CITY OF UNION CITY, CALIFORNIA

MidPen Affordable Housing Project

INITIAL STUDY &
MITIGATED NEGATIVE DECLARATION

APPENDICES

OCTOBER 2019

Douglas Herring & Associates
Environmental, Policy, and Planning Services

Appendix A

Air Quality Appendices

MidPen Housing at Mission D&E, Union City, CA
Air Quality, Greenhouse Gas, and Health Risk Assessment
Technical Report

Prepared by:

RCH Group
11060 White Rock Road, Suite 150-A
Rancho Cordova, California 95670

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1.0 INTRODUCTION

This document presents results of an air quality analysis associated with the project proposing to develop 81 apartment rental units within two connected four-story buildings on the 1.65-acre vacant site located at Mission Boulevard between D, E, and 2nd Streets in Union City, California. This document provides an overview of the existing air quality conditions at the project site, the air quality regulatory framework, an analysis of potential air quality impacts that would result from implementation of the proposed project, and identification of applicable mitigation measures. Other issues related to air emissions covered in this document include the assessment of emissions related to air quality health impacts (health risk assessment or HRA). Issues related to climate change and greenhouse gas (GHG) emissions are also included. The supporting information, methodology, assumptions, and detailed results used in the air quality analysis are provided in **Attachment A: CalEEMod Output Files and Attachment B: Health Risk Assessment Methodology and Assumptions**.

The HRA focuses on health impacts on existing residences from emissions of toxic air contaminants (TAC)[1] such as diesel particulate matter (DPM)[2] from diesel equipment and haul truck emissions associated with the proposed project construction activities. The HRA was conducted to determine the health impacts, in terms of excess cancer risk and non-cancer hazards, using the significance levels[3] identified by the Bay Area Air Quality Management District (BAAQMD)'s *CEQA Air Quality Guidelines*.[4] In accordance with the BAAQMD *CEQA Air Quality Guidelines*, this HRA also evaluated concentrations of particulate matter equal to or less than 2.5 micrometers (fine particulate or $PM_{2.5}$). This HRA was prepared based on the California Office of Environmental Health Hazard Assessment (OEHHA)'s *Air Toxics Hot Spots Program Guidance*

[1] Toxic air contaminants (TAC) are a broad class of compounds known to cause morbidity or mortality. TAC are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., gasoline service stations, dry cleaners). TAC are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a freeway). Because chronic exposure can result in adverse health effects, TAC are regulated at the regional, state, and Federal level.

[2] In 1998, the California Air Resources Board (CARB) classified diesel particulate matter (DPM) as a toxic air contaminant, citing its potential to cause cancer and other health problems. The US Environmental Protection Agency (USEPA) concluded that long-term exposure to diesel engine exhaust is likely to pose a lung cancer hazard to humans and can also contribute to other acute and chronic health effects.

[3] In June of 2010, the Air District's adopted thresholds of significance were challenged in a lawsuit (California Building Industry Association v Bay Area Air Quality Management District). On December 15, 2015, the California Supreme Court (S213478) concluded that agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users. The proposed project includes proposed sensitive receptors and thus, an analysis of the health impacts from existing sources such as stationary sources, rail activities, and major roadways is presented within this document.

[4] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2017, http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

Manual for Preparation of Health Risk Assessments.[5] For existing receptors, the HRA indicates less-than-significant exposures to the health impacts from the proposed project construction activities with the implementation of mitigation measures. This HRA also indicates less than significant exposures for proposed residences to nearby cumulative emission sources such as Mission Boulevard and stationary sources such as a gasoline station and diesel generator. **Attachment B: Health Risk Assessment Methodology and Assumptions** provides information concerning the nearby cumulative emission sources.

2.0 PROJECT OVERVIEW

The proposed development would be affordable rental housing with office space on the ground floor, totaling approximately 167,966 square feet on 1.65 acres. The residential component of the development is proposed to include 81 units with 75,859 square feet of net rentable space plus 20,834 square feet of residential amenities and other spaces. The proposed project would include approximately 6,058 square feet of office space for social service agencies and 2,033 square feet of leasing office space and a two-level parking garage of 63,182 square feet. The project site is surrounded by residential uses to the west/northwest and south, retail/commercial uses to the northwest and southwest, and open space to the east. Construction activities are estimated to begin by August of 2021 and construction of the proposed project is estimated to be completed in March of 2023. An underground water storage tank (UST) of approximately 143,800 gallons and replacement of approximately 1,520 feet of water main may be required.[6]

3.0 ANALYSIS METHODOLGY

Intermittent (short-term construction emissions that occur from activities, such as removal of structures, site-grading, and building construction) and long-term air quality impacts related to the operation of the proposed project were evaluated. The analysis focuses on daily and annual emissions from these construction and operational (mobile, area, stationary, and fugitive sources) activities. This air quality analysis is consistent with the methods described in the Bay Area Air Quality Management District (BAAQMD) *CEQA Air Quality Guidelines* (dated June 2010, updated in May 2011, revised in May 2012, and updated in May 2017).[7] Mitigation measures are presented to reduce impacts to less than significant.

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[5] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, February 2015, http://oehha.ca.gov/air/hot_spots/hotspots2015.html

[6] Mission D&E, Entitlement Package, August 30, 2019.

[7] The Air District's June 2010 adopted thresholds of significance were challenged in a lawsuit. Although the BAAQMD's adoption of significance thresholds for air quality analysis has been subject to judicial actions, the lead agency has determined that BAAQMD's Revised Draft Options and Justification Report (October 2009) provide substantial

The air quality analysis includes a review of criteria pollutant[8] emissions such as carbon monoxide (CO)[9], nitrogen oxides (NO_x), sulfur dioxide (SO_2), volatile organic compounds (VOC) as reactive organic gases (ROG)[10], particulate matter less than 10 micrometers (coarse or PM_{10}), particulate matter less than 2.5 micrometers (fine or $PM_{2.5}$).[11]

Regulatory models used to estimate air quality impacts include:

- California Air Resources Board's (CARB) EMFAC2014[12]emissions inventory model. EMFAC2014[13] is the latest emission inventory model that calculates emission inventories and emission rates for motor vehicles operating on roads in California. This model reflects CARB's current understanding of how vehicles travel and how much they emit. EMFAC2014 can be used to show how California motor vehicle emissions have changed over time and are projected to change in the future.
- CARB OFFROAD[14] emissions inventory model. OFFROAD is the latest emission inventory model that calculates emission inventories and emission rates for off-road equipment such as loaders, excavators, and off-road haul trucks operating in California. This model reflects CARB's current understanding of how equipment operates and how much they emit. OFFROAD can be used to show how California off-road equipment emissions have changed over time and are projected to change in the future.

evidence to support the BAAQMD recommended thresholds. Therefore, the lead agency has determined the BAAQMD recommended thresholds are appropriate for use in this analysis.

[8] Criteria air pollutants refer to those air pollutants for which the USEPA and CARB has established National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) under the Federal Clean Air Act (CAA).

[9] CO is a non–reactive pollutant that is a product of incomplete combustion of organic material, and is mostly associated with motor vehicle traffic, and in wintertime, with wood–burning stoves and fireplaces.

[10] VOC means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions and thus, a precursor of ozone formation. ROG are any reactive compounds of carbon, excluding methane, CO, CO_2 carbonic acid, metallic carbides or carbonates, ammonium carbonate, and other exempt compounds. The terms VOC and ROG are often used interchangeably.

[11] PM_{10} and $PM_{2.5}$ consists of airborne particles that measure 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into the air passages and the lungs, causing adverse health effects.

[12] California Air Resources Board, EMFAC2014 User's Guide, April 30, 2014, http://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol1-users-guide-052015.pdf

[13] As of December 2018, EMFAC2017 has not been approved.

[14] California Air Resources Board, OFFROAD Instructions, http://www.arb.ca.gov/msprog/ordiesel/info_1085/oei_write_up.pdf

- CalEEMod (California Emissions Estimator Model Version 2016.3.2)[15] land use emissions model estimates construction emissions due to demolition and construction activities and operations.
- Road Construction Emissions Model, Version 9.0.0[16] is a roadway construction emissions model, developed by the Sacramento Metropolitan Air Quality Management District (SMAQMD), to assist roadway (and other similar linear) projects with determining the emission impacts.
- AERMOD (American Meteorological Society/USEPA Regulatory Model) is an atmospheric dispersion model which can simulate point, area, volume, and line emissions sources and has the capability to include simple, intermediate, and complex terrain along with meteorological conditions and multiple receptor locations.[17,18] AERMOD is commonly executed to yield 1-hour maximum and annual average concentrations (in $\mu g/m^3$) at each receptor.

4.0 EXISTING CONDITIONS

The project site is located within the San Francisco Bay Area Air Basin (Air Basin), which encompasses Alameda, Contra Costa, Santa Clara, San Francisco, San Mateo, Marin, and Napa Counties, and the southern portions of Solano and Sonoma Counties. The Air Basin is characterized by complex terrain which distorts normal wind flow patterns, consisting of coastal mountain ranges, inland valleys, and bays.

Regional Meteorology

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions, including wind speed, wind direction, stability, and air temperature, in combination with local surface topography (i.e., geographic features such as mountains, valleys, and San Francisco Bay), determine the effect of air pollutant emissions on local air quality.

The climate of the greater San Francisco Bay Area, including Alameda County, is a Mediterranean-type climate characterized by warm, dry summers and mild, wet winters. The

[15] California Air Resources Board, *California Emissions Estimator Model User's Guide*, November 9, 2017, http://www.caleemod.com/

[16] Sacramento Metropolitan Air Quality Management District, *Road Construction Emissions Model, Version 9.0.0*, May 2018, http://www.airquality.org/businesses/ceqa-land-use-planning/ceqa-guidance-tools

[17] US Environmental Protection Agency Preferred/Recommended Models, *AERMOD Modeling System*, https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models#aermod

[18] Title 40 CFR Part 51, *Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule*, http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf

climate is determined largely by a high-pressure system that is often present over the eastern Pacific Ocean off the West Coast of North America. In winter, the Pacific high-pressure system shifts southward, allowing storms to pass through the region. During summer and fall, air emissions generated within the Bay Area can combine with abundant sunshine under the restraining influences of topography and subsidence inversions to create conditions that are conducive to the formation of photochemical pollutants, such as ozone and secondary particulates, such as sulfates and nitrates.

The proposed project lies in the Southwestern Alameda Valley climatological sub-region of the Bay Area. Winds are predominantly out of the northwest quadrant in this region, particularly during summer months. In the winter, winds are equally likely out of the east and southeast. Cold air over land areas creates high pressure to the east, which forces air toward the west. Easterly surface flow into southern Alameda County passes through three major gaps: Hayward/Dublin Canyon, Niles Canyon, and Mission Pass. Areas north of the gaps then experience southeast winds, while areas south of the gaps experience northeast winds. Wind speeds are moderate in this region. Annual average wind speeds close to San Francisco Bay are about seven miles per hour (mph), while further inland at Fremont (project site), annual average wind speeds are about six mph. [19]

Air temperatures are moderated by both the proximity to the bay and to the sea breeze. Temperatures in this region are slightly cooler in the winter and slightly warmer than east bay cities to the north like Oakland. Average daily maximum temperatures in winter are in the high 50's to 60 degrees. During the summer months, average daily maximum temperatures are in the mid 60's. Average minimum temperatures are in the low 40's in winter and mid-50's in the summer.

Rainfall amounts in the region are lower than other east bay sites to its north such as Oakland. Areas near the bay have lower rainfall amounts because of the rain shadow effect of the Santa Cruz Mountains. Areas closer to the hills have higher rainfall amounts because they are further from the Santa Cruz Mountains and because of orographic effects. That is, air that is forced to ascend the mountains will cool and condense, leading to increased rain. Annual rainfall is approximately 14 inches.[20]

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[19] Bay Area Air Quality Management District. October 4, 2010, Bay Area Climatology http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Bay-Area-Climatology.aspx

[20] Bay Area Air Quality Management District. October 4, 2010, Bay Area Climatology http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Bay-Area-Climatology.aspx

Local Air Quality

The BAAQMD maintains a network of monitoring stations within the Air Basin that monitor air quality and compliance with applicable ambient standards. The monitoring station closest to the project site is in Hayward at 3466 La Mesa Drive, approximately 3.5 miles to the northeast of the project site; where levels of ozone are measured. The nearest air monitoring station which measures CO, nitrogen dioxide (NO_2), and $PM_{2.5}$ is located in Oakland at 9925 International Boulevard, 12 miles to the northwest of the project site. The nearest air monitoring station which measures PM_{10} is located in San Jose at 158 East Jackson Street, 19 miles to the south of the project site.

Table 1 summarizes the most recent three years of data (2016 through 2018) from the BAAQMD's Hayward, Oakland, and San Jose air monitoring stations. The state and national 8-hour ozone standards were exceeded in 2017. The 24-hour PM_{10} standard was exceeded six times in 2017 and four times 2018. The state annual average PM_{10} was also exceeded in 2017 and 2018. The 24-hour $PM_{2.5}$ standard was exceeded seven times in 2017 and thirteen times in 2018. No other standards were exceeded during the three-year period. Reflective of the previous information, the Bay Area is currently designated "nonattainment" for state and national (1-hour and 8-hour) ozone standards, for the state PM_{10} standards, and for the state and national (annual average and 24-hour) $PM_{2.5}$ standards. The Bay Area is designated "attainment" or "unclassifiable" with respect to the other ambient air quality standards.

Table 1: Air Quality Data Summary (2016 - 2018)

Pollutant	Monitoring Data by Year			
	Standard[a]	2016	2017	2018
Ozone				
Highest 1 Hour Average (ppm)[b]	0.090	0.083	**0.139**	0.075
Days over State Standard		0	**2**	0
Highest 8 Hour Average (ppm)[b]	0.070	0.064	**0.110**	0.066
Days over National Standard		0	**3**	0
Highest 8 Hour Average (ppm)[b]	0.070	0.064	**0.110**	0.066
Days over State Standard		0	**4**	0
Nitrogen Dioxide				
Highest 1 Hour Average (ppm)[b]	0.180/0.100	0.059	0.065	0.073
Days over State Standard		0	0	0
Annual Average (µg/m^3)[b]	0.030/0.053	0.010	0.010	0.010
Carbon Monoxide				
Highest 1 Hour Average (ppm)[b]	20	2.6	3.2	3.3
Days over State Standard		0	0	0
Highest 8 Hour Average (ppm)[b]	9	1.0	2.2	2.4
Days over State Standard		0	0	0
Particulate Matter (PM_{10})				

Highest 24 Hour Average (µg/m³)[b]	50	41	**70**	**122**
Days over State Standard		0	**6**	**4**
State Annual Average (µg/m³)[b]	20	18.5	**21.6**	**23.1**
Particulate Matter ($PM_{2.5}$)				
Highest 24 Hour Average (µg/m³)[b]	35	15.5	**70.2**	**172.1**
Days over National Standard		0	**7**	**13**
State Annual Average (µg/m³)[b]	12	6.1	9.4	11.8

NOTES: Values in **bold** are in excess of at least one applicable standard.

a. Generally, state standards and national standards are not to be exceeded more than once per year.
b. ppm = parts per million; µg/m³ = micrograms per cubic meter.
c. PM_{10} is not measured every day of the year. Number of estimated days over the standard is based on 365 days per year.

Source: Bay Area Air Quality Management District, Annual Air Quality Summaries, http://www.baaqmd.gov/about-air-quality/air-quality-summaries

Community Air Risk Evaluation

The BAAQMD's Community Air Risk Evaluation (CARE) program was initiated in 2004 to evaluate and reduce health risks associated with exposure to outdoor air toxics in the Bay Area. Based on findings of the latest report, DPM was found to account for approximately 85 percent of the cancer risk from airborne toxics. Carcinogenic compounds from gasoline-powered cars and light duty trucks were also identified as significant contributors: 1,3-butadiene contributed four percent of the cancer risk-weighted emissions, and benzene contributed three percent. Collectively, five compounds—diesel PM, 1,3-butadiene, benzene, formaldehyde, and acetaldehyde—were found to be responsible for more than 90 percent of the cancer risk attributed to emissions. All of these compounds are associated with emissions from internal combustion engines. The most important sources of cancer risk-weighted emissions were combustion-related sources of DPM, including on-road mobile sources (31 percent), construction equipment (29 percent), and ships and harbor craft (13 percent). A 75 percent reduction in DPM was predicted between 2005 and 2015 when the inventory accounted for CARB's diesel regulations. Overall, cancer risk from TAC dropped by more than 50 percent between 2005 and 2015, when emissions inputs accounted for state diesel regulations and other reductions.[21]

Modeled cancer risks from TAC in 2005 were highest near sources of DPM: near core urban areas, along major roadways and freeways, and near maritime shipping terminals. Peak modeled risks were found to be located east of San Francisco, near West Oakland, and the maritime Port of Oakland. BAAQMD has identified seven impacted communities in the Bay Area:

[21] Bay Area Air Quality Management District, *Improving Air Quality & Health in Bay Area Communities, Community Air Risk Program Retrospective & Path Forward (2004 – 2013)*, April 2014, http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CARE%20Program/Documents/CARE_Retrospective_April2014.ashx?la=en

- Western Contra Costa County and the cities of Richmond and San Pablo.
- Western Alameda County along the Interstate 880 corridor and the cities of Berkeley, Alameda, Oakland, and Hayward.
- San Jose.
- Eastern side of San Francisco.
- Concord.
- Vallejo.
- Pittsburgh and Antioch.

The proposed project is within the city of Union City, which is not part of the seven CARE program impacted communities in the Bay Area. The health impacts in the Bay Area, as determined both by pollution levels and by existing health vulnerabilities in a community, are approximately 160 cancer risk per million persons. In Union City, including the project site, the health impact is approximately 161 cancer risk per million persons.[22]

Addressing Sources of Air Pollutants in Community Planning

In May of 2016, the BAAQMD published *Planning Health Places: A Guidebook for Addressing Local Sources of Air Pollutants in Community Planning*.[23] The BAAQMD's primary goal in providing the *Guidebook* is to support and promote infill development; which is important to reducing vehicle miles traveled and the associated air emissions, while minimizing air pollution exposure for existing and future residents. The *Guidebook* provides developers and planners with the information and tools needed to create health-protective communities.

The *Guidebook* recommends Best Practices to Reduce Emissions and Reduce Exposure to Local Air Pollution. Implementing as many Best Practices to Reduce Emissions as is feasible will reduce potential health risks to the greatest extent. The *Guidebook* also lists examples of a variety of strategies to reduce exposure to, and emissions of, air pollution, including the adoption of air quality-specific ordinances, standard conditions of approval, and incorporation of policies into general plans and other planning documents. The BAAQMD recommends implementing all best practices to reduce exposure that are feasible and applicable to a project in areas that are likely to

[22] Bay Area Air Quality Management District, *Identifying Areas with Cumulative Impacts from Air Pollution in the San Francisco Bay Area*, March 2014, http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CARE%20Program/Documents/ImpactCommunities_2_Methodology.ashx?la=en

[23] Bay Area Air Quality Management District, *Planning Health Places: A Guidebook for Addressing Local Sources of Air Pollutants in Community Planning*, January 2016, http://www.baaqmd.gov/~/media/files/planning-and-research/planning-healthy-places/draft_planninghealthyplaces_marchworkshop-pdf.pdf?la=en

experience elevated levels of air pollution. To reduce exposure to pollutants, the *Guidebook* recommends practices like installing indoor air filtration systems, planting dense vegetation, implementing project design which provides a buffer between sensitive receptors and emission source, and developing alternative truck routes.

The *Guidebook* provides an interactive map of the Bay Area showing areas with estimated elevated levels of fine particulates and/or toxic air contaminants. The interactive map shows locations where further study is needed, such as a detailed health risk assessment; specifically locations next to major roads and freeways and large industrial sites, as well as the downtown districts of cities.

Nearby Sensitive Receptors

Land uses such as schools, children's daycare centers, hospitals, and convalescent homes are considered to be more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality. The CARB has identified the following people as most likely to be affected by air pollution: children less than 14 years of age, the elderly over 65 years of age, athletes, and those with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive population groups.

Residential areas are considered more sensitive to air quality conditions than commercial and industrial areas, because people generally spend longer periods of time at their residences, resulting in greater exposure to ambient air quality conditions. Recreational uses are also considered sensitive, due to the greater exposure to ambient air quality conditions and because the presence of pollution detracts from the recreational experience. According to the BAAQMD, 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.

BAAQMD considers the relevant zone of influence for an assessment of air quality health risks to be within 1,000 feet of a project site. The project site is surrounded by residential uses to the west/northwest and south, retail/commercial uses to the northwest and southwest, and agricultural land to the east. No schools or daycares are located within 1,000 feet of the project site.

City of Union City General Plan

The City of Union City General Plan[24] (adopted February 12, 2002) Health and Safety element contains the following policies related to air quality:

- HS-D.1.1: The City shall cooperate with the BAAQMD to implement the Air Quality Plan.
- HS-D.1.2: The City shall implement measures to protect air quality that may be required to mitigate the effects of population growth in the Planning Area.
- HS-D.1.3: The City shall encourage development designs for city circulation systems that conserve air quality and minimize direct and indirect emissions of air pollutants.
- HS-D.1.4: The City shall encourage a reduction in vehicle-trips through Transportation Systems Management (TSM), BAAQMD Transportation Congestion Management (TCM) and the use of non-polluting forms of transportation, including electric hybrid buses, vans, city vehicles, bicycles and walking.
- The City shall encourage developers of large projects to install fueling stations for alternative energy vehicles.
- HS-D.1.6: The City shall require all businesses, in particularly fast food and manufacturing, to minimize odors generated by the business so that the odors are not detectable off-site.

5.0 IMPACT ANALYSIS AND MITIGATION

The air quality analysis includes a review of pollutant emissions such as CO, NO_x, SO_2, VOC as ROG, PM_{10}, and $PM_{2.5}$. The HRA addresses the DPM emissions from on-site construction equipment and haul trucks associated with the proposed project and cumulative impacts from nearby emission sources.

Threshold of Significance

The significance of potential impacts was determined based on State CEQA Guidelines, Appendix G (2019 Revisions), and the BAAQMD *CEQA Air Quality Guidelines*. Using Appendix G evaluation thresholds, the proposed project would be considered to have significant air quality impacts if it were to:

A. Conflict with or obstruct implementation of the applicable air quality plan;

[24] City of Union City, *General Plan Policy Document*, February 2002, https://www.unioncity.org/356/General-Plan

B. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard;

C. Expose sensitive receptors to substantial pollutant concentrations; or

D. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The thresholds and methodologies from the BAAQMD's *CEQA Air Quality Guidelines* were used to evaluate the potential impacts of construction and operation of the proposed project. The thresholds of significance applied to assess project-level air quality impacts are:

- Average daily construction exhaust emissions of 54 pounds per day of ROG, NO_x, or $PM_{2.5}$ or 82 pounds per day of PM_{10};
- Average daily operation emissions of 54 pounds per day of ROG, NO_x, or $PM_{2.5}$ or 82 pounds per day of PM_{10}; or result in maximum annual emissions of 10 tons per year of ROG, NO_x, or $PM_{2.5}$ or 15 tons per year of PM_{10};
- Exposure of persons by siting a new source or a new sensitive receptor to substantial levels of TAC resulting in (a) a cancer risk level greater than 10 in one million, (b) a noncancerous risk (chronic or acute) hazard index greater than 1.0, or (c) an increase of annual average $PM_{2.5}$ of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$). For this threshold, sensitive receptors include residential uses, schools, parks, daycare centers, nursing homes, and medical centers; or
- Frequently and for a substantial duration, create or expose sensitive receptors to substantial objectionable odors affecting a substantial number of people.

Assessment of a significant cumulative impact if it would result in:

- Exposure of persons, by siting a new source or a new sensitive receptor, to substantial levels of TACs during either construction or operation resulting in (a) a cancer risk level greater than 100 in a million, (b) a noncancer risk (chronic or acute) hazard index greater than 10.0, or (c) annual average $PM_{2.5}$ of greater than 0.8 $\mu g/m^3$.

The BAAQMD air quality significance thresholds are found in **Table 2**.

The BAAQMD *CEQA Air Quality Guidelines* identify a project-specific threshold of either 1,100 metric tons of CO_2e per year or 4.6 metric tons of CO_2e per year per service population (i.e., the number of student plus the number of staff associated with a new development), which is also considered a cumulatively considerable contribution to the global GHG burden and, therefore, a significant cumulative impact. This analysis applies the 1,100 metric tons of CO_2e per year

significance criterion to proposed project GHG emissions. GHG emissions and their thresholds of significance are further discussed in **Section 6**.

For projects that are considered new sources of TAC or $PM_{2.5}$ (such as construction activity, stationary sources, industrial sources, or roadway projects), it is generally appropriate to use the project-level thresholds because the project-level threshold identifies project's incremental contribution to health impacts. Project impacts which are below the project-level thresholds would be presumed to contribute a less than significant impact to the cumulative condition. However, for projects that consist of new receptors (such as proposed residences or schools), it is generally appropriate to use only the cumulative-level threshold because the project itself is not a source of TAC or $PM_{2.5}$ and, thus, the individual project-level threshold is not relevant. The cumulative risk threshold accounts for all potential sources of TAC and $PM_{2.5}$ in proximity to the new receptors on the project site. Therefore, the proposed project, which does include existing and proposed receptors, was compared to the project-level and cumulative-level thresholds.

Table 2: BAAQMD Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Daily Operational Thresholds	Annual Operational Thresholds
Criteria Air Pollutants			
ROG	54	54	10
NOx	54	54	10
PM10	82 (exhaust only)	82	15
PM2.5	54 (exhaust only)	54	10
CO	NA	9.0 ppm (8-hour) and 20.0 ppm (1-hour)	
Fugitive Dust	Best Management Practices	NA	
Project Health Risk and Hazards			
Excess Cancer Risk	10 per million		
Chronic Hazard Index	1.0		
Acute Hazard Index	1.0		
Incremental Annual Average PM2.5	0.3 µg/m^3		
Cumulative Health Risk and Hazards			
Excess Cancer Risk	100 per million		
Chronic Hazard Index	10.0		
Acute Hazard Index	10.0		
Incremental Annual Average PM2.5	0.8 µg/m^3		
Greenhouse Gas Emissions			
Annual Emissions	1,100 metric tons or 4.6 metric tons per capita		

SOURCE: BAAQMD Adopted Air Quality CEQA Thresholds of Significance - June 2, 2010, http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Summary_Table_Proposed_BAAQMD_CEQA_Thresholds_May_3_2010.ashx?la=en

Health Impact Evaluation

The HRA was conducted following methodologies in OEHHA's *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*.[25] This was accomplished by applying the estimated concentrations at the receptors analyzed to the established cancer risk estimates and acceptable reference concentrations for non-cancer health effects.

Recent OEHHA's revisions to its *Guidance Manual* were primarily designed to ensure that the greater sensitivity of children to cancer and other health risks is reflected in HRA. For example, OEHHA now recommends that risks be analyzed separately for multiple age groups, focusing especially on young children and teenagers, rather than the past practice of analyzing risks to the general population, without distinction by age. OEHHA also now recommends that statistical "age sensitivity factors" be incorporated into a HRA, and that children's relatively high breathing rates be accounted for. On the other hand, the *Guidance Manual* revisions also include some changes that would reduce calculated health risks. For example, under the former guidance, OEHHA recommended that residential cancer risks be assessed by assuming 70 years of exposure at a residential receptor; under the *Guidance Manual*, this assumption is lessened to 30 years. **Attachment B: Health Risk Assessment Methodology and Assumptions** provides additional methodologies and assumptions used within the health risk assessment.

5.1 Consistency with Clean Air Plan

The BAAQMD adopted its *Bay Area 2010 Clean Air Plan* (CAP)[26] in accordance with the requirements of the California Clean Air Act (CCAA) to implement all feasible measures to reduce ozone; provide a control strategy to reduce ozone, particulate matter, air toxics, and GHG emissions in a single, integrated plan; and establish emission control measures to be adopted or implemented in the 2010 through 2012 timeframe.[27] The primary goals of the 2010 Bay Area CAP are to:

- Attain air quality standards;
- Reduce population exposure and protecting public health in the Bay Area; and

[25] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, February 2015, http://oehha.ca.gov/air/hot_spots/hotspots2015.html

[26] Bay Area Air Quality Management District. *Bay Area 2010 Clean Air Plan*. September 15, 2010, http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans

[27] In 2015, the BAAQMD initiated an update to the 2010 CAP. On February 28, 2014, the District held a public meeting to report progress on implementing the control measures in the 2010 CAP, to solicit ideas and strategies to further reduce ozone precursors, particulate matter, toxic air contaminants, and greenhouse gases, and to seek input on innovative strategies to reduce greenhouse gases, mechanisms for tracking progress in reducing GHG, and how the District may further support actions to reduce GHG. The culmination of this effort will be an updated CAP.

- Reduce GHG emissions and protect the climate.

On January 10, 2017, BAAQMD released the *Draft 2017 Clean Air Plan*.[28] The *Final 2017 Clean Air Plan* was adopted in April 2017.[29] The 2017 Clean Air Plan/Regional Climate Protection Strategy (CAP/RCPS) provides a roadmap for BAAQMD's efforts over the next few years to reduce air pollution and protect public health and the global climate. The CAP/RCPS includes the Bay Area's first-ever comprehensive RCPS, which identifies potential rules, control measures, and strategies that BAAQMD can pursue to reduce GHG in the Bay Area. Measures of the 2017 CAP addressing the transportation sector are in direct support of *Plan Bay Area 2040*, which was prepared by the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) and includes the region's Sustainable Communities Strategy and the 2040 Regional Transportation Plan. Highlights of the *2017 Clean Air Plan* control strategy include:

- **Limit Combustion:** Develop a region-wide strategy to improve fossil fuel combustion efficiency at industrial facilities, beginning with the three largest sources of industrial emissions: oil refineries, power plants, and cement plants.
- **Stop Methane Leaks:** Reduce methane emissions from landfills, and oil and natural gas production and distribution.
- **Reduce Exposure to Toxics:** Reduce emissions of toxic air contaminants by adopting more stringent limits and methods for evaluating toxic risks at existing and new facilities.
- **Put a Price on Driving:** Implement pricing measures to reduce travel demand.
- **Advance Electric Vehicles:** Accelerate the widespread adoption of electric vehicles.
- **Promote Clean Fuels:** Promote the use of clean fuels and low or zero carbon technologies in trucks and heavy-duty vehicles.
- **Accelerate Low-Carbon Buildings:** Expand the production of low-carbon, renewable energy by promoting on-site technologies such as rooftop solar and ground-source heat pumps.
- **Support More Energy Choices:** Support of community choice energy programs throughout the Bay Area.
- **Make Buildings More Efficient:** Promote energy efficiency in both new and existing buildings.

[28] Bay Area Air Quality Management District, *Draft 2017 Clean Air Plan*, January 10, 2017, http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/baaqmd_2017_cap_draft_122816-pdf.pdf?la=en

[29] Bay Area Air Quality Management District, *Final 2017 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

- **Make Space and Water Heating Cleaner:** Promote the switch from natural gas to electricity for space and water heating in Bay Area buildings.

When a public agency contemplates approving a project where an air quality plan consistency determination is required, BAAQMD recommends that the agency analyze the project with respect to the following questions: (1) Does the project support the primary goals of the air quality plan; (2) Does the project include applicable control measures from the air quality plan; and (3) Does the project disrupt or hinder implementation of any 2017 CAP control measures? If the first two questions are concluded in the affirmative and the third question concluded in the negative, the BAAQMD considers the project consistent with air quality plans prepared for the Bay Area.

Any project that would not support the 2017 CAP goals would not be considered consistent with the 2017 CAP. The recommended measure for determining project support of these goals is consistency with BAAQMD CEQA thresholds of significance. As presented in the preceding and subsequent impact discussions, the proposed project would not exceed the BAAQMD significance thresholds; therefore, the proposed project with implementation of mitigation measures would support the primary goals of the 2017 CAP and would not hinder implementation of any of the CAP control measures.

5.2 Construction Impacts

Intermittent (short-term construction emissions that occur from activities, such as site-grading, paving, and building construction) and long-term air quality impacts related to the operation of the proposed project were evaluated. The analysis focuses on daily emissions from these construction and operational (mobile, area, stationary, and fugitive sources) activities. The CARB CalEEMod, Version 2016.3.2[30] and SMAQMD's Road Construction Emissions Model, Version 9.0.0[31] was used to quantify construction-related pollutant emissions. CalEEMod output worksheets are included in **Attachment A: CalEEMod Output Files**. The emissions generated from these construction activities include:

- Dust (including PM_{10} and $PM_{2.5}$) primarily from "fugitive" sources (i.e., emissions released through means other than through a stack or tailpipe) such as material handling and travel on unpaved surfaces; and
- Combustion exhaust emissions of criteria air pollutants (ROG, NO_x, CO, PM_{10}, and $PM_{2.5}$) primarily from operation of heavy off-road construction equipment, haul trucks,

[30] California Air Resources Board, *California Emissions Estimator Model User's Guide*, November 9, 2017, http://www.caleemod.com/

[31] Sacramento Metropolitan Air Quality Management District, *Road Construction Emissions Model, Version 9.0.0*, May 2018, http://www.airquality.org/businesses/ceqa-land-use-planning/ceqa-guidance-tools

(primarily diesel-operated), and construction worker automobile trips (primarily gasoline-operated).

Construction-related fugitive dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. High winds (greater than 10 miles per hour) occur infrequently in the area, less than two percent of the time. In the absence of mitigation, construction activities may result in significant quantities of dust, and as a result, local visibility and PM_{10} concentrations may be adversely affected on a temporary and intermittent basis during construction. In addition, the fugitive dust generated by construction would include not only PM_{10}, but also larger particles, which would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts.

Erosion control measures and water programs are typically undertaken to minimize these fugitive dust and particulate emissions. A dust control efficiency of over 50 percent due to daily watering and other measures (e.g., limiting vehicle speed to 15 mph, management of stockpiles, screening process controls, etc.) was estimated. Based on CalEEMod, one water application per day reduces fugitive dust by 34 percent, two water applications per day reduces fugitive dust by 55 percent, and three water applications per day reduces fugitive dust by 61 percent.

Construction activities are expected to occur from August of 2021 through March of 2023. **Table 3** provides the estimated construction schedule for each phase: site preparation, grading, building construction, paving, and architectural coating. The project site is a vacant lot thus no demolition is required. If the offsite water main improvement work and UST is determined to be needed, then it would take approximately 80 days for the work to be completed. The offsite work would be completed concurrently with the site work for the project.

Table 3: Estimated Construction Schedule

Phase	Description	Start	End	Working Days
1	Site Preparation	08/02/2021	08/13/2021	10
2	Grading	08/16/2021	08/30/2021	10
3	Water Projects	09/01/2021	01/31/2022	80
4	Building Construction	08/28/2021	11/18/2022	305
5	Paving	03/21/2023	04/04/2023	10
6	Architectural Coating	11/21/2023	03/20/2023	80

SOURCE: CARB CalEEMod Version 2016.3.2 and SMAQMD Road Construction Emissions Model Version 9.0.0.

Site preparation would consist of land clearing and grading and would export approximately 2,430 cubic yards of soil requiring approximately 304 haul truck trips. Installation of the fire water tank, water main replacement, and overexcavation would export an additional 2,300 cubic yards of soil requiring approximately 290 haul truck trips. The estimated construction equipment

associated with the proposed project along with the number of pieces of equipment, daily hours of operation, horsepower (hp), and load factor (i.e., percent of full throttle) are shown in **Table 4**.

