	4.4E-07	4.4E-07	7.5E-07
7439-97-6	Mercury	2.6E-04	2.4E-07	3.0E-07	3.0E-07	2.4E-07	3.0E-07	3.0E-07	5.1E-07	2.4E-07	3.0E-07	3.0E-07	5.1E-07
7440-02-0	Nickel	0.0021	1.9E-06	2.4E-06	2.4E-06	1.9E-06	2.4E-06	2.4E-06	4.1E-06	1.9E-06	2.4E-06	2.4E-06	4.1E-06
7782-49-2	Selenium	2.4E-05	2.2E-08	2.8E-08	2.8E-08	2.2E-08	2.8E-08	2.8E-08	4.7E-08	2.2E-08	2.8E-08	2.8E-08	4.7E-08
7440-62-2	Vanadium	0.0023	2.1E-06	2.7E-06	2.7E-06	2.1E-06	2.7E-06	2.7E-06	4.5E-06	2.1E-06	2.7E-06	2.7E-06	4.5E-06
88-10-1	$PM_{2.5}$	7.6000	0.0069	0.0088	0.0088	0.0069	0.0088	0.0088	0.015	0.0069	0.0088	0.0088	0.015

Pollutant		Emission Factor[1,2]	Modeled Emission Rate for Acute HI (g/s)										
			Baseline			Year 10 Project				Year 30 Project			
CAS	Name	(lb/MMSCF)	S34	S10	S11	S34	S10	S11	NEW	S34	S10	S11	NEW
71-43-2	Benzene	0.0021	3.8E-06	9.8E-06	9.8E-06	3.8E-06	9.8E-06	9.8E-06	4.1E-06	3.8E-06	9.8E-06	9.8E-06	4.1E-06
50-00-0	Formaldehyde	0.075	1.4E-04	3.5E-04	3.5E-04	1.4E-04	3.5E-04	3.5E-04	1.5E-04	1.4E-04	3.5E-04	3.5E-04	1.5E-04
110-54-3	n-Hexane	1.8	0.0033	0.0084	0.0084	0.0033	0.0084	0.0084	0.0035	0.0033	0.0084	0.0084	0.0035
91-20-3	Napthalene	6.1E-04	1.1E-06	2.8E-06	2.8E-06	1.1E-06	2.8E-06	2.8E-06	1.2E-06	1.1E-06	2.8E-06	2.8E-06	1.2E-06
108-88-3	Toluene	0.0034	6.2E-06	1.6E-05	1.6E-05	6.2E-06	1.6E-05	1.6E-05	6.7E-06	6.2E-06	1.6E-05	1.6E-05	6.7E-06
--	PAH (as benzo(a)pyrene-equivalents)	1.3E-05	2.4E-08	6.3E-08	6.3E-08	2.4E-08	6.3E-08	6.3E-08	2.7E-08	2.4E-08	6.3E-08	6.3E-08	2.7E-08
7440-38-2	Arsenic	2.0E-04	3.6E-07	9.3E-07	9.3E-07	3.6E-07	9.3E-07	9.3E-07	3.9E-07	3.6E-07	9.3E-07	9.3E-07	3.9E-07
7440-41-7	Beryllium	1.2E-05	2.2E-08	5.6E-08	5.6E-08	2.2E-08	5.6E-08	5.6E-08	2.4E-08	2.2E-08	5.6E-08	5.6E-08	2.4E-08
7440-43-9	Cadmium	0.0011	2.0E-06	5.1E-06	5.1E-06	2.0E-06	5.1E-06	5.1E-06	2.2E-06	2.0E-06	5.1E-06	5.1E-06	2.2E-06
7440-50-8	Copper	8.5E-04	1.5E-06	4.0E-06	4.0E-06	1.5E-06	4.0E-06	4.0E-06	1.7E-06	1.5E-06	4.0E-06	4.0E-06	1.7E-06
7439-96-5	Manganese	3.8E-04	6.9E-07	1.8E-06	1.8E-06	6.9E-07	1.8E-06	1.8E-06	7.5E-07	6.9E-07	1.8E-06	1.8E-06	7.5E-07
7439-97-6	Mercury	2.6E-04	4.7E-07	1.2E-06	1.2E-06	4.7E-07	1.2E-06	1.2E-06	5.1E-07	4.7E-07	1.2E-06	1.2E-06	5.1E-07
7440-02-0	Nickel	0.0021	3.8E-06	9.8E-06	9.8E-06	3.8E-06	9.8E-06	9.8E-06	4.1E-06	3.8E-06	9.8E-06	9.8E-06	4.1E-06
7782-49-2	Selenium	2.4E-05	4.4E-08	1.1E-07	1.1E-07	4.4E-08	1.1E-07	1.1E-07	4.7E-08	4.4E-08	1.1E-07	1.1E-07	4.7E-08
7440-62-2	Vanadium	0.0023	4.2E-06	1.1E-05	1.1E-05	4.2E-06	1.1E-05	1.1E-05	4.5E-06	4.2E-06	1.1E-05	1.1E-05	4.5E-06
88-10-1	$PM_{2.5}$	7.6	0.014	0.035	0.035	0.014	0.035	0.035	0.015	0.014	0.035	0.035	0.015

Notes:

1. The PAH emission factor was calculated as sum product of individual PAH emission factors and Potency Equivalency Factors (PEFs) from Table 2-5-1 of BAAQMD's Regulation 2, Rule 5.
2. External combustion equipment emission factors for toxic air contaminants were obtained from AP-42 Chapter 1.4, Table 1.4-3 Emission Factors for Speciated Organic Compounds from Natural Gas Combustion and Table 1.4-4 Emission Factors for Metals from Natural Gas Combustion. Note that AP-42 emission factors are consistent with BAAQMD Permit Handbook Guidance.

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Table HRA-1b
Modeled Boiler Emissions
Bayer CEQA Long Range Development Project
Berkeley, California

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
BTU - British Thermal Units
g - gram
lb - pound
PAH - polycyclic aromtics hydrocarbons
s - second
scf - standard cubic feet
yr - year

References:

BAAQMD. 2016. Regulation 2, Rule 5. New Source Review of Toxic Air Contaminants. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-2-rule-5-new-source-review-of-toxic-air-contaminants/documents/rg0205_120716-pdf.pdf?la=en.
USEPA. AP-42 Chapter 1.4 Natural Gas Combustion. Available online at: https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf

Table HRA-1c
Emission Factors for Traffic Model
Bayer CEQA Long-Range Development
Berkeley, California

Year	Emission Factor (g/mi)[1,2]			
	DPM	$PM_{2.5}$	TOG [3]	
			Evaporative	Exhaust
2025	0.0010	0.039	0.055	0.037
2026	9.2E-04	0.039	0.053	0.035
2027	8.9E-04	0.039	0.051	0.033
2028	8.6E-04	0.039	0.050	0.031
2029	8.3E-04	0.039	0.048	0.030
2030	8.1E-04	0.039	0.047	0.029
2031	7.9E-04	0.039	0.045	0.028
2032	7.8E-04	0.039	0.044	0.027
2033	7.7E-04	0.039	0.042	0.027
2034	7.5E-04	0.038	0.041	0.026
2035	7.4E-04	0.038	0.039	0.025
2036	7.3E-04	0.038	0.038	0.025
2037	7.2E-04	0.038	0.037	0.025
2038	7.2E-04	0.038	0.036	0.024
2039	7.1E-04	0.038	0.036	0.024
2040	7.1E-04	0.038	0.035	0.024
2041	7.0E-04	0.038	0.035	0.023
2042	7.0E-04	0.038	0.035	0.023
2043	7.0E-04	0.038	0.035	0.023
2044	7.0E-04	0.038	0.034	0.023
2045	6.9E-04	0.038	0.034	0.023
2046	6.9E-04	0.038	0.034	0.023
2047	6.9E-04	0.038	0.034	0.023
2048	6.9E-04	0.038	0.034	0.023
2049	6.9E-04	0.038	0.034	0.023
2050+	6.9E-04	0.038	0.034	0.023

Notes:

1. Emission factors are estimated in EMFAC2017 for Alameda county for 2025 - 2050. EMFAC does not project emissions beyond 2050, so 2050 emission factors are used for all years past 2050. Evaporative sources of TOG and brakewear/tirewear sources of PM emissions were estimated using aggregated speeds in EMFAC. Exhaust sources of TOG, DPM, and PM2.5 were estimated assuming a 25 mile per hour speed.

2. Emission factors include ARB's CAP emission factor adjustments published in response to the "Safer Affordable Fuel-Efficient Vehicles Rule" adopted by the EPA.

Table HRA-1c
Emission Factors for Traffic Model
Bayer CEQA Long-Range Development
Berkeley, California

Notes, Continued:

3. Speciation profiles for tailpipe TOG emissions are different for evaporative versus exhaust sources. Therefore, emissions were estimated separately for these two sources of emissions.

References

CARB. 2019. EMFAC Off-Model Adjustment Factors to Account for the SAFE Vehicle Rule Part One. November. Available at: https://ww3.arb.ca.gov/msei/emfac_off_model_adjustment_factors_final_draft.pdf

Table HRA-1d
Traffic Volumes
Bayer CEQA Long-Range Development
Berkeley, California

Source Group Name[1]	Year 10 Project		Year 30 Project	
	Net Volume[2] (vehicles/day)	Net VMT[3] (mi/day)	Net Volume[2] (vehicles/day)	Net VMT[3] (mi/day)
AALINK	-447	-85	122	23
I80NB1	0	0	0	0
I80NB2	0	0	0	0
I80NB3	0	0	0	0
I80SB1	0	0	0	0
I80SB2	0	0	0	0
I80SB3	0	0	0	0
UALINK	-285	-20	78	6
6THAV1	-38	-4.1	10	1.1
6THAV2	-342	-195	94	53
7THAVE	-523	-160	143	44
ASHAV1	-447	-118	122	32
ASHAV2	-48	-12	13	3
ASHAV3	-57	-20	16	6
DWAVE1	-57	-14	16	4
DWAVE2	-19	-9.3	5	2.5
PKRAVE	-29	-7.2	8	2.0
SPAVE1	-29	-2.3	8	0.6
SPAVE2	-19	-11	5	3
SPAVE3	-48	-5.9	13	1.6
SPAVE4	-48	-24	13	7
SPAVE5	-38	-13	10	4
UNAVE1	-285	-76	78	21
UNAVE2	-19	-5.9	5	1.6
UNAVE3	-10	-1.9	3	0.5

Notes

1. Trip volumes were provided by Fehr & Peers in the Bayer Berkeley Project Transportation Findings memo dated September 29, 2020.
2. VMT is estimated by multiplying the net volume by the length of the modeled segment.

Table HRA-1e
Speciation Profile for Modeled Traffic Emissions
Bayer CEQA Long-Range Development
Berkeley, California

TAC	CAS	Fraction of Emissions by Pollutant[1]			
		DPM	PM2.5	TOG	
				Evaporate	Exhaust
Ethylbenzene	100-41-4	--	--	0.12%	1.1%
Toluene	108-88-3	--	--	1.7%	5.8%
Hexane	110-54-3	--	--	1.5%	1.6%
Xylenes	1330-20-7	--	--	0.58%	4.8%
Benzene	71-43-2	--	--	0.36%	2.5%
Styrene	100-42-5	--	--	--	0.12%
1,3-Butadiene	106-99-0	--	--	--	0.55%
Acrolein	107-02-8	--	--	--	0.13%
Propylene	115-07-1	--	--	--	3.1%
Formaldehyde	50-00-0	--	--	--	1.6%
Methanol	67-56-1	--	--	--	0.12%
Acetaldehyde	75-07-0	--	--	--	0.28%
Methyl Ethyl Ketone	78-93-3	--	--	--	0.020%
Naphthalene	91-20-3	--	--	--	0.050%
DPM	9-90-1	100%	--	--	--
$PM_{2.5}$	88-10-1	--	100%	--	--

Notes:

1. Speciation profiles for mobile source TOG emissions are from Tables 14 and 15 in BAAQMD 2011 "Recommended Methods for Screening and Modeling Local Risks and Hazards" document.

References:

BAAQMD, Recommended Methods for Screening and Modeling Local Risks and Hazards, May 2011, p. 12, https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/baaqmd-modeling-approach.pdf, accessed September 28, 2020.

Table HRA-1f
VOC Emissions from IPA Usage in Laboratories
Bayer CEQA Long-Range Development
Berkeley, California

Total VOC Emissions

Scenario	Total VOC Emissions (lbs/year)	Isopropanol Emission Factor (lbs of VOC emitted/lbs wipe solvent used)
Baseline	32,305	100%
Year 10	54,200	
Year 30	54,200	

Emissions

Source Group[2]	Percent of VOC emissions by building[3]	Hours of Operation[4]	Days of Operation[5]	Total Emissions	Modeling Emissions Rate (g/s)	
				(lb/year)	Max Hourly	Average Yearly
Baseline						
B53	4.9%	16	330	1,575	0.038	0.023
B57	6.0%	16	320	1,925	0.047	0.028
B60	22%	24	345	7,175	0.11	0.10
B66	5.3%	24	320	1,715	0.028	0.025
B80	0.87%	10	250	280	0.014	0.0040
B88	10%	16	330	3,255	0.078	0.047
B81	51%	24	345	16,380	0.25	0.24
Year 10						
B53	4.9%	16	330	2,641	0.063	0.038
B60	22%	24	345	12,033	0.18	0.17
B66	5.3%	24	320	2,876	0.047	0.041
B80	0.87%	10	250	470	0.024	0.0068
B88	10.1%	16	330	5,459	0.13	0.079
B81	51%	24	345	27,470	0.42	0.40
CCTC1	2.0%	24	300	1,084	0.019	0.016
CCTC2/3	4.0%	24	300	2,168	0.038	0.031
Year 30						
B53	4.9%	16	330	2,641	0.063	0.038
B60	22%	24	345	12,033	0.18	0.17
B66	5.3%	24	320	2,876	0.047	0.041
B80	0.87%	10	250	470	0.024	0.0068
B88	10.1%	16	330	5,459	0.13	0.079
B81	51%	24	345	27,470	0.42	0.40
CCTC1	2.0%	24	300	1,084	0.019	0.016
CCTC2/3	4.0%	24	300	2,168	0.038	0.031

Notes

1. The baseline VOC emissions is based on the actual amount of IPA used by laboratory/production/warehouse buildings at the Bayer facilities in 2015 which remained operational in 2020, the baseline year. The total VOC emissions was assumed to be distributed across each building based on percent breakdown provided by Bayer. The total VOC emissions in Year 10 and Year 30 is set equal to the permit limit, as Bayer is not seeking a reduction in IPA usage as part of the Proposed Project.
2. The buildings operational in each buildout condition are based on information provided by Bayer. Building B57 is planned to be demolished as part of the Year 10 construction and thus is only included in the baseline. Buildings CCTC1 and CCTC2/3 are asusmed to be constructed and fully operational in Year 10 and Year 30.
3. The percentage of VOC emissions for each building were provided by the Bayer along with total historical and permitted emissions. These numbers were adjusted to account for the removal and addition of buildings in order to ensure the same total VOC emissions is represented with the change in building configuration.
4. Typical hours of operation for each building were provided by Bayer.
5. Operational days per year for each building were provided by the Bayer.

Abbreivations

g - grams
lb - pound
s - seconds

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Table HRA-2
Model Parameters
Bayer CEQA Long-Range Development
Berkeley, CA

Construction Sources[1]

Source		Source Type	Number of Sources[2]	Source Dimension (m)	Release Height[3] (m)	Initial Vertical Dimension[4] (m)	Initial Lateral Dimension[5] (m)
Construction Off-Road Equipment	Demolition	Polygon Area	9	Variable	5	1.16	--
	Year 10		13				
	Year 30		10				

Operational Sources

Source	Source Type	Number of Sources	Source Dimension (m)	Release Height (m)	Initial Vertical Dimension (m)	Initial Lateral Dimension (m)
Operational Traffic[6]	Volume	1,183	Variable	1.70	1.58	Variable

Source		Source Type	Source ID	Stack Height[7] (m)	Exit Velocity (m/s)	Stack Diameter (m)	Stack Temperature °C
Emergency Generators	Baseline	Point	9098X01	3.7	70	0.15	552
			9098X05	3.7	80	0.090	451
			9098X06	3.7	74	0.20	544
			9098X07	11	44	0.46	453
			9098X14	4.3	46	0.46	553
			9098X17	4.1	44	0.46	453
	Year 10		9098X01	3.7	80	0.090	451
			9098X06	11	44	0.46	453
			9098X07	4.3	46	0.46	553
			9098X14	4.1	44	0.46	453
			NewGen1	3.7	43	0.46	400
			NewGen2	3.7	43	0.46	400
	Year 30		NewGen1	3.7	43	0.46	400
			NewGen2	3.7	43	0.46	400
			NewGen3	3.7	43	0.46	400
			NewGen4	3.7	43	0.46	400
			NewGen5	3.7	43	0.46	400

Table HRA-2
Model Parameters
Bayer CEQA Long-Range Development
Berkeley, CA

Operational Sources

Source		Source Type	Source ID	Stack Height[7] (m)	Exit Velocity (m/s)	Stack Diameter (m)	Stack Temperature °C
Boilers	Baseline	Point	S34	6.1	4.8	0.46	213
			S10	10	5.3	0.71	173
			S11	10	5.3	0.71	173
	Year 10 and Year 30		S34	6.1	4.8	0.46	213
			S10	10	5.3	0.71	173
			S11	10	5.3	0.71	173
			NEW	10.0	4.8	0.48	213

Source		Source Type	Number of Sources	Source Dimension (m)	Release Height[8] (m)	Initial Vertical Dimension[8] (m)	Initial Lateral Dimension[5] (m)
Lab IPA Usage	Baseline	Polygon Area	7	Variable	Variable	Variable	--
	Year 10		8				
	Year 30		8				

Notes:

1. Construction modeling sources include construction off-road equipment modeled as an area source covering the parcel under construction. On-road construction trucks (haul trucks) are not modeled here since they are considered as a minor, low-impact source since the number of truck trips are lesser than 500 trucks per day according to BAAQMD's Recommended Methods for Screening and Modeling Local Risks and Hazards.
2. The number of sources represents the number of parcel locations under construction.
3. Area source release height is assumed to be 5 m, consistent with SCAQMD LST Guidance.
4. The initial vertical dimension of the modeled construction equipment was set to 1.16, consistent with SCAQMD LST Guidance.
5. According to USEPA AERMOD User's Guide, there is no initial lateral dimension for area sources.
6. Model parameters for operational traffic are based on the San Francisco 2020 Community Risk Reduction plan modeling defaults for passenger vehicles.
7. When not available in the specifications sheets for a given generator or boiler, the stack height was set to the San Francisco CRRP modeling default of 3.7 meters for generators and 6.1 meters for boilers. All other parameters were based on the generator or boiler specifications.
8. The release height for laboratory VOCs is set to the building height. Consistent with Table 3-2 of the AERMOD User Guide, the initial vertical dimension for an elevated area source is the release height divided by 2.15.

Table HRA-2
Model Parameters
Bayer CEQA Long-Range Development
Berkeley, CA

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
m - meter
LST - Localized Significance Threshold
s - second
SCAQMD - South Coast Air Quality Management District
USEPA - United States Environmental Protection Agency

Reference:

BAAQMD. 2011. Recommended Methods for Screening and Modeling Local Risks and Hazards. May. Available at: https://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20Modeling%20Approach.ashx

SCAQMD. 2008. Final Localized Significance Threshold Methodology. July. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2

USEPA. 2019. AERMOD User's Guide. August. Available at: https://www3.epa.gov/ttn/scram/models/aermod/aermod_userguide.pdf

Table HRA-3
Toxicity Factors
Bayer CEQA Long-Range Development
Berkeley, CA

Source	Chemical[1]	Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$	Chronic REL ($\mu g/m^3$)	Acute REL ($\mu g/m^3$)
Construction and Diesel Generators	Diesel PM	1.1	5.0	--
Traffic	Diesel PM	1.1	5.0	--
	1,3-Butadiene	0.60	2.0	660
	Acetaldehyde	0.010	140	470
	Acrolein	--	0.35	2.5
	Benzene	0.10	3.0	27
	Ethylbenzene	0.0087	2,000	--
	Formaldehyde	0.021	9.0	55
	Methanol	--	4,000	28,000
	Methyl Ethyl Ketone	--	--	
	Naphthalene	0.12	9.0	--
	n-Hexane	--	7,000	--
	Propene	--	3,000	--
	Styrene	--	900	21,000
	Toluene	--	420	5,000
	Xylenes	--	700	22,000
Boilers	Benzene	0.1	3.0	27
	Formaldehyde	0.021	9.0	55
	n-Hexane	--	7,000	--
	Naphthalene	0.12	9.0	--
	Toluene	--	420	5,000
	PAH (as benzo(a)pyrene-equivalents)	3.9	--	--
	Arsenic	12	0.015	0.20
	Beryllium	8.4	0.0070	--
	Cadmium	15	0.020	--
	Copper	--	--	100
	Manganese	--	0.090	--
	Mercury	--	0.030	0.60
	Nickel	0.91	0.014	0.20
	Selenium	--	20	--
	Vanadium	--	--	30
Lab IPA Usage	Isopropyl Alcohol	--	7,000	3,200

Notes:

1. Chemicals presented in this table reflect air toxic contaminants in the proposed fuel types that are expected from off-road equipment, automobile traffic, diesel generators, natural gas boilers and laboratory chemicals. Emissions from construction exhaust, boilers, traffic, and laboratory sources are included as Tables HRA-1a through HRA-1f. Emissions from generators assume that DPM is equivalent to PM_{10}.

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Table HRA-3
Toxicity Factors
Bayer CEQA Long-Range Development
Berkeley, CA

Abbreviations:

$\mu g/m^3$ - micrograms per cubic meter
ARB - Air Resources Board
Cal/EPA - California Environmental Protection Agency
$(mg/kg\text{-}day)^{-1}$ - per milligram per kilogram-day
OEHHA - Office of Environmental Health Hazard Assessment
PM - particulate matter
REL - reference exposure level

Reference:

Cal/EPA. 2015. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. May 13. Available online at: https://ww3.arb.ca.gov/toxics/healthval/contable.pdf

Table HRA-4
Exposure Parameters for Nearby Off-Site Sensitive Receptors
Bayer CEQA Long-Range Development
Berkeley, CA

Receptor Type	Year	Age Group	Daily Breathing Rate	Exposure Duration	Fraction of Time at Home	Exposure Frequency	Age Sensitivity Factor	Averaging Time	Modeling Adjustment Factor (MAF)	ASF-Weighted Intake Factor, Inhalation	Cumulative Intake Factor, Inhalation
			[L/kg-day]	[years]	[unitless]	[days/year]		[days]	[unitless]	[m^3/kg-day]	[m^3/kg-day]
Residential	1	0-<2 Years	1,090	1	1	350	10	25,550	1	0.15	0.15
	2			1					1	0.15	0.15
	3	2-<16 Years	572	1			3		1	0.024	0.024
	4			1					1	0.024	0.024
	5			1					1	0.024	0.024
	6			1					1	0.024	0.024
	7			1					1	0.024	0.024
	8			1					1	0.024	0.024
	9			1					1	0.024	0.024
	10			1					1	0.024	0.024
	11			1					1	0.024	0.024
	12			1					1	0.024	0.024
	13			1					1	0.024	0.024
	14			1					1	0.024	0.024
	15			1					1	0.024	0.024
	16			1					1	0.024	0.024
	17	16-30 Years	261	1	0.73		1		1	0.0026	0.0026
	18			1					1	0.0026	0.0026
	19			1					1	0.0026	0.0026
	20			1					1	0.0026	0.0026
	21			1					1	0.0026	0.0026
	22			1					1	0.0026	0.0026
	23			1					1	0.0026	0.0026
	24			1					1	0.0026	0.0026
	25			1					1	0.0026	0.0026
	26			1					1	0.0026	0.0026
	27			1					1	0.0026	0.0026
	28			1					1	0.0026	0.0026
	29			1					1	0.0026	0.0026
	30			1					1	0.0026	0.0026

Table HRA-4
Exposure Parameters for Nearby Off-Site Sensitive Receptors
Bayer CEQA Long-Range Development
Berkeley, CA

Receptor Type	Year	Age Group	Daily Breathing Rate	Exposure Duration	Fraction of Time at Home	Exposure Frequency	Age Sensitivity Factor	Averaging Time	Modeling Adjustment Factor (MAF)	ASF-Weighted Intake Factor, Inhalation	Cumulative Intake Factor, Inhalation
			[L/kg-day]	[years]	[unitless]	[days/year]		[days]	[unitless]	[m^3/kg-day]	[m^3/kg-day]
Daycare	1	6 Weeks-<2 Years	1,090	1	--	250	10	25,550	4.2	0.45	0.45
	2			0.88					4.2	0.40	0.41
		2-<6 Years	631	0.12			3		4.2	0.009	
	3			1					4.2	0.08	0.08
	4			1					4.2	0.08	0.08
	5			1					4.2	0.08	0.08
	6			0.88					4.2	0.07	0.07

Notes:

1. Daily breathing rates for residents reflect default breathing rates from Cal/EPA 2015 as follows:
   - 95th percentile 24-hour daily breathing rate for age 3rd trimester and 0-<2 years
   - 80th percentile 24-hour daily breathing rate for age 2-<16 years
   - 80th percentile 24-hour daily breathing rate for age 16-30 years
2. Daily breathing rates for daycare children assumes 2 hour moderate intensity and 6 hour light intensity activity.
3. Fraction of time spent at home is conservatively assumed to be 1 (i.e. 24 hours/day) for all age bins except Age 16-30 Years. Fraction of time spent at home is assumed to be 0.73 for Ages 16-30 Years.
4. Exposure frequency was determined as follows:
   - Residents: reflects default residential exposure frequency from Cal/EPA 2015.
   - Daycare: reflects default worker exposure frequency from Cal/EPA 2015, assuming a daycare child is at the daycare center when the parents are at work.
5. Age sensitivity factors account for an "anticipated special sensitivity to carcinogens" of infants and children as recommended in the OEHHA Technical Support Document (Cal/EPA 2009) and current OEHHA guidance (Cal/EPA 2015). This approach is consistent with the cancer risk adjustment factor calculations recommended by BAAQMD (BAAQMD 2016).