Table 4: Estimated Construction Equipment Usage

Phase	Equipment	Amount	Daily Hours	HP	Load Factor
Site Preparation	Rubber Tired Dozers	1	7	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8	97	0.37
Site Preparation	Graders	1	8	187	0.41
Grading	Graders	1	6	187	0.41
Grading	Rubber Tired Dozers	1	6	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7	97	0.37
Water Projects	Crawler Tractor	2	8	212	0.49
Water Projects	Excavators	4	8	158	0.67
Water Projects	Signal Boards	4	8	6	0.76
Water Projects	Graders	2	6	187	0.41
Water Projects	Rollers	2	7	80	0.38
Water Projects	Rubber Tired Loaders	1	6	247	0.40
Water Projects	Scrapers	4	8	367	0.53
Water Projects	Air Compressors	1	6	78	0.48
Water Projects	Generators	1	8	84	0.16
Water Projects	Plate Compactors	1	8	8	0.55
Water Projects	Pumps	1	8	84	0.50
Water Projects	Rough Terrain Forklifts	1	8	100	0.63
Water Projects	Tractors/Loaders/Backhoes	6	6	97	0.37
Water Projects	Pavers	1	6	130	0.42
Water Projects	Paving Equipment	1	8	132	0.36
Building Construction	Cranes	1	6	231	0.29
Building Construction	Forklifts	1	6	89	0.20
Building Construction	Generator Sets	1	8	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6	97	0.37
Building Construction	Welders	3	8	46	0.45
Paving	Cement and Mortar Mixers	1	6	9	0.56
Paving	Pavers	1	6	130	0.42
Paving	Paving Equipment	1	8	132	0.36
Paving	Rollers	1	7	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8	97	0.37
Architectural Coating	Air Compressors	1	6	78	0.48

SOURCE: CARB CalEEMod Version 2016.3.2 and SMAQMD Road Construction Emissions Model Version 9.0.0.

Table 5 provides the estimated short-term construction emissions that would be associated with the proposed project and compares those emissions to the BAAQMD's significance thresholds for construction exhaust emissions. As the construction phases (i.e., grading, building construction,

paving, etc.) are sequential, the average daily construction period emissions (i.e., total construction period emissions divided by the number of construction days) were compared to the BAAQMD significance thresholds. All construction-related emissions would be below the BAAQMD significance thresholds. Based on the CalEEMod and using standard fuel consumption estimates, construction activities would require 77,650 gallons of diesel fuel.[32]

Table 5: Estimated Proposed Project Daily Construction Emissions (pounds)

Condition	ROG	NOx	PM10	PM2.5	CO
	Unmitigated				
Construction	6.40	20.3	0.86	0.80	18.4
Significance Threshold	54	54	82	54	---
Significant (Yes or No)?	No	No	No	No	No
	Mitigated				
Construction	5.12	7.69	0.05	0.05	19.0
Significance Threshold	54	54	82	54	---
Significant (Yes or No)?	No	No	No	No	No

SOURCE: CARB CalEEMod Version 2016.3.2 and SMAQMD Road Construction Emissions Model Version 9.0.0.
NOTE: Mitigated construction emissions estimates assume implementation of Mitigation Measures AQ-1 through AQ-4.

Nevertheless, BAAQMD's *CEQA Air Quality Guidelines* require a number of best management practices to control fugitive dust and exhaust emissions. The following measures shall be implemented by the construction contractor:

> ***Mitigation Measure AQ-1:*** *BAAQMD Required Fugitive Dust Control Measures:* The construction contractor shall reduce construction-related air pollutant emissions by implementing BAAQMD's basic fugitive dust control measures, including:
>
> - All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
> - All haul trucks transporting soil, sand, or other loose material off site shall be covered.
> - All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
> - All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.

[32] Fuel usage is estimated using the CalEEMod output for CO2, and a kgCO2/gallon conversion factor, as cited in the *U.S. Energy Information Administration Voluntary Reporting of Greenhouse Gases Program*, https://www.eia.gov/environment/pdfpages/0608s(2009)index.php

- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- A publically visible sign shall be posted with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action with 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Mitigation Measure AQ-2: *BAAQMD Required Basic Exhaust Emissions Reduction Measures.* The construction contractor shall implement the following measures during construction to reduce construction-related exhaust emissions:

- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

Mitigation Measure AQ-3: *BAAQMD Regulation 8, Rule 3 for Architectural Coatings.* Emissions of VOC due to the use of architectural coatings are regulated by the limits contained in Regulation 8: Organic Compounds, Rule 3: Architectural Coatings (Rule 8-3). Rule 8-3 was revised on January 1, 2011 to include more stringent VOC limit requirements. The revised VOC architectural coating limits specify that the use paints and solvents with a VOC content of 100 grams per liter or less for interior and 150 grams per liter or less for exterior surfaces shall be required.

Notably, estimated annual average daily construction emissions that would be associated with a 50 units per acre condition (similar to the proposed project) would be expected to be approximately 15 percent higher than the estimated annual average daily construction emissions that would be associated with a 30 units per acre condition.

5.3 Operational Impacts

CalEEMod was used to estimate emissions that would be associated with motor vehicle use, space and water heating, and landscape maintenance emissions expected to occur after the proposed project construction is complete and operational. The proposed project land use types and size and other project-specific information were input to the model. CalEEMod provides emissions for transportation, areas sources, electricity consumption, natural gas combustion, electricity

usage associated with water usage and wastewater discharge, and solid waste land filling and transport. CalEEMod output worksheets are included in **Attachment A: CalEEMod Output Files**.

Annual electricity and natural gas consumption were calculated using the demand factors provided in CalEEMod. The proposed project's building and parking lot lighting energy consumption was estimated to be approximately 813,204 kilowatt-hours (kWh) of electricity per year and natural gas consumption was estimated to be approximately 0.86 million British Thermal Units (BTU) per year. The daily weekday trip rate of 5.43 weekday trips per dwelling unit and 12.3 weekday trips per 1,000 square feet of office space was used to estimate mobile vehicle emissions.[33] The estimated annual vehicle miles traveled for the proposed project would be approximately 1,173,932 miles, requiring approximately 55,610 gallons of gasoline.

Estimated daily and annual operational emissions that would be associated with the proposed project are presented in **Tables 6 and 7** and are compared to BAAQMD's thresholds of significance. As indicated in **Tables 6 and 7**, the estimated proposed project operational emissions would be below the BAAQMD's significance thresholds and would be less than significant.

Table 6: Estimated Proposed Project Daily Operational Emissions (pounds)

Condition	ROG	NOx	PM10	PM2.5	CO
Summer	3.76	4.51	2.75	0.79	14.5
Winter	3.65	4.65	2.75	0.80	14.6
Maximum Daily Proposed Project	**3.76**	**4.65**	**2.75**	**0.80**	**14.6**
Significance Threshold	54	54	82	54	---
Significant Impact?	No	No	No	No	No

SOURCE: CARB CalEEMod Version 2016.3.2.

Table 7: Estimated Proposed Project Annual Operational Emissions (tons)

Condition	ROG	NOx	PM10	PM2.5	CO
Annual Proposed Project	**0.64**	**0.78**	**0.45**	**0.13**	**1.90**
Significance Threshold	10	10	15	10	---
Significant (Yes or No)?	No	No	No	No	No

SOURCE: CalEEMod Version 2016.3.2.

Notably, estimated annual operational emissions that would be associated with a 50 units per acre condition (similar to the proposed project) would be expected to be approximately 70 percent higher than the estimated annual operational emissions that would be associated with a 30 units per acre condition.

[33] Fehr & Peers, *MidPen Mixed-Use Project Transportation Impact Analysis*. August 2019.

5.4 Cumulative Impacts

As shown, project-related emissions would be less than the BAAQMD significance thresholds. The BAAQMD *CEQA Air Quality Guidelines* recommend that cumulative air quality effects from criteria air pollutants also be addressed by comparison to the mass daily and annual thresholds. These thresholds were developed to identify a cumulatively considerable contribution to a significant regional air quality impact. Project-related emissions would be below the significance thresholds. Therefore, the proposed project would not be cumulatively considerable and cumulative impacts would be less than significant.

5.5 Health Impacts

The proposed project would constitute a new emission source of DPM and $PM_{2.5}$ due to its construction activities. Studies have demonstrated that DPM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to DPM poses a chronic health risk. The proposed project would also locate sensitive receptors near existing permitted stationary sources and major roadways.

Health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. Individual cancer risk is the likelihood that a person exposed to air toxic concentrations over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology. The maximally exposed individual (MEI) represents the worst–case risk estimate, based on a theoretical person continuously exposed for a lifetime at the point of highest compound concentration in the air. This is a highly conservative assumption, since most people do not remain at home all day and on average residents change residences every 11 to 12 years. In addition, this assumption assumes that residents are experiencing outdoor concentrations for the entire exposure period.

This HRA analyzes the incremental cancer risks to sensitive receptors in the vicinity of the proposed project, using emission rates (in pounds per hour) from CARB's CalEEMod emission model. DPM (reported as exhaust emissions of $PM_{2.5}$) emission rates were input into the USEPA's AERMOD atmospheric dispersion model to calculate ambient air concentrations at receptors in the proposed project vicinity. This HRA is intended to provide a worst–case estimate of the increased exposure by employing a standard emission estimation program, an accepted pollutant dispersion model, approved toxicity factors, and conservative exposure parameters.

In accordance with OEHHA *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments,* this HRA was accomplished by applying the highest estimated concentrations of TAC at the receptors analyzed to the established cancer potency factors and acceptable reference concentrations for non-cancer health effects. Increased cancer risks were calculated using the modeled DPM concentrations and OEHHA-recommended methodologies for both a

child exposure (3rd trimester through two years of age) and adult exposure. The cancer risk calculations were based on applying the OEHHA-recommended age sensitivity factors and breathing rates, as well as fraction of time at home and an exposure duration of 30 years, to the DPM concentration exposures. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing air pollutants. The supporting methodology and assumptions used in this HRA are provided in **Attachment B: Health Risk Assessment Methodology, Assumptions, and Results**.

These conservative methodologies overestimate both non-carcinogenic and carcinogenic health risk, possibly by an order of magnitude or more. Therefore, for carcinogenic risks, the actual probabilities of cancer formation in the populations of concern due to exposure to carcinogenic pollutants are likely to be lower than the risks derived using the HRA methodology. The extrapolation of toxicity data in animals to humans, the estimation of concentration prediction methods within dispersion models; and the variability in lifestyles, fitness and other confounding factors of the human population also contribute to the overestimation of health impacts. Therefore, the results of this HRA are highly overstated.

Health Impacts on Existing Residences

The following describes the HRA results associated with existing receptors due to unmitigated proposed project construction activities. The maximum cancer risk from unmitigated proposed project construction emissions for a residential-adult receptor would be 10.3 per million and for a residential-child receptor would be 100 per million. As shown in **Table 8**, the total maximum cancer risk from unmitigated proposed project construction emissions for a residential receptor would be 100 per million.[34] The maximum concentrations would occur at a residential receptor (also known as the maximum exposed individual or MEI) to the west of the proposed project. Thus, the cancer risk due to construction activities are potentially above the BAAQMD threshold of 10 per million and would be potentially significant.

Table 8: Estimated Unmitigated Health Impacts for Existing Receptors

Source	Cancer Risk (adult/child)	Hazard Impact (acute/chronic)	$PM_{2.5}$ Concentration
Unmitigated Proposed Project Construction	10.3/100	1.03/0.26	1.30
Total Proposed Project	**10.3/100**	**1.03/0.26**	**1.30**
Significance Threshold	10	1.0	0.3
Potentially Significant (Yes or No)?	**Yes**	**Yes**	**Yes**

[34] This theoretical individual would be born on construction year 1 and subsequently be exposed to the full construction period. Individuals born after construction year 1 would be exposed to shorter construction duration and thus, result in a lower risk and health impacts.

Therefore, the proposed project would be required to implement **Mitigation Measure AQ-4** BAAQMD's *Enhanced Exhaust Emission Reduction Measures*.

> ***Mitigation Measure AQ-4:*** *BAAQMD Enhanced Exhaust Emissions Reduction Measures.* The applicant shall implement the following measures during construction to further reduce construction-related exhaust emissions:
>
> All off-road equipment greater than 25 horsepower (hp) and operating for more than 20 total hours over the entire duration of construction activities shall meet the following requirements:
>
> 1. Where access to alternative sources of power are available, portable diesel engines shall be prohibited; and
> 2. All off-road equipment shall have engines that meet or exceed either USEPA or CARB Tier 4 off-road emission standards

As shown in **Table 9**, with the implementation of **Mitigation Measure AQ-4**, the maximum cancer risk from mitigated proposed project construction for a residential-adult receptor would be 0.65 per million and for a residential-child receptor would be 6.39 per million. The total maximum cancer risk from mitigated proposed project construction emissions for a residential receptor would be 6.39 per million. Thus, the cancer risk due to construction activities and project operations would be below the BAAQMD threshold of 10 per million and would be less than significant with mitigation.

Table 9: Estimated Mitigated Health Impacts for Existing Receptors

Source	Cancer Risk (adult/child)	Hazard Impact (acute/chronic)	$PM_{2.5}$ Concentration
Mitigated Proposed Project Construction	0.65/6.39	0.06/0.02	0.08
Total Proposed Project	**0.65/6.39**	**0.06/0.02**	**0.08**
Significance Threshold	10	1.0	0.3
Potentially Significant (Yes or No)?	No	No	No

Non-Cancer Health Hazard Associated with Existing Receptors

Both acute (short-term) and chronic (long-term) adverse health impacts unrelated to cancer are measured against a hazard index (HI), which is defined as the ratio of the predicted incremental DPM exposure concentration from the proposed project to a reference exposure level (REL) that could cause adverse health effects. The REL are published by OEHHA based on epidemiological research. The ratio (referred to as the Hazard Quotient [HQ]) of each non-carcinogenic substance that affects a certain organ system is added to produce an overall HI for that organ system. The overall HI is calculated for each organ system. The impact is considered to be significant if the overall HI for the highest-impacted organ system is greater than 1.0.

There is no acute REL for DPM. However, diesel exhaust does contain acrolein, formaldehyde and other compounds, which do have an acute REL. Based on DPM speciation data, acrolein emissions are approximately 1.3 percent of the total DPM emissions.[35] The acute REL for acrolein was established by the California OEHHA[36] as 2.5 µg/m^3. In total, acrolein emissions represent over 90 percent of the acute health impacts from diesel engines.

The unmitigated acute HI would be 1.03, based on a project-related maximum 1-hour diesel concentration of 199 µg/m^3, respectively (per dispersion modeling analysis) and acrolein speciation of 1.3 percent for DPM or 199 µg/m^3/2.5 µg/m^3 times 1.3 percent, which is 1.03. The mitigated acute HI would be 0.06. The acute HI would be below the project-level threshold of 1 and the impact of the proposed project would therefore be less than significant.

The chronic reference exposure level for DPM was established by the California OEHHA[37] as 5 µg/m^3. Thus, the proposed project-related annual concentration of DPM cannot exceed 5.0 µg/m^3; resulting in a chronic acute HI of greater than 1.0 (i.e., DPM annual concentration/5.0 µg/m^3).

The unmitigated chronic HI would be 0.26, based on a proposed project-related maximum annual diesel concentration of 1.30 µg/m^3 (per dispersion modeling analysis) or 1.30 µg/m^3/5.0 µg/m^3, which is 0.26. The mitigated chronic HI would be 0.02. The chronic HI would be below the project-level threshold of 1 and the impact of the proposed project would therefore be less than significant.

$PM_{2.5}$ Concentration

Dispersion modeling also estimated the exposure of sensitive receptors to project-related concentrations of $PM_{2.5}$. The BAAQMD *Air Quality Guidelines* requires inclusion only of $PM_{2.5}$ exhaust emissions in this analysis (i.e., fugitive dust emissions are addressed under BAAQMD dust control measures which are required by law to be implemented during project construction). The proposed project's unmitigated annual $PM_{2.5}$ concentration from construction activities would be 1.30 µg/m^3. With implementation of **Mitigation Measure AQ-4**, the annual $PM_{2.5}$ concentration would be reduced to 0.08 µg/m^3. Thus, the annual $PM_{2.5}$ concentration due to project construction would be below the BAAQMD threshold of 0.3 µg/m^3 and would be considered less than significant.

[35] California Air Resources Board Speciation Profile 818 for Off-Road Diesel Emissions (Building Construction - Diesel)

[36] California Office of Environmental Health Hazards Assessment - Acute, 8-hour, and Chronic Reference Exposure Levels, June 2014, http://www.oehha.ca.gov/air/allrels.html

[37] California Office of Environmental Health Hazards Assessment - Acute, 8-hour, and Chronic Reference Exposure Levels, June 2014, http://www.oehha.ca.gov/air/allrels.html

Health Impacts on Proposed Residences

The following describes the health risk assessment associated with proposed residences as a result of existing cumulative sources such as permitted sources (i.e., diesel generators, boilers, gasoline stations), major roadways, rail activities, etc.

The BAAQMD's *CEQA Air Quality Guidelines* include standards and methods for determining the significance of cumulative health risk impacts. The method for determining cumulative health risk requires the tallying of health risk from permitted stationary sources, major roadways and any other identified substantial air toxic sources in the vicinity of a project site (i.e., within a 1,000-foot radius) and then adding the individual sources to determine whether the BAAQMD's cumulative health risk thresholds are exceeded.

Table 10 the cumulative cancer risks, hazard indexes, and $PM_{2.5}$ concentrations (in $\mu g/m^3$) impacting the proposed residences from existing emission sources within 1,000 feet of the project site. The maximum cancer risk from Mission Boulevard would be 85.3 and 64.6 per million for the first floor and second floor residences, respectively. The cancer risk from Whipple Road would be 5.5 per million. The cancer risk from a nearby service station would be 16.2 per million and The cancer risk from a nearby service station would be 4.8 per million.

The cumulative cancer risk of 112 and 91.1 per million for the first floor and second floor residences, respectively. Theerfore, the cumulative cancer risk would be above the BAAQMD cumulative significance threshold of 100 per million for new residential receptors on the first floor but less than the BAAQMD cumulative significance threshold of 100 per million for new residential receptors on the second floor or higher. Thus, the proposed project would be a potentailly significant health impact on proposed receptors. The maximum impacts to $PM_{2.5}$ concentrations would be 0.33 $\mu g/m^3$, which is less than the cumulative significance threshold of 0.80 $\mu g/m^3$.

Table 10: Estimated Unmitigated Health Impacts for Proposed Project Receptors

Source	Cancer Risk	Hazard Impact	$PM_{2.5}$ Concentration
Mission Boulevard	85.3	0.032	0.22
Whipple Road	5.53	0	0.10
Mission Shell	16.2	0.08	0
Pacific Bell/AT&T	4.77	0.008	0.006
Cumulative Impact	**112**	**0.12**	**0.33**
Significance Threshold	100	10	0.8
Potentially Significant (Yes or No)?	**Yes**	No	No

SOURCE: Bay Area Air Quality Management District, *Highway Screening Analysis Tool*, May 2011, Bay Area Air Quality Management District, *Stationary Source Risk & Hazard Analysis Tool*, May 2011, Bay Area Air Quality Management District, *Rail Activities Screening Analysis Tool*, 2016, and Email from Areana Flores at BAAQMD on June 18, 2019 - Stationary Source Inquiry Form Request – Union City MidPen Housing.

Therefore, for first floor residences within 75 feet of Mission Boulevard, the proposed project would be required to implement **Mitigation Measure AQ-5**; *Proposed Receptor Exposure Reduction Measures*.

> ***Mitigation Measure AQ-5:*** *Proposed Receptor Exposure Reduction Measures*. The project applicant shall incorporate the following health risk reduction measures into the project. These features shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City:
>
> - Installation of air filtration to reduce cancer risks and particulate matter exposure for residents and other sensitive populations in the project that are in close proximity to sources of air pollution. Air filter devices shall be rated Minimum Efficiency Reporting Value (MERV)-13 or higher. MERV-13 air filters are considered high efficiency filters able to remove 80 percent of $PM_{2.5}$ from indoor air. MERV-13 air filters may reduce concentrations of DPM from mobile sources by approximately 53 percent and cancer risk by 42 percent. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required.
>
>   To ensure adequate health protection to sensitive receptors, a ventilation system should meet the following minimal design standards:
>
>   - A MERV-13, or higher, rating that represents a minimum of 80 percent efficiency to capture fine particulates;
>   - At least one air exchange(s) per hour of fresh outside filtered air;
>   - At least four air exchange(s) / hour recirculation; and
>   - At least 0.25 air exchange(s) per hour in unfiltered infiltration.
> - Where appropriate, install passive electrostatic filtering systems, especially those with low air velocities (i.e., one mph).
> - The project shall be designed to locate sensitive receptors as far away as feasible from the source(s) of air pollution. Operable windows, balconies, and building air intakes shall be located as far away from these sources as feasible.
> - Planting trees and/or vegetation between sensitive receptors and pollution source, if feasible. Trees that are best suited to trapping PM shall be planted, including one or more of the following: Pine (Pinus nigra var. maritima), Cypress (X Cupressocyparis leylandii), Hybrid poplar (Populus deltoids X trichocarpa), and Redwood (Sequoia sempervirens).

Table 11 the cumulative cancer risks, hazard indexes, and $PM_{2.5}$ concentrations (in $\mu g/m^3$) impacting the proposed residences from existing emission sources within 1,000 feet of the project site with mitigation measures. With **Mitigation Measure AQ-5**, the cumulative cancer risk, 91.1 per million[38], would be below the BAAQMD cumulative significance threshold of 100 per million for new residential receptors. Thus, the proposed project would be a less than significant health impact on proposed receptors. The maximum impacts to $PM_{2.5}$ concentrations would be 0.33 $\mu g/m^3$, which is less than the cumulative significance threshold of 0.80 $\mu g/m^3$. Therefore, health impacts associated with the proposed project residences would be ***less than significant with mitigation***.

Table 11: Estimated Mitigated Health Impacts for Proposed Project Receptors

Source	Cancer Risk	Hazard Impact	$PM_{2.5}$ Concentration
Mission Boulevard	64.6	0.032	0.22
Whipple Road	5.53	0	0.10
Mission Shell	16.2	0.08	0
Pacific Bell/AT&T	4.77	0.008	0.006
Cumulative Impact	**91.1**	**0.12**	**0.33**
Significance Threshold	100	10	0.8
Potentially Significant (Yes or No)?	No	No	No

SOURCE: Bay Area Air Quality Management District, *Highway Screening Analysis Tool*, May 2011, Bay Area Air Quality Management District, *Stationary Source Risk & Hazard Analysis Tool*, May 2011, Bay Area Air Quality Management District, *Rail Activities Screening Analysis Tool*, 2016, and Email from Areana Flores at BAAQMD on June 18, 2019 - Stationary Source Inquiry Form Request – Union City MidPen Housing.

5.6 Odor Impacts

Though offensive odors from stationary and mobile sources rarely cause any physical harm, they still remain unpleasant and can lead to public distress, generating citizen complaints to local governments. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors.

The BAAQMD's significance criteria for odors are subjective and are based on the number of odor complaints generated by a project. Generally, the BAAQMD considers any project with the potential to frequently expose members of the public to objectionable odors to cause a significant impact. With respect to the proposed project, diesel-fueled construction equipment exhaust would generate some odors. However, these emissions typically dissipate quickly and would be unlikely to affect a substantial number of people. The proposed project would not involve operational activities that generate odors.

[38] Second floor residence without **Mitigation Measure AQ-5**; first floor residence cancer risk would be 65.0 per million (or 112 times 58 percent) with **Mitigation Measure AQ-5**.

Generally, odor emissions are highly dispersive, especially in areas with higher average wind speeds. However, odors disperse less quickly during inversions or during calm conditions, which hamper vertical mixing and dispersion. Therefore, odor impacts associated with the location of the proposed project would be less than significant.

6.0 GREENHOUSE GAS ANALYSIS

"Global warming" and "global climate change" are the terms used to describe the increase in the average temperature of the earth's near-surface air and oceans since the mid-20th century and its projected continuation. Warming of the climate system is now considered to be unequivocal, with global surface temperature increasing approximately 1.33 degrees Fahrenheit (°F) over the last 100 years. Continued warming is projected to increase global average temperature between 2 and 11°F over the next 100 years.

Natural processes and human actions have been identified as the causes of this warming. The International Panel on Climate Change concludes that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. After 1950, however, increasing GHG concentrations resulting from human activity such as fossil fuel burning and deforestation have been responsible for most of the observed temperature increase. These basic conclusions have been endorsed by more than 45 scientific societies and academies of science, including all of the national academies of science of the major industrialized countries. Since 2007, no scientific body of national or international standing has maintained a dissenting opinion.

Increases in GHG concentrations in the earth's atmosphere are thought to be the main cause of human-induced climate change. GHG naturally trap heat by impeding the exit of solar radiation that has hit the earth and is reflected back into space. Some GHG occur naturally and are necessary for keeping the earth's surface inhabitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have decreased the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature.

Gases that trap heat in the atmosphere are referred to as GHG because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHG has been implicated as the driving force for global climate change. The primary GHG are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), ozone, and water vapor.

While the presence of the primary GHG in the atmosphere are naturally occurring, CO_2, CH_4, and N_2O are also emitted from human activities, accelerating the rate at which these compounds occur within earth's atmosphere. Emissions of CO_2 are largely by-products of fossil fuel combustion,

whereas methane results from off-gassing associated with agricultural practices and landfills. Other GHG include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and are generated in certain industrial processes.

CO_2 is the reference gas for climate change because it is the predominant GHG emitted. The effect that each of the aforementioned gases can have on global warming is a combination of the mass of their emissions and their global warming potential (GWP). GWP indicates, on a pound-for-pound basis, how much a gas is predicted to contribute to global warming relative to how much warming would be predicted to be caused by the same mass of CO_2. CH_4 and N_2O are substantially more potent GHG than CO_2, with GWP of 25 and 310 times that of CO_2, respectively.

In emissions inventories, GHG emissions are typically reported in terms of pounds or metric tons (MT) of CO_2 equivalents (CO_2e). CO_2e are calculated as the product of the mass emitted of a given GHG and its specific GWP. While CH_4 and N_2O have much higher GWP than CO_2, CO_2 is emitted in such vastly higher quantities that it accounts for the majority of GHG emissions in CO_2e.

Fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles, has led to substantial increases in CO_2 emissions (and thus substantial increases in atmospheric concentrations of CO_2). In pre-industrial times (c. 1860), concentrations of atmospheric CO_2 were approximately 280 parts per million (ppm). By June of 2019, atmospheric CO_2 concentrations had increased to 414 ppm, 48 percent percent above pre-industrial concentrations.[39] There is international scientific consensus that human-caused increases in GHG have contributed and will continue to contribute to global warming.

There is international scientific consensus that human-caused increases in GHG have and will continue to contribute to global warming. Potential global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.[40]

California Green Building Standards Code

California Code of Regulations Title 24, Part 6 and Part 11 (California Green Building Standards Code)[41], which relate to energy and green building and commonly referred to as CALGreen, is a comprehensive and uniform regulatory code for all residential, commercial and school buildings.

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[39] Earth System Research Laboratory, *Recent Monthly Mean CO_2 at Mauna Lora*, www.esrl.noaa.gov/gmd/ccgg/trends/

[40] California Environmental Protection Agency, *2006 Final Climate Action Team Report to the Governor and Legislature*, March 2006, http://www.climatechange.ca.gov/climate_action_team/reports/2006report/2006-04-03_FINAL_CAT_REPORT.PDF

[41] California Code of Regulations Title 24, Part 11, http://www.bsc.ca.gov/Home/CALGreen.aspx

CALGreen contains requirements for construction site selection, storm water control during construction, construction waste reduction, indoor water use reduction, material selection, natural resource conservation, site irrigation conservation, and more. CALGreen provides for design options allowing the designer to determine how best to achieve compliance for a given site or building condition. CALGreen also requires building commissioning, which is a process for verifying that all building systems, like heating and cooling equipment and lighting systems, are functioning at their maximum efficiency. The following provides examples of CALGreen requirements:

- **Designated parking.** Provide designated parking in commercial projects for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles.
- **Recycling by Occupants.** Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling.
- **Construction waste.** A minimum 50-percent diversion of construction and demolition waste from landfills, increasing voluntarily to 65 and-75 percent for new homes and 80-percent for commercial projects. All (100 percent) of trees, stumps, rocks and associated vegetation and soils resulting from land clearing shall be reused or recycled.
- **Wastewater reduction.** Each building shall reduce the generation of wastewater by installation of water-conserving fixtures or using nonpotable water systems.
- **Water use savings.** 20-percent mandatory reduction in indoor water use with voluntary goal standards for 30, 35, and 40-percent reductions.
- **Water meters.** Separate water meters for buildings in excess of 50,000 square feet or buildings projected to consume more than 1,000 gallons per day.
- **Irrigation efficiency.** Moisture-sensing irrigation systems for larger landscaped areas.
- **Materials pollution control.** Low-pollutant emitting interior finish materials such as paints, carpet, vinyl flooring, and particleboard.
- **Building commissioning.** Mandatory inspections of energy systems (i.e. heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity according to their design efficiencies.

Executive Order S-3-05

Governor Schwarzenegger established Executive Order S-3-05 in 2005, in recognition of California's vulnerability to the effects of climate change. Executive Order S-3-05 set forth a series of target dates by which statewide emissions of GHG would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

The executive order directed the Secretary of the CalEPA to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The Secretary will also submit biannual reports to the governor and California Legislature describing the progress made toward the emissions targets, the impacts of global climate change on California's resources, and mitigation and adaptation plans to combat these impacts. To comply with the executive order, the secretary of CalEPA created the California Climate Action Team, made up of members from various state agencies and commissions. The team released its first report in March 2006. The report proposed to achieve the targets by building on the voluntary actions of California businesses, local governments, and communities and through state incentive and regulatory programs.

Assembly Bill 32 (California Global Warming Solutions Act of 2006)

California passed the California Global Warming Solutions Act of 2006 (AB 32; California Health and Safety Code Division 25.5, Sections 38500 - 38599). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished by enforcing a statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires CARB to adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrived at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state reduces GHG emissions enough to meet the cap. AB 32 also includes guidance on instituting emissions reductions in an economically efficient manner, along with conditions to ensure that businesses and consumers are not unfairly affected by the reductions. Using these criteria to reduce statewide GHG emissions to 1990 levels by 2020 would represent an approximate 25 to 30 percent reduction in current emissions levels. However, CARB has discretionary authority to seek greater reductions in more significant and growing GHG sectors, such as transportation, as compared to other sectors that are not anticipated to significantly increase emissions. Under AB 32, CARB must adopt regulations to achieve reductions in GHG to meet the 1990 emissions cap by 2020.

Climate Change Scoping Plan

AB 32 required CARB to develop a Scoping Plan that describes the approach California will take to reduce GHG to achieve the goal of reducing emissions to 1990 levels by 2020. The Scoping Plan was first approved by CARB in 2008 and must be updated every five years. The initial AB 32 Scoping Plan contains the main strategies California will use to reduce the GHG that cause climate change. The initial Scoping Plan has a range of GHG reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 program implementation fee regulation to fund the program. In August 2011, the initial Scoping Plan was approved by CARB.

The 2013 Scoping Plan Update builds upon the initial Scoping Plan with new strategies and recommendations. The 2013 Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The 2013 Update defines CARB climate change priorities for the next five years and sets the groundwork to reach California's long-term climate goals set forth in Executive Orders S-3-05 and B-16-2012. The 2013 Update highlights California progress toward meeting the near-term 2020 GHG emission reduction goals defined in the initial Scoping Plan. In the 2013 Update, nine key focus areas were identified (energy, transportation, agriculture, water, waste management, and natural and working lands), along with short-lived climate pollutants, green buildings, and the cap-and-trade program. On May 22, 2014, the First Update to the Climate Change Scoping Plan was approved by the Board, along with the finalized environmental documents.

Executive Order No. B-30-15

On April 29, 2015, Executive Order No. B-30-15 was issued to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. Executive Order No. B-30-15 sets a new, interim, 2030 reduction goal intended to provide a smooth transition to the existing ultimate 2050 reduction goal set by Executive Order No. S-3-05 (signed by Governor Schwarzenegger in June 2005). It is designed so State agencies do not fall behind the pace of reductions necessary to reach the existing 2050 reduction goal. Executive Order No. B-30-15 orders "All State agencies with jurisdiction over sources of GHG emissions shall implement measures, pursuant to statutory authority, to achieve reductions of GHG emissions to meet the 2030 and 2050 targets." The Executive Order also states that "CARB shall update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent." The CARB is currently moving forward with a second update to the Climate Change Scoping Plan to reflect the 2030 reduction target. The updated Scoping Plan will provide a framework for achieving the 2030 target. In September of 2016, the AB 32 was extended to achieve reductions in GHG of 40

percent below 1990 levels by 2030. The new plan, outlined in SB 32, involves increasing renewable energy use, putting more electric cars on the road, improving energy efficiency, and curbing emissions from key industries.

City of Union City Climate Action Plan

The City of Union City's Climate Action Plan[42] presents a strategy to achieve the City Council's goal of reducing GHG emissions 20 percent below 2005 levels the year 2020. The Climate Action Plan presents GHG reduction measures for land use, transportation, buildings and energy, waste diversion and reduction, water conservation and green infrastructure sectors. The Climate Action Plan does not contain any specific measures that are applicable to the proposed project. The Climate Action Plan measures are focused on actions the City must take and not developers.

Greenhouse Gas Regional Emission Estimates

Worldwide emissions of GHG in 2014 were 45.7 billion tons of CO_2e per year.[43] This value includes ongoing emissions from industrial and agricultural sources, but excludes emissions from land use changes.

In 2016, the United States emitted about 6,511 million metric tons of CO_2. Total U.S. emissions have increased by 2.4 percent from 1990 to 2016, and emissions decreased from 2015 to 2016 by 1.9 percent (126.8 million metric tons of CO_2). The decrease in total GHG emissions between 2015 and 2016 was driven in large part by a decrease in CO_2 emissions from fossil fuel combustion. The decrease in CO_2 emissions from fossil fuel combustion was a result of multiple factors, including substitution from coal to natural gas and other non-fossil energy sources in the electric power sector; and warmer winter conditions in 2016 resulting in a decreased demand for heating fuel in the residential and commercial sectors. Of the five major sectors nationwide — residential and commercial, industrial, agriculture, transportation, and electricity— electricity accounts for the highest fraction of GHG emissions (approximately 28 percent), closely followed by transportation (approximately 28 percent) and by industry (approximately 22 percent).[44]

In 2016, California emitted approximately 429.4 million tons of CO_2e. This represents approximately 6.6 percent of total U.S. emissions. This large number is due primarily to the sheer size of California compared to other states. California's gross emissions of GHGs decreased by

[42] City of Union City, *Union City Climate Action Plan*, November 2010, https://www.unioncity.org/DocumentCenter/View/708/Union-City-Climate-Action-Plan-PDF?bidId=

[43] Climate Analysis Indicator Tool, http://cait.wri.org/

[44] United States Environmental Protections Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016*, April 2018, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2016

9.26 percent from 466.3 million metric tons of CO_2e in 2000, with a maximum of 492.7 million metric tons in 2004.[45]

In 2016, the composition of GHG emissions in California (expressed as CO_2e) were as follows:

- CO_2 accounted for 83 percent;
- CH_4 accounted for 9 percent;
- N_2O accounted for 3 percent; and
- Fluorinated gases (hydrofluorocarbons (HFCs), perfluorinated compounds (PFCs), and sulfur hexafluoride (SF_6)) accounted for 5 percent.

Of these gases, the transportation is the source of approximately 41 percent of the State's GHG emissions, followed by industrial sources at 23 percent and electricity generation (both in-State and out-of-State) at 16 percent. Agriculture is the source of approximately 8 percent, and residential activity is the source of about 7 percent, followed by commercial activities at 5 percent.[46]

In the San Francisco Bay Area, the GHG emissions inventory prepared by the BAAQMD indicates that the transportation and industrial/commercial sectors represent the largest sources of GHG emissions, accounting for 39.7 percent and 35.7 percent, respectively, of the Bay Area's 86.6 million tons of CO_2e emissions in 2011. Electricity/co-generation sources account for approximately 14 percent of the Bay Area's GHG emissions, followed by residential fuel usage at approximately 7.7 percent. Off-road equipment sources currently account for approximately 1.5 percent of total Bay Area GHG emissions.[47]

The Union City community-wide inventory includes GHG emissions from activities such as electricity use, natural gas use, on-road transportation, solid waste disposal, water and wastewater, off-road equipment, agriculture, and stationary sources. The results of the baseline inventory estimate that the City generated 342,297 metric tons of CO_2e for the year 2005. Building energy emissions represent the largest sources of community emissions (approximately 54 percent). Building energy is often one of the largest sources of GHG emissions in community inventories and includes energy consumed for heating, cooling, lighting, and cooking in the residential, commercial, and industrial sectors. Building energy from residential units is 21 percent of the total community GHG emissions and building energy from non-residential units

[45] California Air Resources Board, *Emissions Trends Report 2000-2016*, July 11, 2018, https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_trends_00-16.pdf

[46] California Air Resources Board, *Emissions Trends Report 2000-2016*, July 11, 2018, https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_trends_00-16.pdf

[47] Bay Area Air Quality Management District, *Bay Area Emissions Inventory*, Adopted June 2011, Updated January 2015, http://www.baaqmd.gov/~/media/files/planning-and-research/emission-inventory/ by2011_ghgsummary.pdf

is 33 percent of the total community GHG emissions. Transportation emissions represent the second largest sources of community emissions (approximately 37 percent).[48] The Union City community-wide inventory estimate that the City would generated 364,243 metric tons of CO_2e for the year 2020; a 6.4 percent increase over the baseline community-wide inventory.

Thresholds of Significance

BAAQMD has established separate thresholds of significance for operational GHG emissions from stationary sources (such as generators, furnaces, and boilers) and non-stationary sources (such as on-road vehicles). As no threshold has been established for construction-related emissions, the operational emissions thresholds apply. The threshold for stationary sources is 10,000 metric tons of CO_2e per year (i.e., emissions above this level may be considered significant). For non-stationary sources, three separate thresholds have been established:

- Compliance with a Qualified Greenhouse Gas Reduction Strategy (i.e., if a project is found to be out of compliance with a Qualified Greenhouse Gas Reduction Strategy, its GHG emissions may be considered significant); or
- 1,100 metric tons of CO_2e per year (i.e., emissions above this level may be considered significant), representing a bright line threshold; or
- 4.6 metric tons of CO_2e per service population per year (i.e., emissions above this level may be considered significant), representing an efficiency threshold. Service population is the sum of residents/students/employees expected for a development project.

6.1 Greenhouse Gas Emissions

CalEEMod was used to quantify GHG emissions associated with construction activities, as well as long-term operational emissions produced by motor vehicles, natural gas combustion for space and water heating, electricity use, and landscape maintenance equipment. CalEEMod incorporates GHG emission factors for the central electric utility serving the Bay Area and mitigation measures based on the California Air Pollution Control Officer's Association (CAPCOA) *Quantifying Greenhouse Gas Mitigation Measures*[49] and the *California Climate Action Registry General Reporting Protocol*[50].

CalEEMod incorporates GHG emission factors for the central electric utility serving the Bay Area. Default rates for energy consumption were assumed in the model. Emissions rates associated

[48] City of Union City, *Union City Climate Action Plan*, November 2010, https://www.unioncity.org/DocumentCenter/View/708/Union-City-Climate-Action-Plan-PDF?bidId=

[49] California Air Pollution Control Officer's Association *Quantifying Greenhouse Gas Mitigation Measures*, August 2010, http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

[50] California Climate Action Registry General Reporting Protocol, April 2008, http://www.climateactionreserve.org/wp-content/uploads/videos/GRP_V3_April%202008_FINAL.pdf

with electricity consumption were adjusted to account for Pacific Gas & Electric utility's projected CO_2 intensity rate. This projected CO_2 intensity rate is based, in part, on the requirement of a renewable energy portfolio standard of 33 percent by the year 2020. CalEEMod uses a default rate of 641 pounds of CO_2 per megawatt of electricity produced. The projected CO_2 intensity rate of 290 pounds of CO_2 per megawatt of electricity produced for 2024 (the first year of project operations) was used.[51]

The proposed project's estimated construction and operational GHG emissions are presented in **Table 12**. The estimated construction GHG emissions are approximately 788 metric tons of CO_2e. As indicated, 30-year amortized annual construction related GHG emissions would be approximately 26 metric tons of CO_2e. There is no BAAQMD CEQA significance threshold for construction-related GHG emissions. The GHG construction and operational emissions would be 719 metric tons per year, which is below the BAAQMD Bright line threshold of 1,100 metric tons. The applicant is pursuing a LEED Certification and is targeting to reach LEED Silver rating, which would further reduce the GHG emissions.

Table 12: Estimated Proposed Project Greenhouse Gas Emissions (metric tons)

Source	Annual CO_2e Metric Tons
Construction (30-year amortized)	26.3
Operations	
Area Sources	1.01
Energy	154
Mobile	495
Solid Waste	24.6
Water	17.8
Total Proposed Project Emissions	**719**
BAAQMD Bright line Threshold	1,100
Potentially Significant?	No

SOURCE: CARB CalEEMod Version 2016.3.2.

Notably, estimated annual GHG emissions that would be associated with a 50 units per acre condition (similar to the proposed project) would be expected to be approximately 65 percent higher than the estimated annual GHG emissions that would be associated with a 30 units per acre condition.

[51] PG&E, *Greenhouse Gas Emission Factors: Guidance for PG&E Customers*, November 2015, http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

6.2 Consistency with Assembly Bill 32

California passed the California Global Warming Solutions Act of 2006 (AB 32; California Health and Safety Code Division 25.5, Sections 38500 - 38599). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished by enforcing a statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires CARB to adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrived at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state reduces GHG emissions enough to meet the cap. AB 32 also includes guidance on instituting emissions reductions in an economically efficient manner, along with conditions to ensure that businesses and consumers are not unfairly affected by the reductions. Using these criteria to reduce statewide GHG emissions to 1990 levels by 2020 would represent an approximate 25 to 30 percent reduction in current emissions levels. However, CARB has discretionary authority to seek greater reductions in more significant and growing GHG sectors, such as transportation, as compared to other sectors that are not anticipated to significantly increase emissions. Under AB 32, CARB must adopt regulations to achieve reductions in GHG to meet the 1990 emissions cap by 2020. In September of 2016, AB 32 was extended to achieve reductions in GHG of 40 percent below 1990 levels by 2030. The new plan, outlined in SB 32, involves increasing renewable energy use, putting more electric cars on the road, improving energy efficiency, and curbing emissions from key industries.

The City of Union City adopted its Climate Action Plan in 2010. The Climate Action Plan will be a roadmap for how the City will reduce energy consumption and GHG emissions to meet State GHG emissions targets (AB 32). The principal State plan and policy adopted for the purpose of reducing GHG emissions is AB 32. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. Statewide plans and regulations such as GHG emissions standards for vehicles and the low carbon fuel standard are being implemented at the statewide level, and compliance at the specific plan or project level is not addressed. The assumption is that AB 32 will be successful in reducing GHG emissions and reducing the cumulative GHG emissions statewide by 2020. The State has taken these measures, because no project individually could have

a major impact (either positively or negatively) on the global concentration of GHG. Therefore, the proposed project would result in a significant impact if it would be in conflict with AB 32 State goals. The proposed project has been reviewed relative to the AB 32 measures and it has been determined that the proposed project would not conflict with the goals of AB 32.

Attachment A

Construction and Operational Emissions

CalEEMod Output Files

Proposed Project

- Annual
- Summer
- Winter
- Road Construction Emissions Model, Version 9.0.0

Union City MidPen Housing

Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	8.09	1000sqft	0.12	8,091.00	0
Enclosed Parking with Elevator	63.18	1000sqft	0.61	63,182.00	0
Apartments Mid Rise	81.00	Dwelling Unit	0.92	96,693.00	232

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	290	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - PG&E, November 2015

Land Use - Project Plans for 1.65 acres with 167,966 sq feet of total gross floor area (81 housing units (75,859 net rentable space, 63,182 sq ft of two level garage, and 8,091 sq feet of office space)

Construction Phase - No Demolition required with vacant lot, Construction schedule provided by applicant July 18, 2019

Grading - Site and Grading Plan (6-20-19)

Vehicle Trips - Traffic consultant data provided on July 22, 2019

Woodstoves - no woodstoves or fireplaces

Energy Use -

Construction Off-road Equipment Mitigation - BAAQMD Basic and Enhanced Mitigation Measures

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	2.00	10.00
tblConstructionPhase	NumDays	4.00	11.00
tblConstructionPhase	NumDays	200.00	320.00
tblConstructionPhase	NumDays	10.00	86.00
tblConstructionPhase	NumDays	10.00	11.00
tblFireplaces	FireplaceDayYear	11.14	0.00
tblFireplaces	FireplaceHourDay	3.50	0.00
tblFireplaces	FireplaceWoodMass	228.80	0.00
tblFireplaces	NumberGas	12.15	0.00
tblFireplaces	NumberNoFireplace	3.24	0.00
tblFireplaces	NumberWood	13.77	0.00
tblGrading	AcresOfGrading	4.13	1.50
tblGrading	AcresOfGrading	5.00	1.00
tblGrading	MaterialExported	0.00	2,432.00
tblLandUse	LandUseSquareFeet	81,000.00	96,693.00
tblLandUse	LotAcreage	0.19	0.12
tblLandUse	LotAcreage	1.45	0.61
tblLandUse	LotAcreage	2.13	0.92
tblProjectCharacteristics	CO2IntensityFactor	641.35	290

tblVehicleTrips	ST_TR	6.39	5.22
tblVehicleTrips	ST_TR	2.46	2.74
tblVehicleTrips	SU_TR	5.86	4.79
tblVehicleTrips	SU_TR	1.05	1.17
tblVehicleTrips	WD_TR	6.65	5.43
tblVehicleTrips	WD_TR	11.03	12.31
tblWoodstoves	NumberCatalytic	1.62	0.00
tblWoodstoves	NumberNoncatalytic	1.62	0.00
tblWoodstoves	WoodstoveDayYear	14.12	0.00
tblWoodstoves	WoodstoveWoodMass	582.40	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1135	0.9308	0.7785	1.8400e-003	0.0934	0.0387	0.1321	0.0393	0.0370	0.0763	0.0000	159.7521	159.7521	0.0218	0.0000	160.2976
2022	0.5393	1.7255	1.7687	3.9900e-003	0.0980	0.0700	0.1680	0.0264	0.0676	0.0940	0.0000	343.2149	343.2149	0.0415	0.0000	344.2511
2023	0.5871	0.0718	0.1106	2.0000e-004	4.5500e-003	3.7100e-003	8.2600e-003	1.2100e-003	3.5800e-003	4.7900e-003	0.0000	17.2424	17.2424	2.5600e-003	0.0000	17.3062
Maximum	**0.5871**	**1.7255**	**1.7687**	**3.9900e-003**	**0.0980**	**0.0700**	**0.1680**	**0.0393**	**0.0676**	**0.0940**	**0.0000**	**343.2149**	**343.2149**	**0.0415**	**0.0000**	**344.2511**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0322	0.3270	0.7987	1.8400e-003	0.0645	2.1800e-003	0.0666	0.0238	2.1500e-003	0.0259	0.0000	159.7520	159.7520	0.0218	0.0000	160.2975
2022	0.3808	0.6953	1.8147	3.9900e-003	0.0980	4.5500e-003	0.1026	0.0264	4.4900e-003	0.0309	0.0000	343.2146	343.2146	0.0415	0.0000	344.2508
2023	0.5799	8.4600e-003	0.1170	2.0000e-004	4.5500e-003	2.6000e-004	4.8100e-003	1.2100e-003	2.5000e-004	1.4700e-003	0.0000	17.2424	17.2424	2.5600e-003	0.0000	17.3062
Maximum	**0.5799**	**0.6953**	**1.8147**	**3.9900e-003**	**0.0980**	**4.5500e-003**	**0.1026**	**0.0264**	**4.4900e-003**	**0.0309**	**0.0000**	**343.2146**	**343.2146**	**0.0415**	**0.0000**	**344.2508**

Union City MidPen Housing - Alameda County, Annual

	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	**19.92**	**62.22**	**-2.73**	**0.00**	**14.78**	**93.78**	**43.56**	**23.24**	**93.63**	**66.72**	**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	**8-2-2021**	**11-1-2021**	0.6359	0.2109
2	**11-2-2021**	**2-1-2022**	0.5842	0.2230
3	**2-2-2022**	**5-1-2022**	0.5341	0.2116
4	**5-2-2022**	**8-1-2022**	0.5507	0.2173
5	**8-2-2022**	**11-1-2022**	0.5514	0.2180
6	**11-2-2022**	**2-1-2023**	0.6822	0.5840
7	**2-2-2023**	**5-1-2023**	0.4095	0.3547
		Highest	0.6822	0.5840

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	0.5200	6.9300e-003	0.6018	3.0000e-005		3.3300e-003	3.3300e-003		3.3300e-003	3.3300e-003	0.0000	0.9837	0.9837	9.5000e-004	0.0000	1.0074
Energy	4.6600e-003	0.0403	0.0203	2.5000e-004		3.2200e-003	3.2200e-003		3.2200e-003	3.2200e-003	0.0000	153.0533	153.0533	0.0116	3.0600e-003	154.2541
Mobile	0.1156	0.7341	1.2740	5.3600e-003	0.4390	4.3200e-003	0.4433	0.1180	4.0400e-003	0.1220	0.0000	494.9995	494.9995	0.0189	0.0000	495.4722
Waste						0.0000	0.0000		0.0000	0.0000	9.9466	0.0000	9.9466	0.5878	0.0000	24.6422
Water						0.0000	0.0000		0.0000	0.0000	2.3859	7.5176	9.9035	0.2458	5.9400e-003	17.8193
Total	**0.6403**	**0.7813**	**1.8961**	**5.6400e-003**	**0.4390**	**0.0109**	**0.4499**	**0.1180**	**0.0106**	**0.1286**	**12.3325**	**656.5541**	**668.8865**	**0.8651**	**9.0000e-003**	**693.1951**

2.2 Overall Operational

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	0.5200	6.9300e-003	0.6018	3.0000e-005		3.3300e-003	3.3300e-003		3.3300e-003	3.3300e-003	0.0000	0.9837	0.9837	9.5000e-004	0.0000	1.0074
Energy	4.6600e-003	0.0403	0.0203	2.5000e-004		3.2200e-003	3.2200e-003		3.2200e-003	3.2200e-003	0.0000	153.0533	153.0533	0.0116	3.0600e-003	154.2541
Mobile	0.1156	0.7341	1.2740	5.3600e-003	0.4390	4.3200e-003	0.4433	0.1180	4.0400e-003	0.1220	0.0000	494.9995	494.9995	0.0189	0.0000	495.4722
Waste						0.0000	0.0000		0.0000	0.0000	9.9466	0.0000	9.9466	0.5878	0.0000	24.6422
Water						0.0000	0.0000		0.0000	0.0000	2.3859	7.5176	9.9035	0.2458	5.9400e-003	17.8193
Total	**0.6403**	**0.7813**	**1.8961**	**5.6400e-003**	**0.4390**	**0.0109**	**0.4499**	**0.1180**	**0.0106**	**0.1286**	**12.3325**	**656.5541**	**668.8865**	**0.8651**	**9.0000e-003**	**693.1951**

	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	Site Preparation	Site Preparation	8/2/2021	8/13/2021	5	10	
2	Grading	Grading	8/16/2021	8/30/2021	5	11	
3	Building Construction	Building Construction	8/28/2021	11/18/2022	5	320	
4	Architectural Coating	Architectural Coating	11/21/2022	3/20/2023	5	86	
5	Paving	Paving	3/21/2023	4/4/2023	5	11	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0.61

Residential Indoor: 232,077; Residential Outdoor: 77,359; Non-Residential Indoor: 18,936; Non-Residential Outdoor: 6,312; Striped Parking Area: 3,702 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	304.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	88.00	21.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0269	0.0000	0.0269	0.0145	0.0000	0.0145	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.7800e-003	0.0871	0.0378	9.0000e-005		3.8300e-003	3.8300e-003		3.5200e-003	3.5200e-003	0.0000	7.5592	7.5592	2.4400e-003	0.0000	7.6203
Total	**7.7800e-003**	**0.0871**	**0.0378**	**9.0000e-005**	**0.0269**	**3.8300e-003**	**0.0307**	**0.0145**	**3.5200e-003**	**0.0181**	**0.0000**	**7.5592**	**7.5592**	**2.4400e-003**	**0.0000**	**7.6203**

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	9.0000e-005	9.5000e-004	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2714	0.2714	1.0000e-005	0.0000	0.2716
Total	**1.3000e-004**	**9.0000e-005**	**9.5000e-004**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**8.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2714**	**0.2714**	**1.0000e-005**	**0.0000**	**0.2716**

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					0.0121	0.0000	0.0121	6.5400e-003	0.0000	6.5400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0500e-003	4.5600e-003	0.0434	9.0000e-005		1.4000e-004	1.4000e-004		1.4000e-004	1.4000e-004	0.0000	7.5592	7.5592	2.4400e-003	0.0000	7.6203
Total	**1.0500e-003**	**4.5600e-003**	**0.0434**	**9.0000e-005**	**0.0121**	**1.4000e-004**	**0.0122**	**6.5400e-003**	**1.4000e-004**	**6.6800e-003**	**0.0000**	**7.5592**	**7.5592**	**2.4400e-003**	**0.0000**	**7.6203**

3.2 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	9.0000e-005	9.5000e-004	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2714	0.2714	1.0000e-005	0.0000	0.2716
Total	**1.3000e-004**	**9.0000e-005**	**9.5000e-004**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**8.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2714**	**0.2714**	**1.0000e-005**	**0.0000**	**0.2716**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0258	0.0000	0.0258	0.0138	0.0000	0.0138	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.0900e-003	0.0788	0.0348	8.0000e-005		3.5100e-003	3.5100e-003		3.2300e-003	3.2300e-003	0.0000	6.8110	6.8110	2.2000e-003	0.0000	6.8661
Total	**7.0900e-003**	**0.0788**	**0.0348**	**8.0000e-005**	**0.0258**	**3.5100e-003**	**0.0293**	**0.0138**	**3.2300e-003**	**0.0170**	**0.0000**	**6.8110**	**6.8110**	**2.2000e-003**	**0.0000**	**6.8661**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2200e-003	0.0410	7.6100e-003	1.2000e-004	2.5700e-003	1.3000e-004	2.7000e-003	7.1000e-004	1.2000e-004	8.3000e-004	0.0000	11.4918	11.4918	5.7000e-004	0.0000	11.5061
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	1.4000e-004	1.0000e-004	1.0500e-003	0.0000	3.5000e-004	0.0000	3.5000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2985	0.2985	1.0000e-005	0.0000	0.2987
Total	**1.3600e-003**	**0.0411**	**8.6600e-003**	**1.2000e-004**	**2.9200e-003**	**1.3000e-004**	**3.0500e-003**	**8.0000e-004**	**1.2000e-004**	**9.2000e-004**	**0.0000**	**11.7904**	**11.7904**	**5.8000e-004**	**0.0000**	**11.8048**

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					0.0116	0.0000	0.0116	6.1900e-003	0.0000	6.1900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.5000e-004	4.1100e-003	0.0394	8.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	6.8110	6.8110	2.2000e-003	0.0000	6.8661
Total	**9.5000e-004**	**4.1100e-003**	**0.0394**	**8.0000e-005**	**0.0116**	**1.3000e-004**	**0.0117**	**6.1900e-003**	**1.3000e-004**	**6.3200e-003**	**0.0000**	**6.8110**	**6.8110**	**2.2000e-003**	**0.0000**	**6.8661**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2200e-003	0.0410	7.6100e-003	1.2000e-004	2.5700e-003	1.3000e-004	2.7000e-003	7.1000e-004	1.2000e-004	8.3000e-004	0.0000	11.4918	11.4918	5.7000e-004	0.0000	11.5061
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	1.4000e-004	1.0000e-004	1.0500e-003	0.0000	3.5000e-004	0.0000	3.5000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2985	0.2985	1.0000e-005	0.0000	0.2987
Total	**1.3600e-003**	**0.0411**	**8.6600e-003**	**1.2000e-004**	**2.9200e-003**	**1.3000e-004**	**3.0500e-003**	**8.0000e-004**	**1.2000e-004**	**9.2000e-004**	**0.0000**	**11.7904**	**11.7904**	**5.8000e-004**	**0.0000**	**11.8048**

3.4 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	0.0816	0.6136	0.5805	9.9000e-004		0.0308	0.0308		0.0297	0.0297	0.0000	81.6964	81.6964	0.0146	0.0000	82.0611
Total	**0.0816**	**0.6136**	**0.5805**	**9.9000e-004**		**0.0308**	**0.0308**		**0.0297**	**0.0297**	**0.0000**	**81.6964**	**81.6964**	**0.0146**	**0.0000**	**82.0611**

3.4 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.9300e-003	0.1011	0.0214	2.6000e-004	6.2100e-003	2.1000e-004	6.4200e-003	1.8000e-003	2.0000e-004	2.0000e-003	0.0000	24.7562	24.7562	1.3600e-003	0.0000	24.7902
Worker	0.0127	9.0100e-003	0.0944	3.0000e-004	0.0313	2.1000e-004	0.0315	8.3300e-003	1.9000e-004	8.5200e-003	0.0000	26.8675	26.8675	6.4000e-004	0.0000	26.8836
Total	**0.0156**	**0.1101**	**0.1158**	**5.6000e-004**	**0.0375**	**4.2000e-004**	**0.0379**	**0.0101**	**3.9000e-004**	**0.0105**	**0.0000**	**51.6237**	**51.6237**	**2.0000e-003**	**0.0000**	**51.6738**

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	0.0132	0.1670	0.5906	9.9000e-004		1.3600e-003	1.3600e-003		1.3600e-003	1.3600e-003	0.0000	81.6963	81.6963	0.0146	0.0000	82.0610
Total	**0.0132**	**0.1670**	**0.5906**	**9.9000e-004**		**1.3600e-003**	**1.3600e-003**		**1.3600e-003**	**1.3600e-003**	**0.0000**	**81.6963**	**81.6963**	**0.0146**	**0.0000**	**82.0610**

3.4 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.9300e-003	0.1011	0.0214	2.6000e-004	6.2100e-003	2.1000e-004	6.4200e-003	1.8000e-003	2.0000e-004	2.0000e-003	0.0000	24.7562	24.7562	1.3600e-003	0.0000	24.7902
Worker	0.0127	9.0100e-003	0.0944	3.0000e-004	0.0313	2.1000e-004	0.0315	8.3300e-003	1.9000e-004	8.5200e-003	0.0000	26.8675	26.8675	6.4000e-004	0.0000	26.8836
Total	**0.0156**	**0.1101**	**0.1158**	**5.6000e-004**	**0.0375**	**4.2000e-004**	**0.0379**	**0.0101**	**3.9000e-004**	**0.0105**	**0.0000**	**51.6237**	**51.6237**	**2.0000e-003**	**0.0000**	**51.6738**

3.4 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	0.1896	1.4379	1.4635	2.5400e-003		0.0677	0.0677		0.0654	0.0654	0.0000	208.8135	208.8135	0.0364	0.0000	209.7227
Total	**0.1896**	**1.4379**	**1.4635**	**2.5400e-003**		**0.0677**	**0.0677**		**0.0654**	**0.0654**	**0.0000**	**208.8135**	**208.8135**	**0.0364**	**0.0000**	**209.7227**

3.4 Building Construction - 2022

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	6.9900e-003	0.2454	0.0513	6.5000e-004	0.0159	4.7000e-004	0.0163	4.5900e-003	4.5000e-004	5.0300e-003	0.0000	62.6473	62.6473	3.3200e-003	0.0000	62.7303
Worker	0.0300	0.0206	0.2208	7.3000e-004	0.0800	5.2000e-004	0.0805	0.0213	4.8000e-004	0.0218	0.0000	66.1592	66.1592	1.4700e-003	0.0000	66.1959
Total	**0.0370**	**0.2660**	**0.2721**	**1.3800e-003**	**0.0959**	**9.9000e-004**	**0.0969**	**0.0259**	**9.3000e-004**	**0.0268**	**0.0000**	**128.8064**	**128.8064**	**4.7900e-003**	**0.0000**	**128.9262**

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	0.0337	0.4269	1.5093	2.5400e-003		3.4800e-003	3.4800e-003		3.4800e-003	3.4800e-003	0.0000	208.8132	208.8132	0.0364	0.0000	209.7224
Total	**0.0337**	**0.4269**	**1.5093**	**2.5400e-003**		**3.4800e-003**	**3.4800e-003**		**3.4800e-003**	**3.4800e-003**	**0.0000**	**208.8132**	**208.8132**	**0.0364**	**0.0000**	**209.7224**

3.4 Building Construction - 2022

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	6.9900e-003	0.2454	0.0513	6.5000e-004	0.0159	4.7000e-004	0.0163	4.5900e-003	4.5000e-004	5.0300e-003	0.0000	62.6473	62.6473	3.3200e-003	0.0000	62.7303
Worker	0.0300	0.0206	0.2208	7.3000e-004	0.0800	5.2000e-004	0.0805	0.0213	4.8000e-004	0.0218	0.0000	66.1592	66.1592	1.4700e-003	0.0000	66.1959
Total	**0.0370**	**0.2660**	**0.2721**	**1.3800e-003**	**0.0959**	**9.9000e-004**	**0.0969**	**0.0259**	**9.3000e-004**	**0.0268**	**0.0000**	**128.8064**	**128.8064**	**4.7900e-003**	**0.0000**	**128.9262**

3.5 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3089					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.0700e-003	0.0211	0.0272	4.0000e-005		1.2300e-003	1.2300e-003		1.2300e-003	1.2300e-003	0.0000	3.8299	3.8299	2.5000e-004	0.0000	3.8361
Total	**0.3120**	**0.0211**	**0.0272**	**4.0000e-005**		**1.2300e-003**	**1.2300e-003**		**1.2300e-003**	**1.2300e-003**	**0.0000**	**3.8299**	**3.8299**	**2.5000e-004**	**0.0000**	**3.8361**

3.5 Architectural Coating - 2022

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	8.0000e-004	5.5000e-004	5.8900e-003	2.0000e-005	2.1300e-003	1.0000e-005	2.1500e-003	5.7000e-004	1.0000e-005	5.8000e-004	0.0000	1.7651	1.7651	4.0000e-005	0.0000	1.7661
Total	**8.0000e-004**	**5.5000e-004**	**5.8900e-003**	**2.0000e-005**	**2.1300e-003**	**1.0000e-005**	**2.1500e-003**	**5.7000e-004**	**1.0000e-005**	**5.8000e-004**	**0.0000**	**1.7651**	**1.7651**	**4.0000e-005**	**0.0000**	**1.7661**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3089					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.5000e-004	1.9300e-003	0.0275	4.0000e-005		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	3.8299	3.8299	2.5000e-004	0.0000	3.8361
Total	**0.3093**	**1.9300e-003**	**0.0275**	**4.0000e-005**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**3.8299**	**3.8299**	**2.5000e-004**	**0.0000**	**3.8361**

3.5 Architectural Coating - 2022

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	8.0000e-004	5.5000e-004	5.8900e-003	2.0000e-005	2.1300e-003	1.0000e-005	2.1500e-003	5.7000e-004	1.0000e-005	5.8000e-004	0.0000	1.7651	1.7651	4.0000e-005	0.0000	1.7661
Total	**8.0000e-004**	**5.5000e-004**	**5.8900e-003**	**2.0000e-005**	**2.1300e-003**	**1.0000e-005**	**2.1500e-003**	**5.7000e-004**	**1.0000e-005**	**5.8000e-004**	**0.0000**	**1.7651**	**1.7651**	**4.0000e-005**	**0.0000**	**1.7661**

3.5 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	0.5766					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.3700e-003	0.0365	0.0507	8.0000e-005		1.9800e-003	1.9800e-003		1.9800e-003	1.9800e-003	0.0000	7.1491	7.1491	4.3000e-004	0.0000	7.1598
Total	**0.5819**	**0.0365**	**0.0507**	**8.0000e-005**		**1.9800e-003**	**1.9800e-003**		**1.9800e-003**	**1.9800e-003**	**0.0000**	**7.1491**	**7.1491**	**4.3000e-004**	**0.0000**	**7.1598**

3.5 Architectural Coating - 2023

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	1.3900e-003	9.2000e-004	0.0101	4.0000e-005	3.9800e-003	3.0000e-005	4.0100e-003	1.0600e-003	2.0000e-005	1.0800e-003	0.0000	3.1689	3.1689	7.0000e-005	0.0000	3.1705
Total	**1.3900e-003**	**9.2000e-004**	**0.0101**	**4.0000e-005**	**3.9800e-003**	**3.0000e-005**	**4.0100e-003**	**1.0600e-003**	**2.0000e-005**	**1.0800e-003**	**0.0000**	**3.1689**	**3.1689**	**7.0000e-005**	**0.0000**	**3.1705**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.5766					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.3000e-004	3.6100e-003	0.0513	8.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	7.1491	7.1491	4.3000e-004	0.0000	7.1598
Total	**0.5774**	**3.6100e-003**	**0.0513**	**8.0000e-005**		**1.1000e-004**	**1.1000e-004**		**1.1000e-004**	**1.1000e-004**	**0.0000**	**7.1491**	**7.1491**	**4.3000e-004**	**0.0000**	**7.1598**

3.5 Architectural Coating - 2023

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	1.3900e-003	9.2000e-004	0.0101	4.0000e-005	3.9800e-003	3.0000e-005	4.0100e-003	1.0600e-003	2.0000e-005	1.0800e-003	0.0000	3.1689	3.1689	7.0000e-005	0.0000	3.1705
Total	**1.3900e-003**	**9.2000e-004**	**0.0101**	**4.0000e-005**	**3.9800e-003**	**3.0000e-005**	**4.0100e-003**	**1.0600e-003**	**2.0000e-005**	**1.0800e-003**	**0.0000**	**3.1689**	**3.1689**	**7.0000e-005**	**0.0000**	**3.1705**

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	3.5500e-003	0.0343	0.0484	7.0000e-005		1.7000e-003	1.7000e-003		1.5700e-003	1.5700e-003	0.0000	6.4748	6.4748	2.0500e-003	0.0000	6.5262
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.5500e-003**	**0.0343**	**0.0484**	**7.0000e-005**		**1.7000e-003**	**1.7000e-003**		**1.5700e-003**	**1.5700e-003**	**0.0000**	**6.4748**	**6.4748**	**2.0500e-003**	**0.0000**	**6.5262**

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.3000e-004	1.4300e-003	0.0000	5.7000e-004	0.0000	5.7000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4496	0.4496	1.0000e-005	0.0000	0.4498
Total	**2.0000e-004**	**1.3000e-004**	**1.4300e-003**	**0.0000**	**5.7000e-004**	**0.0000**	**5.7000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4496**	**0.4496**	**1.0000e-005**	**0.0000**	**0.4498**

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	8.8000e-004	3.8100e-003	0.0542	7.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	6.4748	6.4748	2.0500e-003	0.0000	6.5261
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**8.8000e-004**	**3.8100e-003**	**0.0542**	**7.0000e-005**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**	**0.0000**	**6.4748**	**6.4748**	**2.0500e-003**	**0.0000**	**6.5261**

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.3000e-004	1.4300e-003	0.0000	5.7000e-004	0.0000	5.7000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4496	0.4496	1.0000e-005	0.0000	0.4498
Total	**2.0000e-004**	**1.3000e-004**	**1.4300e-003**	**0.0000**	**5.7000e-004**	**0.0000**	**5.7000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4496**	**0.4496**	**1.0000e-005**	**0.0000**	**0.4498**

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	0.1156	0.7341	1.2740	5.3600e-003	0.4390	4.3200e-003	0.4433	0.1180	4.0400e-003	0.1220	0.0000	494.9995	494.9995	0.0189	0.0000	495.4722
Unmitigated	0.1156	0.7341	1.2740	5.3600e-003	0.4390	4.3200e-003	0.4433	0.1180	4.0400e-003	0.1220	0.0000	494.9995	494.9995	0.0189	0.0000	495.4722

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	439.83	422.82	387.99	993,118	993,118
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	99.60	22.17	9.47	180,814	180,814
Total	539.43	444.99	397.46	1,173,932	1,173,932

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
Apartments Mid Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690
Enclosed Parking with Elevator	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690
General Office Building	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690

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	106.9702	106.9702	0.0107	2.2100e-003	107.8972
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	106.9702	106.9702	0.0107	2.2100e-003	107.8972
NaturalGas Mitigated	4.6600e-003	0.0403	0.0203	2.5000e-004		3.2200e-003	3.2200e-003		3.2200e-003	3.2200e-003	0.0000	46.0831	46.0831	8.8000e-004	8.4000e-004	46.3569
NaturalGas Unmitigated	4.6600e-003	0.0403	0.0203	2.5000e-004		3.2200e-003	3.2200e-003		3.2200e-003	3.2200e-003	0.0000	46.0831	46.0831	8.8000e-004	8.4000e-004	46.3569

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					
Apartments Mid Rise	707165	3.8100e-003	0.0326	0.0139	2.1000e-004		2.6300e-003	2.6300e-003		2.6300e-003	2.6300e-003	0.0000	37.7370	37.7370	7.2000e-004	6.9000e-004	37.9613
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 Office Building	156399	8.4000e-004	7.6700e-003	6.4400e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	8.3461	8.3461	1.6000e-004	1.5000e-004	8.3956
Total		**4.6500e-003**	**0.0403**	**0.0203**	**2.6000e-004**		**3.2100e-003**	**3.2100e-003**		**3.2100e-003**	**3.2100e-003**	**0.0000**	**46.0831**	**46.0831**	**8.8000e-004**	**8.4000e-004**	**46.3569**

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					
Apartments Mid Rise	707165	3.8100e-003	0.0326	0.0139	2.1000e-004		2.6300e-003	2.6300e-003		2.6300e-003	2.6300e-003	0.0000	37.7370	37.7370	7.2000e-004	6.9000e-004	37.9613
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 Office Building	156399	8.4000e-004	7.6700e-003	6.4400e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	8.3461	8.3461	1.6000e-004	1.5000e-004	8.3956
Total		**4.6500e-003**	**0.0403**	**0.0203**	**2.6000e-004**		**3.2100e-003**	**3.2100e-003**		**3.2100e-003**	**3.2100e-003**	**0.0000**	**46.0831**	**46.0831**	**8.8000e-004**	**8.4000e-004**	**46.3569**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	341981	44.9848	4.5000e-003	9.3000e-004	45.3746
Enclosed Parking with Elevator	370247	48.7029	4.8700e-003	1.0100e-003	49.1249
General Office Building	100976	13.2825	1.3300e-003	2.7000e-004	13.3976
Total		**106.9702**	**0.0107**	**2.2100e-003**	**107.8972**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	341981	44.9848	4.5000e-003	9.3000e-004	45.3746
Enclosed Parking with Elevator	370247	48.7029	4.8700e-003	1.0100e-003	49.1249
General Office Building	100976	13.2825	1.3300e-003	2.7000e-004	13.3976
Total		**106.9702**	**0.0107**	**2.2100e-003**	**107.8972**