Abbreviations:

AT - averaging time
BAAQMD - Bay Area Air Quality Management District
Cal/EPA - California Environmental Protection Agency
DBR - daily breathing rate
EF - exposure frequency
FAH - fraction of time at home
kg - kilogram
L - liter

Reference:

BAAQMD. 2016. Air Toxics NSR Program Health Risk Assessment Guidelines. December.
Cal/EPA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

Table HRA-5
Summary of Health Impacts from Construction Sources at the Year 10 Construction MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Lifetime Excess Cancer Risk

Source	Lifetime Excess Cancer Risk (in a million)[1]	
	Residential	Daycare
Demolition	0.039	0.44
Year 10 Construction	0.93	3.3
Project Total	**1.0**	**3.7**
BAAQMD Thresholds[3]	**10**	**10**

Non-Cancer Chronic Hazard Index

Source	Non-Cancer Hazard Index[2]	
	Residential	Daycare
Demolition	4.7E-05	1.8E-04
Year 10 Construction	0.0011	0.0013
Project Maximum	**0.0012**	**0.0015**
BAAQMD Thresholds[3]	**1.0**	**1.0**

$PM_{2.5}$ Concentration

Source	$PM_{2.5}$ Concentration ($\mu g/m^3$, Annual Average)	
	Residential	Daycare
Demolition	3.8E-04	0.0015
Year 10 Construction	0.013	0.0090
Project Total/Maximum	**0.013**	**0.011**
BAAQMD Thresholds[3]	**0.30**	**0.30**

Notes:

1. Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to the emissions associated with the Project was calculated based on the modeled annual average DPM concentration presented in Table HRA-1, the Age Sensitivity Factor-weighted intake factors presented in Table HRA-4 and the Cancer Potency Factors (CPF) for Diesel Particulate Matter (DPM) presented in Table HRA-3.
2. The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration to the noncancer chronic Reference Exposure Level (REL) for DPM presented in Table HRA-3. When calculated for a single chemical, the comparison yields a ratio termed a chronic hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the chronic hazard quotients for all chemicals are summed, yielding a hazard index (HI).
3. From BAAQMD CEQA Guidelines (BAAQMD 2017).

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act

Reference:

BAAQMD. 2017. California Environmental Quality Act Air Quality Guidelines. May. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

Table HRA-6
Summary of Health Impacts from Construction Sources at the Year 30 Construction MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Lifetime Excess Cancer Risk

Source	Lifetime Excess Cancer Risk (in a million)[1]	
	Residential	Daycare[3]
Year 30 Construction	0.41	2.7
Project Total	**0.41**	**2.7**
BAAQMD Thresholds[4]	**10**	**10**

Non-Cancer Chronic Hazard Index

Source	Non-Cancer Hazard Index[2]	
	Residential	Daycare
Year 30 Construction	8.9E-04	0.0011
Project Maximum	**8.9E-04**	**0.0011**
BAAQMD Thresholds[4]	**1.0**	**1.0**

$PM_{2.5}$ Concentration

Source	$PM_{2.5}$ Concentration ($\mu g/m^3$, Annual Average)	
	Residential	Daycare
Year 30 Construction	0.012	0.029
Project Total/Maximum	**0.012**	**0.029**
BAAQMD Thresholds[4]	**0.30**	**0.30**

Notes:

1. Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to the emissions associated with the Project was calculated based on the modeled annual average DPM concentration presented in Table HRA-1, the Age Sensitivity Factor-weighted intake factors presented in Table HRA-4 and the Cancer Potency Factors (CPF) for Diesel Particulate Matter (DPM) presented in Table HRA-3.
2. The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration to the noncancer chronic Reference Exposure Level (REL) for DPM presented in Table HRA-3. When calculated for a single chemical, the comparison yields a ratio termed a chronic hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the chronic hazard quotients for all chemicals are summed, yielding a hazard index (HI).
3. Exposure for the daycare receptors are conservatively assumed to start at six weeks old once again at the start of Year 30 construction and is exposed to project emissions until age six. The exposure parameters for the daycare receptor for Year 30 construction is independent of the exposure parameters for Year 10 construction.
4. From BAAQMD CEQA Guidelines (BAAQMD 2017).

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act

Reference:

BAAQMD. 2017. California Environmental Quality Act Air Quality Guidelines. May. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

Table HRA-7

Summary of Health Impacts from Year 10 Operational Sources at the Project Operational MEIR

Bayer CEQA Long-Range Development
Berkeley, CA

Lifetime Excess Cancer Risk

Source	Lifetime Excess Cancer Risk (in a million)[1]	
	Residential	Daycare
Generators	0.30	-0.013
Boilers	0.094	0.17
Traffic	-0.0031	-0.0018
Year 10 Incremental Total[2]	**0.39**	**0.16**
BAAQMD Thresholds[3]	**10**	**10**

Non-Cancer Chronic Hazard Index

Source	Non-Cancer Hazard Index[4]	
	Residential	Daycare
Generators	-3.3E-04	-0.0019
Boilers	0.0052	0.0045
Traffic	-5.2E-07	-8.0E-07
Lab IPA Usage[5]	2.6E-04	1.5E-04
Year 10 Incremental Total[2]	**0.0051**	**0.0027**
BAAQMD Thresholds[3]	**1.0**	**1.0**

$PM_{2.5}$ Concentration

Source	$PM_{2.5}$ Concentration ($\mu g/m^3$, Annual Average)	
	Residential	Daycare
Generators	-0.0016	-0.010
Boilers	0.16	0.14
Traffic	-2.7E-05	-4.3E-05
Year 10 Incremental Total[2]	**0.16**	**0.13**
BAAQMD Thresholds[3]	**0.30**	**0.30**

Non-Cancer Acute Hazard Index

Source	Acute Hazard Index[6]	
	Residential	Daycare
Generators[7]	--	--
Boilers	0.0068	0.0079
Traffic	-6.0E-06	-1.1E-05
Lab IPA Usage[5]	0.054	0.035
Year 10 Incremental Total[2]	**0.061**	**0.043**
BAAQMD Thresholds[3]	**1.0**	**1.0**

Notes:

1. Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to the emissions associated with the Project was calculated based on the modeled annual average DPM concentration, the intake factors presented in Table HRA-4, the Cancer Potency Factors (CPF) for Diesel Particulate Matter (DPM), and the Age Sensitivity Factors (ASF).

2. Incremental risks represent the change from Baseline to Year 30 Project conditions. The Baseline Risks are reported in Appendix Table A-1.

3. From BAAQMD CEQA Guidelines (BAAQMD 2017).

4. The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration to the noncancer chronic Reference Exposure Level (REL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a chronic hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the chronic hazard quotients for all chemicals are summed, yielding a hazard index (HI).

5. Non cancer chronic and acute hazard indices are estimated for Isopropyl Alcohol (IPA) used in laboratory and production buildings based on the VOC emissions data provided by Bayer. Emissions associated with IPA usage are presented in Table HRA-1f and chronic and acute reference exposure levels are presented in Table HRA-3.

Table HRA-7

Summary of Health Impacts from Year 10 Operational Sources at the Project Operational MEIR

Bayer CEQA Long-Range Development
Berkeley, CA

Notes:

6. The potential for exposure to result in adverse acute effects is evaluated by comparing the estimated one-hour maximum air concentration of chemical to the acute reference exposure level (aREL) for each chemical evaluated in this analysis. When calculated for a single chemical, the comparison yields an HQ. To evaluate the potential for adverse acute health effects from simultaneous exposure to multiple chemicals, the acute HQs for all chemicals are summed, yielding an acute HI.

7. Generator emissions were quantified for diesel particulate matter (DPM) and $PM_{2.5}$. Since DPM and $PM_{2.5}$ do not have an acute reference exposure level, there are no acute hazard index risks associated with generators.

Abbreviations:

aREL - Acute Reference Exposure Level
BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HQ - Hazard Quotient
HI - Hazard Index
IPA - Isopropyl Alcohol

Reference:

BAAQMD. 2017. California Environmental Quality Act Air Quality Guidelines. May. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

Table HRA-8
Summary of Health Impacts from Year 30 Operational Sources at the Project Operational MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Lifetime Excess Cancer Risk

Source	Lifetime Excess Cancer Risk (in a million)[1]	
	Residential	Daycare
Generators	-0.19	-0.36
Boilers	0.0046	0.0085
Traffic	1.9E-04	1.4E-04
Year 30 Incremental Total[2]	**-0.19**	**-0.35**
BAAQMD Thresholds[3]	**10**	**10**

Non-Cancer Hazard Index

Source	Non-Cancer Hazard Index[4]	
	Residential	Daycare
Generators	-8.2E-04	-3.9E-04
Boilers	0.0048	0.0018
Traffic	-3.3E-07	-5.4E-07
Lab IPA Usage[5]	2.6E-04	1.5E-04
Year 30 Incremental Maximum[2]	**0.0043**	**0.0016**
BAAQMD Thresholds[3]	**1.0**	**1.0**

$PM_{2.5}$ Concentration

Source	$PM_{2.5}$ Concentration ($\mu g/m^3$, Annual Average)	
	Residential	Daycare
Generators	-0.0041	-0.012
Boilers	0.15	0.086
Traffic	-2.0E-05	-3.1E-05
Year 30 Incremental Total/Maximum[2]	**0.15**	**0.074**
BAAQMD Thresholds[3]	**0.30**	**0.30**

Non-Cancer Acute Hazard Index

Source	Acute Hazard Index[6]	
	Residential	Daycare
Generators[7]	--	--
Boilers	0.017	0.0095
Traffic	1.3E-06	2.6E-06
Lab IPA Usage[5]	0.052	0.034
Year 30 Incremental Total/Maximum[2]	**0.070**	**0.043**
BAAQMD Thresholds[3]	**1.0**	**1.0**

Notes:

1. Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to the emissions associated with the Project was calculated based on the modeled annual average DPM concentration, the intake factors presented in Table HRA-4, the Cancer Potency Factors (CPF) for Diesel Particulate Matter (DPM), and the Age Sensitivity Factors (ASF).
2. Incremental risks represent the change from Baseline to Year 30 Project conditions. The Baseline Risks are reported in Appendix Table A-1.
3. From BAAQMD CEQA Guidelines (BAAQMD 2017).
4. The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration to the noncancer chronic Reference Exposure Level (REL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a chronic hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the chronic hazard quotients for all chemicals are summed, yielding a hazard index (HI).

Table HRA-8
Summary of Health Impacts from Year 30 Operational Sources at the Project Operational MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Notes:

5. Non cancer chronic and acute hazard indices are estimated for Isopropyl Alcohol (IPA) used in laboratory and production buildings based on the VOC emissions data provided by Bayer. Emissions associated with IPA usage are presented in Table HRA-1f and chronic and acute reference exposure levels are presented in Table HRA-3.
6. The potential for exposure to result in adverse acute effects is evaluated by comparing the estimated one-hour maximum air concentration of chemical to the acute reference exposure level (aREL) for each chemical evaluated in this analysis. When calculated for a single chemical, the comparison yields an HQ. To evaluate the potential for adverse acute health effects from simultaneous exposure to multiple chemicals, the acute HQs for all chemicals are summed, yielding an acute HI.

7. Generator emissions were quantified for diesel particulate matter (DPM) and $PM_{2.5}$. Since DPM and $PM_{2.5}$ do not have an acute reference exposure level, there are no acute hazard index risks associated with generators.

Abbreviations:

aREL - Acute Reference Exposure Level
BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HQ - Hazard Quotient
HI - Hazard Index
IPA - Isopropyl Alcohol

Reference:

BAAQMD. 2017. California Environmental Quality Act Air Quality Guidelines. May. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

Table HRA-9
Summary of Health Impacts from all Year 10 Project Sources at the Overall Project MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Lifetime Excess Cancer Risk[1]

Source	Lifetime Excess Cancer Risk (in a million)[2]	
	Residential	Daycare
Demolition	0.031	0.19
Construction	0.90	3.2
Generators	0.30	-0.013
Boilers	0.094	0.17
Traffic	-0.0031	-0.0018
Year 10 Incremental Total[3]	1.3	3.6
BAAQMD Thresholds[4]	**10**	**10**

Non-Cancer Hazard Index[1]

Source	Non-Cancer Hazard Index[5]	
	Residential	Daycare
Demolition	2.1E-04	1.8E-04
Construction	7.0E-04	0.0013
Generators	-3.3E-04	-0.0019
Boilers	0.0052	0.0045
Traffic	-6.2E-07	-9.6E-07
Lab IPA Usage[6]	2.6E-04	1.5E-04
Year 10 Incremental Total[3]	0.0060	0.0042
BAAQMD Thresholds[4]	**1.0**	**1.0**

$PM_{2.5}$ Concentration[1]

Source	$PM_{2.5}$ Concentration ($\mu g/m^3$, Annual Average)	
	Residential	Daycare
Demolition	0.0017	0.0014
Construction	0.0058	0.0084
Generators	-0.0016	-0.010
Boilers	0.16	0.14
Traffic	-2.8E-05	-4.3E-05
Year 10 Incremental Total[3]	0.17	0.14
BAAQMD Thresholds[4]	**0.30**	**0.30**

Non-Cancer Acute Hazard Index

Source	Acute Hazard Index[7]	
	Residential	Daycare
Demolition	--	--
Construction	--	--
Generators[8]	--	--
Boilers	0.0068	0.0079
Traffic	-6.0E-06	-1.1E-05
Lab IPA Usage[6]	0.054	0.035
Year 10 Incremental Total[3]	0.061	0.043
BAAQMD Thresholds[4]	**1.0**	**1.0**

Table HRA-9
Summary of Health Impacts from all Year 10 Project Sources at the Overall Project MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Notes:

1. Excess lifetime cancer risk, noncancer chronic hazard index and $PM_{2.5}$ concentrations for the Year 10 and Year 30 Projects are estimated for the construction plus operational impacts together. The impacts reported in Tables HRA-5 and HRA-7 cannot be directly added to get the sum total of Project impacts because the receptor locations at which the maximum impacts occur for construction and operations individually, and the total of construction plus operational impacts are different. The years at which the maximum impacts occur are also different in each case.
2. Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to the emissions associated with the Project was calculated based on the modeled annual average DPM concentration, the intake factors presented in Table HRA-4, the Cancer Potency Factors (CPF) for Diesel Particulate Matter (DPM), and the Age Sensitivity Factors (ASF).
3. Incremental risks represent the change from Baseline to Year 10 Project conditions. The Baseline Risks are reported in Appendix Table A-1.
4. From BAAQMD CEQA Guidelines (BAAQMD 2017).
5. The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration to the noncancer chronic Reference Exposure Level (REL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a chronic hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the chronic hazard quotients for all chemicals are summed, yielding a hazard index (HI).
6. Non cancer chronic and acute hazard indices are estimated for Isopropyl Alcohol (IPA) used in laboratory and production buildings based on the VOC emissions data provided by Bayer. Emissions associated with IPA usage are presented in Table HRA-1f and chronic and acute reference exposure levels are presented in Table HRA-3.
7. The potential for exposure to result in adverse acute effects is evaluated by comparing the estimated one-hour maximum air concentration of chemical to the acute reference exposure level (aREL) for each chemical evaluated in this analysis. When calculated for a single chemical, the comparison yields an HQ. To evaluate the potential for adverse acute health effects from simultaneous exposure to multiple chemicals, the acute HQs for all chemicals are summed, yielding an acute HI.
8. Generator emissions were quantified for diesel particulate matter (DPM) and $PM_{2.5}$. Since DPM and $PM_{2.5}$ do not have an acute reference exposure level, there are no acute hazard index risks associated with generators.

Abbreviations:

aREL - Acute Reference Exposure Level
BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HQ - Hazard Quotient
HI - Hazard Index
IPA - Isopropyl Alcohol

Reference:

BAAQMD. 2017. California Environmental Quality Act Air Quality Guidelines. May. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

Table HRA-10
Summary of Health Impacts from all Year 30 Project Sources at the Overall Project MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Lifetime Excess Cancer Risk[1]

Source	Lifetime Excess Cancer Risk (in a million)[2]	
	Residential	Daycare
Construction	0.049	0.014
Generators	-0.32	-0.36
Boilers	0.11	0.0085
Traffic	5.3E-04	1.4E-04
Year 30 Incremental Total[3]	-0.17	-0.33
BAAQMD Thresholds[4]	**10**	**10**

Non-Cancer Hazard Index[1]

Source	Non-Cancer Hazard Index[5]	
	Residential	Daycare
Construction	8.9E-04	1.3E-04
Generators	-7.0E-04	-3.9E-04
Boilers	0.0047	0.0018
Traffic	1.2E-07	1.8E-07
Lab IPA Usage[6]	3.0E-04	1.5E-04
Year 30 Incremental Total[3]	0.0052	0.0017
BAAQMD Thresholds[4]	**1.0**	**1.0**

$PM_{2.5}$ Concentration[1]

Source	$PM_{2.5}$ Concentration ($\mu g/m^3$, Annual Average)	
	Residential	Daycare
Construction	0.0085	0.0100
Generators	-0.0041	-0.010
Boilers	0.15	0.083
Traffic	7.4E-06	-3.2E-05
Year 30 Incremental Total[3]	0.16	0.083
BAAQMD Thresholds[4]	**0.30**	**0.30**

Non-Cancer Acute Hazard Index

Source	Acute Hazard Index[7]	
	Residential	Daycare
Construction	--	--
Generators[8]	--	--
Boilers	0.017	0.0095
Traffic	-3.5E-06	-7.0E-06
Lab IPA Usage[6]	0.052	0.034
Year 30 Incremental Total[3]	**0.070**	**0.043**
BAAQMD Thresholds[4]	**1.0**	**1.0**

Table HRA-10
Summary of Health Impacts from all Year 30 Project Sources at the Overall Project MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Notes:

1. Excess lifetime cancer risk, noncancer chronic hazard index and $PM_{2.5}$ concentrations for the Year 10 and Year 30 Projects are estimated for the construction plus operational impacts together. The impacts reported in Tables HRA-5 and HRA-7 cannot be directly added to get the sum total of Project impacts because the receptor locations at which the maximum impacts occur for construction and operations individually, and the total of construction plus operational impacts are different. The years at which the maximum impacts occur are also different in each case.
2. Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to the emissions associated with the Project was calculated based on the modeled annual average DPM concentration, the intake factors presented in Table HRA-4, the Cancer Potency Factors (CPF) for Diesel Particulate Matter (DPM), and the Age Sensitivity Factors (ASF).
3. Incremental risks represent the change from Baseline to Year 10 Project conditions. The Baseline Risks are reported in Appendix Table A-1.
4. From BAAQMD CEQA Guidelines (BAAQMD 2017).
5. The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration to the noncancer chronic Reference Exposure Level (REL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a chronic hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the chronic hazard quotients for all chemicals are summed, yielding a hazard index (HI).
6. Non cancer chronic and acute hazard indices are estimated for Isopropyl Alcohol (IPA) used in laboratory and production buildings based on the VOC emissions data provided by Bayer. Emissions associated with IPA usage are presented in Table HRA-1f and chronic and acute reference exposure levels are presented in Table HRA-3.
7. The potential for exposure to result in adverse acute effects is evaluated by comparing the estimated one-hour maximum air concentration of chemical to the acute reference exposure level (aREL) for each chemical evaluated in this analysis. When calculated for a single chemical, the comparison yields an HQ. To evaluate the potential for adverse acute health effects from simultaneous exposure to multiple chemicals, the acute HQs for all chemicals are summed, yielding an acute HI.
8. Generator emissions were quantified for diesel particulate matter (DPM) and $PM_{2.5}$. Since DPM and $PM_{2.5}$ do not have an acute reference exposure level, there are no acute hazard index risks associated with generators.

Abbreviations:

aREL - Acute Reference Exposure Level
BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HQ - Hazard Quotient
HI - Hazard Index
IPA - Isopropyl Alcohol

Reference:

BAAQMD. 2017. California Environmental Quality Act Air Quality Guidelines. May. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

Table HRA-11
Summary of Health Impacts from all Project Sources at the Overall Project MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Lifetime Excess Cancer Risk

Source	Lifetime Excess Cancer Risk (in a million)	
	Residential	Daycare
Year 10 Incremental Total	1.3	3.6
Year 30 Incremental Total	-0.17	-0.33
BAAQMD Thresholds	**10**	**10**

Non-Cancer Hazard Index

Source	Non-Cancer Hazard Index	
	Residential	Daycare
Year 10 Incremental Total	0.0060	0.0042
Year 30 Incremental Total	0.0052	0.0017
BAAQMD Thresholds	**1.0**	**1.0**

$PM_{2.5}$ Concentration

Source	$PM_{2.5}$ Concentration ($\mu g/m^3$, Annual Average)	
	Residential	Daycare
Year 10 Incremental Total	0.17	0.14
Year 30 Incremental Total	0.16	0.083
BAAQMD Thresholds	**0.30**	**0.30**

Non-Cancer Acute Hazard Index

Source	Non-Cancer Acute Hazard Index	
	Residential	Daycare
Year 10 Incremental Total	0.061	0.043
Year 30 Incremental Total	0.070	0.043
BAAQMD Thresholds	**1.0**	**1.0**

Appendix Table 1
Summary of Health Impacts from Baseline Sources at the Project Operational MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Lifetime Excess Cancer Risk

Source	Lifetime Excess Cancer Risk (in a million)[1]	
	Residential	Daycare
Year 10[2]		
Generators	1.9	3.0
Boilers	0.13	0.25
Year 10 Baseline Total[3]	**2.0**	**3.3**
Year 30[2]		
Generators	0.2	0.41
Boilers	0.01	0.012
Year 30 Baseline Total[3]	**0.2**	**0.42**

Non-Cancer Hazard Index

Source	Non-Cancer Hazard Index[4]	
	Residential	Daycare
Year 10[2]		
Baseline Generators	0.0013	0.0026
Baseline Boilers	0.0076	0.0064
Baseline Lab VOCs	3.8E-04	2.8E-04
Year 10 Baseline Total[3]	**0.0093**	**0.0092**
Year 30[2]		
Generators	0.0013	7.0E-04
Boilers	0.0076	0.0025
Baseline Lab VOCs	3.8E-04	2.2E-04
Year 30 Baseline Total[3]	**0.0093**	**0.0034**

$PM_{2.5}$ Concentration

Source	$PM_{2.5}$ Concentration ($\mu g/m^3$, Annual Average)	
	Residential	Daycare
Year 10[2]		
Baseline Generators	0.0065	0.013
Baseline Boilers	0.24	0.20
Year 10 Baseline Total[3]	**0.24**	**0.213**
Year 30[2]		
Baseline Generators	0.0065	0.013
Baseline Boilers	0.24	0.20
Year 30 Baseline Total[3]	**0.24**	**0.21**

Non-Cancer Acute Hazard Index

Source	Acute Hazard Index[5]	
	Residential	Daycare
Year 10[2]		
Baseline Generators	--	--
Baseline Boilers	0.033	0.040
Baseline Lab VOCs	0.081	0.060
Year 10 Baseline Total[3]	**0.11**	**0.100**
Year 30[2]		
Baseline Generators[6]	--	--
Baseline Boilers	0.028	0.035
Baseline Lab VOCs	0.082	0.057
Year 30 Baseline Total[3]	**0.11**	**0.11**

Appendix Table 1
Summary of Health Impacts from Baseline Sources at the Project Operational MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Notes:

1. Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to the emissions associated with the Project was calculated based on the modeled annual average DPM concentration, the intake factors presented in Table HRA-4, the Cancer Potency Factors (CPF) for Diesel Particulate Matter (DPM), and the Age Sensitivity Factors (ASF).
2. Risks presented in the table are for the CEQA Baseline. The Year 10 CEQA Baseline risks are associated with the Year 10 Project MEIR, and the Year 30 CEQA Baseline risks are associated with the Year 30 Project MEIR.
3. Baseline total represents risks from the existing generators and boilers that are onsite. The incremental Project risk is calculated as the difference in Project risk minus the Baseline risks reported here.
4. The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration to the noncancer chronic Reference Exposure Level (REL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a chronic hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the chronic hazard quotients for all chemicals are summed, yielding a hazard index (HI).
5. The potential for exposure to result in adverse acute effects is evaluated by comparing the estimated one-hour maximum air concentration of chemical to the acute reference exposure level (aREL) for each chemical evaluated in this analysis. When calculated for a single chemical, the comparison yields an HQ. To evaluate the potential for adverse acute health effects from simultaneous exposure to multiple chemicals, the acute HQs for all chemicals are summed, yielding an acute HI.
6. Generator emissions were quantified for diesel particulate matter (DPM) and $PM_{2.5}$. Since DPM and $PM_{2.5}$ do not have an acute reference exposure level, there are no acute hazard index risks associated with generators.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District

CEQA - California Environmental Quality Act

Reference:

BAAQMD. 2017. California Environmental Quality Act Air Quality Guidelines. May. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

Appendix Table 2
Summary of Health Impacts from Baseline Sources at the Overall Project MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Lifetime Excess Cancer Risk

Source	Lifetime Excess Cancer Risk (in a million)[1]	
	Residential	Daycare
Year 10[2]		
Baseline Generators	1.9	3.0
Baseline Boilers	0.13	0.25
Year 10 Baseline Total[3]	2.0	3.3
Year 30[2]		
Baseline Generators	1.9	0.41
Baseline Boilers	0.12	0.012
Year 30 Baseline Total[3]	2.0	0.42

Non-Cancer Hazard Index

Source	Non-Cancer Hazard Index[4]	
	Residential	Daycare
Year 10[2]		
Baseline Generators	0.0013	0.0026
Baseline Boilers	0.0076	0.0064
Baseline Lab VOCs	3.8E-04	2.8E-04
Year 10 Baseline Total[3]	0.0093	0.0092
Year 30[2]		
Baseline Generators	0.0012	7.0E-04
Baseline Boilers	0.0070	0.0025
Baseline Lab VOCs	4.3E-04	2.2E-04
Year 30 Baseline Total[3]	0.0086	0.0034

$PM_{2.5}$ Concentration

Source	$PM_{2.5}$ Concentration ($\mu g/m^3$, Annual Average)	
	Residential	Daycare
Year 10[2]		
Baseline Generators	0.0065	0.013
Baseline Boilers	0.24	0.20
Year 10 Baseline Total[3]	0.24	0.21
Year 30[2]		
Baseline Generators	0.0065	0.011
Baseline Boilers	0.24	0.15
Year 30 Baseline Total[3]	0.24	0.16

Non-Cancer Acute Hazard Index

Source	Acute Hazard Index[5]	
	Residential	Daycare
Year 10[2]		
Baseline Generators	--	--
Baseline Boilers	0.033	0.040
Baseline Lab VOCs	0.081	0.060
Year 10 Baseline Total[3]	0.11	0.10
Year 30[2]		
Baseline Generators[6]	--	--
Baseline Boilers	0.028	0.035
Baseline Lab VOCs	0.082	0.057
Year 30 Baseline Total[3]	0.11	0.093

Appendix Table 2
Summary of Health Impacts from Baseline Sources at the Overall Project MEIR
Bayer CEQA Long-Range Development
Berkeley, CA

Notes:

1. Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to the emissions associated with the Project was calculated based on the modeled annual average DPM concentration, the intake factors presented in Table HRA-4, the Cancer Potency Factors (CPF) for Diesel Particulate Matter (DPM), and the Age Sensitivity Factors (ASF).
2. Risks presented in the table are for the CEQA Baseline. The Year 10 CEQA Baseline risks are associated with the Year 10 Project MEIR, and the Year 30 CEQA Baseline risks are associated with the Year 30 Project MEIR.
3. Baseline total represents risks from the existing generators and boilers that are onsite. The incremental Project risk is calculated as the difference in Project risk minus the Baseline risks reported here.
4. The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration to the noncancer chronic Reference Exposure Level (REL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a chronic hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the chronic hazard quotients for all chemicals are summed, yielding a hazard index (HI).
5. The potential for exposure to result in adverse acute effects is evaluated by comparing the estimated one-hour maximum air concentration of chemical to the acute reference exposure level (aREL) for each chemical evaluated in this analysis. When calculated for a single chemical, the comparison yields an HQ. To evaluate the potential for adverse acute health effects from simultaneous exposure to multiple chemicals, the acute HQs for all chemicals are summed, yielding an acute HI.
6. Generatore emissions were quantified for diesel particulate matter (DPM) and PM2.5. Since DPM and PM2.5 do not have an acute reference exposure level, there are no acute hazard index risks associated with generators.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District

CEQA - California Environmental Quality Act

Reference:

BAAQMD. 2017. California Environmental Quality Act Air Quality Guidelines. May. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

APPENDIX D

Table C-HRA-1
Model Parameters for Cumulative Traffic
Bayer CEQA Long-Range Development
Berkeley, California

Cumulative Sources

Source	Source Type	Number of Sources[1]	Source Dimension	Release Height[2]	Initial Vertical Dimension[3]	Initial Lateral Dimension[4]
			(m)	(m)	(m)	(m)
Cumulative Traffic	Volume	690	Variable	1.70	1.58	Variable

Notes:

1. The number of on-road vehicle sources is based on the geometry of the truck or traffic routes.
2. On-road truck and light-duty release height is based on USEPA haul road guidance, assuming vehicle heights of 2 meters for light-duty vehicles and 3 meters for heavy-duty vehicles. Per this guidance, the release height is set as half of 1.7 times the vehicle height.
3. Vehicle initial vertical dimension is based on USEPA's haul road guidance, assuming vehicle heights of 2 meters for light-duty vehicles and 3 meters for heavy-duty vehicles.
4. Initial lateral dimension for on-road vehicles is based on USEPA's haul road guidance. Operational roadways are assumed to be two or more land roadways; thus, the initial lateral dimension is based on the road width, estimated from the number of road lanes and a standard lane width of 3.7 meters.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
m - meter
s - second
SCAQMD - South Coast Air Quality Management District
USEPA - United States Environmental Protection Agency

Reference:

USEPA. 2012. Haul Road Workgroup Final Report Submission to EPA-OAQPS. U.S. EPA Office of Air Quality and Planning Standards, Research Triangle Park, North Carolina. Available at:
https://www3.epa.gov/scram001/reports/Haul_Road_Workgroup-Final_Report_Package-20120302.pdf

Table C-HRA-2
Toxicity Factors
Bayer CEQA Long-Range Development
Berkeley, California

Source	Chemical	Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$	Chronic REL ($\mu g/m^3$)	Acute REL ($\mu g/m^3$)
Traffic	Diesel PM	1.1	5.0	--
	1,3-Butadiene	0.60	2.0	660
	Acetaldehyde	0.010	140	470
	Acrolein	--	0.35	2.5
	Benzene	0.10	3.0	27
	Ethylbenzene	0.0087	2,000	--
	Formaldehyde	0.021	9.0	55
	Methanol	--	4,000	28,000
	Naphthalene	0.12	9.0	--
	n-Hexane	--	7,000	--
	Propene	--	3,000	--
	Styrene	--	900	21,000
	Toluene	--	420	5,000
	Xylenes	--	700	22,000

Notes:

1. Chemicals presented in this table reflect air toxic contaminants in the proposed fuel types that are expected from automobile traffic.