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	0.5200	6.9300e-003	0.6018	3.0000e-005		3.3300e-003	3.3300e-003		3.3300e-003	3.3300e-003	0.0000	0.9837	0.9837	9.5000e-004	0.0000	1.0074
Unmitigated	0.5200	6.9300e-003	0.6018	3.0000e-005		3.3300e-003	3.3300e-003		3.3300e-003	3.3300e-003	0.0000	0.9837	0.9837	9.5000e-004	0.0000	1.0074

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	0.0886					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4133					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0181	6.9300e-003	0.6018	3.0000e-005		3.3300e-003	3.3300e-003		3.3300e-003	3.3300e-003	0.0000	0.9837	0.9837	9.5000e-004	0.0000	1.0074
Total	**0.5200**	**6.9300e-003**	**0.6018**	**3.0000e-005**		**3.3300e-003**	**3.3300e-003**		**3.3300e-003**	**3.3300e-003**	**0.0000**	**0.9837**	**0.9837**	**9.5000e-004**	**0.0000**	**1.0074**

6.2 Area by SubCategory

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	0.0886					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4133					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0181	6.9300e-003	0.6018	3.0000e-005		3.3300e-003	3.3300e-003		3.3300e-003	3.3300e-003	0.0000	0.9837	0.9837	9.5000e-004	0.0000	1.0074
Total	**0.5200**	**6.9300e-003**	**0.6018**	**3.0000e-005**		**3.3300e-003**	**3.3300e-003**		**3.3300e-003**	**3.3300e-003**	**0.0000**	**0.9837**	**0.9837**	**9.5000e-004**	**0.0000**	**1.0074**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	9.9035	0.2458	5.9400e-003	17.8193
Unmitigated	9.9035	0.2458	5.9400e-003	17.8193

7.2 Water by Land Use

Unmitigated

	Indoor/ Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	5.27748 / 3.3271	6.9625	0.1725	4.1700e-003	12.5175
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	2.243 / 1.37474	2.9410	0.0733	1.7700e-003	5.3018
Total		**9.9035**	**0.2458**	**5.9400e-003**	**17.8193**

7.2 Water by Land Use

Mitigated

	Indoor/ Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	5.27748 / 3.3271	6.9625	0.1725	4.1700e-003	12.5175
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	2.243 / 1.37474	2.9410	0.0733	1.7700e-003	5.3018
Total		**9.9035**	**0.2458**	**5.9400e-003**	**17.8193**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	9.9466	0.5878	0.0000	24.6422
Unmitigated	9.9466	0.5878	0.0000	24.6422

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	37.26	7.5634	0.4470	0.0000	18.7381
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	11.74	2.3831	0.1408	0.0000	5.9041
Total		**9.9466**	**0.5878**	**0.0000**	**24.6422**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	37.26	7.5634	0.4470	0.0000	18.7381
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	11.74	2.3831	0.1408	0.0000	5.9041
Total		**9.9466**	**0.5878**	**0.0000**	**24.6422**

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

Union City MidPen Housing

Alameda County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	8.09	1000sqft	0.12	8,091.00	0
Enclosed Parking with Elevator	63.18	1000sqft	0.61	63,182.00	0
Apartments Mid Rise	81.00	Dwelling Unit	0.92	96,693.00	232

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	290	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Union City MidPen Housing - Alameda County, Summer

Project Characteristics - PG&E, November 2015

Land Use - Project Plans for 1.65 acres with 167,966 sq feet of total gross floor area (81 housing units (75,859 net rentable space, 63,182 sq ft of two level garage, and 8,091 sq feet of office space)

Construction Phase - No Demolition required with vacant lot, Construction schedule provided by applicant July 18, 2019

Grading - Site and Grading Plan (6-20-19)

Vehicle Trips - Traffic consultant data provided on July 22, 2019

Woodstoves - no woodstoves or fireplaces

Energy Use -

Construction Off-road Equipment Mitigation - BAAQMD Basic and Enhanced Mitigation Measures

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	2.00	10.00
tblConstructionPhase	NumDays	4.00	11.00
tblConstructionPhase	NumDays	200.00	320.00
tblConstructionPhase	NumDays	10.00	86.00
tblConstructionPhase	NumDays	10.00	11.00
tblFireplaces	FireplaceDayYear	11.14	0.00
tblFireplaces	FireplaceHourDay	3.50	0.00
tblFireplaces	FireplaceWoodMass	228.80	0.00
tblFireplaces	NumberGas	12.15	0.00
tblFireplaces	NumberNoFireplace	3.24	0.00
tblFireplaces	NumberWood	13.77	0.00
tblGrading	AcresOfGrading	4.13	1.50
tblGrading	AcresOfGrading	5.00	1.00
tblGrading	MaterialExported	0.00	2,432.00
tblLandUse	LandUseSquareFeet	81,000.00	96,693.00
tblLandUse	LotAcreage	0.19	0.12
tblLandUse	LotAcreage	1.45	0.61
tblLandUse	LotAcreage	2.13	0.92
tblProjectCharacteristics	CO2IntensityFactor	641.35	290

tblVehicleTrips	ST_TR	6.39	5.22
tblVehicleTrips	ST_TR	2.46	2.74
tblVehicleTrips	SU_TR	5.86	4.79
tblVehicleTrips	SU_TR	1.05	1.17
tblVehicleTrips	WD_TR	6.65	5.43
tblVehicleTrips	WD_TR	11.03	12.31
tblWoodstoves	NumberCatalytic	1.62	0.00
tblWoodstoves	NumberNoncatalytic	1.62	0.00
tblWoodstoves	WoodstoveDayYear	14.12	0.00
tblWoodstoves	WoodstoveWoodMass	582.40	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2021	3.7075	37.6954	23.5080	0.0716	6.1009	1.3546	7.4555	2.9253	1.2784	4.1633	0.0000	7,075.1741	7,075.1741	0.9597	0.0000	7,099.1663
2022	20.8529	14.7754	15.2449	0.0347	0.8652	0.5974	1.4626	0.2327	0.5769	0.8096	0.0000	3,292.8324	3,292.8324	0.3942	0.0000	3,302.6868
2023	20.8361	6.2567	9.0878	0.0145	0.1479	0.3091	0.4159	0.0392	0.2852	0.3136	0.0000	1,394.8285	1,394.8285	0.4134	0.0000	1,405.1630
Maximum	**20.8529**	**37.6954**	**23.5080**	**0.0716**	**6.1009**	**1.3546**	**7.4555**	**2.9253**	**1.2784**	**4.1633**	**0.0000**	**7,075.1741**	**7,075.1741**	**0.9597**	**0.0000**	**7,099.1663**

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	lb/day										lb/day					
2021	1.0722	14.1881	24.5569	0.0716	3.5235	0.0857	3.6092	1.5088	0.0841	1.5928	0.0000	7,075.1741	7,075.1741	0.9597	0.0000	7,099.1663
2022	20.6781	5.9844	15.6426	0.0347	0.8652	0.0389	0.9040	0.2327	0.0383	0.2710	0.0000	3,292.8324	3,292.8324	0.3942	0.0000	3,302.6868
2023	20.6741	0.7132	10.1366	0.0145	0.1479	0.0220	0.1527	0.0392	0.0219	0.0502	0.0000	1,394.8285	1,394.8285	0.4134	0.0000	1,405.1630
Maximum	**20.6781**	**14.1881**	**24.5569**	**0.0716**	**3.5235**	**0.0857**	**3.6092**	**1.5088**	**0.0841**	**1.5928**	**0.0000**	**7,075.1741**	**7,075.1741**	**0.9597**	**0.0000**	**7,099.1663**

Union City MidPen Housing - Alameda County, Summer

	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	**6.55**	**64.44**	**-5.22**	**0.00**	**36.23**	**93.52**	**50.01**	**44.31**	**93.26**	**63.79**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	2.9515	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371	0.0000	12.0483	12.0483	0.0116	0.0000	12.3380
Energy	0.0255	0.2206	0.1113	1.3900e-003		0.0176	0.0176		0.0176	0.0176		278.3445	278.3445	5.3300e-003	5.1000e-003	279.9986
Mobile	0.7828	4.2128	7.7555	0.0332	2.6747	0.0253	2.7000	0.7165	0.0237	0.7402		3,373.9868	3,373.9868	0.1215		3,377.0239
Total	**3.7598**	**4.5104**	**14.5539**	**0.0349**	**2.6747**	**0.0800**	**2.7547**	**0.7165**	**0.0784**	**0.7949**	**0.0000**	**3,664.3797**	**3,664.3797**	**0.1384**	**5.1000e-003**	**3,669.3604**

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	lb/day										lb/day					
Area	2.9515	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371	0.0000	12.0483	12.0483	0.0116	0.0000	12.3380
Energy	0.0255	0.2206	0.1113	1.3900e-003		0.0176	0.0176		0.0176	0.0176		278.3445	278.3445	5.3300e-003	5.1000e-003	279.9986
Mobile	0.7828	4.2128	7.7555	0.0332	2.6747	0.0253	2.7000	0.7165	0.0237	0.7402		3,373.9868	3,373.9868	0.1215		3,377.0239
Total	**3.7598**	**4.5104**	**14.5539**	**0.0349**	**2.6747**	**0.0800**	**2.7547**	**0.7165**	**0.0784**	**0.7949**	**0.0000**	**3,664.3797**	**3,664.3797**	**0.1384**	**5.1000e-003**	**3,669.3604**

	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	Site Preparation	Site Preparation	8/2/2021	8/13/2021	5	10	
2	Grading	Grading	8/16/2021	8/30/2021	5	11	
3	Building Construction	Building Construction	8/28/2021	11/18/2022	5	320	
4	Architectural Coating	Architectural Coating	11/21/2022	3/20/2023	5	86	
5	Paving	Paving	3/21/2023	4/4/2023	5	11	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0.61

Residential Indoor: 232,077; Residential Outdoor: 77,359; Non-Residential Indoor: 18,936; Non-Residential Outdoor: 6,312; Striped Parking Area: 3,702 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	304.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	88.00	21.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.3754	0.0000	5.3754	2.9079	0.0000	2.9079			0.0000			0.0000
Off-Road	1.5558	17.4203	7.5605	0.0172		0.7654	0.7654		0.7041	0.7041		1,666.5174	1,666.5174	0.5390		1,679.9920
Total	**1.5558**	**17.4203**	**7.5605**	**0.0172**	**5.3754**	**0.7654**	**6.1408**	**2.9079**	**0.7041**	**3.6120**		**1,666.5174**	**1,666.5174**	**0.5390**		**1,679.9920**

3.2 Site Preparation - 2021

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	lb/day										lb/day					
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
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
Worker	0.0270	0.0161	0.2084	6.5000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		64.5102	64.5102	1.5300e-003		64.5485
Total	**0.0270**	**0.0161**	**0.2084**	**6.5000e-004**	**0.0657**	**4.3000e-004**	**0.0661**	**0.0174**	**3.9000e-004**	**0.0178**		**64.5102**	**64.5102**	**1.5300e-003**		**64.5485**

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	lb/day										lb/day					
Fugitive Dust					2.4189	0.0000	2.4189	1.3086	0.0000	1.3086			0.0000			0.0000
Off-Road	0.2106	0.9126	8.6714	0.0172		0.0281	0.0281		0.0281	0.0281	0.0000	1,666.5174	1,666.5174	0.5390		1,679.9920
Total	**0.2106**	**0.9126**	**8.6714**	**0.0172**	**2.4189**	**0.0281**	**2.4470**	**1.3086**	**0.0281**	**1.3366**	**0.0000**	**1,666.5174**	**1,666.5174**	**0.5390**		**1,679.9920**

3.2 Site Preparation - 2021

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	lb/day										lb/day					
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
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
Worker	0.0270	0.0161	0.2084	6.5000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		64.5102	64.5102	1.5300e-003		64.5485
Total	**0.0270**	**0.0161**	**0.2084**	**6.5000e-004**	**0.0657**	**4.3000e-004**	**0.0661**	**0.0174**	**3.9000e-004**	**0.0178**		**64.5102**	**64.5102**	**1.5300e-003**		**64.5485**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.6862	0.0000	4.6862	2.5021	0.0000	2.5021			0.0000			0.0000
Off-Road	1.2884	14.3307	6.3314	0.0141		0.6379	0.6379		0.5869	0.5869		1,365.0648	1,365.0648	0.4415		1,376.1020
Total	**1.2884**	**14.3307**	**6.3314**	**0.0141**	**4.6862**	**0.6379**	**5.3241**	**2.5021**	**0.5869**	**3.0890**		**1,365.0648**	**1,365.0648**	**0.4415**		**1,376.1020**

3.3 Grading - 2021

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	lb/day										lb/day					
Hauling	0.2189	7.3115	1.3344	0.0218	0.4838	0.0226	0.5065	0.1327	0.0216	0.1543		2,321.2510	2,321.2510	0.1107		2,324.0181
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
Worker	0.0270	0.0161	0.2084	6.5000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		64.5102	64.5102	1.5300e-003		64.5485
Total	**0.2459**	**7.3275**	**1.5428**	**0.0225**	**0.5496**	**0.0231**	**0.5726**	**0.1501**	**0.0220**	**0.1721**		**2,385.7612**	**2,385.7612**	**0.1122**		**2,388.5666**

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	lb/day										lb/day					
Fugitive Dust					2.1088	0.0000	2.1088	1.1259	0.0000	1.1259			0.0000			0.0000
Off-Road	0.1725	0.7475	7.1557	0.0141		0.0230	0.0230		0.0230	0.0230	0.0000	1,365.0648	1,365.0648	0.4415		1,376.1020
Total	**0.1725**	**0.7475**	**7.1557**	**0.0141**	**2.1088**	**0.0230**	**2.1318**	**1.1259**	**0.0230**	**1.1489**	**0.0000**	**1,365.0648**	**1,365.0648**	**0.4415**		**1,376.1020**

3.3 Grading - 2021

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	lb/day										lb/day					
Hauling	0.2189	7.3115	1.3344	0.0218	0.4838	0.0226	0.5065	0.1327	0.0216	0.1543		2,321.2510	2,321.2510	0.1107		2,324.0181
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
Worker	0.0270	0.0161	0.2084	6.5000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		64.5102	64.5102	1.5300e-003		64.5485
Total	**0.2459**	**7.3275**	**1.5428**	**0.0225**	**0.5496**	**0.0231**	**0.5726**	**0.1501**	**0.0220**	**0.1721**		**2,385.7612**	**2,385.7612**	**0.1122**		**2,388.5666**

3.4 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	lb/day										lb/day					
Off-Road	1.8125	13.6361	12.8994	0.0221		0.6843	0.6843		0.6608	0.6608		2,001.2200	2,001.2200	0.3573		2,010.1517
Total	**1.8125**	**13.6361**	**12.8994**	**0.0221**		**0.6843**	**0.6843**		**0.6608**	**0.6608**		**2,001.2200**	**2,001.2200**	**0.3573**		**2,010.1517**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0635	2.2243	0.4420	5.8100e-003	0.1423	4.6200e-003	0.1469	0.0410	4.4200e-003	0.0454		613.5159	613.5159	0.0319		614.3125
Worker	0.2973	0.1768	2.2924	7.1200e-003	0.7229	4.6800e-003	0.7276	0.1918	4.3100e-003	0.1961		709.6122	709.6122	0.0169		710.0336
Total	**0.3608**	**2.4011**	**2.7344**	**0.0129**	**0.8652**	**9.3000e-003**	**0.8745**	**0.2327**	**8.7300e-003**	**0.2414**		**1,323.1281**	**1,323.1281**	**0.0487**		**1,324.3460**

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	lb/day										lb/day					
Off-Road	0.2930	3.7120	13.1241	0.0221		0.0303	0.0303		0.0303	0.0303	0.0000	2,001.2200	2,001.2200	0.3573		2,010.1517
Total	**0.2930**	**3.7120**	**13.1241**	**0.0221**		**0.0303**	**0.0303**		**0.0303**	**0.0303**	**0.0000**	**2,001.2200**	**2,001.2200**	**0.3573**		**2,010.1517**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0635	2.2243	0.4420	5.8100e-003	0.1423	4.6200e-003	0.1469	0.0410	4.4200e-003	0.0454		613.5159	613.5159	0.0319		614.3125
Worker	0.2973	0.1768	2.2924	7.1200e-003	0.7229	4.6800e-003	0.7276	0.1918	4.3100e-003	0.1961		709.6122	709.6122	0.0169		710.0336
Total	**0.3608**	**2.4011**	**2.7344**	**0.0129**	**0.8652**	**9.3000e-003**	**0.8745**	**0.2327**	**8.7300e-003**	**0.2414**		**1,323.1281**	**1,323.1281**	**0.0487**		**1,324.3460**

3.4 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	lb/day										lb/day					
Off-Road	1.6487	12.5031	12.7264	0.0221		0.5889	0.5889		0.5689	0.5689		2,001.5429	2,001.5429	0.3486		2,010.2581
Total	**1.6487**	**12.5031**	**12.7264**	**0.0221**		**0.5889**	**0.5889**		**0.5689**	**0.5689**		**2,001.5429**	**2,001.5429**	**0.3486**		**2,010.2581**

3.4 Building Construction - 2022

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	lb/day										lb/day					
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
Vendor	0.0594	2.1141	0.4141	5.7500e-003	0.1423	4.0000e-003	0.1463	0.0410	3.8200e-003	0.0448		607.5553	607.5553	0.0305		608.3167
Worker	0.2759	0.1583	2.1043	6.8600e-003	0.7229	4.5600e-003	0.7275	0.1918	4.2000e-003	0.1959		683.7342	683.7342	0.0151		684.1121
Total	**0.3352**	**2.2724**	**2.5184**	**0.0126**	**0.8652**	**8.5600e-003**	**0.8737**	**0.2327**	**8.0200e-003**	**0.2407**		**1,291.2895**	**1,291.2895**	**0.0456**		**1,292.4287**

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	lb/day										lb/day					
Off-Road	0.2930	3.7120	13.1241	0.0221		0.0303	0.0303		0.0303	0.0303	0.0000	2,001.5429	2,001.5429	0.3486		2,010.2581
Total	**0.2930**	**3.7120**	**13.1241**	**0.0221**		**0.0303**	**0.0303**		**0.0303**	**0.0303**	**0.0000**	**2,001.5429**	**2,001.5429**	**0.3486**		**2,010.2581**

3.4 Building Construction - 2022

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	lb/day										lb/day					
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
Vendor	0.0594	2.1141	0.4141	5.7500e-003	0.1423	4.0000e-003	0.1463	0.0410	3.8200e-003	0.0448		607.5553	607.5553	0.0305		608.3167
Worker	0.2759	0.1583	2.1043	6.8600e-003	0.7229	4.5600e-003	0.7275	0.1918	4.2000e-003	0.1959		683.7342	683.7342	0.0151		684.1121
Total	**0.3352**	**2.2724**	**2.5184**	**0.0126**	**0.8652**	**8.5600e-003**	**0.8737**	**0.2327**	**8.0200e-003**	**0.2407**		**1,291.2895**	**1,291.2895**	**0.0456**		**1,292.4287**

3.5 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.5919					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**20.7965**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.5 Architectural Coating - 2022

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	lb/day										lb/day					
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
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
Worker	0.0564	0.0324	0.4304	1.4000e-003	0.1479	9.3000e-004	0.1488	0.0392	8.6000e-004	0.0401		139.8547	139.8547	3.0900e-003		139.9320
Total	**0.0564**	**0.0324**	**0.4304**	**1.4000e-003**	**0.1479**	**9.3000e-004**	**0.1488**	**0.0392**	**8.6000e-004**	**0.0401**		**139.8547**	**139.8547**	**3.0900e-003**		**139.9320**

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	lb/day										lb/day					
Archit. Coating	20.5919					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**20.6216**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.5 Architectural Coating - 2022

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	lb/day										lb/day					
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
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
Worker	0.0564	0.0324	0.4304	1.4000e-003	0.1479	9.3000e-004	0.1488	0.0392	8.6000e-004	0.0401		139.8547	139.8547	3.0900e-003		139.9320
Total	**0.0564**	**0.0324**	**0.4304**	**1.4000e-003**	**0.1479**	**9.3000e-004**	**0.1488**	**0.0392**	**8.6000e-004**	**0.0401**		**139.8547**	**139.8547**	**3.0900e-003**		**139.9320**

3.5 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	lb/day										lb/day					
Archit. Coating	20.5919					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**20.7836**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.5 Architectural Coating - 2023

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	lb/day										lb/day					
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
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
Worker	0.0525	0.0291	0.3952	1.3500e-003	0.1479	9.1000e-004	0.1488	0.0392	8.4000e-004	0.0401		134.5022	134.5022	2.7700e-003		134.5714
Total	**0.0525**	**0.0291**	**0.3952**	**1.3500e-003**	**0.1479**	**9.1000e-004**	**0.1488**	**0.0392**	**8.4000e-004**	**0.0401**		**134.5022**	**134.5022**	**2.7700e-003**		**134.5714**

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	lb/day										lb/day					
Archit. Coating	20.5919					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**20.6216**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.5 Architectural Coating - 2023

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	lb/day										lb/day					
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
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
Worker	0.0525	0.0291	0.3952	1.3500e-003	0.1479	9.1000e-004	0.1488	0.0392	8.4000e-004	0.0401		134.5022	134.5022	2.7700e-003		134.5714
Total	**0.0525**	**0.0291**	**0.3952**	**1.3500e-003**	**0.1479**	**9.1000e-004**	**0.1488**	**0.0392**	**8.4000e-004**	**0.0401**		**134.5022**	**134.5022**	**2.7700e-003**		**134.5714**

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	lb/day										lb/day					
Off-Road	0.6446	6.2357	8.8024	0.0136		0.3084	0.3084		0.2846	0.2846		1,297.6880	1,297.6880	0.4114		1,307.9725
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6446**	**6.2357**	**8.8024**	**0.0136**		**0.3084**	**0.3084**		**0.2846**	**0.2846**		**1,297.6880**	**1,297.6880**	**0.4114**		**1,307.9725**

3.6 Paving - 2023

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	lb/day										lb/day					
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
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
Worker	0.0379	0.0210	0.2855	9.7000e-004	0.1068	6.6000e-004	0.1075	0.0283	6.1000e-004	0.0289		97.1405	97.1405	2.0000e-003		97.1905
Total	**0.0379**	**0.0210**	**0.2855**	**9.7000e-004**	**0.1068**	**6.6000e-004**	**0.1075**	**0.0283**	**6.1000e-004**	**0.0289**		**97.1405**	**97.1405**	**2.0000e-003**		**97.1905**

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	lb/day										lb/day					
Off-Road	0.1598	0.6922	9.8512	0.0136		0.0213	0.0213		0.0213	0.0213	0.0000	1,297.6880	1,297.6880	0.4114		1,307.9725
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.1598**	**0.6922**	**9.8512**	**0.0136**		**0.0213**	**0.0213**		**0.0213**	**0.0213**	**0.0000**	**1,297.6880**	**1,297.6880**	**0.4114**		**1,307.9725**

3.6 Paving - 2023

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	lb/day										lb/day					
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
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
Worker	0.0379	0.0210	0.2855	9.7000e-004	0.1068	6.6000e-004	0.1075	0.0283	6.1000e-004	0.0289		97.1405	97.1405	2.0000e-003		97.1905
Total	**0.0379**	**0.0210**	**0.2855**	**9.7000e-004**	**0.1068**	**6.6000e-004**	**0.1075**	**0.0283**	**6.1000e-004**	**0.0289**		**97.1405**	**97.1405**	**2.0000e-003**		**97.1905**

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	lb/day										lb/day					
Mitigated	0.7828	4.2128	7.7555	0.0332	2.6747	0.0253	2.7000	0.7165	0.0237	0.7402		3,373.9868	3,373.9868	0.1215		3,377.0239
Unmitigated	0.7828	4.2128	7.7555	0.0332	2.6747	0.0253	2.7000	0.7165	0.0237	0.7402		3,373.9868	3,373.9868	0.1215		3,377.0239

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	439.83	422.82	387.99	993,118	993,118
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	99.60	22.17	9.47	180,814	180,814
Total	539.43	444.99	397.46	1,173,932	1,173,932

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
Apartments Mid Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690
Enclosed Parking with Elevator	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690
General Office Building	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690

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	lb/day										lb/day					
NaturalGas Mitigated	0.0255	0.2206	0.1113	1.3900e-003		0.0176	0.0176		0.0176	0.0176		278.3445	278.3445	5.3300e-003	5.1000e-003	279.9986
NaturalGas Unmitigated	0.0255	0.2206	0.1113	1.3900e-003		0.0176	0.0176		0.0176	0.0176		278.3445	278.3445	5.3300e-003	5.1000e-003	279.9986

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	lb/day										lb/day					
Apartments Mid Rise	1937.44	0.0209	0.1786	0.0760	1.1400e-003		0.0144	0.0144		0.0144	0.0144		227.9339	227.9339	4.3700e-003	4.1800e-003	229.2884
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
General Office Building	428.49	4.6200e-003	0.0420	0.0353	2.5000e-004		3.1900e-003	3.1900e-003		3.1900e-003	3.1900e-003		50.4107	50.4107	9.7000e-004	9.2000e-004	50.7102
Total		**0.0255**	**0.2206**	**0.1113**	**1.3900e-003**		**0.0176**	**0.0176**		**0.0176**	**0.0176**		**278.3445**	**278.3445**	**5.3400e-003**	**5.1000e-003**	**279.9986**

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	lb/day										lb/day					
Apartments Mid Rise	1.93744	0.0209	0.1786	0.0760	1.1400e-003		0.0144	0.0144		0.0144	0.0144		227.9339	227.9339	4.3700e-003	4.1800e-003	229.2884
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
General Office Building	0.42849	4.6200e-003	0.0420	0.0353	2.5000e-004		3.1900e-003	3.1900e-003		3.1900e-003	3.1900e-003		50.4107	50.4107	9.7000e-004	9.2000e-004	50.7102
Total		**0.0255**	**0.2206**	**0.1113**	**1.3900e-003**		**0.0176**	**0.0176**		**0.0176**	**0.0176**		**278.3445**	**278.3445**	**5.3400e-003**	**5.1000e-003**	**279.9986**

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	lb/day										lb/day					
Mitigated	2.9515	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371	0.0000	12.0483	12.0483	0.0116	0.0000	12.3380
Unmitigated	2.9515	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371	0.0000	12.0483	12.0483	0.0116	0.0000	12.3380

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	lb/day										lb/day					
Architectural Coating	0.4852					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.2648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2015	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371		12.0483	12.0483	0.0116		12.3380
Total	**2.9515**	**0.0770**	**6.6871**	**3.5000e-004**		**0.0371**	**0.0371**		**0.0371**	**0.0371**	**0.0000**	**12.0483**	**12.0483**	**0.0116**	**0.0000**	**12.3380**

6.2 Area by SubCategory

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	lb/day										lb/day					
Architectural Coating	0.4852					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.2648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2015	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371		12.0483	12.0483	0.0116		12.3380
Total	**2.9515**	**0.0770**	**6.6871**	**3.5000e-004**		**0.0371**	**0.0371**		**0.0371**	**0.0371**	**0.0000**	**12.0483**	**12.0483**	**0.0116**	**0.0000**	**12.3380**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

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

Union City MidPen Housing

Alameda County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	8.09	1000sqft	0.12	8,091.00	0
Enclosed Parking with Elevator	63.18	1000sqft	0.61	63,182.00	0
Apartments Mid Rise	81.00	Dwelling Unit	0.92	96,693.00	232

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	290	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Union City MidPen Housing - Alameda County, Winter

Project Characteristics - PG&E, November 2015

Land Use - Project Plans for 1.65 acres with 167,966 sq feet of total gross floor area (81 housing units (75,859 net rentable space, 63,182 sq ft of two level garage, and 8,091 sq feet of office space)

Construction Phase - No Demolition required with vacant lot, Construction schedule provided by applicant July 18, 2019

Grading - Site and Grading Plan (6-20-19)

Vehicle Trips - Traffic consultant data provided on July 22, 2019

Woodstoves - no woodstoves or fireplaces

Energy Use -

Construction Off-road Equipment Mitigation - BAAQMD Basic and Enhanced Mitigation Measures

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	2.00	10.00
tblConstructionPhase	NumDays	4.00	11.00
tblConstructionPhase	NumDays	200.00	320.00
tblConstructionPhase	NumDays	10.00	86.00
tblConstructionPhase	NumDays	10.00	11.00
tblFireplaces	FireplaceDayYear	11.14	0.00
tblFireplaces	FireplaceHourDay	3.50	0.00
tblFireplaces	FireplaceWoodMass	228.80	0.00
tblFireplaces	NumberGas	12.15	0.00
tblFireplaces	NumberNoFireplace	3.24	0.00
tblFireplaces	NumberWood	13.77	0.00
tblGrading	AcresOfGrading	4.13	1.50
tblGrading	AcresOfGrading	5.00	1.00
tblGrading	MaterialExported	0.00	2,432.00
tblLandUse	LandUseSquareFeet	81,000.00	96,693.00
tblLandUse	LotAcreage	0.19	0.12
tblLandUse	LotAcreage	1.45	0.61
tblLandUse	LotAcreage	2.13	0.92
tblProjectCharacteristics	CO2IntensityFactor	641.35	290

tblVehicleTrips	ST_TR	6.39	5.22
tblVehicleTrips	ST_TR	2.46	2.74
tblVehicleTrips	SU_TR	5.86	4.79
tblVehicleTrips	SU_TR	1.05	1.17
tblVehicleTrips	WD_TR	6.65	5.43
tblVehicleTrips	WD_TR	11.03	12.31
tblWoodstoves	NumberCatalytic	1.62	0.00
tblWoodstoves	NumberNoncatalytic	1.62	0.00
tblWoodstoves	WoodstoveDayYear	14.12	0.00
tblWoodstoves	WoodstoveWoodMass	582.40	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2021	3.7313	37.9221	23.5481	0.0704	6.1009	1.3551	7.4560	2.9253	1.2789	4.1638	0.0000	6,953.5413	6,953.5413	0.9699	0.0000	6,977.7886
2022	20.8554	14.8273	15.1802	0.0340	0.8652	0.5976	1.4627	0.2327	0.5770	0.8097	0.0000	3,221.4927	3,221.4927	0.3963	0.0000	3,231.4000
2023	20.8385	6.2618	9.0687	0.0145	0.1479	0.3091	0.4159	0.0392	0.2852	0.3136	0.0000	1,387.0835	1,387.0835	0.4132	0.0000	1,397.4144
Maximum	**20.8554**	**37.9221**	**23.5481**	**0.0704**	**6.1009**	**1.3551**	**7.4560**	**2.9253**	**1.2789**	**4.1638**	**0.0000**	**6,953.5413**	**6,953.5413**	**0.9699**	**0.0000**	**6,977.7886**

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	lb/day										lb/day					
2021	1.0960	14.4148	24.5971	0.0704	3.5235	0.0862	3.6097	1.5088	0.0846	1.5933	0.0000	6,953.5413	6,953.5413	0.9699	0.0000	6,977.7886
2022	20.6806	6.0363	15.5779	0.0340	0.8652	0.0390	0.9042	0.2327	0.0385	0.2712	0.0000	3,221.4927	3,221.4927	0.3963	0.0000	3,231.4000
2023	20.6766	0.7183	10.1175	0.0145	0.1479	0.0220	0.1527	0.0392	0.0219	0.0502	0.0000	1,387.0835	1,387.0835	0.4132	0.0000	1,397.4144
Maximum	**20.6806**	**14.4148**	**24.5971**	**0.0704**	**3.5235**	**0.0862**	**3.6097**	**1.5088**	**0.0846**	**1.5933**	**0.0000**	**6,953.5413**	**6,953.5413**	**0.9699**	**0.0000**	**6,977.7886**

Union City MidPen Housing - Alameda County, Winter

	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	**6.54**	**64.13**	**-5.22**	**0.00**	**36.23**	**93.50**	**50.01**	**44.31**	**93.23**	**63.79**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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	lb/day										lb/day					
Area	2.9515	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371	0.0000	12.0483	12.0483	0.0116	0.0000	12.3380
Energy	0.0255	0.2206	0.1113	1.3900e-003		0.0176	0.0176		0.0176	0.0176		278.3445	278.3445	5.3300e-003	5.1000e-003	279.9986
Mobile	0.6690	4.3533	7.8392	0.0311	2.6747	0.0255	2.7002	0.7165	0.0238	0.7403		3,168.4154	3,168.4154	0.1265		3,171.5777
Total	**3.6459**	**4.6509**	**14.6375**	**0.0329**	**2.6747**	**0.0801**	**2.7548**	**0.7165**	**0.0785**	**0.7950**	**0.0000**	**3,458.8083**	**3,458.8083**	**0.1434**	**5.1000e-003**	**3,463.9143**

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	lb/day										lb/day					
Area	2.9515	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371	0.0000	12.0483	12.0483	0.0116	0.0000	12.3380
Energy	0.0255	0.2206	0.1113	1.3900e-003		0.0176	0.0176		0.0176	0.0176		278.3445	278.3445	5.3300e-003	5.1000e-003	279.9986
Mobile	0.6690	4.3533	7.8392	0.0311	2.6747	0.0255	2.7002	0.7165	0.0238	0.7403		3,168.4154	3,168.4154	0.1265		3,171.5777
Total	**3.6459**	**4.6509**	**14.6375**	**0.0329**	**2.6747**	**0.0801**	**2.7548**	**0.7165**	**0.0785**	**0.7950**	**0.0000**	**3,458.8083**	**3,458.8083**	**0.1434**	**5.1000e-003**	**3,463.9143**

	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	Site Preparation	Site Preparation	8/2/2021	8/13/2021	5	10	
2	Grading	Grading	8/16/2021	8/30/2021	5	11	
3	Building Construction	Building Construction	8/28/2021	11/18/2022	5	320	
4	Architectural Coating	Architectural Coating	11/21/2022	3/20/2023	5	86	
5	Paving	Paving	3/21/2023	4/4/2023	5	11	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0.61

Residential Indoor: 232,077; Residential Outdoor: 77,359; Non-Residential Indoor: 18,936; Non-Residential Outdoor: 6,312; Striped Parking Area: 3,702 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	304.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	88.00	21.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.3754	0.0000	5.3754	2.9079	0.0000	2.9079			0.0000			0.0000
Off-Road	1.5558	17.4203	7.5605	0.0172		0.7654	0.7654		0.7041	0.7041		1,666.5174	1,666.5174	0.5390		1,679.9920
Total	**1.5558**	**17.4203**	**7.5605**	**0.0172**	**5.3754**	**0.7654**	**6.1408**	**2.9079**	**0.7041**	**3.6120**		**1,666.5174**	**1,666.5174**	**0.5390**		**1,679.9920**

3.2 Site Preparation - 2021

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	lb/day										lb/day					
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
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
Worker	0.0282	0.0200	0.1961	6.0000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		59.3634	59.3634	1.4300e-003		59.3992
Total	**0.0282**	**0.0200**	**0.1961**	**6.0000e-004**	**0.0657**	**4.3000e-004**	**0.0661**	**0.0174**	**3.9000e-004**	**0.0178**		**59.3634**	**59.3634**	**1.4300e-003**		**59.3992**

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	lb/day										lb/day					
Fugitive Dust					2.4189	0.0000	2.4189	1.3086	0.0000	1.3086			0.0000			0.0000
Off-Road	0.2106	0.9126	8.6714	0.0172		0.0281	0.0281		0.0281	0.0281	0.0000	1,666.5174	1,666.5174	0.5390		1,679.9920
Total	**0.2106**	**0.9126**	**8.6714**	**0.0172**	**2.4189**	**0.0281**	**2.4470**	**1.3086**	**0.0281**	**1.3366**	**0.0000**	**1,666.5174**	**1,666.5174**	**0.5390**		**1,679.9920**

3.2 Site Preparation - 2021

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	lb/day										lb/day					
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
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
Worker	0.0282	0.0200	0.1961	6.0000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		59.3634	59.3634	1.4300e-003		59.3992
Total	**0.0282**	**0.0200**	**0.1961**	**6.0000e-004**	**0.0657**	**4.3000e-004**	**0.0661**	**0.0174**	**3.9000e-004**	**0.0178**		**59.3634**	**59.3634**	**1.4300e-003**		**59.3992**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.6862	0.0000	4.6862	2.5021	0.0000	2.5021			0.0000			0.0000
Off-Road	1.2884	14.3307	6.3314	0.0141		0.6379	0.6379		0.5869	0.5869		1,365.0648	1,365.0648	0.4415		1,376.1020
Total	**1.2884**	**14.3307**	**6.3314**	**0.0141**	**4.6862**	**0.6379**	**5.3241**	**2.5021**	**0.5869**	**3.0890**		**1,365.0648**	**1,365.0648**	**0.4415**		**1,376.1020**

3.3 Grading - 2021

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	lb/day										lb/day					
Hauling	0.2249	7.4749	1.4499	0.0214	0.4838	0.0230	0.5068	0.1327	0.0220	0.1547		2,278.2598	2,278.2598	0.1188		2,281.2297
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
Worker	0.0282	0.0200	0.1961	6.0000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		59.3634	59.3634	1.4300e-003		59.3992
Total	**0.2531**	**7.4949**	**1.6459**	**0.0220**	**0.5496**	**0.0234**	**0.5730**	**0.1501**	**0.0224**	**0.1725**		**2,337.6232**	**2,337.6232**	**0.1202**		**2,340.6288**

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	lb/day										lb/day					
Fugitive Dust					2.1088	0.0000	2.1088	1.1259	0.0000	1.1259			0.0000			0.0000
Off-Road	0.1725	0.7475	7.1557	0.0141		0.0230	0.0230		0.0230	0.0230	0.0000	1,365.0648	1,365.0648	0.4415		1,376.1020
Total	**0.1725**	**0.7475**	**7.1557**	**0.0141**	**2.1088**	**0.0230**	**2.1318**	**1.1259**	**0.0230**	**1.1489**	**0.0000**	**1,365.0648**	**1,365.0648**	**0.4415**		**1,376.1020**

3.3 Grading - 2021

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	lb/day										lb/day					
Hauling	0.2249	7.4749	1.4499	0.0214	0.4838	0.0230	0.5068	0.1327	0.0220	0.1547		2,278.2598	2,278.2598	0.1188		2,281.2297
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
Worker	0.0282	0.0200	0.1961	6.0000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		59.3634	59.3634	1.4300e-003		59.3992
Total	**0.2531**	**7.4949**	**1.6459**	**0.0220**	**0.5496**	**0.0234**	**0.5730**	**0.1501**	**0.0224**	**0.1725**		**2,337.6232**	**2,337.6232**	**0.1202**		**2,340.6288**

3.4 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	lb/day										lb/day					
Off-Road	1.8125	13.6361	12.8994	0.0221		0.6843	0.6843		0.6608	0.6608		2,001.2200	2,001.2200	0.3573		2,010.1517
Total	**1.8125**	**13.6361**	**12.8994**	**0.0221**		**0.6843**	**0.6843**		**0.6608**	**0.6608**		**2,001.2200**	**2,001.2200**	**0.3573**		**2,010.1517**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0672	2.2406	0.5145	5.6500e-003	0.1423	4.7700e-003	0.1471	0.0410	4.5600e-003	0.0455		596.6365	596.6365	0.0352		597.5154
Worker	0.3101	0.2197	2.1568	6.5500e-003	0.7229	4.6800e-003	0.7276	0.1918	4.3100e-003	0.1961		652.9968	652.9968	0.0158		653.3907
Total	**0.3773**	**2.4604**	**2.6714**	**0.0122**	**0.8652**	**9.4500e-003**	**0.8746**	**0.2327**	**8.8700e-003**	**0.2416**		**1,249.6333**	**1,249.6333**	**0.0509**		**1,250.9060**

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	lb/day										lb/day					
Off-Road	0.2930	3.7120	13.1241	0.0221		0.0303	0.0303		0.0303	0.0303	0.0000	2,001.2200	2,001.2200	0.3573		2,010.1517
Total	**0.2930**	**3.7120**	**13.1241**	**0.0221**		**0.0303**	**0.0303**		**0.0303**	**0.0303**	**0.0000**	**2,001.2200**	**2,001.2200**	**0.3573**		**2,010.1517**

3.4 Building Construction - 2021

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	lb/day										lb/day					
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
Vendor	0.0672	2.2406	0.5145	5.6500e-003	0.1423	4.7700e-003	0.1471	0.0410	4.5600e-003	0.0455		596.6365	596.6365	0.0352		597.5154
Worker	0.3101	0.2197	2.1568	6.5500e-003	0.7229	4.6800e-003	0.7276	0.1918	4.3100e-003	0.1961		652.9968	652.9968	0.0158		653.3907
Total	**0.3773**	**2.4604**	**2.6714**	**0.0122**	**0.8652**	**9.4500e-003**	**0.8746**	**0.2327**	**8.8700e-003**	**0.2416**		**1,249.6333**	**1,249.6333**	**0.0509**		**1,250.9060**

3.4 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	lb/day										lb/day					
Off-Road	1.6487	12.5031	12.7264	0.0221		0.5889	0.5889		0.5689	0.5689		2,001.5429	2,001.5429	0.3486		2,010.2581
Total	**1.6487**	**12.5031**	**12.7264**	**0.0221**		**0.5889**	**0.5889**		**0.5689**	**0.5689**		**2,001.5429**	**2,001.5429**	**0.3486**		**2,010.2581**

3.4 Building Construction - 2022

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	lb/day										lb/day					
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
Vendor	0.0628	2.1275	0.4819	5.5900e-003	0.1423	4.1300e-003	0.1464	0.0410	3.9500e-003	0.0449		590.7489	590.7489	0.0336		591.5890
Worker	0.2882	0.1967	1.9718	6.3100e-003	0.7229	4.5600e-003	0.7275	0.1918	4.2000e-003	0.1959		629.2009	629.2009	0.0141		629.5530
Total	**0.3510**	**2.3242**	**2.4538**	**0.0119**	**0.8652**	**8.6900e-003**	**0.8739**	**0.2327**	**8.1500e-003**	**0.2409**		**1,219.9498**	**1,219.9498**	**0.0477**		**1,221.1420**

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	lb/day										lb/day					
Off-Road	0.2930	3.7120	13.1241	0.0221		0.0303	0.0303		0.0303	0.0303	0.0000	2,001.5429	2,001.5429	0.3486		2,010.2581
Total	**0.2930**	**3.7120**	**13.1241**	**0.0221**		**0.0303**	**0.0303**		**0.0303**	**0.0303**	**0.0000**	**2,001.5429**	**2,001.5429**	**0.3486**		**2,010.2581**

3.4 Building Construction - 2022

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	lb/day										lb/day					
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
Vendor	0.0628	2.1275	0.4819	5.5900e-003	0.1423	4.1300e-003	0.1464	0.0410	3.9500e-003	0.0449		590.7489	590.7489	0.0336		591.5890
Worker	0.2882	0.1967	1.9718	6.3100e-003	0.7229	4.5600e-003	0.7275	0.1918	4.2000e-003	0.1959		629.2009	629.2009	0.0141		629.5530
Total	**0.3510**	**2.3242**	**2.4538**	**0.0119**	**0.8652**	**8.6900e-003**	**0.8739**	**0.2327**	**8.1500e-003**	**0.2409**		**1,219.9498**	**1,219.9498**	**0.0477**		**1,221.1420**

3.5 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.5919					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**20.7965**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.5 Architectural Coating - 2022

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	lb/day										lb/day					
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
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
Worker	0.0590	0.0402	0.4033	1.2900e-003	0.1479	9.3000e-004	0.1488	0.0392	8.6000e-004	0.0401		128.7002	128.7002	2.8800e-003		128.7722
Total	**0.0590**	**0.0402**	**0.4033**	**1.2900e-003**	**0.1479**	**9.3000e-004**	**0.1488**	**0.0392**	**8.6000e-004**	**0.0401**		**128.7002**	**128.7002**	**2.8800e-003**		**128.7722**

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	lb/day										lb/day					
Archit. Coating	20.5919					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**20.6216**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.5 Architectural Coating - 2022

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	lb/day										lb/day					
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
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
Worker	0.0590	0.0402	0.4033	1.2900e-003	0.1479	9.3000e-004	0.1488	0.0392	8.6000e-004	0.0401		128.7002	128.7002	2.8800e-003		128.7722
Total	**0.0590**	**0.0402**	**0.4033**	**1.2900e-003**	**0.1479**	**9.3000e-004**	**0.1488**	**0.0392**	**8.6000e-004**	**0.0401**		**128.7002**	**128.7002**	**2.8800e-003**		**128.7722**

3.5 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	lb/day										lb/day					
Archit. Coating	20.5919					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**20.7836**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.5 Architectural Coating - 2023

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	lb/day										lb/day					
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
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
Worker	0.0550	0.0361	0.3688	1.2400e-003	0.1479	9.1000e-004	0.1488	0.0392	8.4000e-004	0.0401		123.7784	123.7784	2.5700e-003		123.8427
Total	**0.0550**	**0.0361**	**0.3688**	**1.2400e-003**	**0.1479**	**9.1000e-004**	**0.1488**	**0.0392**	**8.4000e-004**	**0.0401**		**123.7784**	**123.7784**	**2.5700e-003**		**123.8427**

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	lb/day										lb/day					
Archit. Coating	20.5919					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**20.6216**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.5 Architectural Coating - 2023

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	lb/day										lb/day					
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
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
Worker	0.0550	0.0361	0.3688	1.2400e-003	0.1479	9.1000e-004	0.1488	0.0392	8.4000e-004	0.0401		123.7784	123.7784	2.5700e-003		123.8427
Total	**0.0550**	**0.0361**	**0.3688**	**1.2400e-003**	**0.1479**	**9.1000e-004**	**0.1488**	**0.0392**	**8.4000e-004**	**0.0401**		**123.7784**	**123.7784**	**2.5700e-003**		**123.8427**

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	lb/day										lb/day					
Off-Road	0.6446	6.2357	8.8024	0.0136		0.3084	0.3084		0.2846	0.2846		1,297.6880	1,297.6880	0.4114		1,307.9725
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6446**	**6.2357**	**8.8024**	**0.0136**		**0.3084**	**0.3084**		**0.2846**	**0.2846**		**1,297.6880**	**1,297.6880**	**0.4114**		**1,307.9725**

3.6 Paving - 2023

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	lb/day										lb/day					
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
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
Worker	0.0397	0.0261	0.2663	9.0000e-004	0.1068	6.6000e-004	0.1075	0.0283	6.1000e-004	0.0289		89.3955	89.3955	1.8600e-003		89.4419
Total	**0.0397**	**0.0261**	**0.2663**	**9.0000e-004**	**0.1068**	**6.6000e-004**	**0.1075**	**0.0283**	**6.1000e-004**	**0.0289**		**89.3955**	**89.3955**	**1.8600e-003**		**89.4419**

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	lb/day										lb/day					
Off-Road	0.1598	0.6922	9.8512	0.0136		0.0213	0.0213		0.0213	0.0213	0.0000	1,297.6880	1,297.6880	0.4114		1,307.9725
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.1598**	**0.6922**	**9.8512**	**0.0136**		**0.0213**	**0.0213**		**0.0213**	**0.0213**	**0.0000**	**1,297.6880**	**1,297.6880**	**0.4114**		**1,307.9725**

3.6 Paving - 2023

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	lb/day										lb/day					
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
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
Worker	0.0397	0.0261	0.2663	9.0000e-004	0.1068	6.6000e-004	0.1075	0.0283	6.1000e-004	0.0289		89.3955	89.3955	1.8600e-003		89.4419
Total	**0.0397**	**0.0261**	**0.2663**	**9.0000e-004**	**0.1068**	**6.6000e-004**	**0.1075**	**0.0283**	**6.1000e-004**	**0.0289**		**89.3955**	**89.3955**	**1.8600e-003**		**89.4419**

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	lb/day										lb/day					
Mitigated	0.6690	4.3533	7.8392	0.0311	2.6747	0.0255	2.7002	0.7165	0.0238	0.7403		3,168.4154	3,168.4154	0.1265		3,171.5777
Unmitigated	0.6690	4.3533	7.8392	0.0311	2.6747	0.0255	2.7002	0.7165	0.0238	0.7403		3,168.4154	3,168.4154	0.1265		3,171.5777

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	439.83	422.82	387.99	993,118	993,118
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	99.60	22.17	9.47	180,814	180,814
Total	539.43	444.99	397.46	1,173,932	1,173,932

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
Apartments Mid Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690
Enclosed Parking with Elevator	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690
General Office Building	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690

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	lb/day										lb/day					
NaturalGas Mitigated	0.0255	0.2206	0.1113	1.3900e-003		0.0176	0.0176		0.0176	0.0176		278.3445	278.3445	5.3300e-003	5.1000e-003	279.9986
NaturalGas Unmitigated	0.0255	0.2206	0.1113	1.3900e-003		0.0176	0.0176		0.0176	0.0176		278.3445	278.3445	5.3300e-003	5.1000e-003	279.9986

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	lb/day										lb/day					
Apartments Mid Rise	1937.44	0.0209	0.1786	0.0760	1.1400e-003		0.0144	0.0144		0.0144	0.0144		227.9339	227.9339	4.3700e-003	4.1800e-003	229.2884
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
General Office Building	428.49	4.6200e-003	0.0420	0.0353	2.5000e-004		3.1900e-003	3.1900e-003		3.1900e-003	3.1900e-003		50.4107	50.4107	9.7000e-004	9.2000e-004	50.7102
Total		**0.0255**	**0.2206**	**0.1113**	**1.3900e-003**		**0.0176**	**0.0176**		**0.0176**	**0.0176**		**278.3445**	**278.3445**	**5.3400e-003**	**5.1000e-003**	**279.9986**

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	lb/day										lb/day					
Apartments Mid Rise	1.93744	0.0209	0.1786	0.0760	1.1400e-003		0.0144	0.0144		0.0144	0.0144		227.9339	227.9339	4.3700e-003	4.1800e-003	229.2884
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
General Office Building	0.42849	4.6200e-003	0.0420	0.0353	2.5000e-004		3.1900e-003	3.1900e-003		3.1900e-003	3.1900e-003		50.4107	50.4107	9.7000e-004	9.2000e-004	50.7102
Total		**0.0255**	**0.2206**	**0.1113**	**1.3900e-003**		**0.0176**	**0.0176**		**0.0176**	**0.0176**		**278.3445**	**278.3445**	**5.3400e-003**	**5.1000e-003**	**279.9986**

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	lb/day										lb/day					
Mitigated	2.9515	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371	0.0000	12.0483	12.0483	0.0116	0.0000	12.3380
Unmitigated	2.9515	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371	0.0000	12.0483	12.0483	0.0116	0.0000	12.3380

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	lb/day										lb/day					
Architectural Coating	0.4852					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.2648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2015	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371		12.0483	12.0483	0.0116		12.3380
Total	**2.9515**	**0.0770**	**6.6871**	**3.5000e-004**		**0.0371**	**0.0371**		**0.0371**	**0.0371**	**0.0000**	**12.0483**	**12.0483**	**0.0116**	**0.0000**	**12.3380**

6.2 Area by SubCategory

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	lb/day										lb/day					
Architectural Coating	0.4852					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.2648					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2015	0.0770	6.6871	3.5000e-004		0.0371	0.0371		0.0371	0.0371		12.0483	12.0483	0.0116		12.3380
Total	**2.9515**	**0.0770**	**6.6871**	**3.5000e-004**		**0.0371**	**0.0371**		**0.0371**	**0.0371**	**0.0000**	**12.0483**	**12.0483**	**0.0116**	**0.0000**	**12.3380**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

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

Road Construction Emissions Model Version 9.0.0

Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells D10 through D24, E28 through G35, and D38 through D41 for all project types.
Please use "Clear Data Input & User Overrides" button first before changing the Project Type or begin a new project.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Input Type

Project Name	MidPen Housing	
Construction Start Year	2021	Enter a Year between 2014 and 2040 (inclusive)
Project Type For 4: Other Linear Project Type, please provide project specific off-road equipment population and vehicle trip data	4	1) New Road Construction : Project to build a roadway from bare ground, which generally requires more site preparation than widening an existing roadway 2) Road Widening : Project to add a new lane to an existing roadway 3) Bridge/Overpass Construction : Project to build an elevated roadway, which generally requires some different equipment than a new roadway, such as a crane 4) Other Linear Project Type: Non-roadway project such as a pipeline, transmission line, or levee construction
Project Construction Time	4.00	months
Working Days per Month	22.00	days (assume 22 if unknown)
Predominant Soil/Site Type: Enter 1, 2, or 3 (for project within "Sacramento County", follow soil type selection instructions in cells E18 to E20 otherwise see instructions provided in cells J18 to J22)	1	1) Sand Gravel : Use for quaternary deposits (Delta/West County) 2) Weathered Rock-Earth : Use for Laguna formation (Jackson Highway area) or the Ione formation (Scott Road, Rancho Murieta) 3) Blasted Rock : Use for Salt Springs Slate or Copper Hill Volcanics (Folsom South of Highway 50, Rancho Murieta)
Project Length	0.29	miles
Total Project Area	0.25	acres
Maximum Area Disturbed/Day	0.25	acres
Water Trucks Used?	1	1. Yes 2. No

Please note that the soil type instructions provided in cells E18 to E20 are specific to Sacramento County. Maps available from the California Geologic Survey (see weblink below) can be used to determine soil type outside Sacramento County.

http://www.conservation.ca.gov/cgs/information/geologic_mapping/Pages/googlemaps.aspx#regionalseries

Material Hauling Quantity Input

Material Type	Phase	Haul Truck Capacity (yd^3) (assume 20 if unknown)	Import Volume (yd^3/day)	Export Volume (yd^3/day)
Soil	Grubbing/Land Clearing			
	Grading/Excavation	8.00		61.65
	Drainage/Utilities/Sub-Grade	8.00		4.22
	Paving			
Asphalt	Grubbing/Land Clearing			
	Grading/Excavation			
	Drainage/Utilities/Sub-Grade			
	Paving			

Mitigation Options

On-road Fleet Emissions Mitigation		Select "2010 and Newer On-road Vehicles Fleet" option when the on-road heavy-duty truck fleet for the project will be limited to vehicles of model year 2010 or newer
Off-road Equipment Emissions Mitigation	No Mitigation	Select "20% NOx and 45% Exhaust PM reduction" option if the project will be required to use a lower emitting off-road construction fleet. The SMAQMD Construction Mitigation Calculator can be used to confirm compliance with this mitigation measure (http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/Mitigation). Select "Tier 4 Equipment" option if some or all off-road equipment used for the project meets CARB Tier 4 Standard

The remaining sections of this sheet contain areas that require modification when 'Other Project Type' is selected.

Note: The program's estimates of construction period phase length can be overridden in cells D50 through D53, and F50 through F53.

Construction Periods	User Override of Construction Months	Program Calculated Months	User Override of Phase Starting Date	Program Default Phase Starting Date
Grubbing/Land Clearing	0.40	0.40	9/1/2021	1/1/2021
Grading/Excavation	1.60	1.60	10/14/2021	1/14/2021
Drainage/Utilities/Sub-Grade	1.40	1.40	12/4/2021	3/4/2021
Paving	0.60	0.60	1/31/2022	4/16/2021
Totals (Months)	4			

Note: Soil Hauling emission default values can be overridden in cells D61 through D64, and F61 through F64.

Soil Hauling Emissions User Input	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing	30.00			0	0.00
Miles/round trip: Grading/Excavation	30.00			8	240.00
Miles/round trip: Drainage/Utilities/Sub-Grade	30.00			1	30.00
Miles/round trip: Paving	30.00			0	0.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.06	0.11	0.05	0.02	1,779.29	0.00	0.28	1,862.69
Grading/Excavation (grams/mile)	0.04	0.42	3.06	0.11	0.05	0.02	1,779.29	0.00	0.28	1,862.69
Draining/Utilities/Sub-Grade (grams/mile)	0.04	0.42	3.07	0.11	0.05	0.02	1,768.05	0.00	0.28	1,850.92
Paving (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	3.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	3.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hauling Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.02	0.22	1.68	0.06	0.03	0.01	941.44	0.00	0.15	985.57
Tons per const. Period - Grading/Excavation	0.00	0.00	0.03	0.00	0.00	0.00	16.57	0.00	0.00	17.35
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.03	0.21	0.01	0.00	0.00	116.94	0.00	0.02	122.42
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	1.80	0.00	0.00	1.89
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.03	0.00	0.00	0.00	18.37	0.00	0.00	19.23

Note: Asphalt Hauling emission default values can be overridden in cells D91 through D94, and F91 through F94.

Asphalt Hauling Emissions User Input	User Override of Miles/Round Trip	Program Estimate of Miles/Round Trip	User Override of Truck Round Trips/Day	Default Values Round Trips/Day	Calculated Daily VMT
Miles/round trip: Grubbing/Land Clearing	30.00			0	0.00
Miles/round trip: Grading/Excavation	30.00			0	0.00
Miles/round trip: Drainage/Utilities/Sub-Grade	30.00			0	0.00
Miles/round trip: Paving	30.00			0	0.00

Emission Rates	ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.06	0.11	0.05	0.02	1,779.29	0.00	0.28	1,862.69
Grading/Excavation (grams/mile)	0.04	0.42	3.06	0.11	0.05	0.02	1,779.29	0.00	0.28	1,862.69
Draining/Utilities/Sub-Grade (grams/mile)	0.04	0.42	3.07	0.11	0.05	0.02	1,768.05	0.00	0.28	1,850.92
Paving (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	3.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	3.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons per construction project	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Worker commute default values can be overridden in cells D121 through D126.

Worker Commute Emissions	User Override of Worker Commute Default Values	Default Values		
User Input				
Miles/ one-way trip	20		Calculated Daily Trips	Calculated Daily VMT
One-way trips/day	2			
No. of employees: Grubbing/Land Clearing	4		8	160.00
No. of employees: Grading/Excavation	17		34	680.00
No. of employees: Drainage/Utilities/Sub-Grade	14		28	560.00
No. of employees: Paving	10		20	400.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.02	1.10	0.10	0.05	0.02	0.00	339.80	0.00	0.01	342.28
Grading/Excavation (grams/mile)	0.02	1.10	0.10	0.05	0.02	0.00	339.80	0.00	0.01	342.28
Draining/Utilities/Sub-Grade (grams/mile)	0.02	1.06	0.09	0.05	0.02	0.00	335.74	0.00	0.01	338.14
Paving (grams/mile)	0.02	1.00	0.08	0.05	0.02	0.00	328.72	0.00	0.01	330.96
Grubbing/Land Clearing (grams/trip)	1.18	2.95	0.34	0.00	0.00	0.00	72.81	0.08	0.04	85.39
Grading/Excavation (grams/trip)	1.18	2.95	0.34	0.00	0.00	0.00	72.81	0.08	0.04	85.39
Draining/Utilities/Sub-Grade (grams/trip)	1.15	2.91	0.33	0.00	0.00	0.00	71.98	0.08	0.03	84.30
Paving (grams/trip)	1.11	2.85	0.32	0.00	0.00	0.00	70.54	0.08	0.03	82.43
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.03	0.44	0.04	0.02	0.01	0.00	121.14	0.00	0.00	122.24
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.54
Pounds per day - Grading/Excavation	0.12	1.87	0.17	0.07	0.03	0.01	514.86	0.01	0.01	519.53
Tons per const. Period - Grading/Excavation	0.00	0.03	0.00	0.00	0.00	0.00	9.06	0.00	0.00	9.14
Pounds per day - Drainage/Utilities/Sub-Grade	0.09	1.49	0.13	0.06	0.02	0.00	418.95	0.01	0.01	422.66
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.02	0.00	0.00	0.00	0.00	6.45	0.00	0.00	6.51
Pounds per day - Paving	0.06	1.01	0.09	0.04	0.02	0.00	292.99	0.01	0.01	295.49
Tons per const. Period - Paving	0.00	0.01	0.00	0.00	0.00	0.00	1.93	0.00	0.00	1.95
Total tons per construction project	0.00	0.06	0.01	0.00	0.00	0.00	17.98	0.00	0.00	18.14

Note: Water Truck default values can be overridden in cells D153 through D156, I153 through I156, and F153 through F156.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values	Calculated	User Override of	Default Values	Calculated
User Input	Default # Water Trucks	Number of Water Trucks	Round Trips/Vehicle/Day	Round Trips/Vehicle/Day	Trips/day	Miles/Round Trip	Miles/Round Trip	Daily VMT
Grubbing/Land Clearing - Exhaust	1		5.00			8.00		40.00
Grading/Excavation - Exhaust	1		5.00			8.00		40.00
Drainage/Utilities/Subgrade	1		5.00			8.00		40.00
Paving	1		5.00			8.00		40.00

Emission Rates	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Grubbing/Land Clearing (grams/mile)	0.04	0.42	3.06	0.11	0.05	0.02	1,779.29	0.00	0.28	1,862.69
Grading/Excavation (grams/mile)	0.04	0.42	3.06	0.11	0.05	0.02	1,779.29	0.00	0.28	1,862.69
Draining/Utilities/Sub-Grade (grams/mile)	0.04	0.42	3.07	0.11	0.05	0.02	1,768.05	0.00	0.28	1,850.92
Paving (grams/mile)	0.04	0.42	3.08	0.11	0.05	0.02	1,748.57	0.00	0.27	1,830.52
Grubbing/Land Clearing (grams/trip)	0.00	0.00	3.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation (grams/trip)	0.00	0.00	3.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Draining/Utilities/Sub-Grade (grams/trip)	0.00	0.00	3.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving (grams/trip)	0.00	0.00	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions	**ROG**	**CO**	**NOx**	**PM10**	**PM2.5**	**SOx**	**CO2**	**CH4**	**N2O**	**CO2e**
Pounds per day - Grubbing/Land Clearing	0.00	0.04	0.31	0.01	0.00	0.00	156.91	0.00	0.02	164.26
Tons per const. Period - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.72
Pounds per day - Grading/Excavation	0.00	0.04	0.31	0.01	0.00	0.00	156.91	0.00	0.02	164.26
Tons per const. Period - Grading/Excavation	0.00	0.01	0.01	0.00	0.00	0.00	2.76	0.00	0.00	2.89
Pounds per day - Drainage/Utilities/Sub-Grade	0.00	0.04	0.31	0.01	0.00	0.00	155.92	0.00	0.02	163.22
Tons per const. Period - Drainage/Utilities/Sub-Grade	0.00	0.00	0.00	0.00	0.00	0.00	2.40	0.00	0.00	2.51
Pounds per day - Paving	0.00	0.04	0.32	0.01	0.00	0.00	154.20	0.00	0.02	161.42
Tons per const. Period - Paving	0.00	0.00	0.00	0.00	0.00	0.00	1.02	0.00	0.00	1.07
Total tons per construction project	0.00	0.00	0.01	0.00	0.00	0.00	6.87	0.00	0.00	7.19

Note: Fugitive dust default values can be overridden in cells D183 through D185.

Fugitive Dust	User Override of Max Acreage Disturbed/Day	Default Maximum Acreage/Day	PM10 pounds/day	PM10 tons/per period	PM2.5 pounds/day	PM2.5 tons/per period
Fugitive Dust - Grubbing/Land Clearing	0.25		2.50	0.01	0.52	0.00
Fugitive Dust - Grading/Excavation	0.25		2.50	0.04	0.52	0.01
Fugitive Dust - Drainage/Utilities/Subgrade	0.25		2.50	0.04	0.52	0.01

Values in cells D195 through D228, D246 through D279, D297 through D330, and D348 through D381 are required when 'Other Project Type' is selected.

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Crawler Tractors	0.55	2.44	6.97	0.26	0.24	0.01	760.36	0.25	0.01	768.56
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Excavators	0.23	3.27	2.15	0.10	0.10	0.01	500.19	0.16	0.00	505.59
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equip	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equip	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01	0.00	49.56
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Grubbing/Land Clearing	pounds per day	0.84	6.01	9.48	0.38	0.35	0.01	1,309.87	0.41	0.01	1,323.71
Grubbing/Land Clearing	tons per phase	0.00	0.03	0.04	0.00	0.00	0.00	5.76	0.00	0.00	5.82

Grading/Excavation Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Crawler Tractors	0.55	2.44	6.97	0.26	0.24	0.01	760.36	0.25	0.01	768.56
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.00			Model Default Tier	Excavators	0.69	9.82	6.46	0.31	0.29	0.02	1,500.58	0.49	0.01	1,516.76
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Graders	0.45	1.77	5.92	0.19	0.17	0.01	641.68	0.21	0.01	648.60
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equip	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equip	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Rollers	0.38	3.76	3.85	0.24	0.22	0.01	508.18	0.16	0.00	513.65
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Rubber Tired Loaders	0.34	1.60	3.86	0.13	0.12	0.01	605.23	0.20	0.01	611.76
2.00			Model Default Tier	Scrapers	1.86	14.01	21.41	0.83	0.77	0.03	2,935.83	0.95	0.03	2,967.48
1.00			Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01	0.00	49.56
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Tractors/Loaders/Backhoes	0.37	4.52	3.79	0.22	0.21	0.01	601.80	0.19	0.01	608.28
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

			ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Grading/Excavation	pounds per day	4.70	38.21	52.62	2.20	2.02	0.08	7,602.97	2.45	0.07	7,684.65
	Grading/Excavation	tons per phase	0.08	0.67	0.93	0.04	0.04	0.00	133.81	0.04	0.00	135.25

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Air Compressors	0.28	2.42	1.98	0.12	0.12	0.00	375.26	0.03	0.00	376.74
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Generator Sets	0.35	3.68	3.08	0.16	0.16	0.01	623.04	0.03	0.00	625.21
1.00			Model Default Tier	Graders	0.44	1.75	5.68	0.18	0.17	0.01	641.54	0.21	0.01	648.45
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equip	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equip	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pavers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Paving Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Plate Compactors	0.04	0.21	0.25	0.01	0.01	0.00	34.48	0.00	0.00	34.65
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Pumps	0.37	3.74	3.12	0.17	0.17	0.01	623.04	0.03	0.00	625.26
			Model Default Tier	Rollers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Rough Terrain Forklifts	0.12	2.29	1.56	0.06	0.05	0.00	333.76	0.11	0.00	337.36
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Scrapers	1.78	13.55	20.12	0.78	0.72	0.03	2,937.57	0.95	0.03	2,969.24
1.00			Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01	0.00	49.56
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Tractors/Loaders/Backhoes	0.36	4.50	3.63	0.21	0.19	0.01	602.05	0.19	0.01	608.53
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
Drainage/Utilities/Sub-Grade	pounds per day	3.79	32.45	39.78	1.70	1.60	0.07	6,220.05	1.56	0.05	6,275.00
Drainage/Utilities/Sub-Grade	tons per phase	0.06	0.50	0.61	0.03	0.02	0.00	95.79	0.02	0.00	96.63

Paving Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Mitigation Option Override of Default Equipment Tier (applicable only when "Tier 4 Mitigation" Option Selected)	Default Equipment Tier	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
			Model Default Tier	Aerial Lifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Air Compressors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Cranes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crawler Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Excavators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Generator Sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Graders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other General Industrial Equip	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Other Material Handling Equip	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Pavers	0.21	2.88	2.10	0.10	0.09	0.00	455.26	0.15	0.00	460.17
1.00			Model Default Tier	Paving Equipment	0.18	2.55	1.74	0.08	0.08	0.00	394.47	0.13	0.00	398.73
			Model Default Tier	Plate Compactors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pressure Washers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Pumps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.00			Model Default Tier	Rollers	0.50	5.58	5.18	0.30	0.27	0.01	762.31	0.25	0.01	770.53
			Model Default Tier	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Scrapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00			Model Default Tier	Signal Boards	0.06	0.30	0.36	0.01	0.01	0.00	49.31	0.01	0.00	49.56
			Model Default Tier	Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00			Model Default Tier	Tractors/Loaders/Backhoes	0.33	4.48	3.35	0.18	0.17	0.01	602.48	0.19	0.01	608.96
			Model Default Tier	Trenchers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			Model Default Tier	Welders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

User-Defined Off-road Equipment If non-default vehicles are used, please provide information in 'Non-default Off-road Equipment' tab

Number of Vehicles	Equipment Tier	Type		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day	SOx pounds/day	CO2 pounds/day	CH4 pounds/day	N2O pounds/day	CO2e pounds/day
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	N/A		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

			ROG	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	N2O	CO2e
	Paving	pounds per day	1.27	15.79	12.72	0.68	0.62	0.02	2,263.83	0.72	0.02	2,287.94
	Paving	tons per phase	0.01	0.10	0.08	0.00	0.00	0.00	14.94	0.00	0.00	15.10
Total Emissions all Phases (tons per construction period) =>			0.15	1.30	1.66	0.07	0.07	0.00	250.31	0.07	0.00	252.81

Equipment default values for horsepower and hours/day can be overridden in cells D403 through D436 and F403 through F436.