Abbreviations:

$\mu g/m^3$ - micrograms per cubic meter
ARB - Air Resources Board
Cal/EPA - California Environmental Protection Agency
$(mg/kg\text{-}day)^{-1}$ - per milligram per kilogram-day
OEHHA - Office of Environmental Health Hazard Assessment
PM - particulate matter
REL - reference exposure level

Reference:

Cal/EPA. 2015. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. May 13. Available online at: https://ww3.arb.ca.gov/toxics/healthval/contable.pdf

Table C-HRA-3
Exposure Parameters for Nearby Off-Site Sensitive Receptors
Bayer CEQA Long-Range Development
Berkeley, California

Receptor Type	Year	Age Group	Daily Breathing Rate	Exposure Duration	Fraction of Time at Home	Exposure Frequency	Age Sensitivity Factor	Averaging Time	Modeling Adjustment Factor (MAF)	ASF-Weighted Intake Factor, Inhalation	Cumulative Intake Factor, Inhalation
			[L/kg-day]	[years]	[unitless]	[days/year]		[days]	[unitless]	[m^3/kg-day]	[m^3/kg-day]
Residential	0	3rd Trimester	361	0.25	1	350	10	25,550	1	0.012	0.012
	1	0-<2 Years	1,090	1					1	0.15	0.15
	2			1					1	0.15	0.15
	3	2-<16 Years	572	1			3		1	0.024	0.024
	4			1					1	0.024	0.024
	5			1					1	0.024	0.024
	6			1					1	0.024	0.024
	7			1					1	0.024	0.024
	8			1					1	0.024	0.024
	9			1					1	0.024	0.024
	10			1					1	0.024	0.024
	11			1					1	0.024	0.024
	12			1					1	0.024	0.024
	13			1					1	0.024	0.024
	14			1					1	0.024	0.024
	15			1					1	0.024	0.024
	16			1					1	0.024	0.024
	17	16-30 Years	261	1	0.73		1		1	0.0026	0.0026
	18			1					1	0.0026	0.0026
	19			1					1	0.0026	0.0026
	20			1					1	0.0026	0.0026
	21			1					1	0.0026	0.0026
	22			1					1	0.0026	0.0026
	23			1					1	0.0026	0.0026
	24			1					1	0.0026	0.0026
	25			1					1	0.0026	0.0026
	26			1					1	0.0026	0.0026
	27			1					1	0.0026	0.0026
	28			1					1	0.0026	0.0026
	29			1					1	0.0026	0.0026
	30			1					1	0.0026	0.0026

Table C-HRA-3
Exposure Parameters for Nearby Off-Site Sensitive Receptors
Bayer CEQA Long-Range Development
Berkeley, California

Receptor Type	Year	Age Group	Daily Breathing Rate	Exposure Duration	Fraction of Time at Home	Exposure Frequency	Age Sensitivity Factor	Averaging Time	Modeling Adjustment Factor (MAF)	ASF-Weighted Intake Factor, Inhalation	Cumulative Intake Factor, Inhalation
			[L/kg-day]	[years]	[unitless]	[days/year]		[days]	[unitless]	[m^3/kg-day]	[m^3/kg-day]
Daycare	1	6 Weeks-<2 Years	1,090	1	--	250	10	25,550	4.2	0.45	0.45
	2			0.88					4.2	0.40	0.41
		2-<6 Years	631	0.12			3		4.2	0.009	
	3			1					4.2	0.08	0.08
	4			1					4.2	0.08	0.08
	5			1					4.2	0.08	0.08
	6			0.88					4.2	0.07	0.07

Notes:

1. Daily breathing rates for residents reflect default breathing rates from Cal/EPA 2015 as follows:
   - 95th percentile 24-hour daily breathing rate for age 3rd trimester and 0-<2 years
   - 80th percentile 24-hour daily breathing rate for age 2-<16 years
   - 80th percentile 24-hour daily breathing rate for age 16-30 years
2. Daily breathing rates for daycare children assumes 2 hour moderate intensity and 6 hour light intensity activity.
3. Fraction of time spent at home is conservatively assumed to be 1 (i.e. 24 hours/day) for all age bins except Age 16-30 Years. Fraction of time spent at home is assumed to be 0.73 for Ages 16-30 Years.
4. Exposure frequency was determined as follows:
   - Residents: reflects default residential exposure frequency from Cal/EPA 2015.
   - Daycare: reflects default worker exposure frequency from Cal/EPA 2015, assuming a daycare child is at the daycare center when the parents are at work.
5. Age sensitivity factors account for an "anticipated special sensitivity to carcinogens" of infants and children as recommended in the OEHHA Technical Support Document (Cal/EPA 2009) and current OEHHA guidance (Cal/EPA 2015). This approach is consistent with the cancer risk adjustment factor calculations recommended by BAAQMD (BAAQMD 2016).

Abbreviations:

AT - averaging time
Cal/EPA - California Environmental Protection Agency
DBR - daily breathing rate
EF - exposure frequency
FAH - fraction of time at home
kg - kilogram
L - liter

Reference:

Cal/EPA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

Table C-HRA-4
Summary of Cumulative Health Risk Impacts for Year 10 Project
Bayer CEQA Long-Range Development
Berkeley, California

Emission Source	Cancer Risk Impact (in one million)[1]	Chronic Non-Cancer Hazard Index[1]	Acute Non-Cancer Hazard Index[1]	Annual $PM_{2.5}$ Concentration (ug/m^3)[1]
Project Baseline, Construction and Operations[2]	6.8	0.015	0.17	0.41
Subtotal, Project Impacts	**6.8**	**0.015**	**0.17**	**0.41**
Existing Stationary Sources[3]				
Uncommon Grounds, LLC (Facility #1574)	0.0058	0	N/A	0.014
Consolidated Printers, Inc (Facility #2970)	0.0045	0	N/A	0.015
Electro-Coatings of California Inc (Facility #4449)	18	0	N/A	0
Fifth & Potter Street Assoc (Facility #14949)	0.68	0.0012	N/A	8.0E-04
2929 Seventh Street LLC (Facility #15509)	0.048	0	N/A	0
Seventh Street Properties II (Facility #15697)	0.12	4.0E-04	N/A	0
Verizon Wireless (Oakland W/Berkeley) (Facility #17271)	0.24	0	N/A	4.0E-04
Seventh Street properties II (Facility #18531)	0.014	0	N/A	0
Wareham Development (Facility #18581)	0.068	0	N/A	0
Henkel US Operations Corporation (Facility #19522)	0.010	0	N/A	0.28
DSM Biomedical (Facility #20956)	0.16	0	N/A	0
Ruby's Roast, LLC (Facility #21809)	5.8E-04	8.6E-06	N/A	0.0025
Seventh Street Properties VII, LLC (Facility #22870)	0.087	4.0E-04	N/A	0
AGC Biologics Incorporated (Facility #23177)	0.0076	0	N/A	0.014
Agenus West, LLC (Facility #23417)	0.062	0	N/A	0
APRO LLC dba United Pacific #AD2204 (Facility #112401)	0.40	0.0018	N/A	0
Subtotal, Background Sources	**20**	**0.0038**	**0**	**0.33**
Railway Sources[4]	11	N/A	N/A	0.013
Highway and Major Roadway Sources[5]	0.78	4.3E-04	0.0060	0.017
Subtotal, Mobile Sources	**11**	**4.3E-04**	**0.0060**	**0.031**
Total Cumulative Impact	**38**	**0.019**	**0.18**	**0.77**
BAAQMD Significance Threshold	100	10	10	0.80
Exceed?	No	No	No	No
MEIR Type	Daycare	Residential	Residential	Residential
MEIR Location (UTMx)	562,240	562,260	562,180	562,260
MEIR Location (UTMy)	4,190,020	4,190,140	4,190,360	4,190,140

RAMBOLL

Table C-HRA-4
Summary of Cumulative Health Risk Impacts for Year 10 Project
Bayer CEQA Long-Range Development
Berkeley, California

Notes:

1. Receptors for Cancer Risk Impact, Chronic Non-Cancer Hazard Index, Acute Non-Cancer Hazard Index, and Annual $PM_{2.5}$ Concentration were chosen based on the highest overall Project impact for each risk category.
2. Cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year period, beginning during the first year of construction. Thus, the risk takes into account a receptor living near the Project site beginning during construction and continuing through operations. The cancer risks were estimated using the equation specified in Tables HRA-5 through HRA-11 in Appendix C. The MEIRs for the Year 10 Project will be exposed to construction risks from the Year 30 Project. The Year 30 Project construction risks are not included in this analysis, though these risks would not cause an increase in cumulative risk for the Year 10 MEIRs that would exceed the BAAQMD Significance Thresholds. The Project risks presented here includes risks from all the sources that will be operational in Year 10 including sources that are a part of the Baseline condition that will continue to operate on site after the Year 10 Project buildout, as well as new sources constructed as a part of Year 10 Project.
3. Consistent with BAAQMD guidance, Ramboll included all stationary source facilities within approximately >1,000 feet of the Project site and MEIRs. Facility information was obtained from the Permitted Stationary Source Risks and Hazards Screening Tool. Sources whose cancer risk impact, chronic non-hazard index and annual $PM_{2.5}$ concentration are zero are not included in this table.
4. Health impacts from existing railroads are estimated using BAAQMD rail source raster files for cancer risks and $PM_{2.5}$. Impacts were determined based on the maximum impact of a raster cell located on the MEIRs. The BAAQMD's screening tools do not estimate chronic or acute hazards since the screening levels were found to be extremely low, and thus there are no chronic or acute hazard values associated with railways.
5. Health impacts from existing highway and major roadway sources were estimated based on traffic volumes provided by Fehr & Peers. Impacts from all highways and major roadways within 1,000 feet from the Project were estimated.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HI - health index
MEIR - Maximally Exposed Individual Receptor
N/A - not applicable
$PM_{2.5}$ - fine particulate matter
ug/m^3 - micrograms per cubic meter
UTM - Universal Transverse Mercator coordinate system

References:

BAAQMD Permitted Stationary Source Risk and Hazards tool. Accessed September 2020. Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65

BAAQMD raster tools received by Ramboll through personal communication with Areana Flores from BAAQMD on April 20, 2018. Available online at: https://www.dropbox.com/sh/r0d12b66m4scwlc/AADpA16Bsv1-9A5zIH3L9EAza?dl=0

Table C-HRA-5
Summary of Cumulative Health Risk Impacts for Year 30 Project
Bayer CEQA Long-Range Development
Berkeley, California

Emission Source	Cancer Risk Impact (in one million)[1]	Chronic Non-Cancer Hazard Index[1]	Acute Non-Cancer Hazard Index[1]	Annual $PM_{2.5}$ Concentration (ug/m^3)[1]
Project Operational and Construction[2]	1.8	0.014	0.18	0.40
Subtotal, Project Impacts	**1.8**	**0.014**	**0.18**	**0.40**
Existing Stationary Sources[3]				
Uncommon Grounds, LLC (Facility #1574)	0.010	0	N/A	0.014
Consolidated Printers, Inc (Facility #2970)	0.0026	0	N/A	0.015
Electro-Coatings of California Inc (Facility #4449)	10	0	N/A	0
Fifth & Potter Street Assoc (Facility #14949)	0.68	0.0012	N/A	8.0E-04
2929 Seventh Street LLC (Facility #15509)	0.048	0	N/A	0
Seventh Street Properties II (Facility #15697)	0.12	4.0E-04	N/A	0
Verizon Wireless (Oakland W/Berkeley) (Facility #17271)	0.36	0	N/A	4.0E-04
Seventh Street properties II (Facility #18531)	0.022	0	N/A	0
Wareham Development (Facility #18581)	0.068	0	N/A	0
Henkel US Operations Corporation (Facility #19522)	0.010	0	N/A	0.28
DSM Biomedical (Facility #20956)	0.32	0	N/A	0
Ruby's Roast, LLC (Facility #21809)	0.0004	7.8E-06	N/A	0.0025
Seventh Street Properties VII, LLC (Facility #22870)	0.11	4.0E-04	N/A	0
AGC Biologics Incorporated (Facility #23177)	0.013	0	N/A	0.014
Agenus West, LLC (Facility #23417)	0.16	0	N/A	0
APRO LLC dba United Pacific #AD2204 (Facility #112401)	0.40	0.0018	N/A	0
Subtotal, Background Sources	**13**	**0.0038**	**0**	**0.33**
Railway Sources[4]	11	N/A	N/A	0.013
Highway and Major Roadway Sources[5]	0.47	3.5E-04	0.0047	0.021
Subtotal, Mobile Sources	**11**	**3.5E-04**	**0.0047**	**0.034**
Total Cumulative Impact	**26**	**0.018**	**0.18**	**0.76**
BAAQMD Significance Threshold	100	10	10	0.80
Exceed?	No	No	No	No
MEIR Type	Residential	Residential	Residential	Residential
MEIR Location (UTMx)	562,260	562,260	562,500	562,260
MEIR Location (UTMy)	4,189,940	4,190,120	4,190,340	4,190,140

Table C-HRA-5
Summary of Cumulative Health Risk Impacts for Year 30 Project
Bayer CEQA Long-Range Development
Berkeley, California

Notes:

1. Receptors for Cancer Risk Impact, Chronic Non-Cancer Hazard Index, Acute Non-Cancer Hazard Index, and Annual $PM_{2.5}$ Concentration were chosen based on the highest overall Project impact for each risk category.
2. Cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year period, beginning during the first year of construction. Thus, the risk takes into account a receptor living near the Project site beginning during construction and continuing through operations. The cancer risks were estimated using the equation specified in Tables HRA-5 through HRA-11 in Appendix C. The Project risks presented here includes risks from all the sources that will be operational in Year 30 including sources that are a part of the Baseline condition that will continue to operate on site after the Year 30 Project buildout, sources included as a part of Year 10 Project and newly constructed sources in Year 30.
3. Consistent with BAAQMD guidance, Ramboll included all stationary source facilities within approximately 1,000 feet of the MEIRs as per the BAAQMD Stationary Source Screening Analysis Tool. Facility information was obtained from the Permitted Stationary Source Risks and Hazards Screening Tool. Only sources identified through this tool which are approximately <1,000 feet from the MEIR locations are shown here. Emissions sources whose cancer risk impact, chronic non-hazard index and annual $PM_{2.5}$ concentration are zero are not included in this table
4. Health impacts from existing railroads are estimated using BAAQMD rail source raster files for cancer risks and $PM_{2.5}$. Impacts were determined based on the maximum impact of a raster cell located on the MEIRs. The BAAQMD's screening tools do not estimate chronic or acute hazards since the screening levels were found to be extremely low, and thus there are no chronic or acute hazard values associated with railways.
5. Health impacts from existing highway and major roadway sources were estimated based on traffic volumes provided by Fehr & Peers. Impacts from all highways and major roadways within 1,000 feet from the Project were estimated.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HI - health index
MEIR - Maximally Exposed Individual Receptor
N/A - not applicable
$PM_{2.5}$ - fine particulate matter
ug/m^3 - micrograms per cubic meter
UTM - Universal Transverse Mercator coordinate system

References:

BAAQMD Permitted Stationary Source Risk and Hazards tool. Accessed September 2020. Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65

BAAQMD raster tools received by Ramboll through personal communication with Areana Flores from BAAQMD on April 20, 2018. Available online at: https://www.dropbox.com/sh/r0d12b66m4scwlc/AADpA16Bsv1-9A5zIH3L9EAza?dl=0

Table C-HRA-6
Stationary Source Screening Tool Adjustment Parameters
Bayer CEQA Long-Range Development
Berkeley, California

Location[1]	Maximally Exposed Individual Sensitive Receptors (MEIRs)					
	Year 10			Year 30		
	Cancer Risk	Chronic Hazard Index	$PM_{2.5}$ Concen-tration	Cancer Risk	Chronic Hazard Index	$PM_{2.5}$ Concen-tration
UTMx	562,240	562,260	562,260	562,260	562,260	562,260
UTMy	4,190,020	4,190,140	4,190,140	4,189,940	4,190,120	4,190,140

Stationary Source	Unscaled Impacts[2]			Distance to Stationary Source from MEIR (meters)[3]						Scaling Factor at MEIR[4]					
				Year 10			Year 30			Year 10			Year 30		
	Cancer Risk (in a million)	Chronic Hazard Index	$PM_{2.5}$ Concen-tration (ug/m^3)	Cancer Risk	Chronic Hazard Index	$PM_{2.5}$ Concen-tration	Cancer Risk	Chronic Hazard Index	$PM_{2.5}$ Concen-tration	Cancer Risk	Chronic Hazard Index	$PM_{2.5}$ Concen-tration	Cancer Risk	Chronic Hazard Index	$PM_{2.5}$ Concen-tration
Uncommon Grounds, LLC (Facility #1574)	0.010	0	0.050	77	189	189	2.7	169	189	0.58	0.28	0.28	1.0	0.32	0.28
Consolidated Printers, Inc (Facility #2970)	0.020	0	0.030	223	102	102	302	122	102	0.22	0.49	0.49	0.13	0.43	0.49
Electro-Coatings of California Inc (Facility #4449)	60	0	0	179	94	94	261	105	94	0.30	0.52	0.52	0.17	0.47	0.52
Fifth & Potter Street Assoc (Facility #14949)	17	0.030	0.020	458	575	575	400	552	575	0.040	0.040	0.040	0.040	0.040	0.040
2929 Seventh Street LLC (Facility #15509)	1.2	0	0	381	492	492	299	473	492	0.040	0.040	0.040	0.040	0.040	0.040
Seventh Street Properties II (Facility #15697)	3.0	0.010	0	400	511	511	362	493	511	0.040	0.040	0.040	0.040	0.040	0.040
Verizon Wireless (Oakland W/Berkeley) (Facility #17271)	6.0	0	0.010	306	375	375	251	360	375	0.040	0.040	0.040	0.060	0.040	0.040
Seventh Street properties II (Facility #18531)	0.36	0	0	321	443	443	248	424	443	0.040	0.040	0.040	0.060	0.040	0.040
Wareham Development (Facility #18581)	1.7	0	0	373	259	259	337	276	259	0.040	0.060	0.060	0.040	0.050	0.060
Henkel US Operations Corporation (Facility #19522)	0.040	0	2.1	214	298	298	211	283	298	0.24	0.14	0.14	0.24	0.15	0.14
DSM Biomedical (Facility #20956)	1.8	0	0	194	313	313	113	293	313	0.090	0.040	0.040	0.18	0.040	0.040
Ruby's Roast, LLC (Facility #21809)	0.0019	1.4E-05	0.0039	178	62	62	250	78	62	0.30	0.64	0.64	0.19	0.58	0.64
Seventh Street Properties VII, LLC (Facility #22870)	2.2	0.010	0	323	442	442	268	422	442	0.040	0.040	0.040	0.050	0.040	0.040
AGC Biologics Incorporated (Facility #23177)	0.040	0	0.11	245	366	366	166	346	366	0.19	0.13	0.13	0.32	0.13	0.13
Agenus West, LLC (Facility #23417)	0.62	0	0	173	285	285	91	265	285	0.10	0.040	0.040	0.25	0.050	0.040
APRO LLC dba United Pacific #AD2204 (Facility #112401)	26	0.12	0	466	573	573	385	554	573	0.015	0.015	0.015	0.015	0.015	0.015

Notes

1. The coordinates for each maximally impacted receptor presented in the cumulative analysis.
2. The unscaled impacts for each nearby stationary source are given. These are the impacts at the stationary source itself based on the BAAQMD Permitteed Sources Risks and Hazards data set.
3. The distance from each Project MEIR to each nearby stationary source was approximated using Google Earth and location data for the stationary sources provided by BAAQMD.
4. The scaling factor for the stationary source risks at each MEIR are based on the distance between the stationary source and the MEIR and the type of stationary source (gas station, generator or other). These scaling factors are taken directly from the BAAQMD Health Risk Calculator for the given distance and source type. In the instance there is no discrete scaling factor for a given distance, the scaling factor for the next-nearer distance is conservatively used.

Abbreivations

ug - mircograms
BAAQMD - Bay Area Air Quality Management District
m - meter
MEIR - maximally exposed individual sensitive receptor
PM - particulate matter
UTM - universal transverse mercator

References

BAAQMD Permitted Stationary Source Risk and Hazards tool. Accessed September 2020. Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65
BAAQMD Health Risk Calculator. Available online at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/tools/baaqmd-health-risk-calculator-beta-4-0-xlsx.xlsx?la=en

APPENDIX E

PROJECT: 1690017335 | DATED: 9/15/2020 | DESIGNER: lkoolik

Project Boundary

Constructed Previously*

SITE LAYOUT
BAYER LONG-RANGE DEVELOPMENT

FIGURE 01

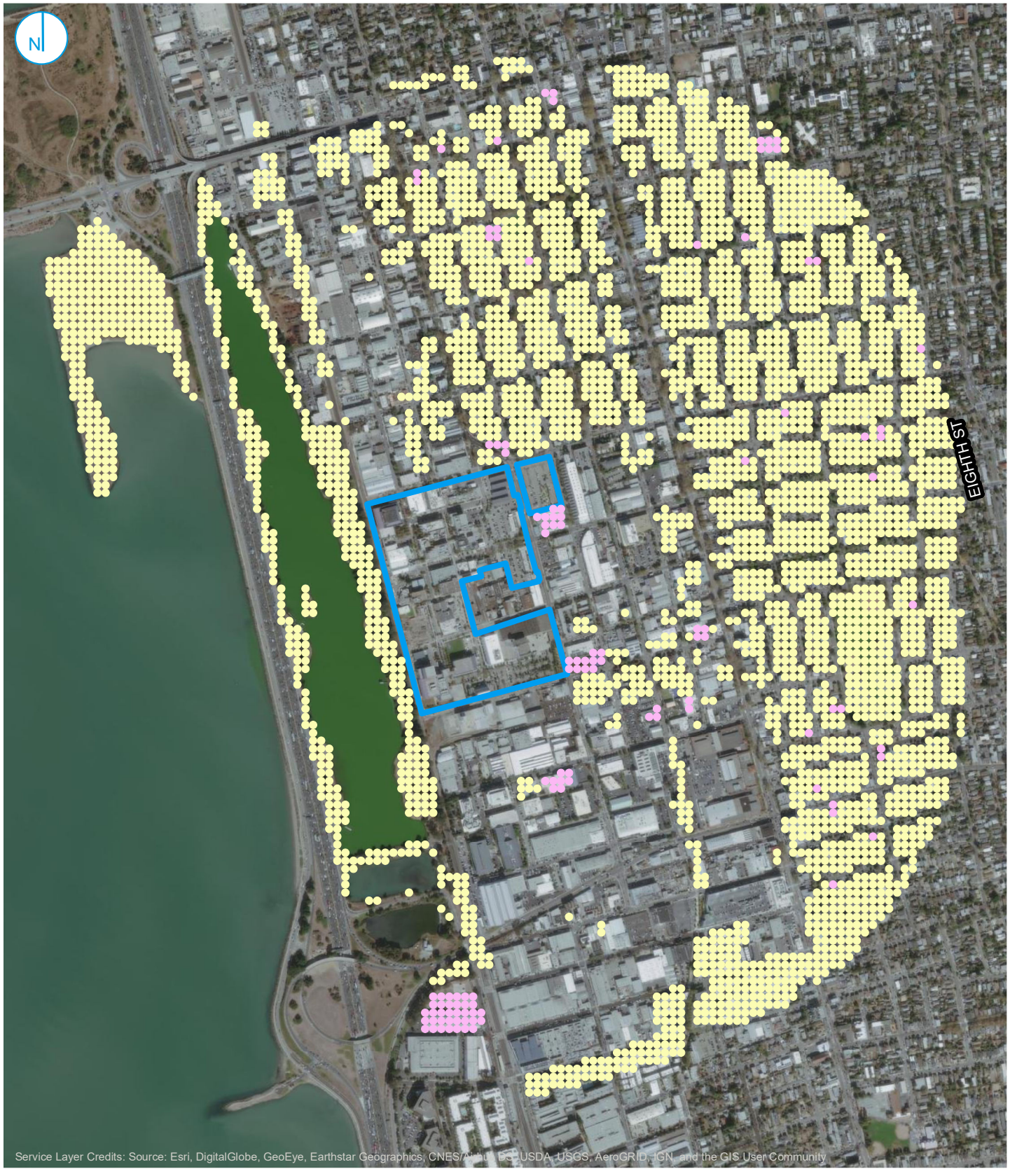
Bayer
Berkeley, CA

*B68 (CCTC 1) and B69 (CCTC 2/3) are being constructed as part of the existing DA and therefore considered part of the baseline.