Equipment	User Override of Horsepower	Default Values Horsepower	User Override of Hours/day	Default Values Hours/day
Aerial Lifts		63		8
Air Compressors		78		8
Bore/Drill Rigs		221		8
Cement and Mortar Mixers		9		8
Concrete/Industrial Saws		81		8
Cranes		231		8
Crawler Tractors		212		8
Crushing/Proc. Equipment		85		8
Excavators		158		8
Forklifts		89		8
Generator Sets		84		8
Graders		187		8
Off-Highway Tractors		124		8
Off-Highway Trucks		402		8
Other Construction Equipment		172		8
Other General Industrial Equipment		88		8
Other Material Handling Equipment		168		8
Pavers		130		8
Paving Equipment		132		8
Plate Compactors		8		8
Pressure Washers		13		8
Pumps		84		8
Rollers		80		8
Rough Terrain Forklifts		100		8
Rubber Tired Dozers		247		8
Rubber Tired Loaders		203		8
Scrapers		367		8
Signal Boards		6		8
Skid Steer Loaders		65		8
Surfacing Equipment		263		8
Sweepers/Scrubbers		64		8
Tractors/Loaders/Backhoes		97		8
Trenchers		78		8
Welders		46		8

END OF DATA ENTRY SHEET

Road Construction Emissions Model, Version 9.0.0

Daily Emission Estimates for -> MidPen Housing

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	0.87	6.49	9.83	2.91	0.41	2.50	0.88	0.36	0.52	0.02	1,587.92	0.42	0.04	1,610.21
Grading/Excavation	4.85	40.34	54.78	4.84	2.34	2.50	2.60	2.08	0.52	0.09	9,216.18	2.46	0.26	9,354.00
Drainage/Utilities/Sub-Grade	3.90	34.01	40.44	4.28	1.78	2.50	2.16	1.64	0.52	0.07	6,911.85	1.57	0.11	6,983.30
Paving	1.34	16.83	13.13	0.73	0.73	0.00	0.65	0.65	0.00	0.03	2,711.02	0.73	0.05	2,744.86
Maximum (pounds/day)	4.85	40.34	54.78	4.84	2.34	2.50	2.60	2.08	0.52	0.09	9,216.18	2.46	0.26	9,354.00
Total (tons/construction project)	0.16	1.37	1.72	0.17	0.08	0.09	0.09	0.07	0.02	0.00	293.53	0.07	0.01	297.37

Notes:

Project Start Year ->	2021
Project Length (months) ->	4
Total Project Area (acres) ->	0
Maximum Area Disturbed/Day (acres) ->	0
Water Truck Used? ->	Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	160	40
Grading/Excavation	62	0	240	0	680	40
Drainage/Utilities/Sub-Grade	4	0	30	0	560	40
Paving	0	0	0	0	400	40

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> MidPen Housing

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.00	0.03	0.04	0.01	0.00	0.01	0.00	0.00	0.00	0.00	6.99	0.00	0.00	6.43
Grading/Excavation	0.09	0.71	0.96	0.09	0.04	0.04	0.05	0.04	0.01	0.00	162.20	0.04	0.00	149.35
Drainage/Utilities/Sub-Grade	0.06	0.52	0.62	0.07	0.03	0.04	0.03	0.03	0.01	0.00	106.44	0.02	0.00	97.56
Paving	0.01	0.11	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.89	0.00	0.00	16.43
Maximum (tons/phase)	0.09	0.71	0.96	0.09	0.04	0.04	0.05	0.04	0.01	0.00	162.20	0.04	0.00	149.35
Total (tons/construction project)	0.16	1.37	1.72	0.17	0.08	0.09	0.09	0.07	0.02	0.00	293.53	0.07	0.01	269.78

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Attachment B

Health Risk Assessment Methodology and Assumptions

A health risk assessment (HRA) is accomplished in four steps: 1) hazards identification, 2) exposure assessment, 3) toxicity assessment, and 4) risk characterization. These steps cover the estimation of air emissions, the estimation of the air concentrations resulting from a dispersion analysis, the incorporation of the toxicity of the pollutants emitted, and the characterization of the risk based on exposure parameters such as breathing rate, age adjustment factors, and exposure duration; each depending on receptor type (i.e., residence, school, daycare centers, hospitals, senior care facilities, recreational areas, adult, infant, child).

This HRA was conducted in accordance with technical guidelines developed by federal, state, and regional agencies, including U.S. Environmental Protection Agency (USEPA), California Environmental Protection Agency (CalEPA), California Office of Environmental Health Hazard Assessment (OEHHA) *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*[1] and the Bay Area Air Quality Management District (BAAQMD) *Health Risk Screening Analysis Guidelines*.[2] This HRA addresses the emissions from construction activities including onsite equipment and haul trucks. Specific focus is on diesel particulate matter (DPM) and particulate matter equal to or less than 2.5 micrometers (fine particulate or $PM_{2.5}$) emissions. Gasoline-fueled vehicles emit air toxics in much smaller quantities and toxicity levels compared to DPM. Thus, gasoline-fueled emission sources were not included in the HRA. Secondly, air toxics emissions from project operations is not expected to be substantial and thus, the HRA focused on construction equipment emissions of DPM.

According to CalEPA, a HRA should not be interpreted as the expected rates of cancer or other potential human health effects, but rather as estimates of potential risk or likelihood of adverse effects based on current knowledge, under a number of highly conservative assumptions and the best assessment tools currently available.

TERMS AND DEFINITIONS

As the practice of conducting a HRA is particularly complex and involves concepts that are not altogether familiar to most people, several terms and definitions are provided that are considered essential to the understanding of the approach, methodology and results:

> *Acute effect* – a health effect (non-cancer) produced within a short period of time (few minutes to several days) following an exposure to toxic air contaminants (TAC).

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[1] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, March 6, 2015, http://oehha.ca.gov/air/hot_spots/hotspots2015.html.

[2] Bay Area Air Quality Management District, *Health Risk Screening Analysis Guidelines*, January 2010, http://www.baaqmd.gov/~/media/Files/Engineering/Air%20Toxics%20Programs/hrsa_guidelines.ashx

Cancer risk – the probability of an individual contracting cancer from a lifetime (i.e., 70 year) exposure to TAC such as DPM in the ambient air.

Chronic effect – a health effect (non-cancer) produced from a continuous exposure occurring over an extended period of time (weeks, months, years).

Hazard Index (HI) – the unitless ratio of an exposure level over the acceptable reference dose. The HI can be applied to multiple compounds in an additive manner.

Hazard Quotient (HQ) – the unitless ratio of an exposure level over the acceptable reference dose. The HQ is applied to individual compounds.

Toxic Air Contaminants – any air pollutant that is capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer causing) adverse human health effects (i.e., injury or illness). The current California list of TAC lists approximately 200 compounds, including particulate emissions from diesel-fueled engines.

Human Health Effects - comprise disorders such as eye watering, respiratory or heart ailments, and other (i.e., non-cancer) related diseases.

Health Risk Assessment – an analysis designed to predict the generation and dispersion of TAC in the outdoor environment, evaluate the potential for exposure of human populations, and to assess and quantify both the individual and population-wide health risks associated with those levels of exposure.

Incremental – under CEQA, the net difference (or change) in conditions or impacts when comparing the baseline to future year project conditions.

Maximum exposed individual (MEI) – an individual assumed to be located at the point where the highest concentrations of TAC, and therefore, health risks are predicted to occur.

Non-cancer risks – health risks such as eye watering, respiratory or heart ailments, and other non-cancer related diseases.

Receptors – the locations where potential health impacts or risks are predicted (i.e., schools, residences, and recreational sites).

LIMITATIONS AND UNCERTAINTIES

There are a number of important limitations and uncertainties commonly associated with a HRA due to the wide variability of human exposures to TAC, the extended timeframes over which the exposures are evaluated, and the inability to verify the results. Limitations and uncertainties associated with the HRA and identified by the CalEPA include: (a.) lack of reliable monitoring data; (b.) extrapolation of toxicity data in animals to humans; (c.) estimation errors in calculating TAC emissions; (d.) concentration prediction errors with dispersion models; and

(e.) the variability in lifestyles, fitness and other confounding factors of the human population. This HRA was performed using the best available data and methodologies, notwithstanding the following uncertainties:

- There are uncertainties associated with the estimation of emissions from project activities. Where project-specific data, such as emission factors, are not available, default assumptions in emission models were used.
- The limitations of the air dispersion model provide a source of uncertainty in the estimation of exposure concentrations. According to USEPA, errors due to the limitation of the algorithms implemented in the air dispersion model in the highest estimated concentrations of +/- 10 percent to 40 percent are typical.[3]
- The source parameters used to model emission sources add uncertainty. For all emission sources, the source parameters used source-specific, recommended as defaults, or expected to produce more conservative results. Discrepancies might exist in actual emissions characteristics of an emission source and its representation in the dispersion model.
- The exposure duration estimates do not take into account that people do not usually reside at the same location for 30 years and that other exposures (i.e., school children) are also of much shorter durations than was assumed in this HRA. This exposure duration is a highly conservative assumption, since most people do not remain at home all day and on average residents change residences every 11 to 12 years. In addition, this assumption adopts that residents are experiencing outdoor concentrations for the entire exposure period.
- For the risk and hazards calculations as well as the cumulative health impact, numerous assumptions must be made in order to estimate human exposure to pollutants. These assumptions include parameters such as breathing rates, exposure time and frequency, exposure duration, and human activity patterns. While a mean value derived from scientifically defensible studies is the best estimate of central tendency, most of the exposure variables used in this HRA are high-end estimates. The combination of several high-end estimates used as exposure parameters may substantially overestimate pollutant intake. The excess lifetime cancer risks calculated in this HRA are therefore likely to be higher than may be required to be protective of public health.
- The Cal/EPA cancer potency factor for DPM was used to estimate cancer risks associated with exposure to DPM emissions from construction activities. However, the cancer

[3] US Environmental Protection Agency, *Guideline on Air Quality Models (Revised), 40 Code of Federal Regulations, Part 51, Appendix W,* November 2005, https://www3.epa.gov/scram001/guidance/guide/appw_05.pdf

potency factor derived by Cal/EPA for DPM is highly uncertain in both the estimation of response and dose. In the past, due to inadequate animal test data and epidemiology data on diesel exhaust, the International Agency for Research on Cancer (IARC), a branch of the World Health Organization, had classified DPM as Probably Carcinogenic to Humans (Group 2); the USEPA had also concluded that the existing data did not provide an adequate basis for quantitative risk assessment.[4] However, based on two recent scientific studies,[5] IARC recently re-classified DPM as Carcinogenic to Humans to Group 1,[6] which means that the agency has determined that there is "sufficient evidence of carcinogenicity" of a substance in humans and represents the strongest weight-of-evidence rating in IARC's carcinogen classification scheme. This determination by the IARC may provide additional impetus for the USEPA to identify a quantitative dose-response relationship between exposure to DPM and cancer.

In summary, the estimated health impacts are based primarily on a series of conservative assumptions related to predicted environmental concentrations, exposure, and chemical toxicity. The use of conservative assumptions tends to produce upper-bound estimates of risk. BAAQMD acknowledges this uncertainty by stating: "the methods used [to estimate risk] are conservative, meaning that the real risks from the source may be lower than the calculations, but it is unlikely that they will be higher." The USEPA notes that the conservative assumptions used in a HRA are intended to assure that the estimated risks do not underestimate the actual risks posed by a site and that the estimated risks do not necessarily represent actual risks experienced by populations at or near a site.[7]

HAZARDS IDENTIFICATION

California Air Resources Board (CARB) has developed a list of TAC, where a TAC is "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health (California Health and Safety Code Section 39655). All USEPA hazardous air pollutants are TAC. CARB administers the Air Toxics "Hot Spots" program under Assembly Bill 2588 "Hot Spots" Information and Assessment Act, which requires periodic local review of facilities which emit TAC. Local air

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[4] US Environmental Protection Agency, *Health Assessment Document for Diesel Engine Exhaust*, May 2002, https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=29060

[5] Attfield MD, Schleiff PL, Lubin JH, Blair A, Stewart PA, Vermeulen R, Coble JB, Silverman DT, *The Diesel Exhaust in Miners Study: A Nested Case-Control Study of Lung Cancer and Diesel Exhaust*, June 2012, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3369553/

[6] International Agency for Research on Cancer, *Diesel Engine Exhaust Carcinogenic*, June 2012, https://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf

[7] US Environmental Protection Agency, *Risk Assessment Guidance for Superfund Human Health Risk Assessment*, December 1989, https://www.epa.gov/sites/production/files/2015-09/documents/rags_a.pdf

agencies periodically must prioritize stationary sources of TAC and prepare health risk assessments for high-priority sources.

Diesel exhaust is a complex mixture of numerous individual gaseous and particulate compounds emitted from diesel-fueled combustion engines. Diesel particulate matter is formed primarily through the incomplete combustion of diesel fuel. DPM is removed from the atmosphere through physical processes including atmospheric fall-out and washout by rain. Humans can be exposed to airborne DPM by deposition on water, soil, and vegetation; although the main pathway of exposure is inhalation. Cal/EPA has concluded that potential cancer risk from inhalation exposure to whole diesel exhaust outweigh the multi-pathway cancer risk from the speciated components.

In August 1998, the CARB identified DPM as an air toxic. CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel- Fueled Engines and Vehicles* and *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines* and approved these documents on September 28, 2000.[8] [9] The documents represent proposals to reduce DPM emissions, with the goal of reducing emissions and the associated health risk by 75 percent in 2010 and by 85 percent in 2020. The program aimed to require the use of state-of-the-art catalyzed DPM filters and ultra-low-sulfur diesel fuel.

In 2001, CARB assessed the state-wide health risks from exposure to diesel exhaust and to other toxic air contaminants. It is difficult to distinguish the health risks of diesel emissions from those of other air toxics, since diesel exhaust contains approximately 40 different TAC. The CARB study detected diesel exhaust by using ambient air carbon soot measurements as a surrogate for diesel emissions. The study reported that the state-wide cancer risk from exposure to diesel exhaust was about 540 per million population as compared to a total risk for exposure to all ambient air toxics of 760 per million. This estimate, which accounts for about 70 percent of the total risk from TAC, included both urban and rural areas in the state. The estimate can also be considered an average worst-case for the state, since it assumes constant exposure to outdoor concentrations of diesel exhaust and does not account for expected lower concentrations indoors, where most of time is spent. DPM is estimated to increase statewide cancer risk by 520 cancers per million residents exposed over a lifetime.[10]

Exposure to DPM results in a greater incidence of chronic non-cancer health effects, such as cough, labored breathing, chest tightness, wheezing, and bronchitis. Individuals particularly

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[8] California Air Resources Board, *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, October 2000, http://www.arb.ca.gov/diesel/documents/rrpfinal.pdf

[9] California Air Resources Board, *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines*, October 2000, https://www.arb.ca.gov/diesel/documents/rmgFinal.pdf

[10] California Air Resources Board, *Summary: Diesel Particulate Matter Health Impacts*, April 12, 2016, https://www.arb.ca.gov/research/diesel/diesel-health_summ.htm

vulnerable to DPM are children, whose lung tissue is still developing, the elderly and people with illnesses who may have other serious health problems that can be aggravated by exposure to DPM. In general, children are more vulnerable than adults to air pollutants because they have higher inhalation rates, narrower airways, and less mature immune systems. In addition, children with allergies may have an enhanced allergic response when exposed to diesel exhaust).

EXPOSURE ASSESSMENT

Dispersion is the process by which atmospheric pollutants disseminate due to wind and vertical stability. The results of a dispersion analysis are used to assess pollutant concentrations at or near an emission source. The results of an analysis allow predicted concentrations of pollutants to be compared directly to air quality standards and other criteria such as health risks based on modeled concentrations.

A rising pollutant plume reacts with the environment in several ways before it levels off. First, the plume's own turbulence interacts with atmospheric turbulence to entrain ambient air. This mixing process reduces and eventually eliminates the density and momentum differences that cause the plume to rise. Second, the wind transports the plume during its rise and entrainment process. Higher winds mix the plume more rapidly, resulting in a lower final rise. Third, the plume interacts with the vertical temperature stratification of the atmosphere, rising as a result of buoyancy in the unstable-to-neutrally stratified mixed layer. However, after the plume encounters the mixing lid and the stably stratified air above, its vertical motion is dampened.

Molecules of gas or small particles injected into the atmosphere will separate from each other as they are acted on by turbulent eddies. The Gaussian mathematical model such as AERMOD simulates the dispersion of the gas or particles within the atmosphere. The formulation of the Gaussian model is based on the following assumptions:

- The predictions are not time-dependent (all conditions remain unchanged with time)
- The wind speed and direction are uniform, both horizontally and vertically, throughout the region of concern
- The rate of diffusion is not a function of position
- Diffusion in the direction of the transporting wind is negligible when compared to the transport flow

Dispersion Modeling Approach

Air dispersion modeling was performed to estimate the downwind dispersion of DPM exhaust emissions resulting from construction activities. The following sections present the fundamental components of an air dispersion modeling analysis including air dispersion model selection and options, receptor locations, meteorological data, and source exhaust parameters.

Model Selection and Options

AERMOD (Version 18081)[11] was used for the dispersion analysis. AERMOD is the USEPA preferred atmospheric dispersion modeling system for general industrial sources. The model can simulate point, area, volume, and line sources. AERMOD is the appropriate model for this analysis based on the coverage of simple, intermediate, and complex terrain. It also predicts both short-term and long-term (annual) average concentrations. The model was executed using the regulatory default options (stack-tip downwash, buoyancy-induced dispersion, and final plume rise), default wind speed profile categories, default potential temperature gradients, and assuming no pollutant decay.

The selection of the appropriate dispersion coefficients depends on the land use within three kilometers (km) of the project site. The types of land use were based on the classification method defined by Auer (1978); using pertinent United States Geological Survey (USGS) 1:24,000 scale (7.5 minute) topographic maps of the area. If the Auer land use types of heavy industrial, light-to-moderate industrial, commercial, and compact residential account for 50 percent or more of the total area, the USEPA *Guideline on Air Quality Models*[12] recommends using urban dispersion coefficients; otherwise, the appropriate rural coefficients can be used. Based on observation of the area surrounding the project site, rural (urban is only designated within dense city centers such as downtown San Francisco) dispersion coefficients were applied within AERMOD.

Receptor Locations

Some receptors are considered more sensitive to air pollutants than others, because of preexisting health problems, proximity to the emissions source, or duration of exposure to air pollutants. Land uses such as primary and secondary schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because the very young, the old, and the infirm are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential areas are also considered sensitive to poor air quality because people in residential areas are often at home for extended periods. Recreational land uses are moderately sensitive to air pollution because vigorous exercise associated with recreation places having a high demand on respiratory system function.

Sensitive receptors were placed at receptors to estimate health impacts due to proposed project construction on existing residences. The project site is surrounded by residential uses to the west/northwest and retail/commercial/open space uses to the east. No schools or daycares are

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[11] US Environmental Protection Agency, AERMOD Modeling System, https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models

[12] US Environmental Protection Agency, *Guideline on Air Quality Models (Revised), 40 Code of Federal Regulations, Part 51, Appendix W*, November 2005, https://www3.epa.gov/scram001/guidance/guide/appw_05.pdf

located within 1,000 feet of the project site. **Figure B-1** displays the location of the sensitive receptors used in this HRA. Receptors were placed at a height of 1.8 meters (typical breathing height). Terrain elevations for receptor locations were used based on available USGS information for the area.

Meteorological Data

Hourly meteorological data from BAAQMD's Lake Chabot (surface data) monitoring station, located approximately ten mile to the northwest of the project site, and Oakland International Airport (upper air) were used in the dispersion modeling analysis. Meteorological data from 2010 through 2014 were used. **Figure B-2** displays the wind rose during this period. Wind directions are predominately from the west and northeast with a high frequency of low wind conditions, as shown in **Figure B-3**. The regional average annual wind speed is 5.7 miles per hour.

Source Release Characteristics

Construction equipment activities were treated as an area source. The release height of the off-road equipment exhaust was 3.05 meters and an initial vertical dimension of 4.15 meters, which reflects the height of the equipment plus an additional height of the exhaust plume above the exhaust point to account for plume rise due to buoyancy and momentum. Haul trucks were treated as a line source (i.e., volume sources placed at regular intervals) located along an access road. The haul trucks were assigned a release height of 3.05 meters and an initial vertical dimension of 4.15 meters, which accounts for dispersion from the movement of vehicles.[13] Typically, construction activities would occur between 8 a.m. and 5 p.m. (eight hours per day), on Monday through Friday. Terrain elevations for emission source locations were used based on available USGS information for the area. AERMAP (Version 11103)[14] was used to develop the terrain elevations.

[13] While haul truck emissions contribute substantially to overall project emissions, they are spread over many miles. Hence, the portion of trucking emissions that would impact one receptor is much smaller than the emissions that the clustered off-road activity at the project site would impact a receptor near the site. For example, the DPM emissions from truck travel within 1,000 feet of the project are less than 1 percent of the total off-road DPM emissions.

[14] US Environmental Protection Agency, AERMAP, https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models

FIGURE B-1
HEALTH RISK ASSESSMENT RECEPTORS

FIGURE B-2
WINDROSE FOR BAAQMD LAKE CHABOT STATION

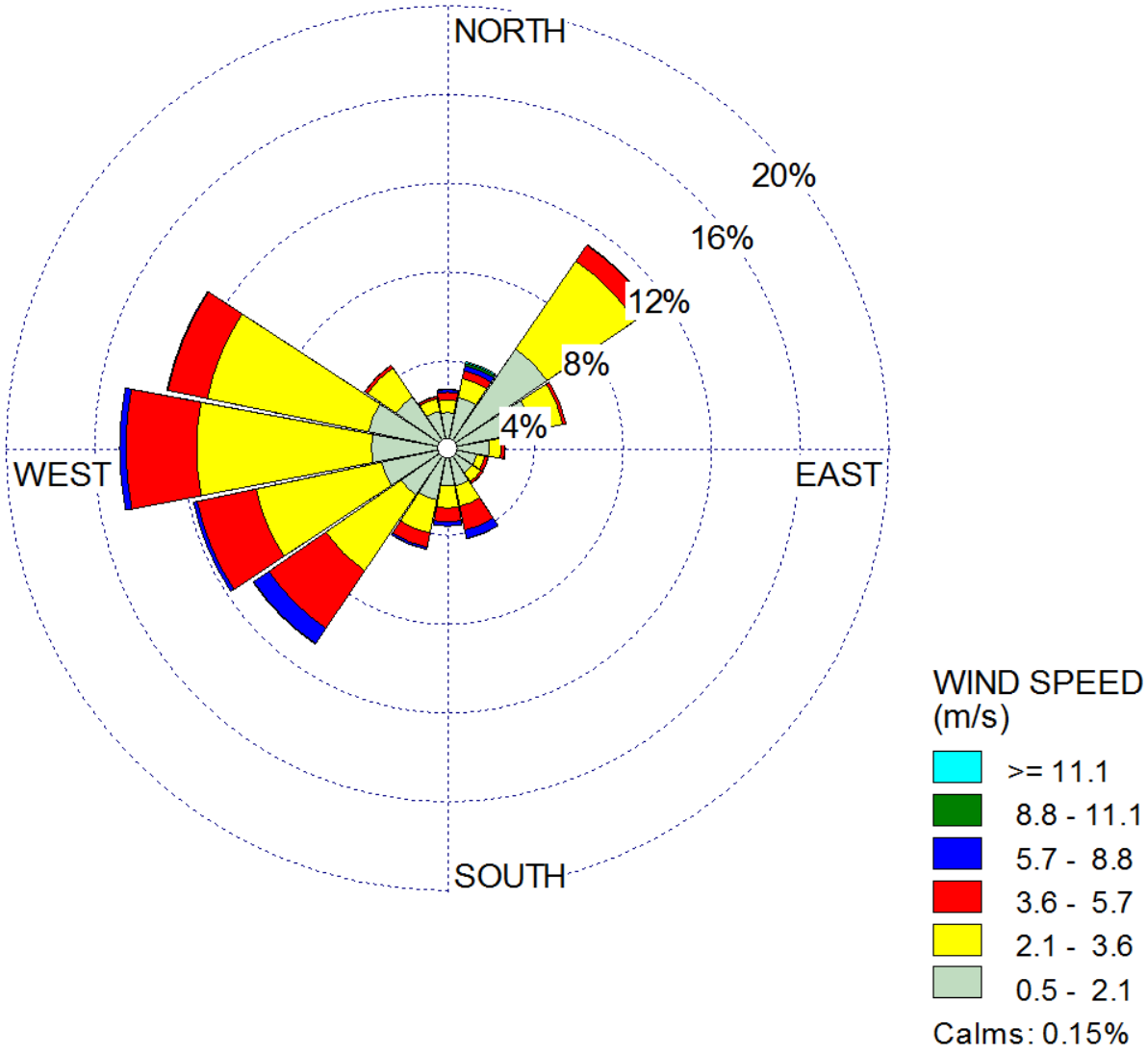
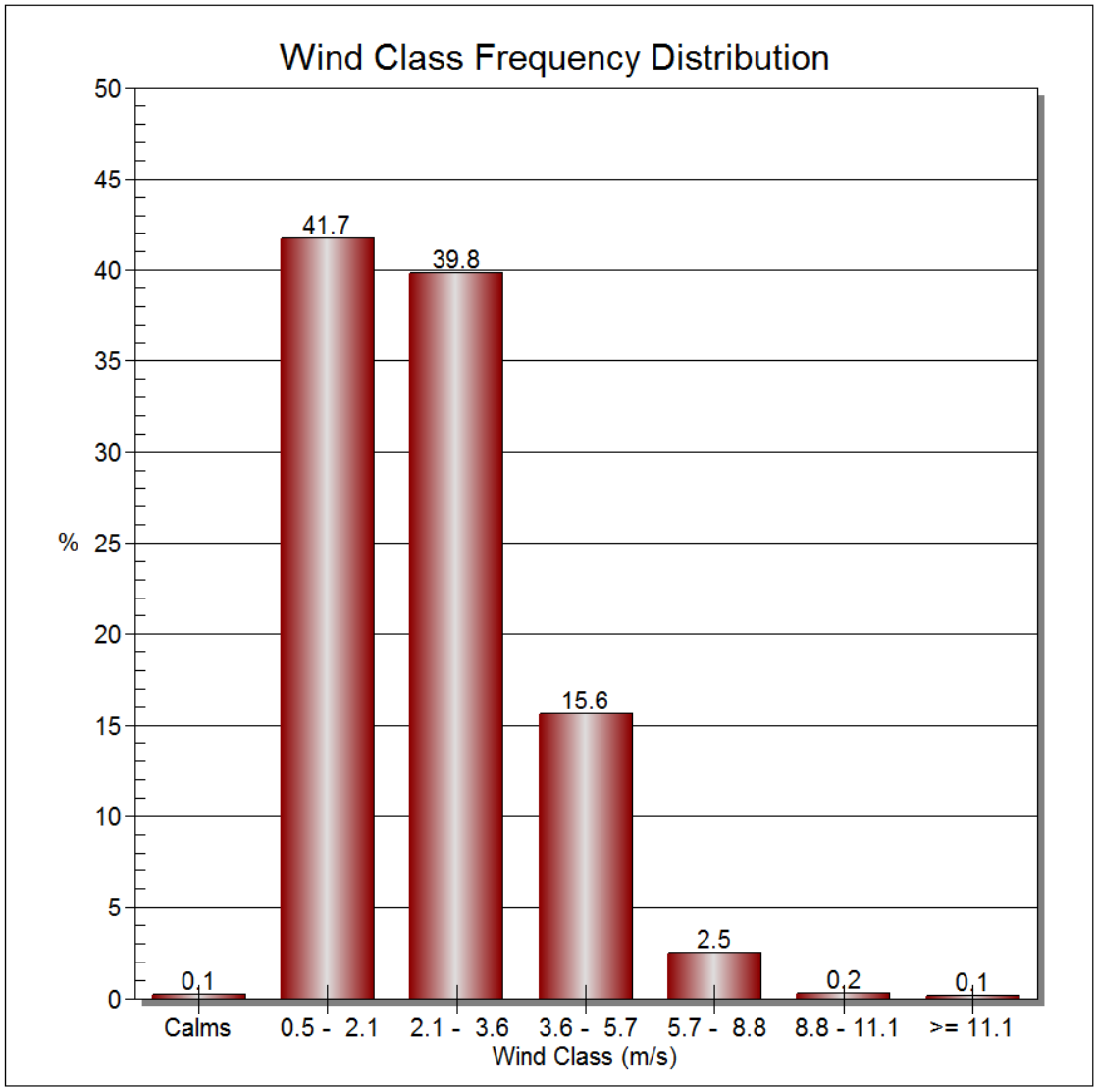


FIGURE B-3
WIND SPEED DISTRIBUTION FOR BAAQMD LAKE CHABOT STATION



EXPOSURE PARAMETERS

This HRA was conducted following methodologies in OEHHA's *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*.[15] This was accomplished by applying the estimated concentrations at the receptors analyzed to the established cancer risk estimates and acceptable reference concentrations for non-cancer health effects.

OEHHA's revisions to its *Guidance Manual* were primarily designed to ensure that the greater sensitivity of children to cancer and other health risks is reflected in HRAs. For example, OEHHA now recommends that risks be analyzed separately for multiple age groups, focusing especially on young children and teenagers, rather than the past practice of analyzing risks to the general population, without distinction by age. OEHHA also now recommends that statistical "age sensitivity factors" be incorporated into a HRA, and that children's relatively high breathing rates be accounted for. On the other hand, the *Guidance Manual* revisions also include some changes that would reduce calculated health risks. For example, under the former guidance, OEHHA recommended that residential cancer risks be assessed by assuming 70 years of exposure at a residential receptor; under the *Guidance Manual*, this assumption is lessened to 30 years.

OEHHA has developed exposure factors (e.g., daily breathing rates) for six age groups including the last trimester to birth, birth to 2 years, 2 to 9 years, 2 to 16 years, 16 to 30 years, and 16 to 70 years. These age bins allow for more refined exposure information to be used when estimating exposure and the potential for developing cancer over a lifetime. This means that exposure variates are needed for the third trimester, ages zero to less than two, ages two to less than nine, ages two to less than 16, ages 16 to less than 30, and ages 16 to 70. Residential receptors utilize the 95th percentile breathing rate values. The breathing rates are age-specific and are 1,090 liters per kilogram-day for ages less than 2 years, 745 liters per kilogram-day for ages 2 to 16 years, 335 liters per kilogram-day for ages 16 to 30 years, and 290 liters per kilogram-day for ages 30 to 70 years. A school child breathing rate is 520 liters per kilogram-day and an off-site worker breathing rate is 230 liters per kilogram-day.

OEHHA developed age sensitivity factors (ASF) to take into account the increased sensitivity to carcinogens during early-in-life exposures. OEHHA recommends that cancer risks be weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to 2 years of age, and by a factor of 3 for exposures from 2 years through 15 years of age.

Based on OEHHA recommendations, the cancer risk to residential receptors assumes exposure occurs 24 hours per day for 350 days per year while accounting for a percentage of time at home. OEHHA evaluated information from activity pattern databases to estimate the fraction of

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[15] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, March 6, 2015, http://oehha.ca.gov/air/hot_spots/hotspots2015.html

time at home (FAH) during the day. This information was used to adjust exposure duration and cancer risk based on the assumption that a person is not present at home continuously for 24 hours and therefore exposure to emissions is not occurring when a person is away from their home. In general, the FAH factors are age-specific and are 0.85 for ages less than 2 years, 0.72 for ages 2 to 16 years, and 0.73 for ages 30 to 70 years.

OEHHA has decreased the exposure duration currently being used for estimating cancer risk at the maximum exposed individual resident from 70 years to 30 years. This is based on studies showing that 30 years is a reasonable estimate of the 90th to 95th percentile of residency duration in the population. Additionally, OEHHA recommends using the 9 and 70-year exposure duration to represent the potential impacts over the range of residency periods.

Given the exposure durations of less than 24 hours, sensitive recreational receptors were evaluated for acute impacts only. Based on OEHHA recommendations, for children at school sites, exposure is assumed to occur 10 hours per day for 180 days (or 36 weeks) per year. Cancer risk estimates for children at school sites are calculated based on 9 year exposure duration. School sites also include teachers and other adult staff which are treated as off-site workers.

RISK CHARACTERIZATION

Cancer risk is defined as the lifetime probability of developing cancer from exposure to carcinogenic substances. Cancer risks are expressed as the chance in one million of getting cancer (i.e., number of cancer cases among one million people exposed). The cancer risks are assumed to occur exclusively through the inhalation pathway. The cancer risk can be estimated by using the cancer potency factor (milligrams per kilogram of body weight per day [mg/kg-day]), the 30-year annual average concentration (microgram per cubic meter [$\mu g/m^3$]), and the lifetime exposure adjustment.

Following guidelines established by OEHHA, the incremental cancer risks attributable to the proposed project were calculated by applying exposure parameters to modeled DPM concentrations in order to determine the inhalation dose (mg/kg-day) or the amount of pollutants inhaled per body weight mass per day. The cancer risks occur exclusively through the inhalation pathway; therefore, the cancer risks can be estimated from the following equation:

$$\text{Dose-inh} = \frac{C_{air} * \{DBR\} * A * ASF * FAH * EF * ED * 10^{-6}}{AT}$$

where:

Dose-inh = Dose of the toxic substance through inhalation in mg/kg-day

10^{-6} = Micrograms to milligrams conversion, Liters to cubic meters conversion

C_{air} = Concentration in air in microgram (μg)/cubic meter (m^3)

{DBR} = Daily breathing rate in liter (L)/kg body weight – day

A = Inhalation absorption factor, 1.0

ASF = Age Sensitivity Factor

EF = Exposure frequency (days/year)

ED = Exposure duration (years)

FAH = Fraction of Time at Home

AT = Averaging time period over which exposure is averaged in days (25,550 days for a 70 year cancer risk)

To determine incremental cancer risk, the estimated inhalation dose attributed to the proposed project was multiplied by the cancer potency slope factor (cancer risk per mg/kg-day). The cancer potency slope factor is the upper bound on the increased cancer risk from a lifetime exposure to a pollutant. These slope factors are based on epidemiological studies and are different values for different pollutants. This allows the estimated inhalation dose to be equated to a cancer risk.

Non-cancer adverse health impacts, acute (short-term) and chronic (long-term), are measured against a hazard index (HI), which is defined as the ratio of the predicted incremental exposure concentration from the proposed project to a published reference exposure level (REL) that could cause adverse health effects as established by OEHHA. The ratio (referred to as the Hazard Quotient [HQ]) of each non-carcinogenic substance that affects a certain organ system is added to produce an overall HI for that organ system. The overall HI is calculated as the total for each organ system. If the overall HI for the highest-impacted organ system is greater than one, then the impact is considered to be significant.

The HI is an expression used for the potential for non-cancer health effects. The relationship for the non-cancer health effects is given by the annual concentration (in $\mu g/m^3$) and the REL (in $\mu g/m^3$). The acute hazard index was determined using the "simple" concurrent maximum approach, which tends to be conservative (i.e., overpredicts).

The relationship for the non-cancer health effects is given by the following equation:

$$HI = C/REL$$

Where:

HI = Hazard index; an expression of the potential for non-cancer health effects.

C = Annual average concentration ($\mu g/m^3$) during the 70 year exposure period.

REL = Concentration at which no adverse health effects are anticipated.

The chronic REL for DPM was established by the California OEHHA as 5 µg/m^3.[16] There is no acute REL for DPM. However, diesel exhaust does contain acrolein and other compounds, which do have an acute REL. BAAQMD's DPM speciation table (based on profile 4674 within the USEPA Speciate 4.2)[17] was used to assess the acute impacts. Acrolein emissions are approximately 1.3 percent of the total diesel fuel emissions. The acute REL for acrolein was established by the California OEHHA as 2.5 µg/m^3.[18]

CUMULATIVE SOURCES

The BAAQMD's *CEQA Air Quality Guidelines* include standards and methods for determining the significance of cumulative health risk impacts.[19] The method for determining cumulative health risk requires the tallying of health risk from permitted stationary sources, rail activities, and roadways in the vicinity of a project (i.e., within a 1,000-foot radius or "zone of influence") to determine whether the cumulative health risk thresholds are exceeded.

BAAQMD has developed a geo-referenced database of permitted emissions sources throughout the San Francisco Bay Area, and has developed the *Stationary Source Risk & Hazard Analysis Tool* for estimating cumulative health risks from permitted sources.[20] Two permitted sources (diesel generator and service station) are located within 1,000 feet of the project site. **Table B-1** provide the estimated screening cancer risk, hazard impacts, and the $PM_{2.5}$ concentrations for the nearby permitted sources. The screening impact values represent impacts at the source property line.

TABLE B-1
SCREENING HEALTH IMPACTS – PERMITTED SOURCES

Facility ID	Facility Type	Address	Cancer Risk	Hazard Impact	$PM_{2.5}$ Concentration
112397	Mission Shell	33365 Mission Blvd	36.4	0.180	0
13554	Pacific Bell	118 East Street	25.4	0.042	0.032

SOURCE: Bay Area Air Quality Management District, *Stationary Source Risk & Hazard Analysis Tool*, May 2011 and Email from Areana Flores at BAAQMD on June 18, 2019 - Stationary Source Inquiry Form Request – Union City MidPen Housing.

Per BAAQMD guidance, a distance adjustment multiplier was applied to the gasoline service station and diesel generator. The Pacific Bell diesel generator is located approximately 240 feet (to the south of the project site) from the proposed receptors. The Mission Shell service station

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[16] Office of Environmental Health Hazards Assessment - Acute, 8-hour, and Chronic Reference Exposure Levels, June 2014, http://www.oehha.ca.gov/air/allrels.html

[17] Provides for a speciation faction of 1.3 percent of acrolein per DPM emission rate

[18] Office of Environmental Health Hazards Assessment - Acute, 8-hour, and Chronic Reference Exposure Levels, June 2014, http://www.oehha.ca.gov/air/allrels.html

[19] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines,* May 2017, http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

[20] Bay Area Air Quality Management District, *CEQA Tools and Methodologies*, http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools

(maximum throughput for 2019 of 3.4 million gallons) is located approximately 120 feet (to the north of the project site) from the proposed receptors. For the proposed sensitive receptors, **Table B-2** provides the estimated adjusted cancer risk, hazard impacts, and the $PM_{2.5}$ concentrations for the nearby permitted sources; adjusted for distance from the emission sources to proposed receptor. The adjusted values represent impacts at the proposed receptors.

TABLE B-2
ADJUSTED HEALTH IMPACTS – PROPOSED RECEPTORS

Facility ID	Facility Type	Address	Cancer Risk	Hazard Impact	$PM_{2.5}$ Concentration
112397	Mission Shell	33365 Mission Blvd	16.2	0.08	0
13554	Pacific Bell	118 East Street	4.77	0.008	0.006

SOURCE: Bay Area Air Quality Management District, *Stationary Source Risk & Hazard Analysis Tool*, May 2011 and Email from Areana Flores at BAAQMD on June 18, 2019 - Stationary Source Inquiry Form Request – Union City MidPen Housing. Cancer risk was subsequently adjusted to account for the BAAQMD's *Distance Adjustment Multiplier for Diesel Internal Combustion Engine* and BAAQMD's *Distance Adjustment Multiplier for Gas Station*.

BAAQMD has also developed a geo-referenced database of roadways throughout the San Francisco Bay Area and has developed the *Highway Screening Analysis Tool* for estimating cumulative health risks from major roadways. Mission Boulevard is located to the east of the project site and within 1,000 feet. **Table B-3** display the health impacts from Mission Boulevard in association with the proposed residences at ground floor. **Table B-4** display the health impacts from Mission Boulevard in association with the proposed residences at second floor. Typically, health impacts from a roadway at grade are lower at second floor than the first floor. The nearest proposed receptor would be located approximately 25 feet from Mission Boulevard.

BAAQMD *CEQA Air Quality Guidelines* also require the inclusion of surface streets within 1,000 feet of the proposed project with annual average daily traffic of 10,000 or greater. BAAQMD has developed a county-specific tool, *Roadway Screening Analysis Calculator*, for estimating cumulative health risks from minor roadways. Upon review of nearby roadways, one roadway meets the criteria: Whipple Road with approximately 36,760 annual average daily traffic[21] and is approximately 250 feet from the project site. For Whipple Road, the estimated cancer risk is 5.53 per million persons and the estimated $PM_{2.5}$ concentration is 0.10 $\mu g/m^3$. Decoto Road is approximately 1,170 feet from the project site was not included in the analysis.

[21] Fehr & Peers, *MidPen Mixed-Use Project Transportation Impact Analysis*. August 2019. Based on a ratio of 10 percent for peak hour to annual average daily traffic.

TABLE B-3
MISSION BOULEVARD HEALTH IMPACTS AT GROUND FLOOR

Distance from Nearest Travel Lane (feet)	Cancer Risk	Chronic Impact	Acute Impact	$PM_{2.5}$ Concentration
10	108	0.040	0.031	0.274
25	85.3	0.032	0.026	0.215
50	65.8	0.024	0.021	0.165
75	54.5	0.020	0.018	0.136
100	47.1	0.017	0.016	0.117
200	31.5	0.011	0.010	0.077
300	24.4	0.009	0.008	0.059
400	20.0	0.007	0.006	0.048
500	17.0	0.006	0.005	0.041
750	9.87	0.004	0.004	0.030
1000	108	0.003	0.003	0.023

SOURCE: Bay Area Air Quality Management District, *Highway Screening Analysis Tool*, May 2011. Cancer Risk was adjusted by a factor of 2.6 to account for the Revised OEHHA Guidance Manual.

TABLE B-4
MISSION BOULEVARD HEALTH IMPACTS AT SECOND FLOOR

Distance from Nearest Travel Lane (feet)	Cancer Risk	Chronic Impact	Acute Impact	$PM_{2.5}$ Concentration
10	72.0	0.027	0.027	0.185
25	64.6	0.024	0.023	0.165
50	54.8	0.020	0.020	0.138
75	47.6	0.017	0.017	0.119
100	42.2	0.015	0.015	0.105
200	29.7	0.011	0.010	0.073
300	23.3	0.008	0.007	0.057
400	19.4	0.007	0.006	0.047
500	16.6	0.006	0.005	0.040
750	12.3	0.004	0.004	0.029
1000	9.71	0.003	0.003	0.023

SOURCE: Bay Area Air Quality Management District, *Highway Screening Analysis Tool*, May 2011. Cancer Risk was adjusted by a factor of 2.6 to account for the Revised OEHHA Guidance Manual.

ADJUSTMENT OF BAAQMD DATA FOR REVISED OEHHA GUIDANCE

This HRA was conducted following methodologies in OEHHA's *Air Toxics Hot Spots Program*

Guidance Manual for Preparation of Health Risk Assessments,[22] BAAQMD's *Stationary Source Risk & Hazard Analysis Tool* for estimating cumulative health risks from permitted sources, *Highway Screening Analysis Tool* for estimating cumulative health risks from major roadways, and *Roadway Screening Analysis Calculator* for estimating cumulative health risks from surface streets were based on the previous OEHHA guidance. Thus, an adjustment factor was developed to adjust the BAAQMD-developed cancer risks to account for the revised OEHHA guidance. The cancer risks for project construction activities as well as nearby rail activities were developed using AERMOD and the revised OEHHA guidance and thus were not further adjusted.

OEHHA's revisions to its *Guidance Manual* were primarily designed to ensure that the greater sensitivity of children to cancer and other health risks is reflected in HRA. For example, OEHHA now recommends that risks be analyzed separately for multiple age groups, focusing especially on young children and teenagers, rather than the past practice of analyzing risks to the general population, without distinction by age. OEHHA also now recommends that statistical "age sensitivity factors" be incorporated into a HRA, and that children's relatively high breathing rates be accounted for. On the other hand, the *Guidance Manual* revisions also include some changes that would reduce calculated health risks. For example, under the former guidance, OEHHA recommended that residential cancer risks be assessed by assuming 70 years of exposure at a residential receptor; under the *Guidance Manual*, this assumption is lessened to 30 years.

The revised OEHHA guidance has developed exposure factors (e.g., daily breathing rates) for six age groups including the last trimester to birth, birth to 2 years, 2 to 9 years, 2 to 16 years, 16 to 30 years, and 16 to 70 years. OEHHA also developed age sensitivity factors (ASF) to take into account the increased sensitivity to carcinogens during early-in-life exposures. OEHHA recommends that cancer risks be weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to 2 years of age, and by a factor of 3 for exposures from 2 years through 15 years of age.

In the previous OEHHA guidance, the adult breathing rate of 302 liters per kilogram per day (L/kg-day) and the children breathing rate of 581 L/kg-day was recommended. For estimating cancer risks for residential receptors over a 70 year lifetime, the incorporation of the ASF results in a cancer risk adjustment factor of 1.7.

In the revised OEHHA guidance, residential receptors utilize the 95th percentile breathing rate values. The breathing rates are age-specific and are 1,090 liters per kilogram-day for ages less than 2 years, 745 liters per kilogram-day for ages 2 to 16 years, and 335 liters per kilogram-day for ages 16 to 30 years.

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[22] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, February 2015, http://oehha.ca.gov/air/hot_spots/hotspots2015.html

These differences in breathing rates, exposure duration, and other factors result in difference in health risk results. According to the SJVAPCD, these differences would increase the likelihood of finding significant health risks by as much as three-fold. Based on calculations for this proposed project, an adjustment factor of 2.6 was calculated to account for differences in the previous OEHHA and revised OEHHA guidance related to differences in breathing rates, incorporation of a age sensitivity factors, incorporation of a fraction of time at home during the day, and a modification of the lifetime exposure of 70 to 30 years. The adjustment factor was determined by evaluating the cancer risk for the rail activities using the previous OEHHA guidance and comparing to the cancer risk for the rail activities using the revised OEHHA guidance.

Several presentations have reviewed the differences between the previous and revised OEHHA guidance and have determined that the differences range from 2.1 to 3.0, using a 30 year exposure and 95th percentile breathing rates, depending on the type of emission source.[23] Cancer risks associated with Mission Boulevard and other nearby roadways were adjusted by a factor of 2.6.

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23 ERM, *Updated Health Risk Assessment Guidelines*, March 31, 2015, http://www.erm.com/contentassets/c107b8507dbb4cd3a58e04f1e6438384/erm-oehha-webinar-3-31-15.pdf

San Joaquin Valley Air Pollution Control District, *Update to District's Risk Management Policy to Address OEHHA's Revised Risk Assessment Guidance Document*, May 28, 2015, http://www.valleyair.org/busind/pto/staff-report-5-28-15.pdf

San Joaquin Valley Air Pollution Control District, *Update On District's Implementation Of OEHHA's Revised Air Toxics Health Risk Assessment Guidelines*, August 20, 2015, http://www.valleyair.org/Board_meetings/GB/agenda_minutes/Agenda/2015/August/presentations/09.pdf

Health Risk Assessment Assumptions

5	Chronic Reference Exposure Level (ug/m3) for DPM	
2.5	Acute Reference Exposure Level (ug/m3) for Acrolien	
1.1	Cancer Potency Slope Factor (cancer risk per mg/kg-day) for DPM	
350	days per year	
25,550	days per lifetime	
1,090	95th Percentile Daily Breathing Rates (L/kg-day)	0<2 Years
861	95th Percentile Daily Breathing Rates (L/kg-day)	2<9 Years
745	95th Percentile Daily Breathing Rates (L/kg-day)	2<16 Years
335	95th Percentile Daily Breathing Rates (L/kg-day)	16<30 Years
290	95th Percentile Daily Breathing Rates (L/kg-day)	30<70 Years
0.85	fraction of time at home	0<2 Years
0.72	fraction of time at home	2<16 Years
0.73	fraction of time at home	16<70 Years

Project:	Union City MidPen Housing
Date:	September 20, 2019
Condition:	Unmitigated
Receptor:	Existing Residence

Exposure Year	Calender Year	Maximum 1-Hour Acrolien Concentration (ug/m3)	Annual PM2.5 Concentration (ug/m3)	Daily Breathing Rates (L/kg-day)	Exposure Factor	fraction of time at home	Cancer Risk
1	2021	2.59	1.30	1,090	10.0	0.85	60.7
2	2022	0.56	0.28	1,090	10.0	0.85	39.2
3	2023	0.12	0.06	745	4.75	0.72	0.57
4	2024			745	3.00	0.72	
5	2025			745	3.00	0.72	
6	2026			745	3.00	0.72	
7	2027			745	3.00	0.72	
8	2028			745	3.00	0.72	
9	2029			745	3.00	0.72	
10	2030			745	3.00	0.72	
11	2031			745	3.00	0.72	
12	2032			745	3.00	0.72	
13	2033			745	3.00	0.72	
14	2034			745	3.00	0.72	
15	2035			745	3.00	0.72	
16	2036			745	3.00	0.72	
17	2037			335	1.70	0.73	
18	2038			335	1.00	0.73	
19	2039			335	1.00	0.73	
20	2040			335	1.00	0.73	
21	2041			335	1.00	0.73	
22	2042			335	1.00	0.73	
23	2043			335	1.00	0.73	
24	2044			335	1.00	0.73	
25	2045			335	1.00	0.73	
26	2046			335	1.00	0.73	
27	2047			335	1.00	0.73	
28	2048			335	1.00	0.73	
29	2049			335	1.00	0.73	
30	2050			335	1.00	0.73	

1.30	Maximum Annual PM2.5 Concentration (ug/m3)
0.3	Significance Threshold (ug/m3)
Yes	Significant?
0.26	Chronic Hazard Impact
1	Significance Threshold
No	Significant?
1.03	Acute Hazard Impact
1	Significance Threshold
Yes	Significant?
100	Cancer Risk (Child)
10	Significance Threshold
Yes	Significant?
10.3	Cancer Risk (Adult)
10	Significance Threshold
Yes	Significant?
100	30-Year Exposure Cancer Risk
10	Significance Threshold
Yes	Significant?

Health Risk Assessment Assumptions

5	Chronic Reference Exposure Level (ug/m3) for DPM	
2.5	Acute Reference Exposure Level (ug/m3) for Acrolien	
1.1	Cancer Potency Slope Factor (cancer risk per mg/kg-day) for DPM	
350	days per year	
25,550	days per lifetime	
1,090	95th Percentile Daily Breathing Rates (L/kg-day)	0<2 Years
861	95th Percentile Daily Breathing Rates (L/kg-day)	2<9 Years
745	95th Percentile Daily Breathing Rates (L/kg-day)	2<16 Years
335	95th Percentile Daily Breathing Rates (L/kg-day)	16<30 Years
290	95th Percentile Daily Breathing Rates (L/kg-day)	30<70 Years
0.85	fraction of time at home	0<2 Years
0.72	fraction of time at home	2<16 Years
0.73	fraction of time at home	16<70 Years

Project:	Union City MidPen Housing
Date:	September 20, 2019
Condition:	Mitigated
Receptor:	Existing Residence

Exposure Year	Calender Year	Maximum 1-Hour Acrolien Concentration (ug/m3)	Annual PM2.5 Concentration (ug/m3)	Daily Breathing Rates (L/kg-day)	Exposure Factor	fraction of time at home	Cancer Risk
1	2021	0.16	0.08	1,090	10.0	0.85	3.75
2	2022	0.04	0.02	1,090	10.0	0.85	2.60
3	2023	0.01	0.00	745	4.75	0.72	0.04
4	2024			745	3.00	0.72	
5	2025			745	3.00	0.72	
6	2026			745	3.00	0.72	
7	2027			745	3.00	0.72	
8	2028			745	3.00	0.72	
9	2029			745	3.00	0.72	
10	2030			745	3.00	0.72	
11	2031			745	3.00	0.72	
12	2032			745	3.00	0.72	
13	2033			745	3.00	0.72	
14	2034			745	3.00	0.72	
15	2035			745	3.00	0.72	
16	2036			745	3.00	0.72	
17	2037			335	1.70	0.73	
18	2038			335	1.00	0.73	
19	2039			335	1.00	0.73	
20	2040			335	1.00	0.73	
21	2041			335	1.00	0.73	
22	2042			335	1.00	0.73	
23	2043			335	1.00	0.73	
24	2044			335	1.00	0.73	
25	2045			335	1.00	0.73	
26	2046			335	1.00	0.73	
27	2047			335	1.00	0.73	
28	2048			335	1.00	0.73	
29	2049			335	1.00	0.73	
30	2050			335	1.00	0.73	

0.08	Maximum Annual PM2.5 Concentration (ug/m3)
0.3	Significance Threshold (ug/m3)
No	Significant?
0.02	Chronic Hazard Impact
1	Significance Threshold
No	Significant?
0.06	Acute Hazard Impact
1	Significance Threshold
No	Significant?
6.39	Cancer Risk (Child)
10	Significance Threshold
No	Significant?
0.65	Cancer Risk (Adult)
10	Significance Threshold
No	Significant?
6.39	30-Year Exposure Cancer Risk
10	Significance Threshold
No	Significant?

Appendix B

Traffic Appendices

Appendix A: Intersection Count Data

Prepared by National Data & Surveying Services

Mission Blvd & Whipple Rd

Peak Hour Turning Movement Count

ID: 18-08594-001
City: Union City

Day: Thursday
Date: 11/08/2018

PEAK HOURS

AM	07:15 AM - 08:15 AM
NOON	NONE
PM	04:45 PM - 05:45 PM

COUNT PERIODS

AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

Mission Blvd

SOUTHBOUND

AM	157	1734	18	3	768	AM
NOON	0	0	0	0	0	NOON
PM	173	995	12	1	1885	PM

0 3 1 0

Whipple Rd — EASTBOUND

AM	NOON	PM	
475	0	499	
1	0	2	0
150	0	215	0.5
7	0	12	0.5
169	0	251	1

WESTBOUND — Whipple Rd

PM	NOON	AM	
13	0	14	0
11	0	23	1
20	0	36	0
0	0	0	0
50	0	33	

CONTROL

Signalized

TEV	3219	0	3706
	AM	NOON	PM
PHF	0.95		0.91

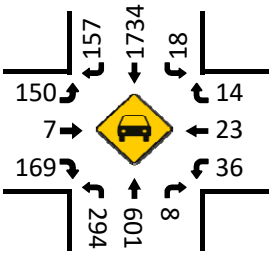
0 2 3 0

PM	1272	6	313	1656	26	PM
NOON	0	0	0	0	0	NOON
AM	1943	4	294	601	8	AM

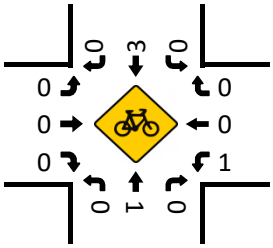
NORTHBOUND

Mission Blvd

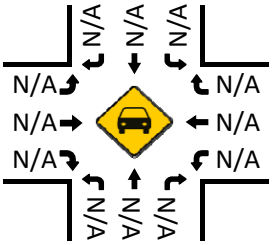
Total Vehicles (AM)



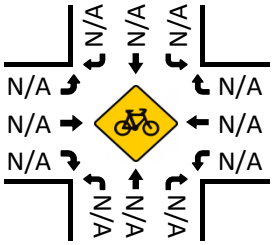
Bikes (AM)



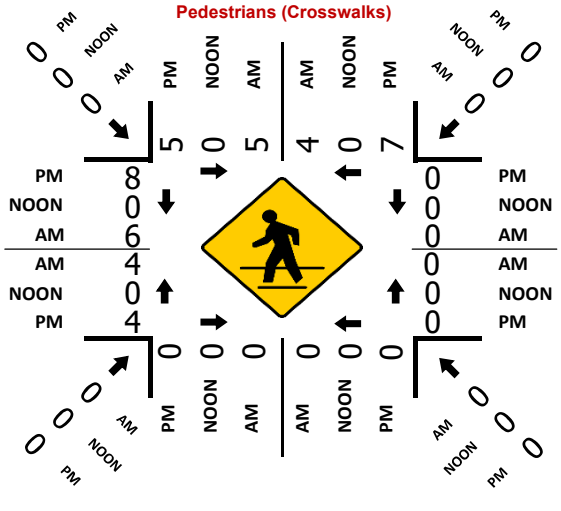
Total Vehicles (Noon)



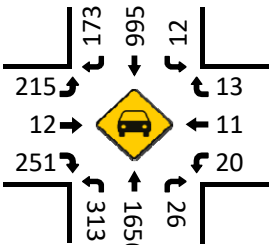
Bikes (NOON)



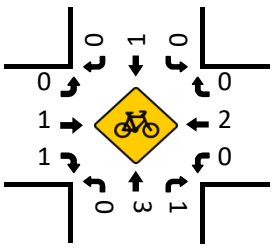
Pedestrians (Crosswalks)



Total Vehicles (PM)



Bikes (PM)



Prepared by National Data & Surveying Services

Mission Blvd & D St

Peak Hour Turning Movement Count

ID: 19-08283-001
City: Union City

Day: Wednesday
Date: 06/05/2019

	PEAK HOURS	COUNT PERIODS
AM	07:15 AM - 08:15 AM	07:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:15 PM - 05:15 PM	04:00 PM - 06:00 PM

Mission Blvd — SOUTHBOUND

	Right	Thru	Left	U-Turn	Exit (NB)
AM	7	1895	0	0	767
NOON	0	0	0	0	0
PM	14	1078	0	0	2059
(red)	0	3	0	0	

D St — EASTBOUND

	AM	NOON	PM	(red)
Exit (WB)	7	0	14	
U-Turn	0	0	0	0
Left	0	0	0	0
Thru	0	0	0	1
Right	13	0	21	0

D St — WESTBOUND

	(red)	PM	NOON	AM
Right	0	0	0	0
Thru	0	0	0	0
Left	0	0	0	0
U-Turn	0	0	0	0
Exit (EB)		0	0	0

CONTROL

1-Way Stop (EB)

	AM	NOON	PM
TEV	2682	0	3172
PHF	0.98		0.98

Mission Blvd — NORTHBOUND

	Exit (SB)	U-Turn	Left	Thru	Right
(red)		0	0	5	0
PM	1099	0	0	2059	0
NOON	0	0	0	0	0
AM	1908	0	0	767	0

Total Vehicles (AM)

Approach	Movements
SB	7 (right), 1895 (thru), 0 (left/U)
EB	0 (left), 0 (thru), 13 (right)
WB	0, 0, 0
NB	0, 767 (thru), 0

Total Vehicles (Noon)

Approach	Movements
SB	N/A, N/A, N/A
EB	N/A, N/A, N/A
WB	N/A, N/A, N/A
NB	N/A, N/A, N/A

Total Vehicles (PM)

Approach	Movements
SB	14 (right), 1078 (thru), 0
EB	0 (left), 0 (thru), 21 (right)
WB	0, 0, 0
NB	0, 205 (thru), 0

Bikes (AM)

Approach	Movements
SB	0, 5, 0
EB	1, 0, 0
WB	0, 0, 0
NB	0, 0, 0

Bikes (NOON)

Approach	Movements
SB	N/A, N/A, N/A
EB	N/A, N/A, N/A
WB	N/A, N/A, N/A
NB	N/A, N/A, N/A

Bikes (PM)

Approach	Movements
SB	0, 1, 0
EB	1, 0, 0
WB	0, 0, 0
NB	1, 4, 0

Pedestrians (Crosswalks)

Crosswalk		PM	NOON	AM
West leg	southbound	1	0	2
West leg	northbound	4	0	0
East leg	southbound	0	0	0
East leg	northbound	0	0	0
North leg	eastbound	0	0	0
North leg	westbound	0	0	0
South leg	eastbound	0	0	0
South leg	westbound	0	0	0
Diagonal NW		0	0	0
Diagonal NE		0	0	0
Diagonal SW		0	0	0
Diagonal SE		0	0	0

Prepared by National Data & Surveying Services

Mission Blvd & E St

Peak Hour Turning Movement Count

ID: 19-08283-002
City: Union City

Day: Wednesday
Date: 06/05/2019

PEAK HOURS	COUNT PERIODS
AM: 07:15 AM - 08:15 AM	AM: 07:00 AM - 09:00 AM
NOON: NONE	NOON: NONE
PM: 04:15 PM - 05:15 PM	PM: 04:00 PM - 06:00 PM

Mission Blvd – SOUTHBOUND

	Right	Through	Left	U-Turn	Outbound
AM	32	1883	0	0	766
NOON	0	0	0	0	0
PM	41	1068	0	0	2042
(red)	0	3	0	0	

E St – EASTBOUND

	AM	NOON	PM	(red)
Outbound	73	0	99	
U-Turn	0	0	0	0
Left	0	0	0	0
Through	0	0	0	1
Right	34	0	22	0

E St – WESTBOUND

	(red)	PM	NOON	AM
Right	0	0	0	0
Through	0	0	0	0
Left	0	0	0	0
U-Turn	0	0	0	0
Outbound		0	0	0

Mission Blvd – NORTHBOUND

	Outbound	U-Turn	Left	Through	Right
(red)		0	1	3	0
PM	1094	4	58	2042	0
NOON	0	0	0	0	0
AM	1918	1	41	766	0

CONTROL

1-Way Stop (EB)

	AM	NOON	PM
TEV	2757	0	3235
PHF	0.97		0.99

Total Vehicles (AM)

Approach	Right	Through	Left	U-Turn
Southbound	32	1883	0	
Eastbound	34	0	0	
Westbound	0	0	0	0
Northbound	0	766	41	

Total Vehicles (Noon)

All movements: N/A

Total Vehicles (PM)

Approach	Right	Through	Left	U-Turn
Southbound	41	1068	0	
Eastbound	22	0	0	
Westbound	0	0	0	0
Northbound	0	204	58	

Bikes (AM)

Approach	Right	Through	Left
Southbound	1	5	0
Eastbound	0	0	0
Westbound	0	0	0
Northbound	0	0	0

Bikes (NOON)

All movements: N/A

Bikes (PM)

Approach	Right	Through	Left
Southbound	0	1	0
Eastbound	0	0	0
Westbound	0	0	0
Northbound	0	5	0

Pedestrians (Crosswalks)

Crosswalk	Direction	AM	NOON	PM
North	Eastbound	0	0	0
North	Westbound	0	0	0
West	Southbound	2	0	1
West	Northbound	0	0	3
East	Southbound	0	0	0
East	Northbound	0	0	0
South	Eastbound	0	0	0
South	Westbound	0	0	0
NW corner (diagonal)		0	0	0
NE corner (diagonal)		0	0	0
SW corner (diagonal)		0	0	0
SE corner (diagonal)		0	0	0

Prepared by National Data & Surveying Services

2nd St & Whipple Rd

Peak Hour Turning Movement Count

ID: 19-08283-003
City: Union City

Day: Wednesday
Date: 06/05/2019

	PEAK HOURS	COUNT PERIODS
AM	07:45 AM - 08:45 AM	07:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:45 PM - 05:45 PM	04:00 PM - 06:00 PM

2nd St SOUTHBOUND

	Right	Through	Left	U-Turn	Departing
AM	0	0	0	0	0
NOON	0	0	0	0	0
PM	0	0	0	0	0
(red)	0	0	0	0	

Whipple Rd EASTBOUND

	AM	NOON	PM	(red)
Departing	401	0	522	
U-Turn	0	0	0	0
Left	0	0	0	0
Through	345	0	482	1
Right	3	0	11	0

Whipple Rd WESTBOUND

	(red)	PM	NOON	AM
Left	0	0	0	0
Through	2	502	0	381
Right	0	10	0	8
U-Turn	0	0	0	0
Departing		518	0	379

2nd St NORTHBOUND

	Departing	U-Turn	Left	Through	Right
(red)		0	1	0	1
PM	21	0	20	0	36
NOON	0	0	0	0	0
AM	11	0	20	0	34

CONTROL

1-Way Stop (NB)

	AM	NOON	PM
TEV	791	0	1061
PHF	0.85		0.91

Total Vehicles (AM)

Approach	Movements
Southbound	0, 0, 0
Eastbound	0, 345, 3
Westbound	0, 381, 8
Northbound	20, 0, 34

Bikes (AM)

Approach	Movements
Southbound	0, 0, 0
Eastbound	0, 0, 0
Westbound	0, 0, 1
Northbound	0, 0, 0

Total Vehicles (Noon)

Approach	Movements
Southbound	N/A, N/A, N/A
Eastbound	N/A, N/A, N/A
Westbound	N/A, N/A, N/A
Northbound	N/A, N/A, N/A

Bikes (NOON)

Approach	Movements
Southbound	N/A, N/A, N/A
Eastbound	N/A, N/A, N/A
Westbound	N/A, N/A, N/A
Northbound	N/A, N/A, N/A

Total Vehicles (PM)

Approach	Movements
Southbound	0, 0, 0
Eastbound	0, 482, 11
Westbound	0, 502, 10
Northbound	20, 0, 36

Bikes (PM)

Approach	Movements
Southbound	0, 0, 0
Eastbound	0, 1, 0
Westbound	0, 1, 0
Northbound	0, 0, 2

Pedestrians (Crosswalks)

Crosswalk	Direction 1 (PM / NOON / AM)	Direction 2 (AM / NOON / PM)
North	0 / 0 / 0	0 / 0 / 0
West	0 / 0 / 0	0 / 0 / 0
East	0 / 0 / 0	0 / 0 / 1
South	3 / 0 / 2	1 / 0 / 0
NW diagonal	0 / 0 / 0	
NE diagonal	0 / 0 / 0	
SW diagonal	0 / 0 / 0	
SE diagonal	0 / 0 / 0	

Prepared by National Data & Surveying Services

2nd St & D St

Peak Hour Turning Movement Count

ID: 19-08283-004
City: Union City

Day: Wednesday
Date: 06/05/2019

PEAK HOURS	
AM	07:00 AM - 08:00 AM
NOON	NONE
PM	05:00 PM - 06:00 PM

COUNT PERIODS	
AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

SOUTHBOUND (2nd St)

	L	T	R	U	
AM	2	15	0	0	56
NOON	0	0	0	0	0
PM	5	21	1	0	57

EASTBOUND (D St)

AM	NOON	PM		
3	0	14	⇦	
0	0	1	↰	0
8	0	5	↱	0
11	0	9	→	1
1	0	0	↳	0
AM	NOON	PM		

WESTBOUND (D St)

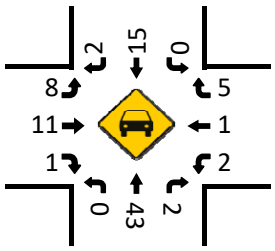
PM	NOON	AM		
4	0	5	↰	0
5	0	1	←	1
2	0	2	↰	0
0	0	0	↰	0
14	0	13	⇨	
PM	NOON	AM		

NORTHBOUND (2nd St)

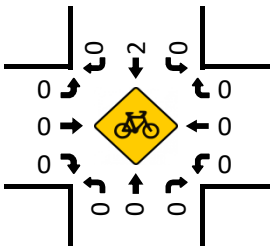
	L	T	R	U	
PM	23	0	3	48	4
NOON	0	0	0	0	0
AM	18	0	0	43	2

CONTROL			
2-Way Stop (EB/WB)			
TEV	90	0	108
	AM	NOON	PM
PHF	0.70		0.82

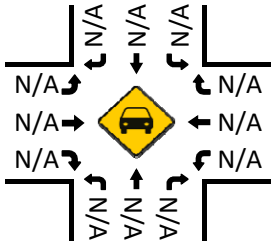
Total Vehicles (AM)



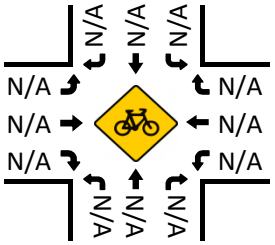
Bikes (AM)



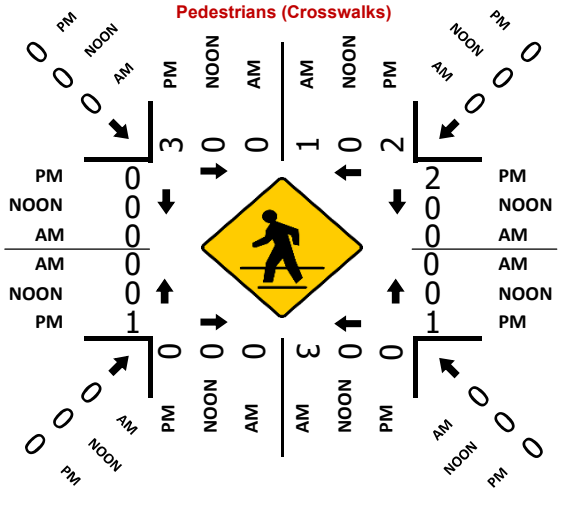
Total Vehicles (Noon)



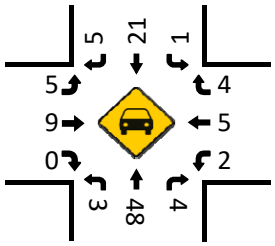
Bikes (NOON)



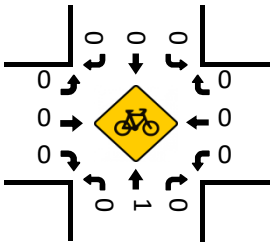
Pedestrians (Crosswalks)



Total Vehicles (PM)



Bikes (PM)



Prepared by National Data & Surveying Services

2nd St & E St

Peak Hour Turning Movement Count

ID: 19-08283-005
City: Union City

Day: Wednesday
Date: 06/05/2019

PEAK HOURS	
AM	07:15 AM - 08:15 AM
NOON	NONE
PM	05:00 PM - 06:00 PM

COUNT PERIODS	
AM	07:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 06:00 PM

SOUTHBOUND (2nd St)

	L	T	R	U	Total
AM	5	9	2	0	46
NOON	0	0	0	0	0
PM	8	9	4	1	52

EASTBOUND (E St)

	L	T	R	U
AM	71	0	116	0
NOON	0	0	0	0
PM	20	0	21	0
AM	33	0	29	1
NOON	2	0	0	0
PM	12	0	2	18
NOON	0	0	0	0
AM	15	0	3	19

WESTBOUND (E St)

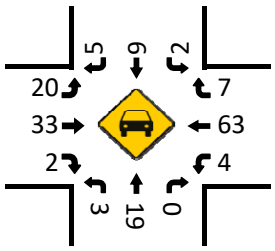
	L	T	R	U
PM	12	0	7	0
NOON	106	0	63	1
AM	3	0	4	0
PM	1	0	0	0
NOON	34	0	35	0
AM	0	0	1	0

NORTHBOUND (2nd St)

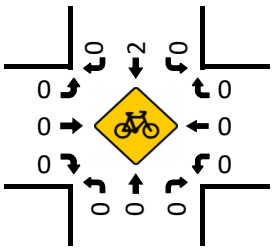
	L	T	R	U	Total
PM	0	1	0	0	1
NOON	0	0	0	0	0
AM	0	0	1	0	1

CONTROL			
2-Way Stop (NB/SB)			
TEV	167 AM	0 NOON	214 PM
PHF	0.73		0.91

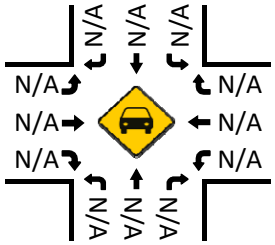
Total Vehicles (AM)



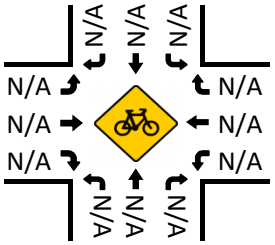
Bikes (AM)



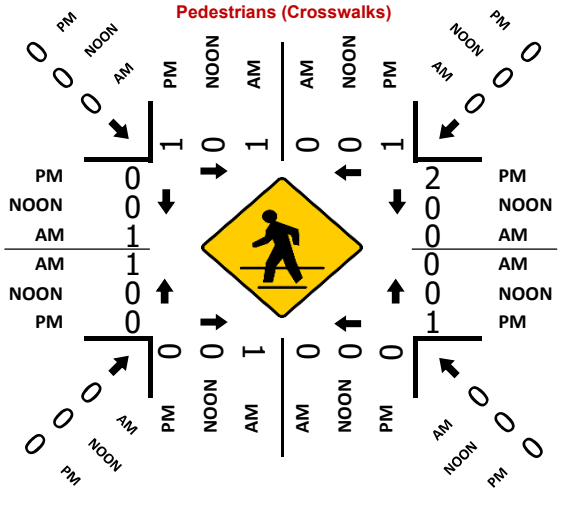
Total Vehicles (Noon)



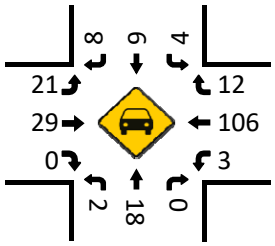
Bikes (NOON)