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

0 140 280 Meters

RAMBOLL



PROJECT: 1690017335 | DATED: 10/21/2020 | DESIGNER: lkoolik

Daycare

Residential

Project Boundary

0 600 1,200 Meters

AIR QUALITY MODELING EXTENT AND RECEPTOR LOCATIONS

BAYER LONG-RANGE DEVELOPMENT

FIGURE 02

Bayer
Berkeley, CA

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1690017335 | DATED: 9/16/2020 | DESIGNER: lkoolik

A-North
A-South
C-North
Project Boundary
Constructed Previously*

BUILDINGS TO BE DEMOLISHED
BAYER LONG-RANGE DEVELOPMENT

FIGURE 03

Bayer
Berkeley, CA

*B68 (CCTC 1) and B69 (CCTC 2/3) are being constructed as part of the existing DA and therefore considered part of the baseline.

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

0 140 280 Meters

RAMBOLL

PROJECT: 1690017335 | DATED: 9/15/2020 | DESIGNER: lkoolik

- Project Boundary
- A-North
- A-South
- B-North
- C-North
- C-South
- Constructed Previously*

YEAR 10 (2032) BUILDOUT
BAYER LONG-RANGE DEVELOPMENT

FIGURE 04

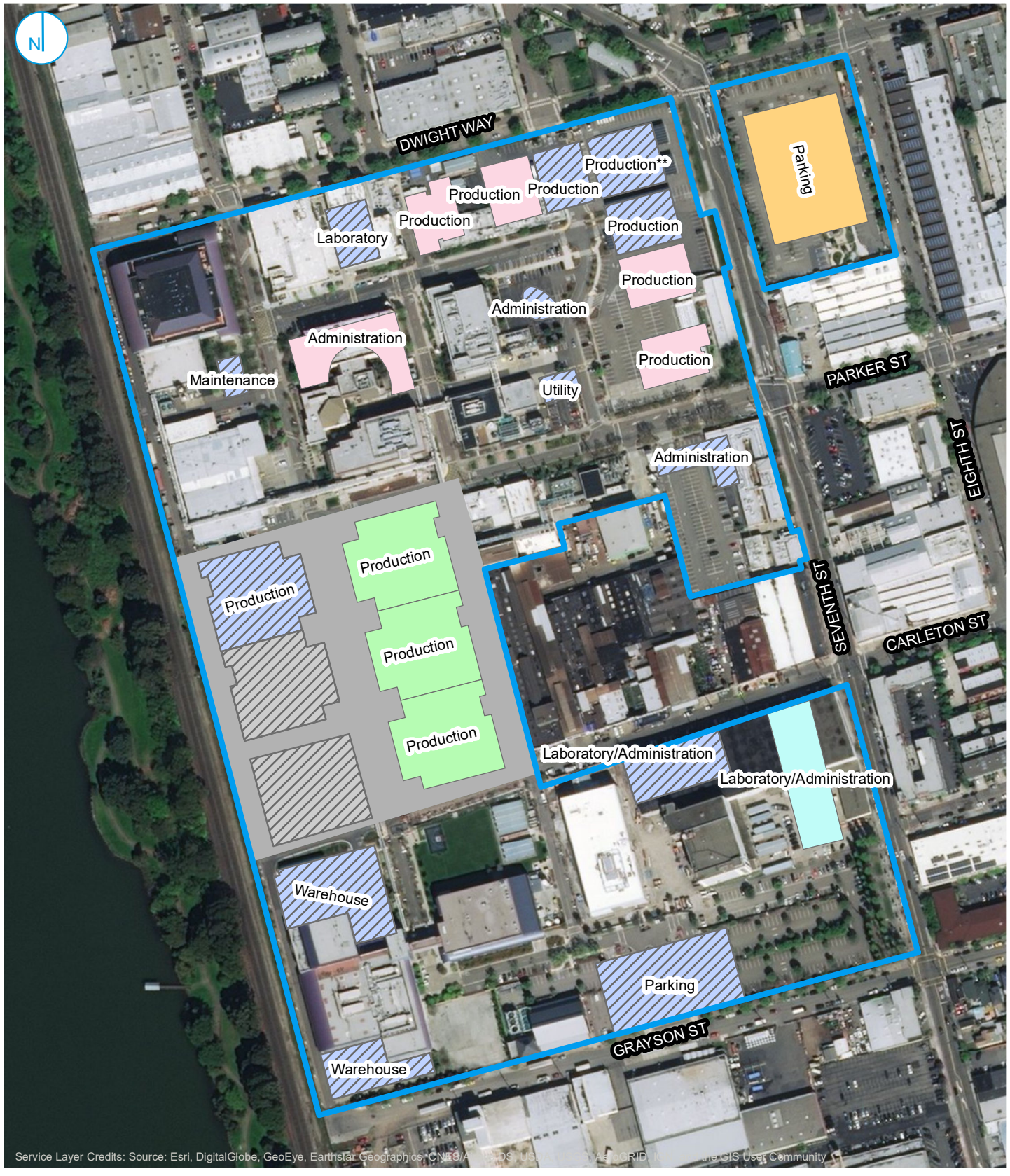
Bayer
Berkeley, CA

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

*B68 (CCTC 1) and B69 (CCTC 2/3) are being constructed as part of the existing DA and therefore considered par of the baseline.
** Existing parking lot solar panels in this location are to be relocated or, new panels to be installed in a different location.

0 140 280 Meters

RAMBOLL



PROJECT: 1690017335 | DATED: 9/15/2020 | DESIGNER: lkoolik

Project Boundary
Year 10 Buildout
A-North
A-South
B-North
D-North
Constructed Previously*

YEAR 30 (2052) BUILDOUT
BAYER LONG-RANGE DEVELOPMENT

FIGURE 05

Bayer
Berkeley, CA

*B68 (CCTC 1) and B69 (CCTC 2/3) are being constructed as part of the existing DA and therefore considered par of the baseline.
** Existing parking lot solar panels in this location are to be relocated or, new panels to be installed in a different location.

0 140 280 Meters

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1690017335 | DATED: 10/12/2020 | DESIGNER: DWILTON

Project Boundary

Emergency Generators

0 125 Meters

BASELINE EMERGENCY GENERATOR LOCATIONS
BAYER LONG-RANGE DEVELOPMENT

FIGURE 06

Bayer
Berkeley, CA

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1690017335 | DATED: 10/12/2020 | DESIGNER: DWILTON

Project Boundary

Year 10 Construction

Emergency Generators

0 125 Meters

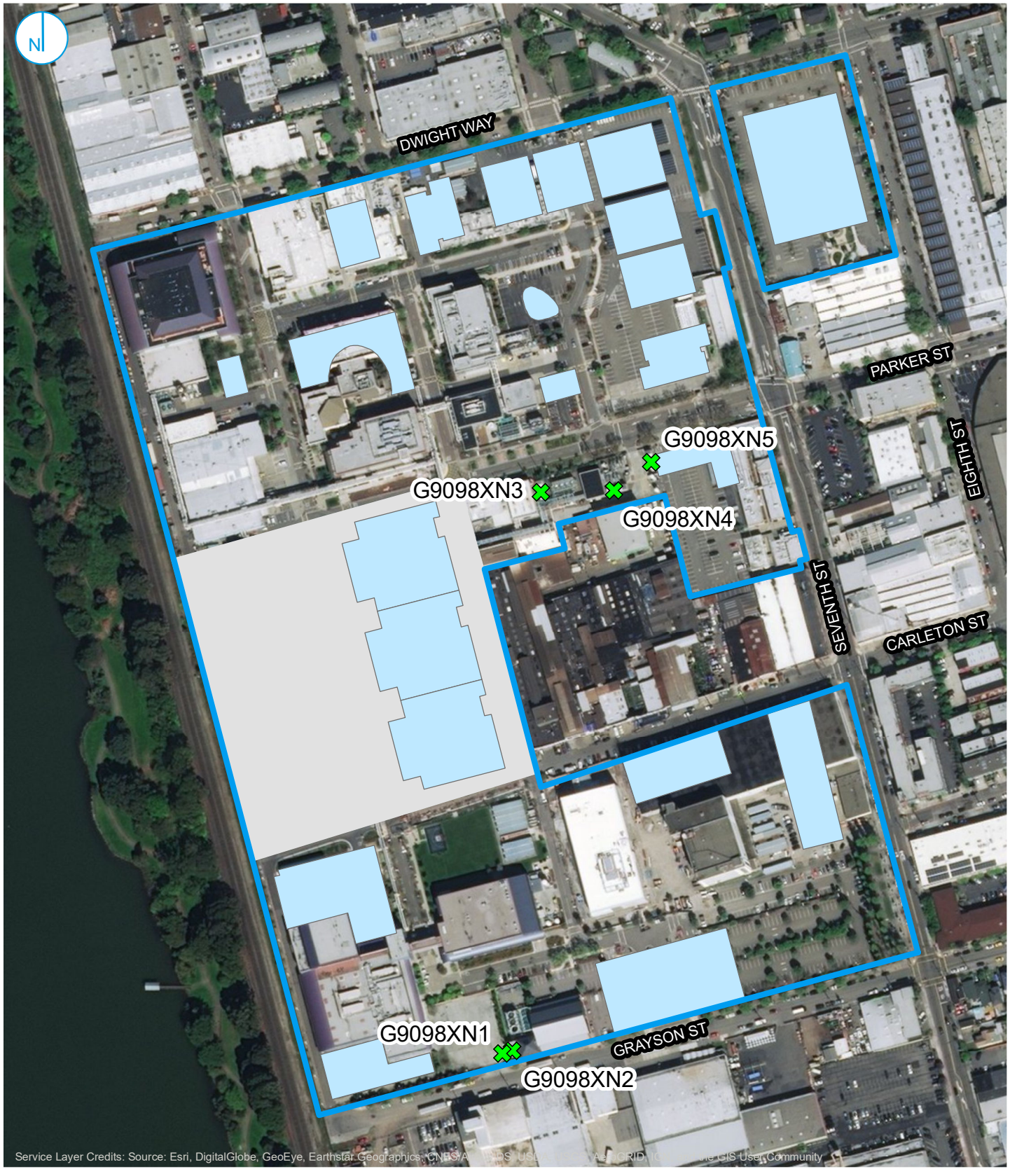
YEAR 10 EMERGENCY GENERATOR LOCATIONS
BAYER LONG-RANGE DEVELOPMENT

FIGURE 07

Bayer
Berkeley, CA

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL



PROJECT: 1690017335 | DATED: 10/12/2020 | DESIGNER: DWILTON

Project Boundary

Year 30 Construction

Emergency Generators

0 125 Meters

YEAR 30 EMERGENCY GENERATOR LOCATIONS

BAYER LONG-RANGE DEVELOPMENT

FIGURE 08

Bayer
Berkeley, CA

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

DRAFT

PROJECT: 1690017335 | DATED: 10/12/2020 | DESIGNER: DWILTON

Project Boundary

Existing Boilers

0 125 Meters

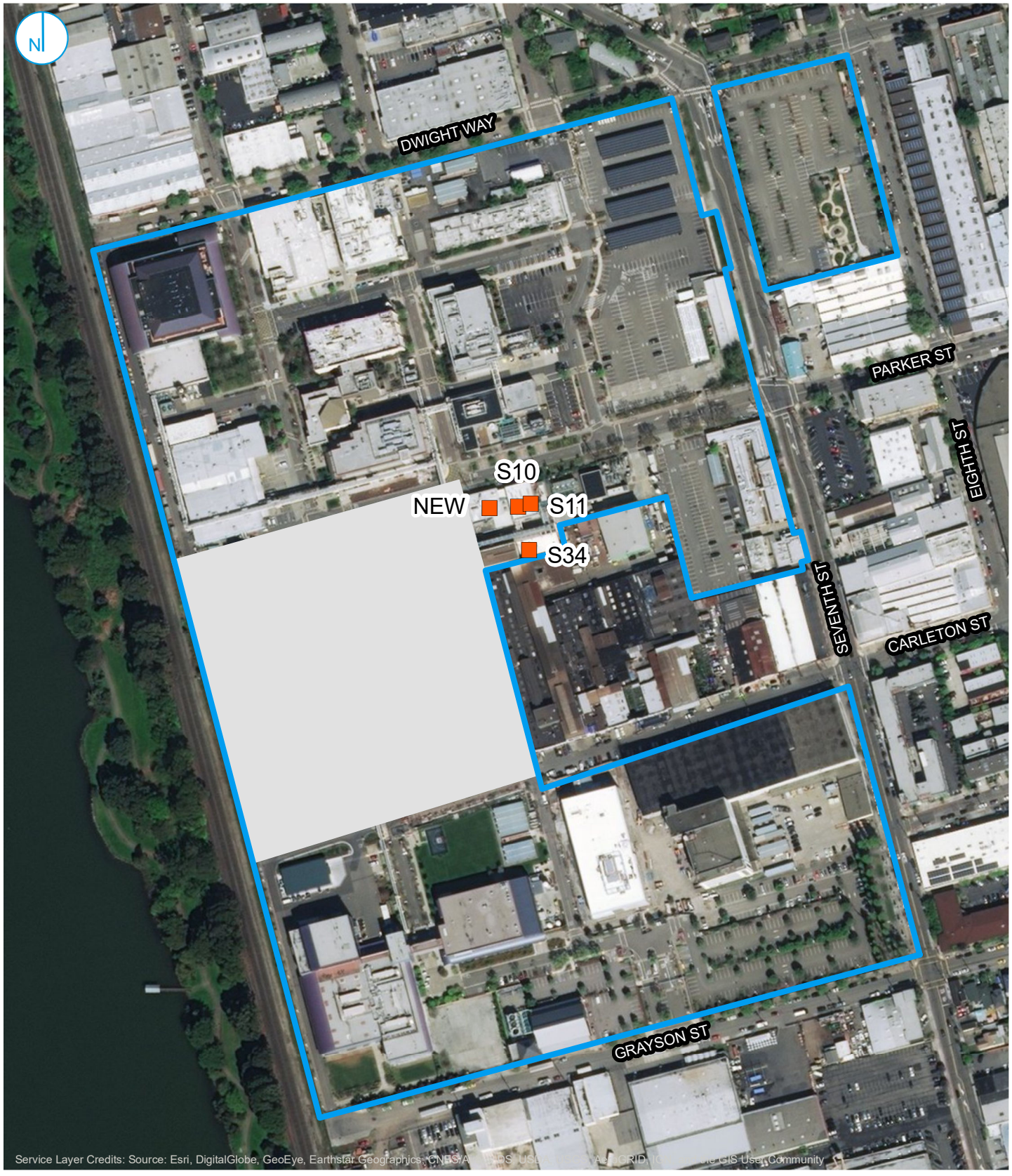
BASELINE BOILER LOCATIONS
BAYER LONG-RANGE DEVELOPMENT

FIGURE 09

Bayer
Berkeley, CA

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL



PROJECT: 1690017335 | DATED: 10/12/2020 | DESIGNER: DWILTON

Project Boundary

Boilers

0 125 250 Meters

YEAR 10 & YEAR 30 BOILER LOCATIONS

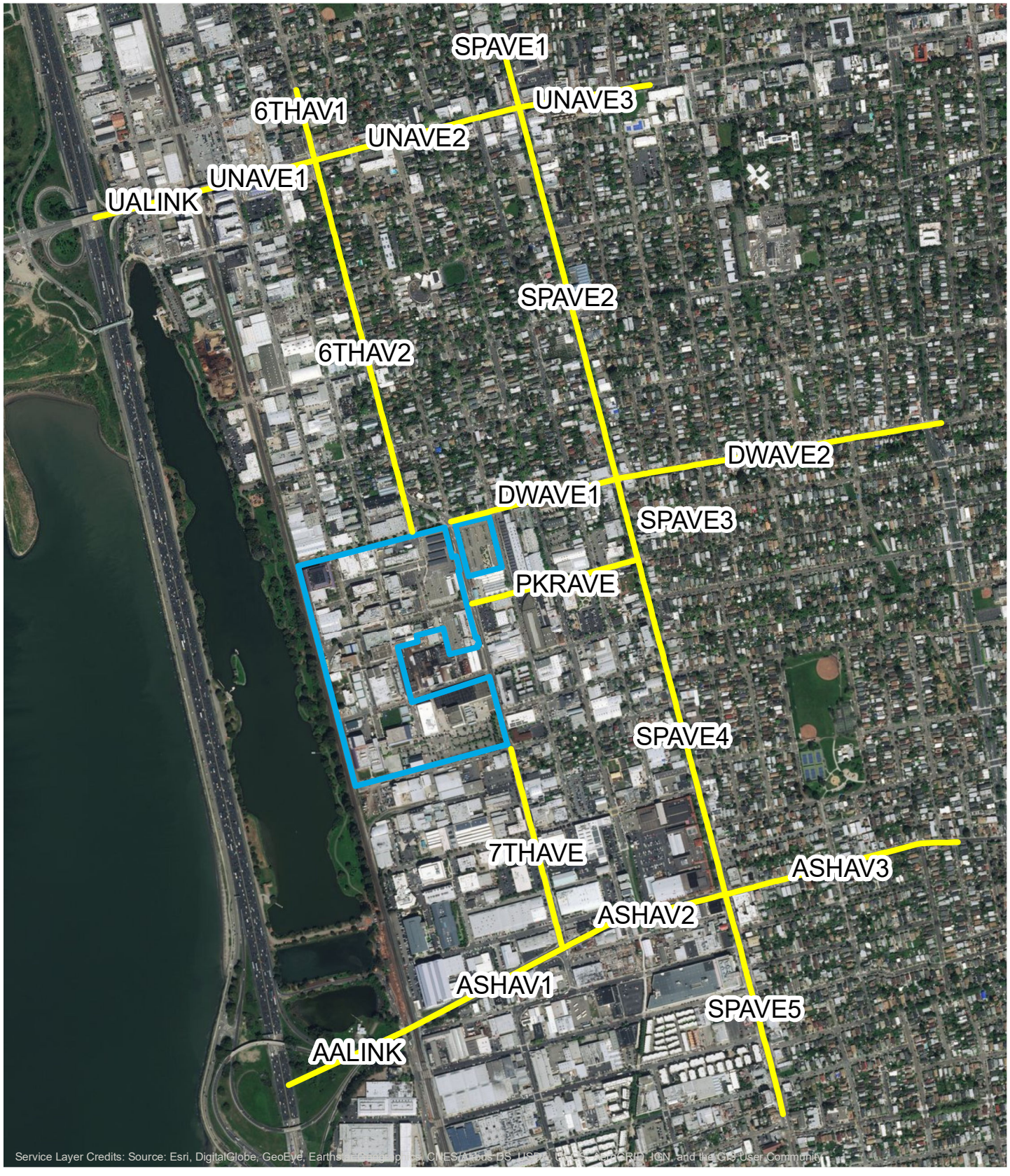
BAYER LONG-RANGE DEVELOPMENT

FIGURE 10

Bayer
Berkeley, CA

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL



PROJECT: 1690017335 | DATED: 10/12/2020 | DESIGNER: DWILTON

Project Boundary

Operational Roadways

0 1,000 Meters

MODELLED OPERATIONAL TRAFFIC ROUTES

BAYER LONG-RANGE DEVELOPMENT

FIGURE 11

Bayer
Berkeley, CA

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

APPENDIX F

Bayer - Baseline - AQ

Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	244.22	1000sqft	5.61	244,225.00	0
Research & Development	415.83	1000sqft	9.55	415,832.00	0
General Heavy Industry	79.74	1000sqft	1.83	79,743.00	0
General Light Industry	36.95	1000sqft	0.85	36,955.00	0
Manufacturing	793.60	1000sqft	18.22	793,598.00	0
Refrigerated Warehouse-No Rail	295.65	1000sqft	6.79	295,649.00	0
Enclosed Parking with Elevator	0.00	1000sqft	0.00	0.00	0
Parking Lot	1,720.00	Space	15.48	767,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	243	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Energy intensity factors based on data for PG&E from The Climate Registry and RPS reductions

Land Use - Land use square footage updated to match project description

Construction Phase -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Grading -

Vehicle Trips -

Consumer Products -

Area Coating -

Energy Use -

Table Name	Column Name	Default Value	New Value
tblLandUse	LandUseSquareFeet	244,220.00	244,225.00
tblLandUse	LandUseSquareFeet	415,830.00	415,832.00
tblLandUse	LandUseSquareFeet	79,740.00	79,743.00
tblLandUse	LandUseSquareFeet	36,950.00	36,955.00
tblLandUse	LandUseSquareFeet	793,600.00	793,598.00
tblLandUse	LandUseSquareFeet	295,650.00	295,649.00
tblLandUse	LandUseSquareFeet	688,000.00	767,120.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.033
tblProjectCharacteristics	CO2IntensityFactor	641.35	243
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004

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					

2020	0.5115	5.3936	3.4688	7.6100e-003	0.9481	0.2337	1.1817	0.4262	0.2158	0.6420						682.5314
2021	0.8560	8.6140	6.6751	0.0291	1.4434	0.1449	1.5882	0.3926	0.1363	0.5289						2,704.3966
2022	0.7852	8.0110	6.2691	0.0285	1.4378	0.1230	1.5608	0.3911	0.1158	0.5068						2,646.1747
2023	0.6968	6.5338	5.8547	0.0277	1.4378	0.1025	1.5403	0.3911	0.0964	0.4874						2,570.5749
2024	0.6611	6.4040	5.6358	0.0274	1.4489	0.0917	1.5407	0.3941	0.0862	0.4803						2,546.5025
2025	10.0904	1.5643	1.7873	6.6400e-003	0.3426	0.0334	0.3760	0.0928	0.0312	0.1240						611.5170
Maximum	**10.0904**	**8.6140**	**6.6751**	**0.0291**	**1.4489**	**0.2337**	**1.5882**	**0.4262**	**0.2158**	**0.6420**						**2,704.3966**

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					
2020	0.5115	5.3936	3.4688	7.6100e-003	0.9481	0.2337	1.1817	0.4262	0.2158	0.6420						682.5308
2021	0.8560	8.6140	6.6751	0.0291	1.4434	0.1449	1.5882	0.3926	0.1363	0.5289						2,704.3962
2022	0.7852	8.0110	6.2691	0.0285	1.4378	0.1230	1.5608	0.3911	0.1158	0.5068						2,646.1743
2023	0.6968	6.5338	5.8547	0.0277	1.4378	0.1025	1.5403	0.3911	0.0964	0.4874						2,570.5746
2024	0.6611	6.4040	5.6358	0.0274	1.4489	0.0917	1.5407	0.3941	0.0862	0.4803						2,546.5021
2025	10.0904	1.5643	1.7873	6.6400e-003	0.3426	0.0334	0.3760	0.0928	0.0312	0.1240						611.5168
Maximum	**10.0904**	**8.6140**	**6.6751**	**0.0291**	**1.4489**	**0.2337**	**1.5882**	**0.4262**	**0.2158**	**0.6420**						**2,704.3962**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	2-5-2020	5-4-2020	1.1767	1.1767
2	5-5-2020	8-4-2020	1.5842	1.5842
3	8-5-2020	11-4-2020	1.7996	1.7996
4	11-5-2020	2-4-2021	2.2402	2.2402
5	2-5-2021	5-4-2021	2.3096	2.3096
6	5-5-2021	8-4-2021	2.3657	2.3657
7	8-5-2021	11-4-2021	2.3791	2.3791
8	11-5-2021	2-4-2022	2.3389	2.3389
9	2-5-2022	5-4-2022	2.1534	2.1534
10	5-5-2022	8-4-2022	2.2068	2.2068
11	8-5-2022	11-4-2022	2.2186	2.2186
12	11-5-2022	2-4-2023	2.0871	2.0871
13	2-5-2023	5-4-2023	1.7723	1.7723
14	5-5-2023	8-4-2023	1.8170	1.8170
15	8-5-2023	11-4-2023	1.8263	1.8263
16	11-5-2023	2-4-2024	1.8198	1.8198
17	2-5-2024	5-4-2024	1.7376	1.7376
18	5-5-2024	8-4-2024	1.7620	1.7620
19	8-5-2024	11-4-2024	1.7707	1.7707
20	11-5-2024	2-4-2025	1.7633	1.7633
21	2-5-2025	5-4-2025	0.8523	0.8523
22	5-5-2025	8-4-2025	4.0768	4.0768
23	8-5-2025	9-30-2025	5.4121	5.4121
		Highest	5.4121	5.4121

2.2 Overall Operational

Unmitigated Operational

	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					
Area	8.3294	3.1000e-004	0.0332	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004						0.0684
Energy	0.2306	2.0967	1.7612	0.0126		0.1594	0.1594		0.1594	0.1594						4,561.8674
Mobile	2.6087	17.1662	30.0212	0.1040	7.7662	0.1261	7.8922	2.0878	0.1190	2.2068						9,579.3129
Waste						0.0000	0.0000		0.0000	0.0000						837.5272
Water						0.0000	0.0000		0.0000	0.0000						1,044.0921
Total	**11.1687**	**19.2632**	**31.8156**	**0.1166**	**7.7662**	**0.2856**	**8.0517**	**2.0878**	**0.2785**	**2.3662**						**16,022.8679**

Mitigated Operational

	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					
Area	8.3294	3.1000e-004	0.0332	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004						0.0684
Energy	0.2306	2.0967	1.7612	0.0126		0.1594	0.1594		0.1594	0.1594						4,561.8674
Mobile	2.6087	17.1662	30.0212	0.1040	7.7662	0.1261	7.8922	2.0878	0.1190	2.2068						9,579.3129
Waste						0.0000	0.0000		0.0000	0.0000						837.5272
Water						0.0000	0.0000		0.0000	0.0000						1,044.0921
Total	**11.1687**	**19.2632**	**31.8156**	**0.1166**	**7.7662**	**0.2856**	**8.0517**	**2.0878**	**0.2785**	**2.3662**						**16,022.8679**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	2/5/2020	5/12/2020	5	70	
2	Site Preparation	Site Preparation	5/13/2020	7/7/2020	5	40	
3	Grading	Grading	7/8/2020	12/8/2020	5	110	
4	Building Construction	Building Construction	12/9/2020	3/11/2025	5	1110	
5	Paving	Paving	3/12/2025	6/24/2025	5	75	
6	Architectural Coating	Architectural Coating	6/25/2025	10/7/2025	5	75	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 275

Acres of Paving: 15.48

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 2,799,003; Non-Residential Outdoor: 933,001; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29

Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building 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

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	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	1,040.00	432.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	208.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 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	0.1159	1.1620	0.7614	1.3600e-003		0.0581	0.0581		0.0540	0.0540						119.8349

Total	**0.1159**	**1.1620**	**0.7614**	**1.3600e-003**		**0.0581**	**0.0581**		**0.0540**	**0.0540**						**119.8349**

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
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.8200e-003	1.3400e-003	0.0137	4.0000e-005	4.1500e-003	3.0000e-005	4.1800e-003	1.1000e-003	3.0000e-005	1.1300e-003						3.6924
Total	**1.8200e-003**	**1.3400e-003**	**0.0137**	**4.0000e-005**	**4.1500e-003**	**3.0000e-005**	**4.1800e-003**	**1.1000e-003**	**3.0000e-005**	**1.1300e-003**						**3.6924**

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	0.1159	1.1620	0.7614	1.3600e-003		0.0581	0.0581		0.0540	0.0540						119.8348
Total	**0.1159**	**1.1620**	**0.7614**	**1.3600e-003**		**0.0581**	**0.0581**		**0.0540**	**0.0540**						**119.8348**

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
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.8200e-003	1.3400e-003	0.0137	4.0000e-005	4.1500e-003	3.0000e-005	4.1800e-003	1.1000e-003	3.0000e-005	1.1300e-003						3.6924
Total	**1.8200e-003**	**1.3400e-003**	**0.0137**	**4.0000e-005**	**4.1500e-003**	**3.0000e-005**	**4.1800e-003**	**1.1000e-003**	**3.0000e-005**	**1.1300e-003**						**3.6924**

3.3 Site Preparation - 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					
Fugitive Dust					0.3613	0.0000	0.3613	0.1986	0.0000	0.1986						0.0000
Off-Road	0.0815	0.8484	0.4303	7.6000e-004		0.0440	0.0440		0.0404	0.0404						67.4020
Total	**0.0815**	**0.8484**	**0.4303**	**7.6000e-004**	**0.3613**	**0.0440**	**0.4053**	**0.1986**	**0.0404**	**0.2390**						**67.4020**

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
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.2400e-003	9.2000e-004	9.4200e-003	3.0000e-005	2.8500e-003	2.0000e-005	2.8700e-003	7.6000e-004	2.0000e-005	7.8000e-004						2.5319
Total	**1.2400e-003**	**9.2000e-004**	**9.4200e-003**	**3.0000e-005**	**2.8500e-003**	**2.0000e-005**	**2.8700e-003**	**7.6000e-004**	**2.0000e-005**	**7.8000e-004**						**2.5319**

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					0.3613	0.0000	0.3613	0.1986	0.0000	0.1986						0.0000
Off-Road	0.0815	0.8484	0.4303	7.6000e-004		0.0440	0.0440		0.0404	0.0404						67.4019
Total	**0.0815**	**0.8484**	**0.4303**	**7.6000e-004**	**0.3613**	**0.0440**	**0.4053**	**0.1986**	**0.0404**	**0.2390**						**67.4019**

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
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000

Worker	1.2400e-003	9.2000e-004	9.4200e-003	3.0000e-005	2.8500e-003	2.0000e-005	2.8700e-003	7.6000e-004	2.0000e-005	7.8000e-004						2.5319
Total	**1.2400e-003**	**9.2000e-004**	**9.4200e-003**	**3.0000e-005**	**2.8500e-003**	**2.0000e-005**	**2.8700e-003**	**7.6000e-004**	**2.0000e-005**	**7.8000e-004**						**2.5319**

3.4 Grading - 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					
Fugitive Dust					0.4770	0.0000	0.4770	0.1978	0.0000	0.1978						0.0000
Off-Road	0.2448	2.7609	1.7577	3.4100e-003		0.1196	0.1196		0.1100	0.1100						302.0865
Total	**0.2448**	**2.7609**	**1.7577**	**3.4100e-003**	**0.4770**	**0.1196**	**0.5966**	**0.1978**	**0.1100**	**0.3078**						**302.0865**

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
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	3.8000e-003	2.8100e-003	0.0288	9.0000e-005	8.7000e-003	6.0000e-005	8.7600e-003	2.3100e-003	6.0000e-005	2.3700e-003						7.7364
Total	**3.8000e-003**	**2.8100e-003**	**0.0288**	**9.0000e-005**	**8.7000e-003**	**6.0000e-005**	**8.7600e-003**	**2.3100e-003**	**6.0000e-005**	**2.3700e-003**						**7.7364**

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					0.4770	0.0000	0.4770	0.1978	0.0000	0.1978						0.0000
Off-Road	0.2448	2.7609	1.7577	3.4100e-003		0.1196	0.1196		0.1100	0.1100						302.0862
Total	**0.2448**	**2.7609**	**1.7577**	**3.4100e-003**	**0.4770**	**0.1196**	**0.5966**	**0.1978**	**0.1100**	**0.3078**						**302.0862**

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
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	3.8000e-003	2.8100e-003	0.0288	9.0000e-005	8.7000e-003	6.0000e-005	8.7600e-003	2.3100e-003	6.0000e-005	2.3700e-003						7.7364
Total	**3.8000e-003**	**2.8100e-003**	**0.0288**	**9.0000e-005**	**8.7000e-003**	**6.0000e-005**	**8.7600e-003**	**2.3100e-003**	**6.0000e-005**	**2.3700e-003**						**7.7364**

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	0.0180	0.1631	0.1432	2.3000e-004		9.4900e-003	9.4900e-003		8.9300e-003	8.9300e-003						19.8069
Total	**0.0180**	**0.1631**	**0.1432**	**2.3000e-004**		**9.4900e-003**	**9.4900e-003**		**8.9300e-003**	**8.9300e-003**						**19.8069**

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
Vendor	0.0138	0.4316	0.0930	1.0100e-003	0.0241	2.0000e-003	0.0261	6.9800e-003	1.9200e-003	8.8900e-003						97.2678
Worker	0.0306	0.0226	0.2313	6.9000e-004	0.0699	4.8000e-004	0.0704	0.0186	4.5000e-004	0.0190						62.1725
Total	**0.0444**	**0.4542**	**0.3243**	**1.7000e-003**	**0.0940**	**2.4800e-003**	**0.0965**	**0.0256**	**2.3700e-003**	**0.0279**						**159.4404**

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	0.0180	0.1631	0.1432	2.3000e-004		9.4900e-003	9.4900e-003		8.9300e-003	8.9300e-003						19.8069
Total	**0.0180**	**0.1631**	**0.1432**	**2.3000e-004**		**9.4900e-003**	**9.4900e-003**		**8.9300e-003**	**8.9300e-003**						**19.8069**

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
Vendor	0.0138	0.4316	0.0930	1.0100e-003	0.0241	2.0000e-003	0.0261	6.9800e-003	1.9200e-003	8.8900e-003						97.2678
Worker	0.0306	0.0226	0.2313	6.9000e-004	0.0699	4.8000e-004	0.0704	0.0186	4.5000e-004	0.0190						62.1725
Total	**0.0444**	**0.4542**	**0.3243**	**1.7000e-003**	**0.0940**	**2.4800e-003**	**0.0965**	**0.0256**	**2.3700e-003**	**0.0279**						**159.4404**

3.5 Building 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	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176						304.1099
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**						**304.1099**

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
Vendor	0.1745	6.0302	1.2773	0.0154	0.3703	0.0126	0.3828	0.1071	0.0120	0.1191						1,478.9135
Worker	0.4334	0.3089	3.2348	0.0102	1.0731	7.2100e-003	1.0803	0.2855	6.6400e-003	0.2921						921.3732
Total	**0.6079**	**6.3391**	**4.5121**	**0.0256**	**1.4434**	**0.0198**	**1.4631**	**0.3926**	**0.0187**	**0.4112**						**2,400.2867**

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	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176						304.1095
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**						**304.1095**

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
Vendor	0.1745	6.0302	1.2773	0.0154	0.3703	0.0126	0.3828	0.1071	0.0120	0.1191						1,478.9135
Worker	0.4334	0.3089	3.2348	0.0102	1.0731	7.2100e-003	1.0803	0.2855	6.6400e-003	0.2921						921.3732
Total	**0.6079**	**6.3391**	**4.5121**	**0.0256**	**1.4434**	**0.0198**	**1.4631**	**0.3926**	**0.0187**	**0.4112**						**2,400.2867**

3.5 Building Construction - 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	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990						303.0471
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**						**303.0471**

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
Vendor	0.1625	5.7055	1.1918	0.0152	0.3689	0.0108	0.3797	0.1067	0.0104	0.1171						1,458.7716
Worker	0.4009	0.2754	2.9500	9.7700e-003	1.0690	7.0000e-003	1.0760	0.2844	6.4500e-003	0.2908						884.3561

Total	**0.5634**	**5.9810**	**4.1419**	**0.0250**	**1.4378**	**0.0178**	**1.4557**	**0.3911**	**0.0168**	**0.4079**						**2,343.1276**

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	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990						303.0467
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**						**303.0467**

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
Vendor	0.1625	5.7055	1.1918	0.0152	0.3689	0.0108	0.3797	0.1067	0.0104	0.1171						1,458.7716
Worker	0.4009	0.2754	2.9500	9.7700e-003	1.0690	7.0000e-003	1.0760	0.2844	6.4500e-003	0.2908						884.3561
Total	**0.5634**	**5.9810**	**4.1419**	**0.0250**	**1.4378**	**0.0178**	**1.4557**	**0.3911**	**0.0168**	**0.4079**						**2,343.1276**

3.5 Building Construction - 2023

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	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856						303.1383
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**						**303.1383**

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
Vendor	0.1191	4.4167	1.0417	0.0148	0.3689	4.6800e-003	0.3735	0.1067	4.4700e-003	0.1112						1,416.9362
Worker	0.3732	0.2471	2.7012	9.4000e-003	1.0690	6.8400e-003	1.0758	0.2844	6.3000e-003	0.2907						850.5005
Total	**0.4923**	**4.6638**	**3.7430**	**0.0242**	**1.4378**	**0.0115**	**1.4494**	**0.3911**	**0.0108**	**0.4019**						**2,267.4366**

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	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856						303.1380
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**						**303.1380**

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
Vendor	0.1191	4.4167	1.0417	0.0148	0.3689	4.6800e-003	0.3735	0.1067	4.4700e-003	0.1112						1,416.9362
Worker	0.3732	0.2471	2.7012	9.4000e-003	1.0690	6.8400e-003	1.0758	0.2844	6.3000e-003	0.2907						850.5005
Total	**0.4923**	**4.6638**	**3.7430**	**0.0242**	**1.4378**	**0.0115**	**1.4494**	**0.3911**	**0.0108**	**0.4019**						**2,267.4366**

3.5 Building Construction - 2024

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	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756						305.5179
Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**						**305.5179**

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
Vendor	0.1165	4.4184	1.0053	0.0148	0.3717	4.6600e-003	0.3764	0.1075	4.4500e-003	0.1120						1,417.9385
Worker	0.3519	0.2244	2.5126	9.0900e-003	1.0772	6.7500e-003	1.0840	0.2866	6.2100e-003	0.2928						823.0461
Total	**0.4684**	**4.6428**	**3.5180**	**0.0239**	**1.4489**	**0.0114**	**1.4603**	**0.3941**	**0.0107**	**0.4048**						**2,240.9846**

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	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756						305.5175
Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**						**305.5175**

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
Vendor	0.1165	4.4184	1.0053	0.0148	0.3717	4.6600e-003	0.3764	0.1075	4.4500e-003	0.1120						1,417.9385
Worker	0.3519	0.2244	2.5126	9.0900e-003	1.0772	6.7500e-003	1.0840	0.2866	6.2100e-003	0.2928						823.0461
Total	**0.4684**	**4.6428**	**3.5180**	**0.0239**	**1.4489**	**0.0114**	**1.4603**	**0.3941**	**0.0107**	**0.4048**						**2,240.9846**

3.5 Building Construction - 2025

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	0.0342	0.3117	0.4021	6.7000e-004		0.0132	0.0132		0.0124	0.0124						58.3206
Total	**0.0342**	**0.3117**	**0.4021**	**6.7000e-004**		**0.0132**	**0.0132**		**0.0124**	**0.0124**						**58.3206**

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

Vendor	0.0216	0.8364	0.1850	2.8000e-003	0.0709	8.8000e-004	0.0718	0.0205	8.4000e-004	0.0214						268.8209
Worker	0.0632	0.0389	0.4431	1.6600e-003	0.2056	1.2700e-003	0.2068	0.0547	1.1700e-003	0.0559						150.6532
Total	**0.0849**	**0.8753**	**0.6281**	**4.4600e-003**	**0.2765**	**2.1500e-003**	**0.2787**	**0.0752**	**2.0100e-003**	**0.0772**						**419.4741**

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	0.0342	0.3117	0.4021	6.7000e-004		0.0132	0.0132		0.0124	0.0124						58.3205
Total	**0.0342**	**0.3117**	**0.4021**	**6.7000e-004**		**0.0132**	**0.0132**		**0.0124**	**0.0124**						**58.3205**

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
Vendor	0.0216	0.8364	0.1850	2.8000e-003	0.0709	8.8000e-004	0.0718	0.0205	8.4000e-004	0.0214						268.8209
Worker	0.0632	0.0389	0.4431	1.6600e-003	0.2056	1.2700e-003	0.2068	0.0547	1.1700e-003	0.0559						150.6532
Total	**0.0849**	**0.8753**	**0.6281**	**4.4600e-003**	**0.2765**	**2.1500e-003**	**0.2787**	**0.0752**	**2.0100e-003**	**0.0772**						**419.4741**

3.6 Paving - 2025

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	0.0343	0.3218	0.5467	8.5000e-004		0.0157	0.0157		0.0144	0.0144						75.6792
Paving	0.0203					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.0546**	**0.3218**	**0.5467**	**8.5000e-004**		**0.0157**	**0.0157**		**0.0144**	**0.0144**						**75.6792**

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
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.3700e-003	8.4000e-004	9.5900e-003	4.0000e-005	4.4500e-003	3.0000e-005	4.4700e-003	1.1800e-003	3.0000e-005	1.2100e-003						3.2593
Total	**1.3700e-003**	**8.4000e-004**	**9.5900e-003**	**4.0000e-005**	**4.4500e-003**	**3.0000e-005**	**4.4700e-003**	**1.1800e-003**	**3.0000e-005**	**1.2100e-003**						**3.2593**

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	0.0343	0.3218	0.5467	8.5000e-004		0.0157	0.0157		0.0144	0.0144						75.6791
Paving	0.0203					0.0000	0.0000		0.0000	0.0000						0.0000
Total	**0.0546**	**0.3218**	**0.5467**	**8.5000e-004**		**0.0157**	**0.0157**		**0.0144**	**0.0144**						**75.6791**

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
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	1.3700e-003	8.4000e-004	9.5900e-003	4.0000e-005	4.4500e-003	3.0000e-005	4.4700e-003	1.1800e-003	3.0000e-005	1.2100e-003						3.2593
Total	**1.3700e-003**	**8.4000e-004**	**9.5900e-003**	**4.0000e-005**	**4.4500e-003**	**3.0000e-005**	**4.4700e-003**	**1.1800e-003**	**3.0000e-005**	**1.2100e-003**						**3.2593**

3.7 Architectural Coating - 2025

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	9.8900					0.0000	0.0000		0.0000	0.0000						0.0000

Off-Road	6.4100e-003	0.0430	0.0678	1.1000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003						9.5878
Total	**9.8965**	**0.0430**	**0.0678**	**1.1000e-004**		**1.9300e-003**	**1.9300e-003**		**1.9300e-003**	**1.9300e-003**						**9.5878**

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
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0190	0.0117	0.1329	5.0000e-004	0.0617	3.8000e-004	0.0621	0.0164	3.5000e-004	0.0168						45.1960
Total	**0.0190**	**0.0117**	**0.1329**	**5.0000e-004**	**0.0617**	**3.8000e-004**	**0.0621**	**0.0164**	**3.5000e-004**	**0.0168**						**45.1960**

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	9.8900					0.0000	0.0000		0.0000	0.0000						0.0000
Off-Road	6.4100e-003	0.0430	0.0678	1.1000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003						9.5878
Total	**9.8965**	**0.0430**	**0.0678**	**1.1000e-004**		**1.9300e-003**	**1.9300e-003**		**1.9300e-003**	**1.9300e-003**						**9.5878**

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
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						0.0000
Worker	0.0190	0.0117	0.1329	5.0000e-004	0.0617	3.8000e-004	0.0621	0.0164	3.5000e-004	0.0168						45.1960
Total	**0.0190**	**0.0117**	**0.1329**	**5.0000e-004**	**0.0617**	**3.8000e-004**	**0.0621**	**0.0164**	**3.5000e-004**	**0.0168**						**45.1960**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	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					
Mitigated	2.6087	17.1662	30.0212	0.1040	7.7662	0.1261	7.8922	2.0878	0.1190	2.2068						9,579.3129
Unmitigated	2.6087	17.1662	30.0212	0.1040	7.7662	0.1261	7.8922	2.0878	0.1190	2.2068						9,579.3129

4.2 Trip Summary Information

	Average Daily Trip Rate		
	Unmitigated	Mitigated	

Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Heavy Industry	119.61	119.61	119.61	349,203	349,203
General Light Industry	257.54	48.77	25.13	567,890	567,890
General Office Building	2,693.75	600.78	256.43	4,890,781	4,890,781
Manufacturing	3,031.55	1,182.46	492.03	7,020,280	7,020,280
Parking Lot	0.00	0.00	0.00		
Refrigerated Warehouse-No Rail	496.69	496.69	496.69	1,450,098	1,450,098
Research & Development	3,372.38	790.08	461.57	6,485,293	6,485,293
Total	9,971.52	3,238.40	1,851.46	20,763,544	20,763,544

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Manufacturing	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Refrigerated Warehouse-No Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000759
General Heavy Industry	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000759
General Light Industry	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000759
General Office Building	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000759
Manufacturing	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000759
Parking Lot	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000759
Refrigerated Warehouse-No Rail	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000759
Research & Development	0.558186	0.040947	0.190770	0.110456	0.017401	0.005228	0.022658	0.042795	0.002118	0.002805	0.005569	0.000308	0.000759

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	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					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000						2,265.7965
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000						2,265.7965
NaturalGas Mitigated	0.2306	2.0967	1.7612	0.0126		0.1594	0.1594		0.1594	0.1594						2,296.0709
NaturalGas Unmitigated	0.2306	2.0967	1.7612	0.0126		0.1594	0.1594		0.1594	0.1594						2,296.0709

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	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
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
General Heavy Industry	1.97364e+006	0.0106	0.0968	0.0813	5.8000e-004		7.3500e-003	7.3500e-003		7.3500e-003	7.3500e-003						105.9468
General Light Industry	914636	4.9300e-003	0.0448	0.0377	2.7000e-004		3.4100e-003	3.4100e-003		3.4100e-003	3.4100e-003						49.0985
General Office Building	4.72087e+006	0.0255	0.2314	0.1944	1.3900e-003		0.0176	0.0176		0.0176	0.0176						253.4206
Manufacturing	1.96416e+007	0.1059	0.9628	0.8088	5.7800e-003		0.0732	0.0732		0.0732	0.0732						1,054.3766

Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Refrigerated Warehouse-No Rail	5.23003e+006	0.0282	0.2564	0.2154	1.5400e-003		0.0195	0.0195		0.0195	0.0195						280.7529
Research & Development	1.02918e+007	0.0555	0.5045	0.4238	3.0300e-003		0.0383	0.0383		0.0383	0.0383						552.4756
Total		**0.2306**	**2.0967**	**1.7612**	**0.0126**		**0.1593**	**0.1593**		**0.1593**	**0.1593**						**2,296.0709**

Mitigated

	NaturalGas Use	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
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
General Heavy Industry	1.97364e+006	0.0106	0.0968	0.0813	5.8000e-004		7.3500e-003	7.3500e-003		7.3500e-003	7.3500e-003						105.9468
General Light Industry	914636	4.9300e-003	0.0448	0.0377	2.7000e-004		3.4100e-003	3.4100e-003		3.4100e-003	3.4100e-003						49.0985
General Office Building	4.72087e+006	0.0255	0.2314	0.1944	1.3900e-003		0.0176	0.0176		0.0176	0.0176						253.4206
Manufacturing	1.96416e+007	0.1059	0.9628	0.8088	5.7800e-003		0.0732	0.0732		0.0732	0.0732						1,054.3766
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000						0.0000
Refrigerated Warehouse-No Rail	5.23003e+006	0.0282	0.2564	0.2154	1.5400e-003		0.0195	0.0195		0.0195	0.0195						280.7529
Research & Development	1.02918e+007	0.0555	0.5045	0.4238	3.0300e-003		0.0383	0.0383		0.0383	0.0383						552.4756
Total		**0.2306**	**2.0967**	**1.7612**	**0.0126**		**0.1593**	**0.1593**		**0.1593**	**0.1593**						**2,296.0709**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	0				0.0000
General Heavy Industry	602857				67.0002
General Light Industry	279380				31.0497
General Office Building	3.04793e+006				338.7401
Manufacturing	5.9996e+006				666.7827
Parking Lot	268492				29.8396
Refrigerated Warehouse-No Rail	7.04532e+006				783.0012
Research & Development	3.14369e+006				349.3829
Total					**2,265.7964**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	0				0.0000
General Heavy Industry	602857				67.0002
General Light Industry	279380				31.0497
General Office Building	3.04793e+006				338.7401
Manufacturing	5.9996e+006				666.7827

Parking Lot	268492				29.8396
Refrigerated Warehouse-No Rail	7.04532e+006				783.0012
Research & Development	3.14369e+006				349.3829
Total					**2,265.7964**

6.0 Area Detail

6.1 Mitigation Measures Area

	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					
Mitigated	8.3294	3.1000e-004	0.0332	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004						0.0684
Unmitigated	8.3294	3.1000e-004	0.0332	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004						0.0684

6.2 Area by SubCategory

Unmitigated

	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
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.9890					0.0000	0.0000		0.0000	0.0000						0.0000

Consumer Products	7.3373					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	3.1200e-003	3.1000e-004	0.0332	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004						0.0684
Total	**8.3294**	**3.1000e-004**	**0.0332**	**0.0000**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**						**0.0684**

Mitigated

	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
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.9890					0.0000	0.0000		0.0000	0.0000						0.0000
Consumer Products	7.3373					0.0000	0.0000		0.0000	0.0000						0.0000
Landscaping	3.1200e-003	3.1000e-004	0.0332	0.0000		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004						0.0684
Total	**8.3294**	**3.1000e-004**	**0.0332**	**0.0000**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**						**0.0684**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated				1,044.0921
Unmitigated				1,044.0921

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0				0.0000
General Heavy Industry	18.4399 / 0				36.1888
General Light Industry	8.54469 / 0				16.7692
General Office Building	43.4061 / 26.6038				95.5342
Manufacturing	183.52 / 0				360.1632
Parking Lot	0 / 0				0.0000
Refrigerated Warehouse-No Rail	68.3691 / 0				134.1762
Research & Development	204.461 / 0				401.2607
Total					**1,044.0921**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0				0.0000

General Heavy Industry	18.4399 / 0			36.1888
General Light Industry	8.54469 / 0			16.7692
General Office Building	43.4061 / 26.6038			95.5342
Manufacturing	183.52 / 0			360.1632
Parking Lot	0 / 0			0.0000
Refrigerated Warehouse-No Rail	68.3691 / 0			134.1762
Research & Development	204.461 / 0			401.2607
Total				**1,044.0921**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated				837.5272
Unmitigated				837.5272

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0				0.0000
General Heavy Industry	98.88				49.7269
General Light Industry	45.82				23.0430
General Office Building	227.12				114.2190
Manufacturing	984.06				494.8853
Parking Lot	0				0.0000
Refrigerated Warehouse-No Rail	277.91				139.7614
Research & Development	31.6				15.8917
Total					**837.5272**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0				0.0000
General Heavy Industry	98.88				49.7269
General Light Industry	45.82				23.0430
General Office Building	227.12				114.2190
Manufacturing	984.06				494.8853

Parking Lot	0			0.0000
Refrigerated Warehouse-No Rail	277.91			139.7614
Research & Development	31.6			15.8917
Total				**837.5272**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Bayer - Project - Y10

Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	214.00	1000sqft	4.91	214,000.00	0
Research & Development	180.00	1000sqft	4.13	180,000.00	0
General Heavy Industry	71.00	1000sqft	1.63	71,000.00	0
General Light Industry	18.00	1000sqft	0.41	18,000.00	0
Manufacturing	548.00	1000sqft	12.58	548,000.00	0
Refrigerated Warehouse-No Rail	157.00	1000sqft	3.60	157,000.00	0
Enclosed Parking with Elevator	370.18	1000sqft	8.50	370,180.00	0
Parking Lot	165.02	1000sqft	3.79	165,020.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2025
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	194	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Energy intensity factors based on data for PG&E from The Climate Registry and RPS reductions

Land Use -

Construction Phase -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Grading -

Vehicle Trips -

Consumer Products -

Area Coating -

Energy Use -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.033
tblProjectCharacteristics	CO2IntensityFactor	641.35	194
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004