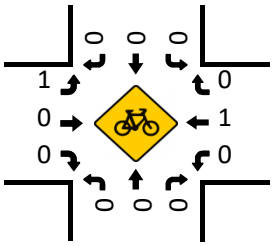
Pedestrians (Crosswalks)



Total Vehicles (PM)



Bikes (PM)



Appendix B: Existing and Existing with Project Intersection Analysis Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	151	7	169	36	23	14	298	601	8	21	1734	157
Future Volume (veh/h)	151	7	169	36	23	14	298	601	8	21	1734	157
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.98	1.00		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1845	1900	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	159	7	178	38	24	15	314	633	8	22	1825	165
Adj No. of Lanes	0	1	1	0	1	0	2	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	338	13	384	126	75	34	454	2883	36	94	2263	204
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.13	0.56	0.55	0.05	0.48	0.47
Sat Flow, veh/h	1040	53	1551	264	301	137	3408	5125	65	1757	4689	422
Grp Volume(v), veh/h	166	0	178	77	0	0	314	414	227	22	1304	686
Grp Sat Flow(s),veh/h/ln	1094	0	1551	702	0	0	1704	1679	1832	1757	1679	1753
Q Serve(g_s), s	0.0	0.0	8.6	1.9	0.0	0.0	7.7	5.4	5.4	1.1	28.9	29.2
Cycle Q Clear(g_c), s	13.4	0.0	8.6	15.3	0.0	0.0	7.7	5.4	5.4	1.1	28.9	29.2
Prop In Lane	0.96		1.00	0.49		0.19	1.00		0.04	1.00		0.24
Lane Grp Cap(c), veh/h	351	0	384	235	0	0	454	1889	1031	94	1621	846
V/C Ratio(X)	0.47	0.00	0.46	0.33	0.00	0.00	0.69	0.22	0.22	0.23	0.80	0.81
Avail Cap(c_a), veh/h	590	0	657	481	0	0	1153	2291	1250	314	1755	917
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.9	0.0	28.1	29.7	0.0	0.0	36.3	9.6	9.6	39.8	19.2	19.4
Incr Delay (d2), s/veh	1.0	0.0	0.9	0.8	0.0	0.0	1.9	0.1	0.1	1.3	2.7	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	3.8	1.8	0.0	0.0	3.7	2.5	2.7	0.5	13.8	15.3
LnGrp Delay(d),s/veh	30.9	0.0	29.0	30.5	0.0	0.0	38.2	9.6	9.7	41.1	21.9	24.6
LnGrp LOS	C		C	C			D	A	A	D	C	C
Approach Vol, veh/h		344			77			955			2012	
Approach Delay, s/veh		29.9			30.5			19.1			23.0	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.7	53.4		25.7	15.7	46.4		25.7
Change Period (Y+Rc), s	3.7	4.9		* 4.2	* 4.7	4.9		* 4.2
Max Green Setting (Gmax), s	16.0	59.0		* 37	* 29	45.0		* 37
Max Q Clear Time (g_c+I1), s	3.1	7.4		17.3	9.7	31.2		15.4
Green Ext Time (p_c), s	0.0	4.3		0.3	1.0	10.3		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	22.8
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	13	0	907	1895	7
Future Vol, veh/h	0	13	0	907	1895	7
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	13	0	926	1934	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	973	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	215	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	215	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	215	-	-
HCM Lane V/C Ratio	-	0.062	-	-
HCM Control Delay (s)	-	22.8	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	34	42	907	1883	32
Future Vol, veh/h	0	34	42	907	1883	32
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	35	43	935	1941	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	989	1976	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	5.36	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	3.13	-	-	-
Pot Cap-1 Maneuver	0	210	127	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	210	127	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.5	2.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	127	-	210	-	-
HCM Lane V/C Ratio	0.341	-	0.167	-	-
HCM Control Delay (s)	47.3	-	25.5	-	-
HCM Lane LOS	E	-	D	-	-
HCM 95th %tile Q(veh)	1.4	-	0.6	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	306	2	8	470	23	35
Future Vol, veh/h	306	2	8	470	23	35
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	373	2	10	573	28	43

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	379	0	971	378
Stage 1	-	-	-	-	378	-
Stage 2	-	-	-	-	593	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1174	-	279	667
Stage 1	-	-	-	-	691	-
Stage 2	-	-	-	-	550	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1170	-	274	664
Mov Cap-2 Maneuver	-	-	-	-	274	-
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	543	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	14.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	274	664	-	-	1170	-
HCM Lane V/C Ratio	0.102	0.064	-	-	0.008	-
HCM Control Delay (s)	19.6	10.8	-	-	8.1	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	6	11	1	2	2	3	0	45	1	0	13	1
Future Vol, veh/h	6	11	1	2	2	3	0	45	1	0	13	1
Conflicting Peds, #/hr	2	0	0	0	0	2	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	8	14	1	3	3	4	0	56	1	0	16	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	80	75	18	81	75	59	18	0	0	57	0	0
Stage 1	18	18	-	57	57	-	-	-	-	-	-	-
Stage 2	62	57	-	24	18	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	906	813	1058	904	813	1004	1592	-	-	1541	-	-
Stage 1	999	878	-	952	845	-	-	-	-	-	-	-
Stage 2	947	845	-	991	878	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	898	812	1057	891	812	1002	1590	-	-	1541	-	-
Mov Cap-2 Maneuver	898	812	-	891	812	-	-	-	-	-	-	-
Stage 1	998	877	-	952	845	-	-	-	-	-	-	-
Stage 2	939	845	-	974	877	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	9	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1590	-	-	850	909	1541	-	-
HCM Lane V/C Ratio	-	-	-	0.026	0.01	-	-	-
HCM Control Delay (s)	0	-	-	9.4	9	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	20	33	2	4	63	7	3	19	0	2	9	5
Future Vol, veh/h	20	33	2	4	63	7	3	19	0	2	9	5
Conflicting Peds, #/hr	1	0	1	1	0	1	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	25	41	3	5	79	9	4	24	0	3	11	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	89	0	0	45	0	0	198	193	44	200	190	87
Stage 1	-	-	-	-	-	-	94	94	-	95	95	-
Stage 2	-	-	-	-	-	-	104	99	-	105	95	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1500	-	-	1557	-	-	759	700	1023	756	703	969
Stage 1	-	-	-	-	-	-	910	815	-	909	814	-
Stage 2	-	-	-	-	-	-	899	811	-	898	814	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1499	-	-	1556	-	-	731	685	1022	724	688	966
Mov Cap-2 Maneuver	-	-	-	-	-	-	731	685	-	724	688	-
Stage 1	-	-	-	-	-	-	894	800	-	893	811	-
Stage 2	-	-	-	-	-	-	876	808	-	857	799	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.7	0.4	10.4	9.9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	691	1499	-	-	1556	-	-	761
HCM Lane V/C Ratio	0.04	0.017	-	-	0.003	-	-	0.026
HCM Control Delay (s)	10.4	7.4	0	-	7.3	0	-	9.9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	217	12	251	20	11	13	298	1656	8	13	995	173
Future Volume (veh/h)	217	12	251	20	11	13	298	1656	8	13	995	173
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1845	1900	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	228	13	264	21	12	14	314	1743	8	14	1047	182
Adj No. of Lanes	0	1	1	0	1	0	2	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	388	17	514	107	62	45	479	2525	12	64	1647	286
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.14	0.49	0.48	0.04	0.38	0.37
Sat Flow, veh/h	915	52	1551	134	186	136	3408	5174	24	1757	4291	745
Grp Volume(v), veh/h	241	0	264	47	0	0	314	1131	620	14	819	410
Grp Sat Flow(s),veh/h/ln	968	0	1551	455	0	0	1704	1679	1840	1757	1679	1678
Q Serve(g_s), s	0.0	0.0	11.4	0.7	0.0	0.0	7.3	21.7	21.7	0.6	16.5	16.7
Cycle Q Clear(g_c), s	21.4	0.0	11.4	22.1	0.0	0.0	7.3	21.7	21.7	0.6	16.5	16.7
Prop In Lane	0.95		1.00	0.45		0.30	1.00		0.01	1.00		0.44
Lane Grp Cap(c), veh/h	405	0	514	213	0	0	479	1639	898	64	1289	644
V/C Ratio(X)	0.60	0.00	0.51	0.22	0.00	0.00	0.66	0.69	0.69	0.22	0.64	0.64
Avail Cap(c_a), veh/h	564	0	693	368	0	0	1216	2415	1324	331	1851	925
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.8	0.0	22.4	21.4	0.0	0.0	33.9	16.5	16.5	39.0	20.9	21.1
Incr Delay (d2), s/veh	1.4	0.0	0.8	0.5	0.0	0.0	1.5	0.5	1.0	1.7	0.5	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	5.0	0.8	0.0	0.0	3.5	10.0	11.1	0.3	7.7	7.8
LnGrp Delay(d),s/veh	27.2	0.0	23.2	21.9	0.0	0.0	35.4	17.0	17.4	40.7	21.4	22.1
LnGrp LOS	C		C	C			D	B	B	D	C	C
Approach Vol, veh/h		505			47			2065			1243	
Approach Delay, s/veh		25.1			21.9			19.9			21.9	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.0	44.6		31.6	15.7	36.0		31.6
Change Period (Y+Rc), s	3.7	4.9		* 4.2	* 4.7	4.9		* 4.2
Max Green Setting (Gmax), s	16.0	59.0		* 37	* 29	45.0		* 37
Max Q Clear Time (g_c+I1), s	2.6	23.7		24.1	9.3	18.7		23.4
Green Ext Time (p_c), s	0.0	16.1		0.1	1.0	9.1		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	21.2
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	20	0	1962	1193	11
Future Vol, veh/h	0	20	0	1962	1193	11
Conflicting Peds, #/hr	0	0	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	21	0	2023	1230	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	626	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	364	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	362	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	362	-	-
HCM Lane V/C Ratio	-	0.057	-	-
HCM Control Delay (s)	-	15.5	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	75	1962	1168	45
Future Vol, veh/h	0	27	75	1962	1168	45
Conflicting Peds, #/hr	0	0	4	0	0	4
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	28	77	2002	1192	46

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	623	1242	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	5.36	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	3.13	-	-	-
Pot Cap-1 Maneuver	0	366	296	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	365	295	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	0.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	295	-	365	-	-
HCM Lane V/C Ratio	0.259	-	0.075	-	-
HCM Control Delay (s)	21.4	-	15.7	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	1	-	0.2	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	468	13	10	472	22	34
Future Vol, veh/h	468	13	10	472	22	34
Conflicting Peds, #/hr	0	4	4	0	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	520	14	11	524	24	38

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	538	0	1077	533
Stage 1	-	-	-	-	531	-
Stage 2	-	-	-	-	546	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1025	-	241	545
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	578	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1021	-	236	542
Mov Cap-2 Maneuver	-	-	-	-	236	-
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	569	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	236	542	-	-	1021	-
HCM Lane V/C Ratio	0.104	0.07	-	-	0.011	-
HCM Control Delay (s)	22	12.1	-	-	8.6	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	14	1	0	9	5	4	43	2	2	15	3
Future Vol, veh/h	4	14	1	0	9	5	4	43	2	2	15	3
Conflicting Peds, #/hr	3	0	0	0	0	3	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	5	16	1	0	11	6	5	51	2	2	18	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	100	91	22	97	92	57	24	0	0	55	0	0
Stage 1	26	26	-	64	64	-	-	-	-	-	-	-
Stage 2	74	65	-	33	28	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	879	797	1052	883	796	1006	1584	-	-	1544	-	-
Stage 1	989	872	-	944	840	-	-	-	-	-	-	-
Stage 2	933	839	-	981	870	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	858	791	1050	864	790	1001	1581	-	-	1541	-	-
Mov Cap-2 Maneuver	858	791	-	864	790	-	-	-	-	-	-	-
Stage 1	984	869	-	939	836	-	-	-	-	-	-	-
Stage 2	910	835	-	960	867	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	9.3	0.6	0.7
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1581	-	-	815	854	1541	-	-
HCM Lane V/C Ratio	0.003	-	-	0.027	0.019	0.002	-	-
HCM Control Delay (s)	7.3	0	-	9.5	9.3	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	12	24	3	4	94	16	2	20	0	4	8	3
Future Vol, veh/h	12	24	3	4	94	16	2	20	0	4	8	3
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	6	6	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	15	30	4	5	116	20	2	25	0	5	10	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	137	0	0	34	0	0	205	209	38	218	201	127
Stage 1	-	-	-	-	-	-	62	62	-	137	137	-
Stage 2	-	-	-	-	-	-	143	147	-	81	64	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1441	-	-	1571	-	-	751	686	1031	736	693	921
Stage 1	-	-	-	-	-	-	947	841	-	864	781	-
Stage 2	-	-	-	-	-	-	857	774	-	925	840	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1440	-	-	1571	-	-	732	676	1025	703	683	920
Mov Cap-2 Maneuver	-	-	-	-	-	-	732	676	-	703	683	-
Stage 1	-	-	-	-	-	-	937	832	-	854	778	-
Stage 2	-	-	-	-	-	-	840	771	-	883	831	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.3	10.5	10.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	681	1440	-	-	1571	-	-	726
HCM Lane V/C Ratio	0.04	0.01	-	-	0.003	-	-	0.026
HCM Control Delay (s)	10.5	7.5	0	-	7.3	0	-	10.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	7	170	36	23	14	298	601	8	21	1741	156
Future Volume (veh/h)	155	7	170	36	23	14	298	601	8	21	1741	156
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.98	1.00		0.99	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1845	1900	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	163	7	179	38	24	15	314	633	8	22	1833	164
Adj No. of Lanes	0	1	1	0	1	0	2	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	340	12	390	125	74	33	450	2868	36	94	2257	201
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.13	0.56	0.55	0.05	0.48	0.47
Sat Flow, veh/h	1034	47	1551	255	292	132	3408	5125	65	1757	4694	418
Grp Volume(v), veh/h	170	0	179	77	0	0	314	414	227	22	1309	688
Grp Sat Flow(s),veh/h/ln	1081	0	1551	680	0	0	1704	1679	1832	1757	1679	1754
Q Serve(g_s), s	0.0	0.0	8.7	1.9	0.0	0.0	7.8	5.5	5.5	1.1	29.4	29.7
Cycle Q Clear(g_c), s	14.1	0.0	8.7	16.0	0.0	0.0	7.8	5.5	5.5	1.1	29.4	29.7
Prop In Lane	0.96		1.00	0.49		0.19	1.00		0.04	1.00		0.24
Lane Grp Cap(c), veh/h	352	0	390	232	0	0	450	1879	1025	94	1615	844
V/C Ratio(X)	0.48	0.00	0.46	0.33	0.00	0.00	0.70	0.22	0.22	0.24	0.81	0.82
Avail Cap(c_a), veh/h	580	0	651	466	0	0	1142	2269	1238	311	1739	909
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	0.0	28.0	29.9	0.0	0.0	36.8	9.8	9.8	40.2	19.6	19.8
Incr Delay (d2), s/veh	1.0	0.0	0.8	0.8	0.0	0.0	2.0	0.1	0.1	1.3	2.8	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	3.8	1.8	0.0	0.0	3.8	2.5	2.8	0.6	14.1	15.6
LnGrp Delay(d),s/veh	31.1	0.0	28.9	30.7	0.0	0.0	38.7	9.9	9.9	41.5	22.4	25.2
LnGrp LOS	C		C	C			D	A	A	D	C	C
Approach Vol, veh/h		349			77			955			2019	
Approach Delay, s/veh		30.0			30.7			19.4			23.6	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.7	53.6		26.3	15.7	46.6		26.3
Change Period (Y+Rc), s	3.7	4.9		* 4.2	* 4.7	4.9		* 4.2
Max Green Setting (Gmax), s	16.0	59.0		* 37	* 29	45.0		* 37
Max Q Clear Time (g_c+I1), s	3.1	7.5		18.0	9.8	31.7		16.1
Green Ext Time (p_c), s	0.0	4.3		0.3	1.0	10.0		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	23.2
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	17	0	907	1899	11
Future Vol, veh/h	0	17	0	907	1899	11
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	17	0	926	1938	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	977	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	213	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	213	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	213	-	-
HCM Lane V/C Ratio	-	0.081	-	-
HCM Control Delay (s)	-	23.4	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	42	53	907	1887	36
Future Vol, veh/h	0	42	53	907	1887	36
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	43	55	935	1945	37

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	993	1984	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	5.36	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	3.13	-	-	-
Pot Cap-1 Maneuver	0	208	126	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	208	126	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.8	3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	126	-	208	-	-
HCM Lane V/C Ratio	0.434	-	0.208	-	-
HCM Control Delay (s)	53.8	-	26.8	-	-
HCM Lane LOS	F	-	D	-	-
HCM 95th %tile Q(veh)	1.9	-	0.8	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	306	7	8	470	27	40
Future Vol, veh/h	306	7	8	470	27	40
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	373	9	10	573	33	49

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	386	0	975	382
Stage 1	-	-	-	-	382	-
Stage 2	-	-	-	-	593	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1167	-	278	663
Stage 1	-	-	-	-	688	-
Stage 2	-	-	-	-	550	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1163	-	273	660
Mov Cap-2 Maneuver	-	-	-	-	273	-
Stage 1	-	-	-	-	685	-
Stage 2	-	-	-	-	543	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	14.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	273	660	-	-	1163	-
HCM Lane V/C Ratio	0.121	0.074	-	-	0.008	-
HCM Control Delay (s)	20	10.9	-	-	8.1	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	6	17	1	4	5	7	0	50	6	2	15	1
Future Vol, veh/h	6	17	1	4	5	7	0	50	6	2	15	1
Conflicting Peds, #/hr	2	0	0	0	0	2	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	100	80	80	80
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	8	21	1	5	6	9	0	63	6	3	19	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	103	96	21	103	93	68	21	0	0	69	0	0
Stage 1	27	27	-	66	66	-	-	-	-	-	-	-
Stage 2	76	69	-	37	27	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	875	792	1054	875	795	992	1588	-	-	1526	-	-
Stage 1	988	871	-	942	838	-	-	-	-	-	-	-
Stage 2	931	835	-	976	871	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	858	790	1053	855	793	990	1586	-	-	1526	-	-
Mov Cap-2 Maneuver	858	790	-	855	793	-	-	-	-	-	-	-
Stage 1	987	868	-	942	838	-	-	-	-	-	-	-
Stage 2	914	835	-	949	868	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	9.2	0	0.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1586	-	-	815	886	1526	-	-
HCM Lane V/C Ratio	-	-	-	0.037	0.023	0.002	-	-
HCM Control Delay (s)	0	-	-	9.6	9.2	7.4	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	20	39	2	6	66	17	3	19	0	4	11	5
Future Vol, veh/h	20	39	2	6	66	17	3	19	0	4	11	5
Conflicting Peds, #/hr	1	0	1	1	0	1	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	25	49	3	8	83	21	4	24	0	5	14	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	105	0	0	53	0	0	224	223	52	224	214	97
Stage 1	-	-	-	-	-	-	102	102	-	111	111	-
Stage 2	-	-	-	-	-	-	122	121	-	113	103	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1480	-	-	1546	-	-	729	674	1013	729	682	956
Stage 1	-	-	-	-	-	-	902	809	-	892	802	-
Stage 2	-	-	-	-	-	-	880	794	-	890	808	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1479	-	-	1545	-	-	698	657	1012	696	665	953
Mov Cap-2 Maneuver	-	-	-	-	-	-	698	657	-	696	665	-
Stage 1	-	-	-	-	-	-	886	794	-	876	796	-
Stage 2	-	-	-	-	-	-	852	788	-	849	793	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	0.5	10.7	10.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	662	1479	-	-	1545	-	-	726
HCM Lane V/C Ratio	0.042	0.017	-	-	0.005	-	-	0.034
HCM Control Delay (s)	10.7	7.5	0	-	7.3	0	-	10.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	12	251	20	11	13	298	1656	8	13	1001	173
Future Volume (veh/h)	220	12	251	20	11	13	298	1656	8	13	1001	173
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1845	1900	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	232	13	264	21	12	14	314	1743	8	14	1054	182
Adj No. of Lanes	0	1	1	0	1	0	2	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	388	17	520	105	60	44	474	2515	12	64	1647	284
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.14	0.49	0.48	0.04	0.38	0.37
Sat Flow, veh/h	909	51	1551	128	180	131	3408	5174	24	1757	4296	741
Grp Volume(v), veh/h	245	0	264	47	0	0	314	1131	620	14	823	413
Grp Sat Flow(s),veh/h/ln	960	0	1551	440	0	0	1704	1679	1840	1757	1679	1679
Q Serve(g_s), s	0.0	0.0	11.5	0.7	0.0	0.0	7.3	22.0	22.0	0.7	16.9	17.0
Cycle Q Clear(g_c), s	22.2	0.0	11.5	22.9	0.0	0.0	7.3	22.0	22.0	0.7	16.9	17.0
Prop In Lane	0.95		1.00	0.45		0.30	1.00		0.01	1.00		0.44
Lane Grp Cap(c), veh/h	405	0	520	209	0	0	474	1632	894	64	1287	644
V/C Ratio(X)	0.60	0.00	0.51	0.22	0.00	0.00	0.66	0.69	0.69	0.22	0.64	0.64
Avail Cap(c_a), veh/h	553	0	686	353	0	0	1204	2391	1310	328	1832	916
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.0	0.0	22.4	21.5	0.0	0.0	34.3	16.7	16.8	39.4	21.2	21.4
Incr Delay (d2), s/veh	1.5	0.0	0.8	0.5	0.0	0.0	1.6	0.5	1.0	1.7	0.5	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	5.0	0.8	0.0	0.0	3.6	10.2	11.3	0.3	7.9	8.0
LnGrp Delay(d),s/veh	27.4	0.0	23.2	22.1	0.0	0.0	35.9	17.3	17.7	41.1	21.7	22.5
LnGrp LOS	C		C	C			D	B	B	D	C	C
Approach Vol, veh/h		509			47			2065			1250	
Approach Delay, s/veh		25.2			22.1			20.3			22.2	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.0	44.9		32.2	15.7	36.2		32.2
Change Period (Y+Rc), s	3.7	4.9		* 4.2	* 4.7	4.9		* 4.2
Max Green Setting (Gmax), s	16.0	59.0		* 37	* 29	45.0		* 37
Max Q Clear Time (g_c+I1), s	2.7	24.0		24.9	9.3	19.0		24.2
Green Ext Time (p_c), s	0.0	16.0		0.1	1.0	9.1		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	21.6
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	24	0	1962	1196	14
Future Vol, veh/h	0	24	0	1962	1196	14
Conflicting Peds, #/hr	0	0	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	25	0	2023	1233	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	629	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	362	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	360	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	360	-	-
HCM Lane V/C Ratio	-	0.069	-	-
HCM Control Delay (s)	-	15.7	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	32	83	1962	1172	48
Future Vol, veh/h	0	32	83	1962	1172	48
Conflicting Peds, #/hr	0	0	4	0	0	4
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	33	85	2002	1196	49

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	627	1249	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	5.36	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	3.13	-	-	-
Pot Cap-1 Maneuver	0	364	294	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	363	293	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.9	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	293	-	363	-	-
HCM Lane V/C Ratio	0.289	-	0.09	-	-
HCM Control Delay (s)	22.2	-	15.9	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	1.2	-	0.3	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	468	17	10	472	25	37
Future Vol, veh/h	468	17	10	472	25	37
Conflicting Peds, #/hr	0	4	4	0	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	520	19	11	524	28	41

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	543	0	1080	536
Stage 1	-	-	-	-	534	-
Stage 2	-	-	-	-	546	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1021	-	240	543
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	578	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1017	-	235	540
Mov Cap-2 Maneuver	-	-	-	-	235	-
Stage 1	-	-	-	-	584	-
Stage 2	-	-	-	-	569	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	16.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	235	540	-	-	1017	-
HCM Lane V/C Ratio	0.118	0.076	-	-	0.011	-
HCM Control Delay (s)	22.4	12.2	-	-	8.6	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	19	1	2	11	8	4	46	6	4	17	3
Future Vol, veh/h	4	19	1	2	11	8	4	46	6	4	17	3
Conflicting Peds, #/hr	3	0	0	0	0	3	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	5	22	1	2	13	9	5	54	7	5	20	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	116	107	24	114	106	63	26	0	0	63	0	0
Stage 1	34	34	-	70	70	-	-	-	-	-	-	-
Stage 2	82	73	-	44	36	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	858	781	1050	861	782	999	1582	-	-	1533	-	-
Stage 1	979	865	-	937	835	-	-	-	-	-	-	-
Stage 2	924	832	-	968	863	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	831	773	1048	836	774	994	1579	-	-	1530	-	-
Mov Cap-2 Maneuver	831	773	-	836	774	-	-	-	-	-	-	-
Stage 1	974	861	-	932	831	-	-	-	-	-	-	-
Stage 2	896	828	-	939	859	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.4	0.5	1.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1579	-	-	791	852	1530	-	-
HCM Lane V/C Ratio	0.003	-	-	0.036	0.029	0.003	-	-
HCM Control Delay (s)	7.3	0	-	9.7	9.4	7.4	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	29	3	6	96	23	2	20	0	4	10	5
Future Vol, veh/h	12	29	3	6	96	23	2	20	0	4	10	5
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	6	6	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	15	36	4	7	119	28	2	25	0	5	12	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	148	0	0	40	0	0	224	230	44	235	218	134
Stage 1	-	-	-	-	-	-	68	68	-	148	148	-
Stage 2	-	-	-	-	-	-	156	162	-	87	70	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1427	-	-	1563	-	-	729	668	1023	717	678	912
Stage 1	-	-	-	-	-	-	940	836	-	852	773	-
Stage 2	-	-	-	-	-	-	844	762	-	918	835	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1426	-	-	1563	-	-	705	657	1017	683	666	911
Mov Cap-2 Maneuver	-	-	-	-	-	-	705	657	-	683	666	-
Stage 1	-	-	-	-	-	-	930	827	-	842	768	-
Stage 2	-	-	-	-	-	-	821	757	-	876	826	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	0.4	10.7	10.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	661	1426	-	-	1563	-	-	721
HCM Lane V/C Ratio	0.041	0.01	-	-	0.005	-	-	0.033
HCM Control Delay (s)	10.7	7.6	0	-	7.3	0	-	10.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Appendix C: Signal Warrant Analysis Worksheets

FEHR PEERS

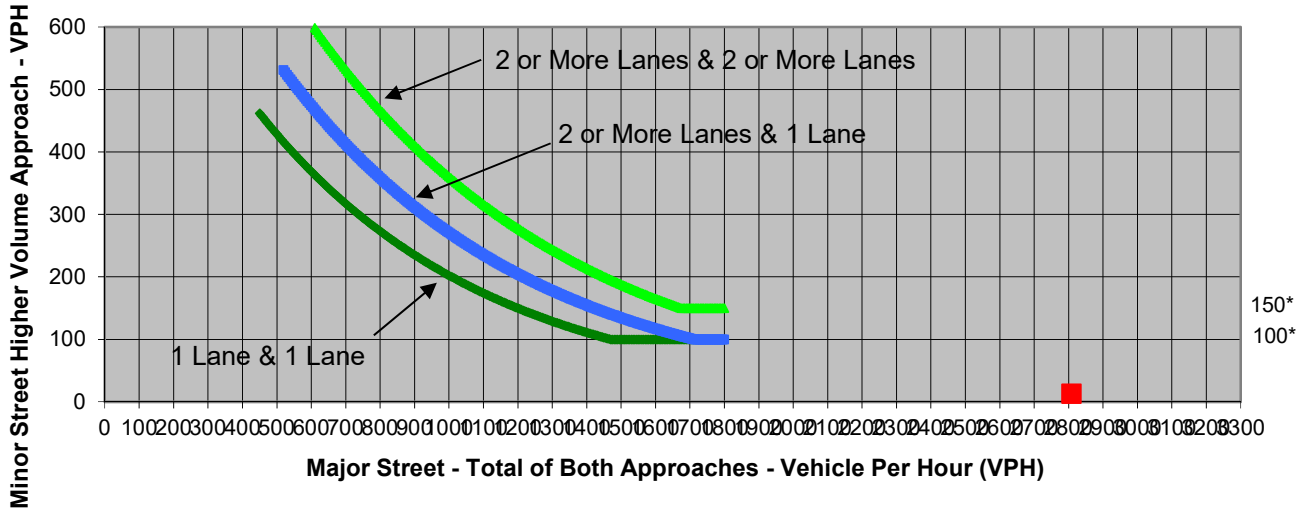
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	D Street	Scenario	Existing
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	0	0
Through	907	1,895	0	0
Right	0	7	13	0
Total	907	1,902	13	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	D Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**2,809**	**13**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

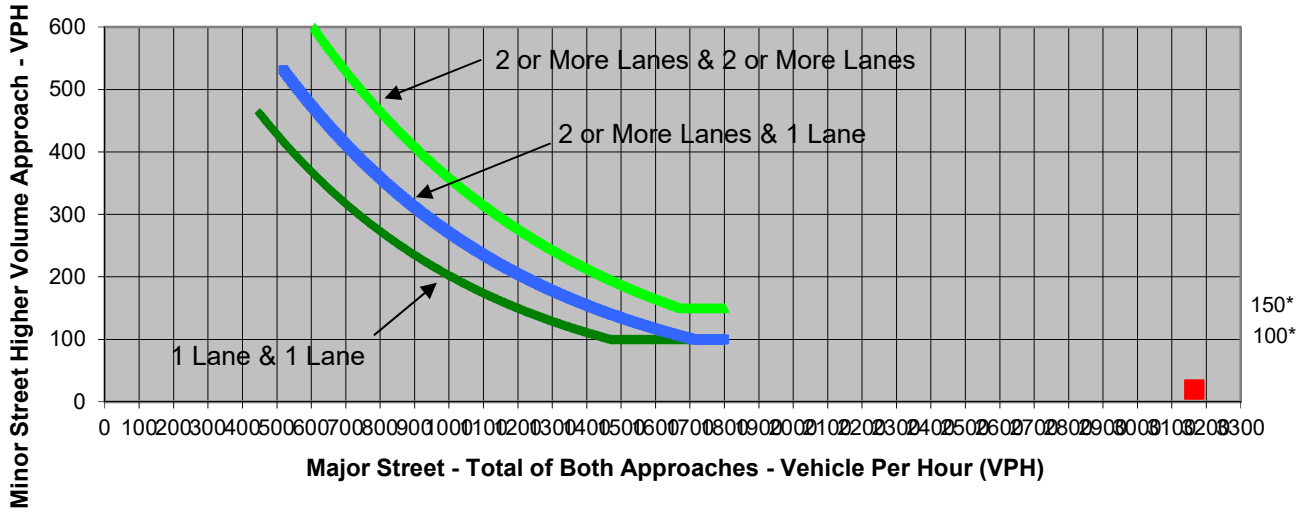
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	D Street	Scenario	Existing
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	0	0
Through	1,962	1,193	0	0
Right	0	11	20	0
Total	1,962	1,204	20	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	D Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**3,166**	**20**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

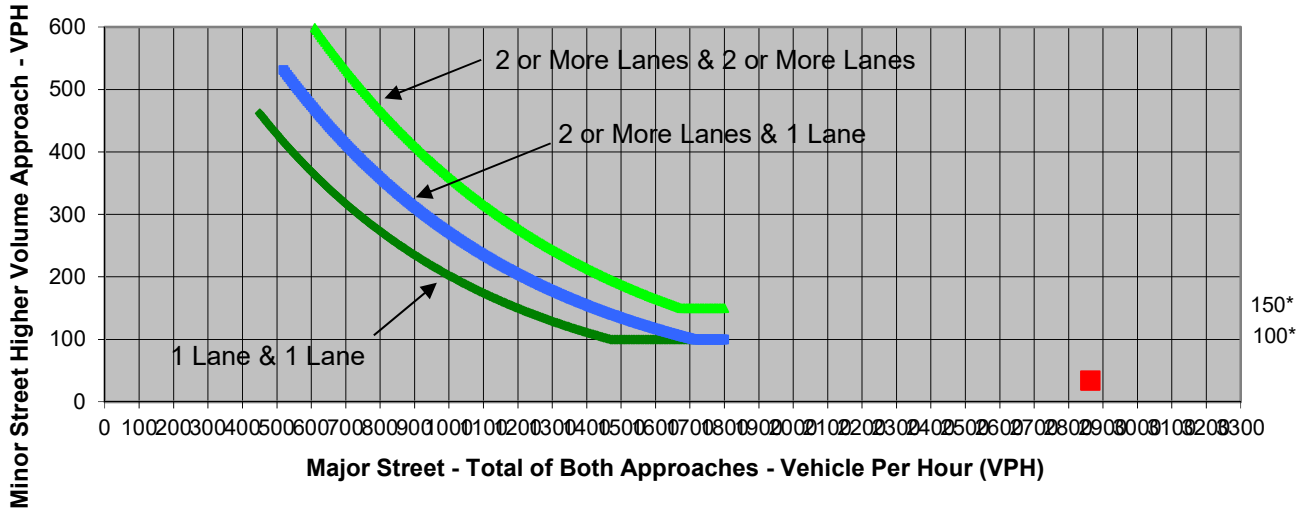
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	E Street	Scenario	Existing
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	42	0	0	0
Through	907	1,883	0	0
Right	0	32	34	0
Total	949	1,915	34	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	E Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**2,864**	**34**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

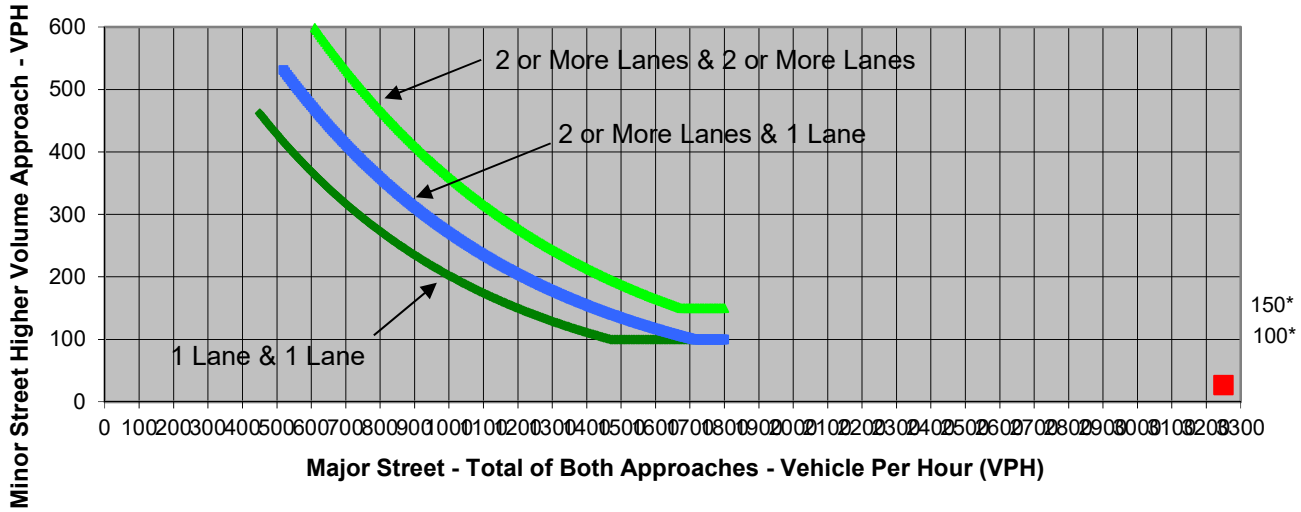
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	E Street	Scenario	Existing
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	75	0	0	0
Through	1,962	1,168	0	0
Right	0	45	27	0
Total	2,037	1,213	27	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	E Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**3,250**	**27**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