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					
2020	0.5430	5.5695	3.8189	0.0105	0.9049	0.2097	1.1146	0.3677	0.1945	0.5622	0.0000	947.1592	947.1592	0.1524	0.0000	950.9689
2021	0.6470	6.4144	5.1243	0.0203	0.9475	0.1381	1.0855	0.2577	0.1298	0.3875	0.0000	1,871.9831	1,871.9831	0.1404	0.0000	1,875.4918
2022	0.5915	5.9356	4.8455	0.0199	0.9438	0.1169	1.0607	0.2567	0.1100	0.3666	0.0000	1,833.5477	1,833.5477	0.1355	0.0000	1,836.9349
2023	6.6345	2.9139	2.9415	0.0112	0.5304	0.0681	0.5985	0.1440	0.0639	0.2079	0.0000	1,028.5990	1,028.5990	0.0838	0.0000	1,030.6950
Maximum	**6.6345**	**6.4144**	**5.1243**	**0.0203**	**0.9475**	**0.2097**	**1.1146**	**0.3677**	**0.1945**	**0.5622**	**0.0000**	**1,871.9831**	**1,871.9831**	**0.1524**	**0.0000**	**1,875.4918**

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					
2020	0.5430	5.5695	3.8189	0.0105	0.9049	0.2097	1.1146	0.3677	0.1945	0.5622	0.0000	947.1587	947.1587	0.1524	0.0000	950.9684
2021	0.6470	6.4144	5.1243	0.0203	0.9475	0.1381	1.0855	0.2577	0.1298	0.3875	0.0000	1,871.9827	1,871.9827	0.1404	0.0000	1,875.4914
2022	0.5915	5.9356	4.8455	0.0199	0.9438	0.1169	1.0607	0.2567	0.1100	0.3666	0.0000	1,833.5473	1,833.5473	0.1355	0.0000	1,836.9345
2023	6.6345	2.9139	2.9415	0.0112	0.5304	0.0681	0.5985	0.1440	0.0639	0.2079	0.0000	1,028.5987	1,028.5987	0.0838	0.0000	1,030.6948
Maximum	**6.6345**	**6.4144**	**5.1243**	**0.0203**	**0.9475**	**0.2097**	**1.1146**	**0.3677**	**0.1945**	**0.5622**	**0.0000**	**1,871.9827**	**1,871.9827**	**0.1524**	**0.0000**	**1,875.4914**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	2-5-2020	5-4-2020	1.2481	1.2481
2	5-5-2020	8-4-2020	1.7353	1.7353
3	8-5-2020	11-4-2020	1.8996	1.8996
4	11-5-2020	2-4-2021	1.9022	1.9022
5	2-5-2021	5-4-2021	1.7220	1.7220
6	5-5-2021	8-4-2021	1.7657	1.7657
7	8-5-2021	11-4-2021	1.7745	1.7745
8	11-5-2021	2-4-2022	1.7396	1.7396
9	2-5-2022	5-4-2022	1.5978	1.5978
10	5-5-2022	8-4-2022	1.6390	1.6390
11	8-5-2022	11-4-2022	1.6468	1.6468

12	**11-5-2022**	**2-4-2023**	1.5550	1.5550
13	**2-5-2023**	**5-4-2023**	1.3338	1.3338
14	**5-5-2023**	**8-4-2023**	1.1101	1.1101
15	**8-5-2023**	**9-30-2023**	0.5478	0.5478
		Highest	1.9022	1.9022

2.2 Overall Operational

Unmitigated Operational

	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					
Area	5.3064	1.4000e-004	0.0158	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0308	0.0308	8.0000e-005	0.0000	0.0328
Energy	0.1463	1.3301	1.1173	7.9800e-003		0.1011	0.1011		0.1011	0.1011	0.0000	2,751.7347	2,751.7347	0.2495	0.0534	2,773.8942
Mobile	1.1444	7.5713	13.0944	0.0583	4.9728	0.0467	5.0194	1.3363	0.0437	1.3800	0.0000	5,390.9666	5,390.9666	0.1967	0.0000	5,395.8849
Waste						0.0000	0.0000		0.0000	0.0000	233.4721	0.0000	233.4721	13.7978	0.0000	578.4172
Water						0.0000	0.0000		0.0000	0.0000	98.3971	154.8593	253.2563	10.1327	0.2418	578.6368
Total	**6.5971**	**8.9016**	**14.2275**	**0.0663**	**4.9728**	**0.1478**	**5.1206**	**1.3363**	**0.1448**	**1.4811**	**331.8692**	**8,297.5914**	**8,629.4606**	**24.3768**	**0.2953**	**9,326.8660**

Mitigated Operational

	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					
Area	5.3064	1.4000e-004	0.0158	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0308	0.0308	8.0000e-005	0.0000	0.0328

Energy	0.1463	1.3301	1.1173	7.9800e-003		0.1011	0.1011		0.1011	0.1011	0.0000	2,751.7347	2,751.7347	0.2495	0.0534	2,773.8942
Mobile	1.1444	7.5713	13.0944	0.0583	4.9728	0.0467	5.0194	1.3363	0.0437	1.3800	0.0000	5,390.9666	5,390.9666	0.1967	0.0000	5,395.8849
Waste						0.0000	0.0000		0.0000	0.0000	233.4721	0.0000	233.4721	13.7978	0.0000	578.4172
Water						0.0000	0.0000		0.0000	0.0000	98.3971	154.8593	253.2563	10.1327	0.2418	578.6368
Total	**6.5971**	**8.9016**	**14.2275**	**0.0663**	**4.9728**	**0.1478**	**5.1206**	**1.3363**	**0.1448**	**1.4811**	**331.8692**	**8,297.5914**	**8,629.4606**	**24.3768**	**0.2953**	**9,326.8660**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	2/5/2020	4/14/2020	5	50	
2	Site Preparation	Site Preparation	4/15/2020	5/26/2020	5	30	
3	Grading	Grading	5/27/2020	9/8/2020	5	75	
4	Building Construction	Building Construction	9/9/2020	7/11/2023	5	740	
5	Paving	Paving	7/12/2023	9/26/2023	5	55	
6	Architectural Coating	Architectural Coating	9/27/2023	12/12/2023	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 187.5

Acres of Paving: 12.29

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,782,000; Non-Residential Outdoor: 594,000; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73

Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building 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

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	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	684.00	282.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	137.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 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	0.0828	0.8300	0.5438	9.7000e-004		0.0415	0.0415		0.0386	0.0386	0.0000	84.9965	84.9965	0.0240	0.0000	85.5964
Total	**0.0828**	**0.8300**	**0.5438**	**9.7000e-004**		**0.0415**	**0.0415**		**0.0386**	**0.0386**	**0.0000**	**84.9965**	**84.9965**	**0.0240**	**0.0000**	**85.5964**

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-003	9.6000e-004	9.8100e-003	3.0000e-005	2.9700e-003	2.0000e-005	2.9900e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.6357	2.6357	7.0000e-005	0.0000	2.6374
Total	**1.3000e-003**	**9.6000e-004**	**9.8100e-003**	**3.0000e-005**	**2.9700e-003**	**2.0000e-005**	**2.9900e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.6357**	**2.6357**	**7.0000e-005**	**0.0000**	**2.6374**

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	0.0828	0.8300	0.5438	9.7000e-004		0.0415	0.0415		0.0386	0.0386	0.0000	84.9964	84.9964	0.0240	0.0000	85.5963
Total	**0.0828**	**0.8300**	**0.5438**	**9.7000e-004**		**0.0415**	**0.0415**		**0.0386**	**0.0386**	**0.0000**	**84.9964**	**84.9964**	**0.0240**	**0.0000**	**85.5963**

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-003	9.6000e-004	9.8100e-003	3.0000e-005	2.9700e-003	2.0000e-005	2.9900e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.6357	2.6357	7.0000e-005	0.0000	2.6374
Total	**1.3000e-003**	**9.6000e-004**	**9.8100e-003**	**3.0000e-005**	**2.9700e-003**	**2.0000e-005**	**2.9900e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.6357**	**2.6357**	**7.0000e-005**	**0.0000**	**2.6374**

3.3 Site Preparation - 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					

Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0612	0.6363	0.3227	5.7000e-004		0.0330	0.0330		0.0303	0.0303	0.0000	50.1460	50.1460	0.0162	0.0000	50.5515
Total	**0.0612**	**0.6363**	**0.3227**	**5.7000e-004**	**0.2710**	**0.0330**	**0.3040**	**0.1490**	**0.0303**	**0.1793**	**0.0000**	**50.1460**	**50.1460**	**0.0162**	**0.0000**	**50.5515**

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	9.3000e-004	6.9000e-004	7.0600e-003	2.0000e-005	2.1300e-003	1.0000e-005	2.1500e-003	5.7000e-004	1.0000e-005	5.8000e-004	0.0000	1.8977	1.8977	5.0000e-005	0.0000	1.8989
Total	**9.3000e-004**	**6.9000e-004**	**7.0600e-003**	**2.0000e-005**	**2.1300e-003**	**1.0000e-005**	**2.1500e-003**	**5.7000e-004**	**1.0000e-005**	**5.8000e-004**	**0.0000**	**1.8977**	**1.8977**	**5.0000e-005**	**0.0000**	**1.8989**

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					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0612	0.6363	0.3227	5.7000e-004		0.0330	0.0330		0.0303	0.0303	0.0000	50.1460	50.1460	0.0162	0.0000	50.5514
Total	**0.0612**	**0.6363**	**0.3227**	**5.7000e-004**	**0.2710**	**0.0330**	**0.3040**	**0.1490**	**0.0303**	**0.1793**	**0.0000**	**50.1460**	**50.1460**	**0.0162**	**0.0000**	**50.5514**

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	9.3000e-004	6.9000e-004	7.0600e-003	2.0000e-005	2.1300e-003	1.0000e-005	2.1500e-003	5.7000e-004	1.0000e-005	5.8000e-004	0.0000	1.8977	1.8977	5.0000e-005	0.0000	1.8989
Total	**9.3000e-004**	**6.9000e-004**	**7.0600e-003**	**2.0000e-005**	**2.1300e-003**	**1.0000e-005**	**2.1500e-003**	**5.7000e-004**	**1.0000e-005**	**5.8000e-004**	**0.0000**	**1.8977**	**1.8977**	**5.0000e-005**	**0.0000**	**1.8989**

3.4 Grading - 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					
Fugitive Dust					0.3253	0.0000	0.3253	0.1349	0.0000	0.1349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1669	1.8824	1.1984	2.3300e-003		0.0815	0.0815		0.0750	0.0750	0.0000	204.3161	204.3161	0.0661	0.0000	205.9681
Total	**0.1669**	**1.8824**	**1.1984**	**2.3300e-003**	**0.3253**	**0.0815**	**0.4068**	**0.1349**	**0.0750**	**0.2099**	**0.0000**	**204.3161**	**204.3161**	**0.0661**	**0.0000**	**205.9681**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5900e-003	1.9100e-003	0.0196	6.0000e-005	5.9300e-003	4.0000e-005	5.9700e-003	1.5800e-003	4.0000e-005	1.6200e-003	0.0000	5.2714	5.2714	1.4000e-004	0.0000	5.2748
Total	**2.5900e-003**	**1.9100e-003**	**0.0196**	**6.0000e-005**	**5.9300e-003**	**4.0000e-005**	**5.9700e-003**	**1.5800e-003**	**4.0000e-005**	**1.6200e-003**	**0.0000**	**5.2714**	**5.2714**	**1.4000e-004**	**0.0000**	**5.2748**

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					0.3253	0.0000	0.3253	0.1349	0.0000	0.1349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1669	1.8824	1.1984	2.3300e-003		0.0815	0.0815		0.0750	0.0750	0.0000	204.3159	204.3159	0.0661	0.0000	205.9679
Total	**0.1669**	**1.8824**	**1.1984**	**2.3300e-003**	**0.3253**	**0.0815**	**0.4068**	**0.1349**	**0.0750**	**0.2099**	**0.0000**	**204.3159**	**204.3159**	**0.0661**	**0.0000**	**205.9679**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5900e-003	1.9100e-003	0.0196	6.0000e-005	5.9300e-003	4.0000e-005	5.9700e-003	1.5800e-003	4.0000e-005	1.6200e-003	0.0000	5.2714	5.2714	1.4000e-004	0.0000	5.2748
Total	**2.5900e-003**	**1.9100e-003**	**0.0196**	**6.0000e-005**	**5.9300e-003**	**4.0000e-005**	**5.9700e-003**	**1.5800e-003**	**4.0000e-005**	**1.6200e-003**	**0.0000**	**5.2714**	**5.2714**	**1.4000e-004**	**0.0000**	**5.2748**

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	0.0869	0.7866	0.6908	1.1000e-003		0.0458	0.0458		0.0431	0.0431	0.0000	94.9601	94.9601	0.0232	0.0000	95.5393
Total	**0.0869**	**0.7866**	**0.6908**	**1.1000e-003**		**0.0458**	**0.0458**		**0.0431**	**0.0431**	**0.0000**	**94.9601**	**94.9601**	**0.0232**	**0.0000**	**95.5393**

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	0.0434	1.3591	0.2929	3.1900e-003	0.0759	6.3000e-003	0.0822	0.0220	6.0300e-003	0.0280	0.0000	305.8269	305.8269	0.0176	0.0000	306.2665
Worker	0.0970	0.0716	0.7338	2.1800e-003	0.2217	1.5400e-003	0.2233	0.0590	1.4200e-003	0.0604	0.0000	197.1088	197.1088	5.0900e-003	0.0000	197.2360
Total	**0.1404**	**1.4306**	**1.0266**	**5.3700e-003**	**0.2977**	**7.8400e-003**	**0.3055**	**0.0810**	**7.4500e-003**	**0.0884**	**0.0000**	**502.9356**	**502.9356**	**0.0227**	**0.0000**	**503.5025**

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	0.0869	0.7866	0.6908	1.1000e-003		0.0458	0.0458		0.0431	0.0431	0.0000	94.9600	94.9600	0.0232	0.0000	95.5392
Total	**0.0869**	**0.7866**	**0.6908**	**1.1000e-003**		**0.0458**	**0.0458**		**0.0431**	**0.0431**	**0.0000**	**94.9600**	**94.9600**	**0.0232**	**0.0000**	**95.5392**

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	0.0434	1.3591	0.2929	3.1900e-003	0.0759	6.3000e-003	0.0822	0.0220	6.0300e-003	0.0280	0.0000	305.8269	305.8269	0.0176	0.0000	306.2665
Worker	0.0970	0.0716	0.7338	2.1800e-003	0.2217	1.5400e-003	0.2233	0.0590	1.4200e-003	0.0604	0.0000	197.1088	197.1088	5.0900e-003	0.0000	197.2360
Total	**0.1404**	**1.4306**	**1.0266**	**5.3700e-003**	**0.2977**	**7.8400e-003**	**0.3055**	**0.0810**	**7.4500e-003**	**0.0884**	**0.0000**	**502.9356**	**502.9356**	**0.0227**	**0.0000**	**503.5025**

3.5 Building 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	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2867	302.2867	0.0729	0.0000	304.1099
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2867**	**302.2867**	**0.0729**	**0.0000**	**304.1099**

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	0.1139	3.9364	0.8338	0.0101	0.2417	8.2100e-003	0.2499	0.0699	7.8500e-003	0.0778	0.0000	964.0781	964.0781	0.0530	0.0000	965.4019
Worker	0.2851	0.2031	2.1275	6.7000e-003	0.7058	4.7400e-003	0.7105	0.1878	4.3700e-003	0.1921	0.0000	605.6184	605.6184	0.0145	0.0000	605.9801
Total	**0.3990**	**4.1395**	**2.9613**	**0.0168**	**0.9475**	**0.0130**	**0.9604**	**0.2577**	**0.0122**	**0.2699**	**0.0000**	**1,569.6964**	**1,569.6964**	**0.0674**	**0.0000**	**1,571.3819**

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	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2863	302.2863	0.0729	0.0000	304.1095

Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2863**	**302.2863**	**0.0729**	**0.0000**	**304.1095**

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	0.1139	3.9364	0.8338	0.0101	0.2417	8.2100e-003	0.2499	0.0699	7.8500e-003	0.0778	0.0000	964.0781	964.0781	0.0530	0.0000	965.4019
Worker	0.2851	0.2031	2.1275	6.7000e-003	0.7058	4.7400e-003	0.7105	0.1878	4.3700e-003	0.1921	0.0000	605.6184	605.6184	0.0145	0.0000	605.9801
Total	**0.3990**	**4.1395**	**2.9613**	**0.0168**	**0.9475**	**0.0130**	**0.9604**	**0.2577**	**0.0122**	**0.2699**	**0.0000**	**1,569.6964**	**1,569.6964**	**0.0674**	**0.0000**	**1,571.3819**

3.5 Building Construction - 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	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2428	301.2428	0.0722	0.0000	303.0471
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2428**	**301.2428**	**0.0722**	**0.0000**	**303.0471**

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	0.1061	3.7244	0.7780	9.9300e-003	0.2408	7.0700e-003	0.2479	0.0697	6.7700e-003	0.0764	0.0000	950.9933	950.9933	0.0504	0.0000	952.2537
Worker	0.2637	0.1812	1.9402	6.4300e-003	0.7031	4.6000e-003	0.7077	0.1870	4.2400e-003	0.1913	0.0000	581.3115	581.3115	0.0129	0.0000	581.6342
Total	**0.3697**	**3.9056**	**2.7182**	**0.0164**	**0.9438**	**0.0117**	**0.9555**	**0.2567**	**0.0110**	**0.2677**	**0.0000**	**1,532.3049**	**1,532.3049**	**0.0633**	**0.0000**	**1,533.8878**

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	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2425	301.2425	0.0722	0.0000	303.0467
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2425**	**301.2425**	**0.0722**	**0.0000**	**303.0467**

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	0.1061	3.7244	0.7780	9.9300e-003	0.2408	7.0700e-003	0.2479	0.0697	6.7700e-003	0.0764	0.0000	950.9933	950.9933	0.0504	0.0000	952.2537
Worker	0.2637	0.1812	1.9402	6.4300e-003	0.7031	4.6000e-003	0.7077	0.1870	4.2400e-003	0.1913	0.0000	581.3115	581.3115	0.0129	0.0000	581.6342
Total	**0.3697**	**3.9056**	**2.7182**	**0.0164**	**0.9438**	**0.0117**	**0.9555**	**0.2567**	**0.0110**	**0.2677**	**0.0000**	**1,532.3049**	**1,532.3049**	**0.0633**	**0.0000**	**1,533.8878**

3.5 Building Construction - 2023

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	0.1077	0.9854	1.1127	1.8500e-003		0.0479	0.0479		0.0451	0.0451	0.0000	158.7863	158.7863	0.0378	0.0000	159.7306
Total	**0.1077**	**0.9854**	**1.1127**	**1.8500e-003**		**0.0479**	**0.0479**		**0.0451**	**0.0451**	**0.0000**	**158.7863**	**158.7863**	**0.0378**	**0.0000**	**159.7306**

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	0.0410	1.5192	0.3583	5.0800e-003	0.1269	1.6100e-003	0.1285	0.0367	1.5400e-003	0.0382	0.0000	486.8443	486.8443	0.0212	0.0000	487.3746

Worker	0.1293	0.0856	0.9361	3.2600e-003	0.3705	2.3700e-003	0.3728	0.0986	2.1800e-003	0.1007	0.0000	294.5916	294.5916	6.0800e-003	0.0000	294.7437
Total	**0.1703**	**1.6048**	**1.2944**	**8.3400e-003**	**0.4973**	**3.9800e-003**	**0.5013**	**0.1353**	**3.7200e-003**	**0.1390**	**0.0000**	**781.4359**	**781.4359**	**0.0273**	**0.0000**	**782.1183**

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	0.1077	0.9854	1.1127	1.8500e-003		0.0479	0.0479		0.0451	0.0451	0.0000	158.7861	158.7861	0.0378	0.0000	159.7304
Total	**0.1077**	**0.9854**	**1.1127**	**1.8500e-003**		**0.0479**	**0.0479**		**0.0451**	**0.0451**	**0.0000**	**158.7861**	**158.7861**	**0.0378**	**0.0000**	**159.7304**

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	0.0410	1.5192	0.3583	5.0800e-003	0.1269	1.6100e-003	0.1285	0.0367	1.5400e-003	0.0382	0.0000	486.8443	486.8443	0.0212	0.0000	487.3746
Worker	0.1293	0.0856	0.9361	3.2600e-003	0.3705	2.3700e-003	0.3728	0.0986	2.1800e-003	0.1007	0.0000	294.5916	294.5916	6.0800e-003	0.0000	294.7437
Total	**0.1703**	**1.6048**	**1.2944**	**8.3400e-003**	**0.4973**	**3.9800e-003**	**0.5013**	**0.1353**	**3.7200e-003**	**0.1390**	**0.0000**	**781.4359**	**781.4359**	**0.0273**	**0.0000**	**782.1183**

3.6 Paving - 2023

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	0.0284	0.2803	0.4011	6.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	55.0739	55.0739	0.0178	0.0000	55.5192
Paving	4.9600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0334**	**0.2803**	**0.4011**	**6.3000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**55.0739**	**55.0739**	**0.0178**	**0.0000**	**55.5192**

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	1.1400e-003	7.5000e-004	8.2400e-003	3.0000e-005	3.2600e-003	2.0000e-005	3.2800e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.5936	2.5936	5.0000e-005	0.0000	2.5949
Total	**1.1400e-003**	**7.5000e-004**	**8.2400e-003**	**3.0000e-005**	**3.2600e-003**	**2.0000e-005**	**3.2800e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.5936**	**2.5936**	**5.0000e-005**	**0.0000**	**2.5949**

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	0.0284	0.2803	0.4011	6.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	55.0738	55.0738	0.0178	0.0000	55.5191
Paving	4.9600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0334**	**0.2803**	**0.4011**	**6.3000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**55.0738**	**55.0738**	**0.0178**	**0.0000**	**55.5191**

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	1.1400e-003	7.5000e-004	8.2400e-003	3.0000e-005	3.2600e-003	2.0000e-005	3.2800e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.5936	2.5936	5.0000e-005	0.0000	2.5949
Total	**1.1400e-003**	**7.5000e-004**	**8.2400e-003**	**3.0000e-005**	**3.2600e-003**	**2.0000e-005**	**3.2800e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.5936**	**2.5936**	**5.0000e-005**	**0.0000**	**2.5949**

3.7 Architectural Coating - 2023

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	6.3063					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2700e-003	0.0358	0.0498	8.0000e-005		1.9500e-003	1.9500e-003		1.9500e-003	1.9500e-003	0.0000	7.0215	7.0215	4.2000e-004	0.0000	7.0320

Total	**6.3116**	**0.0358**	**0.0498**	**8.0000e-005**		**1.9500e-003**	**1.9500e-003**		**1.9500e-003**	**1.9500e-003**	**0.0000**	**7.0215**	**7.0215**	**4.2000e-004**	**0.0000**	**7.0320**

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	0.0104	6.8900e-003	0.0753	2.6000e-004	0.0298	1.9000e-004	0.0300	7.9200e-003	1.8000e-004	8.1000e-003	0.0000	23.6879	23.6879	4.9000e-004	0.0000	23.7002
Total	**0.0104**	**6.8900e-003**	**0.0753**	**2.6000e-004**	**0.0298**	**1.9000e-004**	**0.0300**	**7.9200e-003**	**1.8000e-004**	**8.1000e-003**	**0.0000**	**23.6879**	**23.6879**	**4.9000e-004**	**0.0000**	**23.7002**

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	6.3063					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2700e-003	0.0358	0.0498	8.0000e-005		1.9500e-003	1.9500e-003		1.9500e-003	1.9500e-003	0.0000	7.0214	7.0214	4.2000e-004	0.0000	7.0319
Total	**6.3116**	**0.0358**	**0.0498**	**8.0000e-005**		**1.9500e-003**	**1.9500e-003**		**1.9500e-003**	**1.9500e-003**	**0.0000**	**7.0214**	**7.0214**	**4.2000e-004**	**0.0000**	**7.0319**

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	0.0104	6.8900e-003	0.0753	2.6000e-004	0.0298	1.9000e-004	0.0300	7.9200e-003	1.8000e-004	8.1000e-003	0.0000	23.6879	23.6879	4.9000e-004	0.0000	23.7002
Total	**0.0104**	**6.8900e-003**	**0.0753**	**2.6000e-004**	**0.0298**	**1.9000e-004**	**0.0300**	**7.9200e-003**	**1.8000e-004**	**8.1000e-003**	**0.0000**	**23.6879**	**23.6879**	**4.9000e-004**	**0.0000**	**23.7002**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	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					
Mitigated	1.1444	7.5713	13.0944	0.0583	4.9728	0.0467	5.0194	1.3363	0.0437	1.3800	0.0000	5,390.9666	5,390.9666	0.1967	0.0000	5,395.8849
Unmitigated	1.1444	7.5713	13.0944	0.0583	4.9728	0.0467	5.0194	1.3363	0.0437	1.3800	0.0000	5,390.9666	5,390.9666	0.1967	0.0000	5,395.8849

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT

Enclosed Parking with Elevator	0.00	0.00	0.00		
General Heavy Industry	106.50	106.50	106.50	310,928	310,928
General Light Industry	125.46	23.76	12.24	276,645	276,645
General Office Building	2,360.42	526.44	224.70	4,285,592	4,285,592
Manufacturing	2,093.36	816.52	339.76	4,847,673	4,847,673
Parking Lot	0.00	0.00	0.00		
Refrigerated Warehouse-No Rail	263.76	263.76	263.76	770,050	770,050
Research & Development	1,459.80	342.00	199.80	2,807,283	2,807,283
Total	6,409.30	2,078.98	1,146.76	13,298,171	13,298,171

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Manufacturing	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Refrigerated Warehouse-No Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.563555	0.037576	0.190339	0.105468	0.014285	0.005132	0.025195	0.047484	0.002230	0.002277	0.005427	0.000351	0.000679
General Heavy Industry	0.563555	0.037576	0.190339	0.105468	0.014285	0.005132	0.025195	0.047484	0.002230	0.002277	0.005427	0.000351	0.000679
General Light Industry	0.563555	0.037576	0.190339	0.105468	0.014285	0.005132	0.025195	0.047484	0.002230	0.002277	0.005427	0.000351	0.000679
General Office Building	0.563555	0.037576	0.190339	0.105468	0.014285	0.005132	0.025195	0.047484	0.002230	0.002277	0.005427	0.000351	0.000679
Manufacturing	0.563555	0.037576	0.190339	0.105468	0.014285	0.005132	0.025195	0.047484	0.002230	0.002277	0.005427	0.000351	0.000679
Parking Lot	0.563555	0.037576	0.190339	0.105468	0.014285	0.005132	0.025195	0.047484	0.002230	0.002277	0.005427	0.000351	0.000679
Refrigerated Warehouse-No Rail	0.563555	0.037576	0.190339	0.105468	0.014285	0.005132	0.025195	0.047484	0.002230	0.002277	0.005427	0.000351	0.000679
Research & Development	0.563555	0.037576	0.190339	0.105468	0.014285	0.005132	0.025195	0.047484	0.002230	0.002277	0.005427	0.000351	0.000679

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	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					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,303.7238	1,303.7238	0.2218	0.0269	1,317.2785
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,303.7238	1,303.7238	0.2218	0.0269	1,317.2785
NaturalGas Mitigated	0.1463	1.3301	1.1173	7.9800e-003		0.1011	0.1011		0.1011	0.1011	0.0000	1,448.0109	1,448.0109	0.0278	0.0266	1,456.6157
NaturalGas Unmitigated	0.1463	1.3301	1.1173	7.9800e-003		0.1011	0.1011		0.1011	0.1011	0.0000	1,448.0109	1,448.0109	0.0278	0.0266	1,456.6157

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	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
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	1.75725e+006	9.4800e-003	0.0861	0.0724	5.2000e-004		6.5500e-003	6.5500e-003		6.5500e-003	6.5500e-003	0.0000	93.7736	93.7736	1.8000e-003	1.7200e-003	94.3308
General Light Industry	445500	2.4000e-003	0.0218	0.0183	1.3000e-004		1.6600e-003	1.6600e-003		1.6600e-003	1.6600e-003	0.0000	23.7736	23.7736	4.6000e-004	4.4000e-004	23.9149
General Office Building	4.13662e+006	0.0223	0.2028	0.1703	1.2200e-003		0.0154	0.0154		0.0154	0.0154	0.0000	220.7458	220.7458	4.2300e-003	4.0500e-003	222.0576
Manufacturing	1.3563e+007	0.0731	0.6649	0.5585	3.9900e-003		0.0505	0.0505		0.0505	0.0505	0.0000	723.7733	723.7733	0.0139	0.0133	728.0744
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Refrigerated Warehouse-No Rail	2.77733e+006	0.0150	0.1361	0.1144	8.2000e-004		0.0104	0.0104		0.0104	0.0104	0.0000	148.2089	148.2089	2.8400e-003	2.7200e-003	149.0896
Research & Development	4.455e+006	0.0240	0.2184	0.1834	1.3100e-003		0.0166	0.0166		0.0166	0.0166	0.0000	237.7358	237.7358	4.5600e-003	4.3600e-003	239.1485
Total		**0.1463**	**1.3301**	**1.1173**	**7.9900e-003**		**0.1011**	**0.1011**		**0.1011**	**0.1011**	**0.0000**	**1,448.0109**	**1,448.0109**	**0.0278**	**0.0266**	**1,456.6157**

Mitigated

	NaturalGas Use	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
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	1.75725e+006	9.4800e-003	0.0861	0.0724	5.2000e-004		6.5500e-003	6.5500e-003		6.5500e-003	6.5500e-003	0.0000	93.7736	93.7736	1.8000e-003	1.7200e-003	94.3308
General Light Industry	445500	2.4000e-003	0.0218	0.0183	1.3000e-004		1.6600e-003	1.6600e-003		1.6600e-003	1.6600e-003	0.0000	23.7736	23.7736	4.6000e-004	4.4000e-004	23.9149
General Office Building	4.13662e+006	0.0223	0.2028	0.1703	1.2200e-003		0.0154	0.0154		0.0154	0.0154	0.0000	220.7458	220.7458	4.2300e-003	4.0500e-003	222.0576
Manufacturing	1.3563e+007	0.0731	0.6649	0.5585	3.9900e-003		0.0505	0.0505		0.0505	0.0505	0.0000	723.7733	723.7733	0.0139	0.0133	728.0744
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Refrigerated Warehouse-No Rail	2.77733e+006	0.0150	0.1361	0.1144	8.2000e-004		0.0104	0.0104		0.0104	0.0104	0.0000	148.2089	148.2089	2.8400e-003	2.7200e-003	149.0896
Research & Development	4.455e+006	0.0240	0.2184	0.1834	1.3100e-003		0.0166	0.0166		0.0166	0.0166	0.0000	237.7358	237.7358	4.5600e-003	4.3600e-003	239.1485
Total		**0.1463**	**1.3301**	**1.1173**	**7.9900e-003**		**0.1011**	**0.1011**		**0.1011**	**0.1011**	**0.0000**	**1,448.0109**	**1,448.0109**	**0.0278**	**0.0266**	**1,456.6157**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e

Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	2.16925e+006	190.8877	0.0325	3.9400e-003	192.8724
General Heavy Industry	536760	47.2332	8.0300e-003	9.7000e-004	47.7243
General Light Industry	136080	11.9746	2.0400e-003	2.5000e-004	12.0991
General Office Building	2.67072e+006	235.0151	0.0400	4.8500e-003	237.4586
Manufacturing	4.14288e+006	364.5607	0.0620	7.5200e-003	368.3510
Parking Lot	57757	5.0824	8.6000e-004	1.0000e-004	5.1353
Refrigerated Warehouse-No Rail	3.74131e+006	329.2238	0.0560	6.7900e-003	332.6467
Research & Development	1.3608e+006	119.7462	0.0204	2.4700e-003	120.9912
Total		**1,303.7238**	**0.2218**	**0.0269**	**1,317.2785**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	2.16925e+006	190.8877	0.0325	3.9400e-003	192.8724
General Heavy Industry	536760	47.2332	8.0300e-003	9.7000e-004	47.7243
General Light Industry	136080	11.9746	2.0400e-003	2.5000e-004	12.0991
General Office Building	2.67072e+006	235.0151	0.0400	4.8500e-003	237.4586
Manufacturing	4.14288e+006	364.5607	0.0620	7.5200e-003	368.3510
Parking Lot	57757	5.0824	8.6000e-004	1.0000e-004	5.1353

Refrigerated Warehouse-No Rail	3.74131e+006	329.2238	0.0560	6.7900e-003	332.6467
Research & Development	1.3608e+006	119.7462	0.0204	2.4700e-003	120.9912
Total		**1,303.7238**	**0.2218**	**0.0269**	**1,317.2785**

6.0 Area Detail

6.1 Mitigation Measures Area

	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					
Mitigated	5.3064	1.4000e-004	0.0158	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0308	0.0308	8.0000e-005	0.0000	0.0328
Unmitigated	5.3064	1.4000e-004	0.0158	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0308	0.0308	8.0000e-005	0.0000	0.0328

6.2 Area by SubCategory

Unmitigated

	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
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.6306					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.6743					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Landscaping	1.4500e-003	1.4000e-004	0.0158	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0308	0.0308	8.0000e-005	0.0000	0.0328
Total	**5.3064**	**1.4000e-004**	**0.0158**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0308**	**0.0308**	**8.0000e-005**	**0.0000**	**0.0328**

Mitigated

	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
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.6306					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.6743					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.4500e-003	1.4000e-004	0.0158	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0308	0.0308	8.0000e-005	0.0000	0.0328
Total	**5.3064**	**1.4000e-004**	**0.0158**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0308**	**0.0308**	**8.0000e-005**	**0.0000**	**0.0328**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	253.2563	10.1327	0.2418	578.6368
Unmitigated	253.2563	10.1327	0.2418	578.6368

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	16.4187 / 0	13.0267	0.5363	0.0128	30.2477
General Light Industry	4.1625 / 0	3.3026	0.1360	3.2400e-003	7.6684
General Office Building	38.035 / 23.3118	37.3570	1.2437	0.0298	77.3249
Manufacturing	126.725 / 0	100.5443	4.1396	0.0988	233.4608
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Refrigerated Warehouse-No Rail	36.3062 / 0	28.8056	1.1860	0.0283	66.8857
Research & Development	88.5049 / 0	70.2203	2.8911	0.0690	163.0493
Total		**253.2563**	**10.1327**	**0.2418**	**578.6368**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	16.4187 / 0	13.0267	0.5363	0.0128	30.2477

General Light Industry	4.1625 / 0	3.3026	0.1360	3.2400e-003	7.6684
General Office Building	38.035 / 23.3118	37.3570	1.2437	0.0298	77.3249
Manufacturing	126.725 / 0	100.5443	4.1396	0.0988	233.4608
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Refrigerated Warehouse-No Rail	36.3062 / 0	28.8056	1.1860	0.0283	66.8857
Research & Development	88.5049 / 0	70.2203	2.8911	0.0690	163.0493
Total		**253.2563**	**10.1327**	**0.2418**	**578.6368**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	233.4721	13.7978	0.0000	578.4172
Unmitigated	233.4721	13.7978	0.0000	578.4172

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	88.04	17.8713	1.0562	0.0000	44.2755
General Light Industry	22.32	4.5308	0.2678	0.0000	11.2248
General Office Building	199.02	40.3993	2.3875	0.0000	100.0875
Manufacturing	679.52	137.9364	8.1518	0.0000	341.7316
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Refrigerated Warehouse-No Rail	147.58	29.9574	1.7704	0.0000	74.2182
Research & Development	13.68	2.7769	0.1641	0.0000	6.8797
Total		**233.4721**	**13.7978**	**0.0000**	**578.4172**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	88.04	17.8713	1.0562	0.0000	44.2755
General Light Industry	22.32	4.5308	0.2678	0.0000	11.2248
General Office Building	199.02	40.3993	2.3875	0.0000	100.0875
Manufacturing	679.52	137.9364	8.1518	0.0000	341.7316

Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Refrigerated Warehouse-No Rail	147.58	29.9574	1.7704	0.0000	74.2182
Research & Development	13.68	2.7769	0.1641	0.0000	6.8797
Total		**233.4721**	**13.7978**	**0.0000**	**578.4172**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Bayer - Project - Y30

Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	284.00	1000sqft	6.52	284,000.00	0
Research & Development	230.00	1000sqft	5.28	230,000.00	0
General Heavy Industry	71.00	1000sqft	1.63	71,000.00	0
General Light Industry	18.00	1000sqft	0.41	18,000.00	0
Manufacturing	978.00	1000sqft	22.45	978,000.00	0
Refrigerated Warehouse-No Rail	157.00	1000sqft	3.60	157,000.00	0
Enclosed Parking with Elevator	780.50	1000sqft	17.92	780,500.00	0
Parking Lot	31.22	1000sqft	0.72	31,220.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2035
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	97	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Energy intensity factors based on data for PG&E from The Climate Registry and RPS reductions

Land Use -

Construction Phase -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Vehicle Trips -

Consumer Products -

Area Coating -

Energy Use -

Grading -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.033
tblProjectCharacteristics	CO2IntensityFactor	641.35	97
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004

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					
2020	0.5104	5.3791	3.4611	7.5700e-003	0.9459	0.2336	1.1795	0.4256	0.2157	0.6413	0.0000	674.0170	674.0170	0.1643	0.0000	678.1238
2021	0.8416	8.4123	6.5684	0.0284	1.4097	0.1443	1.5540	0.3833	0.1358	0.5191	0.0000	2,633.5398	2,633.5398	0.1730	0.0000	2,637.8642
2022	0.7718	7.8205	6.1709	0.0278	1.4043	0.1225	1.5268	0.3819	0.1153	0.4972	0.0000	2,576.8894	2,576.8894	0.1661	0.0000	2,581.0425
2023	0.6854	6.3857	5.7664	0.0270	1.4043	0.1022	1.5065	0.3819	0.0961	0.4780	0.0000	2,503.7683	2,503.7683	0.1486	0.0000	2,507.4821
2024	0.6503	6.2563	5.5525	0.0267	1.4151	0.0915	1.5066	0.3848	0.0860	0.4708	0.0000	2,480.2619	2,480.2619	0.1468	0.0000	2,483.9316

2025	9.4106	1.5362	1.7698	6.5000e-003	0.3350	0.0333	0.3683	0.0907	0.0311	0.1218	0.0000	597.5649	597.5649	0.0532	0.0000	598.8940
Maximum	**9.4106**	**8.4123**	**6.5684**	**0.0284**	**1.4151**	**0.2336**	**1.5540**	**0.4256**	**0.2157**	**0.6413**	**0.0000**	**2,633.5398**	**2,633.5398**	**0.1730**	**0.0000**	**2,637.8642**

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					
2020	0.5104	5.3791	3.4611	7.5700e-003	0.9459	0.2336	1.1795	0.4256	0.2157	0.6413	0.0000	674.0164	674.0164	0.1643	0.0000	678.1232
2021	0.8416	8.4123	6.5684	0.0284	1.4097	0.1443	1.5540	0.3833	0.1358	0.5191	0.0000	2,633.5395	2,633.5395	0.1730	0.0000	2,637.8638
2022	0.7718	7.8205	6.1709	0.0278	1.4043	0.1225	1.5268	0.3819	0.1153	0.4972	0.0000	2,576.8891	2,576.8891	0.1661	0.0000	2,581.0421
2023	0.6854	6.3857	5.7664	0.0270	1.4043	0.1022	1.5065	0.3819	0.0961	0.4780	0.0000	2,503.7679	2,503.7679	0.1486	0.0000	2,507.4818
2024	0.6503	6.2563	5.5525	0.0267	1.4151	0.0915	1.5066	0.3848	0.0860	0.4708	0.0000	2,480.2615	2,480.2615	0.1468	0.0000	2,483.9312
2025	9.4106	1.5362	1.7698	6.5000e-003	0.3350	0.0333	0.3683	0.0907	0.0311	0.1218	0.0000	597.5648	597.5648	0.0532	0.0000	598.8938
Maximum	**9.4106**	**8.4123**	**6.5684**	**0.0284**	**1.4151**	**0.2336**	**1.5540**	**0.4256**	**0.2157**	**0.6413**	**0.0000**	**2,633.5395**	**2,633.5395**	**0.1730**	**0.0000**	**2,637.8638**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**2-5-2020**	**5-4-2020**	1.1767	1.1767
2	**5-5-2020**	**8-4-2020**	1.5842	1.5842
3	**8-5-2020**	**11-4-2020**	1.7996	1.7996
4	**11-5-2020**	**2-4-2021**	2.2043	2.2043
5	**2-5-2021**	**5-4-2021**	2.2570	2.2570

6	**5-5-2021**	**8-4-2021**	2.3118	2.3118
7	**8-5-2021**	**11-4-2021**	2.3249	2.3249
8	**11-5-2021**	**2-4-2022**	2.2853	2.2853
9	**2-5-2022**	**5-4-2022**	2.1036	2.1036
10	**5-5-2022**	**8-4-2022**	2.1558	2.1558
11	**8-5-2022**	**11-4-2022**	2.1673	2.1673
12	**11-5-2022**	**2-4-2023**	2.0395	2.0395
13	**2-5-2023**	**5-4-2023**	1.7333	1.7333
14	**5-5-2023**	**8-4-2023**	1.7770	1.7770
15	**8-5-2023**	**11-4-2023**	1.7860	1.7860
16	**11-5-2023**	**2-4-2024**	1.7795	1.7795
17	**2-5-2024**	**5-4-2024**	1.6986	1.6986
18	**5-5-2024**	**8-4-2024**	1.7225	1.7225
19	**8-5-2024**	**11-4-2024**	1.7310	1.7310
20	**11-5-2024**	**2-4-2025**	1.7235	1.7235
21	**2-5-2025**	**5-4-2025**	0.8273	0.8273
22	**5-5-2025**	**8-4-2025**	3.8102	3.8102
23	**8-5-2025**	**9-30-2025**	5.0545	5.0545
		Highest	5.0545	5.0545

2.2 Overall Operational

Unmitigated Operational

	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					
Area	7.7656	2.1000e-004	0.0233	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0456	0.0456	1.2000e-004	0.0000	0.0485
Energy	0.2177	1.9788	1.6622	0.0119		0.1504	0.1504		0.1504	0.1504	0.0000	3,107.8729	3,107.8729	0.3657	0.0788	3,140.5050

Mobile	1.0781	9.7422	12.3133	0.0731	7.2092	0.0362	7.2454	1.9363	0.0339	1.9702	0.0000	6,804.0333	6,804.0333	0.2361	0.0000	6,809.9349
Waste						0.0000	0.0000		0.0000	0.0000	355.6929	0.0000	355.6929	21.0209	0.0000	881.2142
Water						0.0000	0.0000		0.0000	0.0000	141.6907	111.0926	252.7832	14.5908	0.3482	721.3190
Total	**9.0613**	**11.7213**	**13.9988**	**0.0850**	**7.2092**	**0.1867**	**7.3959**	**1.9363**	**0.1843**	**2.1207**	**497.3836**	**10,023.0443**	**10,520.4278**	**36.2136**	**0.4270**	**11,553.0216**

Mitigated Operational

	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					
Area	7.7656	2.1000e-004	0.0233	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0456	0.0456	1.2000e-004	0.0000	0.0485
Energy	0.2177	1.9788	1.6622	0.0119		0.1504	0.1504		0.1504	0.1504	0.0000	3,107.8729	3,107.8729	0.3657	0.0788	3,140.5050
Mobile	1.0781	9.7422	12.3133	0.0731	7.2092	0.0362	7.2454	1.9363	0.0339	1.9702	0.0000	6,804.0333	6,804.0333	0.2361	0.0000	6,809.9349
Waste						0.0000	0.0000		0.0000	0.0000	355.6929	0.0000	355.6929	21.0209	0.0000	881.2142
Water						0.0000	0.0000		0.0000	0.0000	141.6907	111.0926	252.7832	14.5908	0.3482	721.3190
Total	**9.0613**	**11.7213**	**13.9988**	**0.0850**	**7.2092**	**0.1867**	**7.3959**	**1.9363**	**0.1843**	**2.1207**	**497.3836**	**10,023.0443**	**10,520.4278**	**36.2136**	**0.4270**	**11,553.0216**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description

1	Demolition	Demolition	2/5/2020	5/12/2020	5	70	
2	Site Preparation	Site Preparation	5/13/2020	7/7/2020	5	40	
3	Grading	Grading	7/8/2020	12/8/2020	5	110	
4	Building Construction	Building Construction	12/9/2020	3/11/2025	5	1110	
5	Paving	Paving	3/12/2025	6/24/2025	5	75	
6	Architectural Coating	Architectural Coating	6/25/2025	10/7/2025	5	75	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 275

Acres of Paving: 18.64

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 2,607,000; Non-Residential Outdoor: 869,000; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building 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

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	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	1,019.00	418.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	204.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 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	0.1159	1.1620	0.7614	1.3600e-003		0.0581	0.0581		0.0540	0.0540	0.0000	118.9951	118.9951	0.0336	0.0000	119.8349
Total	**0.1159**	**1.1620**	**0.7614**	**1.3600e-003**		**0.0581**	**0.0581**		**0.0540**	**0.0540**	**0.0000**	**118.9951**	**118.9951**	**0.0336**	**0.0000**	**119.8349**

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	1.8200e-003	1.3400e-003	0.0137	4.0000e-005	4.1500e-003	3.0000e-005	4.1800e-003	1.1000e-003	3.0000e-005	1.1300e-003	0.0000	3.6900	3.6900	1.0000e-004	0.0000	3.6924
Total	**1.8200e-003**	**1.3400e-003**	**0.0137**	**4.0000e-005**	**4.1500e-003**	**3.0000e-005**	**4.1800e-003**	**1.1000e-003**	**3.0000e-005**	**1.1300e-003**	**0.0000**	**3.6900**	**3.6900**	**1.0000e-004**	**0.0000**	**3.6924**

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	0.1159	1.1620	0.7614	1.3600e-003		0.0581	0.0581		0.0540	0.0540	0.0000	118.9950	118.9950	0.0336	0.0000	119.8348
Total	**0.1159**	**1.1620**	**0.7614**	**1.3600e-003**		**0.0581**	**0.0581**		**0.0540**	**0.0540**	**0.0000**	**118.9950**	**118.9950**	**0.0336**	**0.0000**	**119.8348**

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	1.8200e-003	1.3400e-003	0.0137	4.0000e-005	4.1500e-003	3.0000e-005	4.1800e-003	1.1000e-003	3.0000e-005	1.1300e-003	0.0000	3.6900	3.6900	1.0000e-004	0.0000	3.6924
Total	**1.8200e-003**	**1.3400e-003**	**0.0137**	**4.0000e-005**	**4.1500e-003**	**3.0000e-005**	**4.1800e-003**	**1.1000e-003**	**3.0000e-005**	**1.1300e-003**	**0.0000**	**3.6900**	**3.6900**	**1.0000e-004**	**0.0000**	**3.6924**

3.3 Site Preparation - 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					
Fugitive Dust					0.3613	0.0000	0.3613	0.1986	0.0000	0.1986	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0815	0.8484	0.4303	7.6000e-004		0.0440	0.0440		0.0404	0.0404	0.0000	66.8614	66.8614	0.0216	0.0000	67.4020
Total	**0.0815**	**0.8484**	**0.4303**	**7.6000e-004**	**0.3613**	**0.0440**	**0.4053**	**0.1986**	**0.0404**	**0.2390**	**0.0000**	**66.8614**	**66.8614**	**0.0216**	**0.0000**	**67.4020**

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	1.2400e-003	9.2000e-004	9.4200e-003	3.0000e-005	2.8500e-003	2.0000e-005	2.8700e-003	7.6000e-004	2.0000e-005	7.8000e-004	0.0000	2.5303	2.5303	7.0000e-005	0.0000	2.5319

Total	**1.2400e-003**	**9.2000e-004**	**9.4200e-003**	**3.0000e-005**	**2.8500e-003**	**2.0000e-005**	**2.8700e-003**	**7.6000e-004**	**2.0000e-005**	**7.8000e-004**	**0.0000**	**2.5303**	**2.5303**	**7.0000e-005**	**0.0000**	**2.5319**

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					0.3613	0.0000	0.3613	0.1986	0.0000	0.1986	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0815	0.8484	0.4303	7.6000e-004		0.0440	0.0440		0.0404	0.0404	0.0000	66.8613	66.8613	0.0216	0.0000	67.4019
Total	**0.0815**	**0.8484**	**0.4303**	**7.6000e-004**	**0.3613**	**0.0440**	**0.4053**	**0.1986**	**0.0404**	**0.2390**	**0.0000**	**66.8613**	**66.8613**	**0.0216**	**0.0000**	**67.4019**

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	1.2400e-003	9.2000e-004	9.4200e-003	3.0000e-005	2.8500e-003	2.0000e-005	2.8700e-003	7.6000e-004	2.0000e-005	7.8000e-004	0.0000	2.5303	2.5303	7.0000e-005	0.0000	2.5319
Total	**1.2400e-003**	**9.2000e-004**	**9.4200e-003**	**3.0000e-005**	**2.8500e-003**	**2.0000e-005**	**2.8700e-003**	**7.6000e-004**	**2.0000e-005**	**7.8000e-004**	**0.0000**	**2.5303**	**2.5303**	**7.0000e-005**	**0.0000**	**2.5319**

3.4 Grading - 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					
Fugitive Dust					0.4770	0.0000	0.4770	0.1978	0.0000	0.1978	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2448	2.7609	1.7577	3.4100e-003		0.1196	0.1196		0.1100	0.1100	0.0000	299.6636	299.6636	0.0969	0.0000	302.0865
Total	**0.2448**	**2.7609**	**1.7577**	**3.4100e-003**	**0.4770**	**0.1196**	**0.5966**	**0.1978**	**0.1100**	**0.3078**	**0.0000**	**299.6636**	**299.6636**	**0.0969**	**0.0000**	**302.0865**

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	3.8000e-003	2.8100e-003	0.0288	9.0000e-005	8.7000e-003	6.0000e-005	8.7600e-003	2.3100e-003	6.0000e-005	2.3700e-003	0.0000	7.7314	7.7314	2.0000e-004	0.0000	7.7364
Total	**3.8000e-003**	**2.8100e-003**	**0.0288**	**9.0000e-005**	**8.7000e-003**	**6.0000e-005**	**8.7600e-003**	**2.3100e-003**	**6.0000e-005**	**2.3700e-003**	**0.0000**	**7.7314**	**7.7314**	**2.0000e-004**	**0.0000**	**7.7364**

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					0.4770	0.0000	0.4770	0.1978	0.0000	0.1978	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2448	2.7609	1.7577	3.4100e-003		0.1196	0.1196		0.1100	0.1100	0.0000	299.6633	299.6633	0.0969	0.0000	302.0862
Total	**0.2448**	**2.7609**	**1.7577**	**3.4100e-003**	**0.4770**	**0.1196**	**0.5966**	**0.1978**	**0.1100**	**0.3078**	**0.0000**	**299.6633**	**299.6633**	**0.0969**	**0.0000**	**302.0862**

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	3.8000e-003	2.8100e-003	0.0288	9.0000e-005	8.7000e-003	6.0000e-005	8.7600e-003	2.3100e-003	6.0000e-005	2.3700e-003	0.0000	7.7314	7.7314	2.0000e-004	0.0000	7.7364
Total	**3.8000e-003**	**2.8100e-003**	**0.0288**	**9.0000e-005**	**8.7000e-003**	**6.0000e-005**	**8.7600e-003**	**2.3100e-003**	**6.0000e-005**	**2.3700e-003**	**0.0000**	**7.7314**	**7.7314**	**2.0000e-004**	**0.0000**	**7.7364**

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	0.0180	0.1631	0.1432	2.3000e-004		9.4900e-003	9.4900e-003		8.9300e-003	8.9300e-003	0.0000	19.6869	19.6869	4.8000e-003	0.0000	19.8069
Total	**0.0180**	**0.1631**	**0.1432**	**2.3000e-004**		**9.4900e-003**	**9.4900e-003**		**8.9300e-003**	**8.9300e-003**	**0.0000**	**19.6869**	**19.6869**	**4.8000e-003**	**0.0000**	**19.8069**

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	0.0133	0.4176	0.0900	9.8000e-004	0.0233	1.9400e-003	0.0253	6.7500e-003	1.8500e-003	8.6000e-003	0.0000	93.9805	93.9805	5.4000e-003	0.0000	94.1156
Worker	0.0300	0.0221	0.2266	6.7000e-004	0.0685	4.8000e-004	0.0690	0.0182	4.4000e-004	0.0187	0.0000	60.8778	60.8778	1.5700e-003	0.0000	60.9171
Total	**0.0433**	**0.4397**	**0.3166**	**1.6500e-003**	**0.0918**	**2.4200e-003**	**0.0942**	**0.0250**	**2.2900e-003**	**0.0273**	**0.0000**	**154.8583**	**154.8583**	**6.9700e-003**	**0.0000**	**155.0328**

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	0.0180	0.1631	0.1432	2.3000e-004		9.4900e-003	9.4900e-003		8.9300e-003	8.9300e-003	0.0000	19.6868	19.6868	4.8000e-003	0.0000	19.8069
Total	**0.0180**	**0.1631**	**0.1432**	**2.3000e-004**		**9.4900e-003**	**9.4900e-003**		**8.9300e-003**	**8.9300e-003**	**0.0000**	**19.6868**	**19.6868**	**4.8000e-003**	**0.0000**	**19.8069**

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	0.0133	0.4176	0.0900	9.8000e-004	0.0233	1.9400e-003	0.0253	6.7500e-003	1.8500e-003	8.6000e-003	0.0000	93.9805	93.9805	5.4000e-003	0.0000	94.1156
Worker	0.0300	0.0221	0.2266	6.7000e-004	0.0685	4.8000e-004	0.0690	0.0182	4.4000e-004	0.0187	0.0000	60.8778	60.8778	1.5700e-003	0.0000	60.9171
Total	**0.0433**	**0.4397**	**0.3166**	**1.6500e-003**	**0.0918**	**2.4200e-003**	**0.0942**	**0.0250**	**2.2900e-003**	**0.0273**	**0.0000**	**154.8583**	**154.8583**	**6.9700e-003**	**0.0000**	**155.0328**

3.5 Building 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	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2867	302.2867	0.0729	0.0000	304.1099
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2867**	**302.2867**	**0.0729**	**0.0000**	**304.1099**

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	0.1689	5.8348	1.2359	0.0149	0.3583	0.0122	0.3704	0.1036	0.0116	0.1153	0.0000	1,429.0235	1,429.0235	0.0785	0.0000	1,430.9857
Worker	0.4247	0.3026	3.1695	9.9800e-003	1.0514	7.0700e-003	1.0585	0.2797	6.5100e-003	0.2862	0.0000	902.2297	902.2297	0.0216	0.0000	902.7686
Total	**0.5935**	**6.1374**	**4.4054**	**0.0249**	**1.4097**	**0.0192**	**1.4289**	**0.3833**	**0.0182**	**0.4015**	**0.0000**	**2,331.2532**	**2,331.2532**	**0.1001**	**0.0000**	**2,333.7543**

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	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2863	302.2863	0.0729	0.0000	304.1095
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2863**	**302.2863**	**0.0729**	**0.0000**	**304.1095**

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	0.1689	5.8348	1.2359	0.0149	0.3583	0.0122	0.3704	0.1036	0.0116	0.1153	0.0000	1,429.0235	1,429.0235	0.0785	0.0000	1,430.9857
Worker	0.4247	0.3026	3.1695	9.9800e-003	1.0514	7.0700e-003	1.0585	0.2797	6.5100e-003	0.2862	0.0000	902.2297	902.2297	0.0216	0.0000	902.7686
Total	**0.5935**	**6.1374**	**4.4054**	**0.0249**	**1.4097**	**0.0192**	**1.4289**	**0.3833**	**0.0182**	**0.4015**	**0.0000**	**2,331.2532**	**2,331.2532**	**0.1001**	**0.0000**	**2,333.7543**

3.5 Building Construction - 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	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2428	301.2428	0.0722	0.0000	303.0471
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2428**	**301.2428**	**0.0722**	**0.0000**	**303.0471**

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	0.1572	5.5206	1.1532	0.0147	0.3569	0.0105	0.3674	0.1032	0.0100	0.1133	0.0000	1,409.6284	1,409.6284	0.0747	0.0000	1,411.4966
Worker	0.3928	0.2699	2.8905	9.5700e-003	1.0474	6.8600e-003	1.0543	0.2786	6.3200e-003	0.2849	0.0000	866.0182	866.0182	0.0192	0.0000	866.4989
Total	**0.5500**	**5.7905**	**4.0437**	**0.0243**	**1.4043**	**0.0174**	**1.4216**	**0.3819**	**0.0164**	**0.3982**	**0.0000**	**2,275.6466**	**2,275.6466**	**0.0940**	**0.0000**	**2,277.9954**

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	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2425	301.2425	0.0722	0.0000	303.0467
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2425**	**301.2425**	**0.0722**	**0.0000**	**303.0467**

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	0.1572	5.5206	1.1532	0.0147	0.3569	0.0105	0.3674	0.1032	0.0100	0.1133	0.0000	1,409.6284	1,409.6284	0.0747	0.0000	1,411.4966
Worker	0.3928	0.2699	2.8905	9.5700e-003	1.0474	6.8600e-003	1.0543	0.2786	6.3200e-003	0.2849	0.0000	866.0182	866.0182	0.0192	0.0000	866.4989
Total	**0.5500**	**5.7905**	**4.0437**	**0.0243**	**1.4043**	**0.0174**	**1.4216**	**0.3819**	**0.0164**	**0.3982**	**0.0000**	**2,275.6466**	**2,275.6466**	**0.0940**	**0.0000**	**2,277.9954**

3.5 Building Construction - 2023

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	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3462	301.3462	0.0717	0.0000	303.1383

Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3462**	**301.3462**	**0.0717**	**0.0000**	**303.1383**

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	0.1152	4.2736	1.0080	0.0143	0.3569	4.5300e-003	0.3614	0.1033	4.3300e-003	0.1076	0.0000	1,369.5252	1,369.5252	0.0597	0.0000	1,371.0170
Worker	0.3657	0.2421	2.6467	9.2100e-003	1.0474	6.7000e-003	1.0541	0.2786	6.1700e-003	0.2848	0.0000	832.8970	832.8970	0.0172	0.0000	833.3269
Total	**0.4809**	**4.5157**	**3.6547**	**0.0235**	**1.4043**	**0.0112**	**1.4155**	**0.3819**	**0.0105**	**0.3924**	**0.0000**	**2,202.4221**	**2,202.4221**	**0.0769**	**0.0000**	**2,204.3438**

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	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3458	301.3458	0.0717	0.0000	303.1380
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3458**	**301.3458**	**0.0717**	**0.0000**	**303.1380**

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	0.1152	4.2736	1.0080	0.0143	0.3569	4.5300e-003	0.3614	0.1033	4.3300e-003	0.1076	0.0000	1,369.5252	1,369.5252	0.0597	0.0000	1,371.0170
Worker	0.3657	0.2421	2.6467	9.2100e-003	1.0474	6.7000e-003	1.0541	0.2786	6.1700e-003	0.2848	0.0000	832.8970	832.8970	0.0172	0.0000	833.3269
Total	**0.4809**	**4.5157**	**3.6547**	**0.0235**	**1.4043**	**0.0112**	**1.4155**	**0.3819**	**0.0105**	**0.3924**	**0.0000**	**2,202.4221**	**2,202.4221**	**0.0769**	**0.0000**	**2,204.3438**

3.5 Building Construction - 2024

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	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756	0.0000	303.7223	303.7223	0.0718	0.0000	305.5179
Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**	**0.0000**	**303.7223**	**303.7223**	**0.0718**	**0.0000**	**305.5179**

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	0.1127	4.2753	0.9728	0.0143	0.3597	4.5000e-003	0.3642	0.1040	4.3100e-003	0.1084	0.0000	1,370.5022	1,370.5022	0.0594	0.0000	1,371.9868
Worker	0.3448	0.2199	2.4619	8.9100e-003	1.0555	6.6100e-003	1.0621	0.2808	6.0900e-003	0.2869	0.0000	806.0374	806.0374	0.0156	0.0000	806.4269
Total	**0.4575**	**4.4951**	**3.4347**	**0.0232**	**1.4151**	**0.0111**	**1.4262**	**0.3848**	**0.0104**	**0.3952**	**0.0000**	**2,176.5396**	**2,176.5396**	**0.0750**	**0.0000**	**2,178.4137**

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	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756	0.0000	303.7220	303.7220	0.0718	0.0000	305.5175
Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**	**0.0000**	**303.7220**	**303.7220**	**0.0718**	**0.0000**	**305.5175**

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	0.1127	4.2753	0.9728	0.0143	0.3597	4.5000e-003	0.3642	0.1040	4.3100e-003	0.1084	0.0000	1,370.5022	1,370.5022	0.0594	0.0000	1,371.9868

Worker	0.3448	0.2199	2.4619	8.9100e-003	1.0555	6.6100e-003	1.0621	0.2808	6.0900e-003	0.2869	0.0000	806.0374	806.0374	0.0156	0.0000	806.4269
Total	**0.4575**	**4.4951**	**3.4347**	**0.0232**	**1.4151**	**0.0111**	**1.4262**	**0.3848**	**0.0104**	**0.3952**	**0.0000**	**2,176.5396**	**2,176.5396**	**0.0750**	**0.0000**	**2,178.4137**

3.5 Building Construction - 2025

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	0.0342	0.3117	0.4021	6.7000e-004		0.0132	0.0132		0.0124	0.0124	0.0000	57.9799	57.9799	0.0136	0.0000	58.3206
Total	**0.0342**	**0.3117**	**0.4021**	**6.7000e-004**		**0.0132**	**0.0132**		**0.0124**	**0.0124**	**0.0000**	**57.9799**	**57.9799**	**0.0136**	**0.0000**	**58.3206**

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	0.0209	0.8093	0.1790	2.7100e-003	0.0686	8.5000e-004	0.0695	0.0199	8.1000e-004	0.0207	0.0000	259.8298	259.8298	0.0112	0.0000	260.1091
Worker	0.0619	0.0381	0.4341	1.6300e-003	0.2014	1.2400e-003	0.2027	0.0536	1.1400e-003	0.0547	0.0000	147.5439	147.5439	2.6900e-003	0.0000	147.6112
Total	**0.0829**	**0.8474**	**0.6132**	**4.3400e-003**	**0.2701**	**2.0900e-003**	**0.2722**	**0.0734**	**1.9500e-003**	**0.0754**	**0.0000**	**407.3737**	**407.3737**	**0.0139**	**0.0000**	**407.7203**

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	0.0342	0.3117	0.4021	6.7000e-004		0.0132	0.0132		0.0124	0.0124	0.0000	57.9798	57.9798	0.0136	0.0000	58.3205
Total	**0.0342**	**0.3117**	**0.4021**	**6.7000e-004**		**0.0132**	**0.0132**		**0.0124**	**0.0124**	**0.0000**	**57.9798**	**57.9798**	**0.0136**	**0.0000**	**58.3205**

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	0.0209	0.8093	0.1790	2.7100e-003	0.0686	8.5000e-004	0.0695	0.0199	8.1000e-004	0.0207	0.0000	259.8298	259.8298	0.0112	0.0000	260.1091
Worker	0.0619	0.0381	0.4341	1.6300e-003	0.2014	1.2400e-003	0.2027	0.0536	1.1400e-003	0.0547	0.0000	147.5439	147.5439	2.6900e-003	0.0000	147.6112
Total	**0.0829**	**0.8474**	**0.6132**	**4.3400e-003**	**0.2701**	**2.0900e-003**	**0.2722**	**0.0734**	**1.9500e-003**	**0.0754**	**0.0000**	**407.3737**	**407.3737**	**0.0139**	**0.0000**	**407.7203**

3.6 Paving - 2025

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	0.0343	0.3218	0.5467	8.5000e-004		0.0157	0.0157		0.0144	0.0144	0.0000	75.0722	75.0722	0.0243	0.0000	75.6792
Paving	9.4000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0353**	**0.3218**	**0.5467**	**8.5000e-004**		**0.0157**	**0.0157**		**0.0144**	**0.0144**	**0.0000**	**75.0722**	**75.0722**	**0.0243**	**0.0000**	**75.6792**

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	1.3700e-003	8.4000e-004	9.5900e-003	4.0000e-005	4.4500e-003	3.0000e-005	4.4700e-003	1.1800e-003	3.0000e-005	1.2100e-003	0.0000	3.2578	3.2578	6.0000e-005	0.0000	3.2593
Total	**1.3700e-003**	**8.4000e-004**	**9.5900e-003**	**4.0000e-005**	**4.4500e-003**	**3.0000e-005**	**4.4700e-003**	**1.1800e-003**	**3.0000e-005**	**1.2100e-003**	**0.0000**	**3.2578**	**3.2578**	**6.0000e-005**	**0.0000**	**3.2593**

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	0.0343	0.3218	0.5467	8.5000e-004		0.0157	0.0157		0.0144	0.0144	0.0000	75.0721	75.0721	0.0243	0.0000	75.6791
Paving	9.4000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	**0.0353**	**0.3218**	**0.5467**	**8.5000e-004**		**0.0157**	**0.0157**		**0.0144**	**0.0144**	**0.0000**	**75.0721**	**75.0721**	**0.0243**	**0.0000**	**75.6791**

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	1.3700e-003	8.4000e-004	9.5900e-003	4.0000e-005	4.4500e-003	3.0000e-005	4.4700e-003	1.1800e-003	3.0000e-005	1.2100e-003	0.0000	3.2578	3.2578	6.0000e-005	0.0000	3.2593
Total	**1.3700e-003**	**8.4000e-004**	**9.5900e-003**	**4.0000e-005**	**4.4500e-003**	**3.0000e-005**	**4.4700e-003**	**1.1800e-003**	**3.0000e-005**	**1.2100e-003**	**0.0000**	**3.2578**	**3.2578**	**6.0000e-005**	**0.0000**	**3.2593**

3.7 Architectural Coating - 2025

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	9.2319					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.4100e-003	0.0430	0.0678	1.1000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003	0.0000	9.5747	9.5747	5.2000e-004	0.0000	9.5878
Total	**9.2383**	**0.0430**	**0.0678**	**1.1000e-004**		**1.9300e-003**	**1.9300e-003**		**1.9300e-003**	**1.9300e-003**	**0.0000**	**9.5747**	**9.5747**	**5.2000e-004**	**0.0000**	**9.5878**

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	0.0186	0.0114	0.1304	4.9000e-004	0.0605	3.7000e-004	0.0609	0.0161	3.4000e-004	0.0164	0.0000	44.3066	44.3066	8.1000e-004	0.0000	44.3268
Total	**0.0186**	**0.0114**	**0.1304**	**4.9000e-004**	**0.0605**	**3.7000e-004**	**0.0609**	**0.0161**	**3.4000e-004**	**0.0164**	**0.0000**	**44.3066**	**44.3066**	**8.1000e-004**	**0.0000**	**44.3268**

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	9.2319					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.4100e-003	0.0430	0.0678	1.1000e-004		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003	0.0000	9.5747	9.5747	5.2000e-004	0.0000	9.5878
Total	**9.2383**	**0.0430**	**0.0678**	**1.1000e-004**		**1.9300e-003**	**1.9300e-003**		**1.9300e-003**	**1.9300e-003**	**0.0000**	**9.5747**	**9.5747**	**5.2000e-004**	**0.0000**	**9.5878**

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	0.0186	0.0114	0.1304	4.9000e-004	0.0605	3.7000e-004	0.0609	0.0161	3.4000e-004	0.0164	0.0000	44.3066	44.3066	8.1000e-004	0.0000	44.3268
Total	**0.0186**	**0.0114**	**0.1304**	**4.9000e-004**	**0.0605**	**3.7000e-004**	**0.0609**	**0.0161**	**3.4000e-004**	**0.0164**	**0.0000**	**44.3066**	**44.3066**	**8.1000e-004**	**0.0000**	**44.3268**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	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					
Mitigated	1.0781	9.7422	12.3133	0.0731	7.2092	0.0362	7.2454	1.9363	0.0339	1.9702	0.0000	6,804.0333	6,804.0333	0.2361	0.0000	6,809.9349
Unmitigated	1.0781	9.7422	12.3133	0.0731	7.2092	0.0362	7.2454	1.9363	0.0339	1.9702	0.0000	6,804.0333	6,804.0333	0.2361	0.0000	6,809.9349

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Heavy Industry	106.50	106.50	106.50	310,928	310,928
General Light Industry	125.46	23.76	12.24	276,645	276,645
General Office Building	3,132.52	698.64	298.20	5,687,421	5,687,421
Manufacturing	3,735.96	1,457.22	606.36	8,651,504	8,651,504
Parking Lot	0.00	0.00	0.00		
Refrigerated Warehouse-No Rail	263.76	263.76	263.76	770,050	770,050
Research & Development	1,865.30	437.00	255.30	3,587,084	3,587,084

Total	9,229.50	2,986.88	1,542.36	19,283,632	19,283,632

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Manufacturing	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Refrigerated Warehouse-No Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.566131	0.035263	0.188976	0.102013	0.011508	0.005051	0.027665	0.053145	0.002326	0.001628	0.005241	0.000420	0.000634
General Heavy Industry	0.566131	0.035263	0.188976	0.102013	0.011508	0.005051	0.027665	0.053145	0.002326	0.001628	0.005241	0.000420	0.000634
General Light Industry	0.566131	0.035263	0.188976	0.102013	0.011508	0.005051	0.027665	0.053145	0.002326	0.001628	0.005241	0.000420	0.000634
General Office Building	0.566131	0.035263	0.188976	0.102013	0.011508	0.005051	0.027665	0.053145	0.002326	0.001628	0.005241	0.000420	0.000634
Manufacturing	0.566131	0.035263	0.188976	0.102013	0.011508	0.005051	0.027665	0.053145	0.002326	0.001628	0.005241	0.000420	0.000634
Parking Lot	0.566131	0.035263	0.188976	0.102013	0.011508	0.005051	0.027665	0.053145	0.002326	0.001628	0.005241	0.000420	0.000634
Refrigerated Warehouse-No Rail	0.566131	0.035263	0.188976	0.102013	0.011508	0.005051	0.027665	0.053145	0.002326	0.001628	0.005241	0.000420	0.000634
Research & Development	0.566131	0.035263	0.188976	0.102013	0.011508	0.005051	0.027665	0.053145	0.002326	0.001628	0.005241	0.000420	0.000634

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	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					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	953.6933	953.6933	0.3245	0.0393	973.5243
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	953.6933	953.6933	0.3245	0.0393	973.5243
NaturalGas Mitigated	0.2177	1.9788	1.6622	0.0119		0.1504	0.1504		0.1504	0.1504	0.0000	2,154.1795	2,154.1795	0.0413	0.0395	2,166.9808
NaturalGas Unmitigated	0.2177	1.9788	1.6622	0.0119		0.1504	0.1504		0.1504	0.1504	0.0000	2,154.1795	2,154.1795	0.0413	0.0395	2,166.9808

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	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
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	1.75725e+006	9.4800e-003	0.0861	0.0724	5.2000e-004		6.5500e-003	6.5500e-003		6.5500e-003	6.5500e-003	0.0000	93.7736	93.7736	1.8000e-003	1.7200e-003	94.3308
General Light Industry	445500	2.4000e-003	0.0218	0.0183	1.3000e-004		1.6600e-003	1.6600e-003		1.6600e-003	1.6600e-003	0.0000	23.7736	23.7736	4.6000e-004	4.4000e-004	23.9149
General Office Building	5.48972e+006	0.0296	0.2691	0.2261	1.6100e-003		0.0205	0.0205		0.0205	0.0205	0.0000	292.9524	292.9524	5.6100e-003	5.3700e-003	294.6932
Manufacturing	2.42055e+007	0.1305	1.1865	0.9967	7.1200e-003		0.0902	0.0902		0.0902	0.0902	0.0000	1,291.6977	1,291.6977	0.0248	0.0237	1,299.3736
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Refrigerated Warehouse-No Rail	2.77733e+006	0.0150	0.1361	0.1144	8.2000e-004		0.0104	0.0104		0.0104	0.0104	0.0000	148.2089	148.2089	2.8400e-003	2.7200e-003	149.0896
Research & Development	5.6925e+006	0.0307	0.2790	0.2344	1.6700e-003		0.0212	0.0212		0.0212	0.0212	0.0000	303.7735	303.7735	5.8200e-003	5.5700e-003	305.5787

Total		**0.2177**	**1.9788**	**1.6622**	**0.0119**		**0.1504**	**0.1504**		**0.1504**	**0.1504**	**0.0000**	**2,154.1796**	**2,154.1796**	**0.0413**	**0.0395**	**2,166.9807**

Mitigated

	NaturalGas Use	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
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	1.75725e+006	9.4800e-003	0.0861	0.0724	5.2000e-004		6.5500e-003	6.5500e-003		6.5500e-003	6.5500e-003	0.0000	93.7736	93.7736	1.8000e-003	1.7200e-003	94.3308
General Light Industry	445500	2.4000e-003	0.0218	0.0183	1.3000e-004		1.6600e-003	1.6600e-003		1.6600e-003	1.6600e-003	0.0000	23.7736	23.7736	4.6000e-004	4.4000e-004	23.9149
General Office Building	5.48972e+006	0.0296	0.2691	0.2261	1.6100e-003		0.0205	0.0205		0.0205	0.0205	0.0000	292.9524	292.9524	5.6100e-003	5.3700e-003	294.6932
Manufacturing	2.42055e+007	0.1305	1.1865	0.9967	7.1200e-003		0.0902	0.0902		0.0902	0.0902	0.0000	1,291.6977	1,291.6977	0.0248	0.0237	1,299.3736
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Refrigerated Warehouse-No Rail	2.77733e+006	0.0150	0.1361	0.1144	8.2000e-004		0.0104	0.0104		0.0104	0.0104	0.0000	148.2089	148.2089	2.8400e-003	2.7200e-003	149.0896
Research & Development	5.6925e+006	0.0307	0.2790	0.2344	1.6700e-003		0.0212	0.0212		0.0212	0.0212	0.0000	303.7735	303.7735	5.8200e-003	5.5700e-003	305.5787
Total		**0.2177**	**1.9788**	**1.6622**	**0.0119**		**0.1504**	**0.1504**		**0.1504**	**0.1504**	**0.0000**	**2,154.1796**	**2,154.1796**	**0.0413**	**0.0395**	**2,166.9807**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	4.57373e+006	201.2371	0.0685	8.3000e-003	205.4216

General Heavy Industry	536760	23.6166	8.0300e-003	9.7000e-004	24.1077
General Light Industry	136080	5.9873	2.0400e-003	2.5000e-004	6.1118
General Office Building	3.54432e+006	155.9446	0.0531	6.4300e-003	159.1873
Manufacturing	7.39368e+006	325.3105	0.1107	0.0134	332.0750
Parking Lot	10927	0.4808	1.6000e-004	2.0000e-005	0.4908
Refrigerated Warehouse-No Rail	3.74131e+006	164.6119	0.0560	6.7900e-003	168.0348
Research & Development	1.7388e+006	76.5045	0.0260	3.1500e-003	78.0953
Total		**953.6933**	**0.3244**	**0.0393**	**973.5242**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	4.57373e+006	201.2371	0.0685	8.3000e-003	205.4216
General Heavy Industry	536760	23.6166	8.0300e-003	9.7000e-004	24.1077
General Light Industry	136080	5.9873	2.0400e-003	2.5000e-004	6.1118
General Office Building	3.54432e+006	155.9446	0.0531	6.4300e-003	159.1873
Manufacturing	7.39368e+006	325.3105	0.1107	0.0134	332.0750
Parking Lot	10927	0.4808	1.6000e-004	2.0000e-005	0.4908
Refrigerated Warehouse-No Rail	3.74131e+006	164.6119	0.0560	6.7900e-003	168.0348
Research & Development	1.7388e+006	76.5045	0.0260	3.1500e-003	78.0953

Total		**953.6933**	**0.3244**	**0.0393**	**973.5242**

6.0 Area Detail

6.1 Mitigation Measures Area

	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					
Mitigated	7.7656	2.1000e-004	0.0233	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0456	0.0456	1.2000e-004	0.0000	0.0485
Unmitigated	7.7656	2.1000e-004	0.0233	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0456	0.0456	1.2000e-004	0.0000	0.0485

6.2 Area by SubCategory

Unmitigated

	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
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.9232					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	6.8402					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.1300e-003	2.1000e-004	0.0233	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0456	0.0456	1.2000e-004	0.0000	0.0485
Total	**7.7656**	**2.1000e-004**	**0.0233**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**	**0.0000**	**0.0456**	**0.0456**	**1.2000e-004**	**0.0000**	**0.0485**

Mitigated

	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
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.9232					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	6.8402					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.1300e-003	2.1000e-004	0.0233	0.0000		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	0.0456	0.0456	1.2000e-004	0.0000	0.0485
Total	**7.7656**	**2.1000e-004**	**0.0233**	**0.0000**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**	**0.0000**	**0.0456**	**0.0456**	**1.2000e-004**	**0.0000**	**0.0485**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	252.7832	14.5908	0.3482	721.3190
Unmitigated	252.7832	14.5908	0.3482	721.3190

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	16.4187 / 0	9.1178	0.5363	0.0128	26.3388
General Light Industry	4.1625 / 0	2.3116	0.1360	3.2400e-003	6.6774
General Office Building	50.4764 / 30.9371	32.7952	1.6505	0.0395	85.8368
Manufacturing	226.162 / 0	125.5947	7.3878	0.1762	362.8070
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Refrigerated Warehouse-No Rail	36.3062 / 0	20.1619	1.1860	0.0283	58.2420
Research & Development	113.09 / 0	62.8020	3.6942	0.0881	181.4169
Total		**252.7832**	**14.5908**	**0.3482**	**721.3190**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	16.4187 / 0	9.1178	0.5363	0.0128	26.3388
General Light Industry	4.1625 / 0	2.3116	0.1360	3.2400e-003	6.6774
General Office Building	50.4764 / 30.9371	32.7952	1.6505	0.0395	85.8368

Manufacturing	226.162 / 0	125.5947	7.3878	0.1762	362.8070
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Refrigerated Warehouse-No Rail	36.3062 / 0	20.1619	1.1860	0.0283	58.2420
Research & Development	113.09 / 0	62.8020	3.6942	0.0881	181.4169
Total		**252.7832**	**14.5908**	**0.3482**	**721.3190**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	355.6929	21.0209	0.0000	881.2142
Unmitigated	355.6929	21.0209	0.0000	881.2142

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			

Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	88.04	17.8713	1.0562	0.0000	44.2755
General Light Industry	22.32	4.5308	0.2678	0.0000	11.2248
General Office Building	264.12	53.6140	3.1685	0.0000	132.8264
Manufacturing	1212.72	246.1712	14.5483	0.0000	609.8787
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Refrigerated Warehouse-No Rail	147.58	29.9574	1.7704	0.0000	74.2182
Research & Development	17.48	3.5483	0.2097	0.0000	8.7907
Total		**355.6929**	**21.0209**	**0.0000**	**881.2142**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Heavy Industry	88.04	17.8713	1.0562	0.0000	44.2755
General Light Industry	22.32	4.5308	0.2678	0.0000	11.2248
General Office Building	264.12	53.6140	3.1685	0.0000	132.8264
Manufacturing	1212.72	246.1712	14.5483	0.0000	609.8787
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Refrigerated Warehouse-No Rail	147.58	29.9574	1.7704	0.0000	74.2182
Research & Development	17.48	3.5483	0.2097	0.0000	8.7907

Total		**355.6929**	**21.0209**	**0.0000**	**881.2142**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation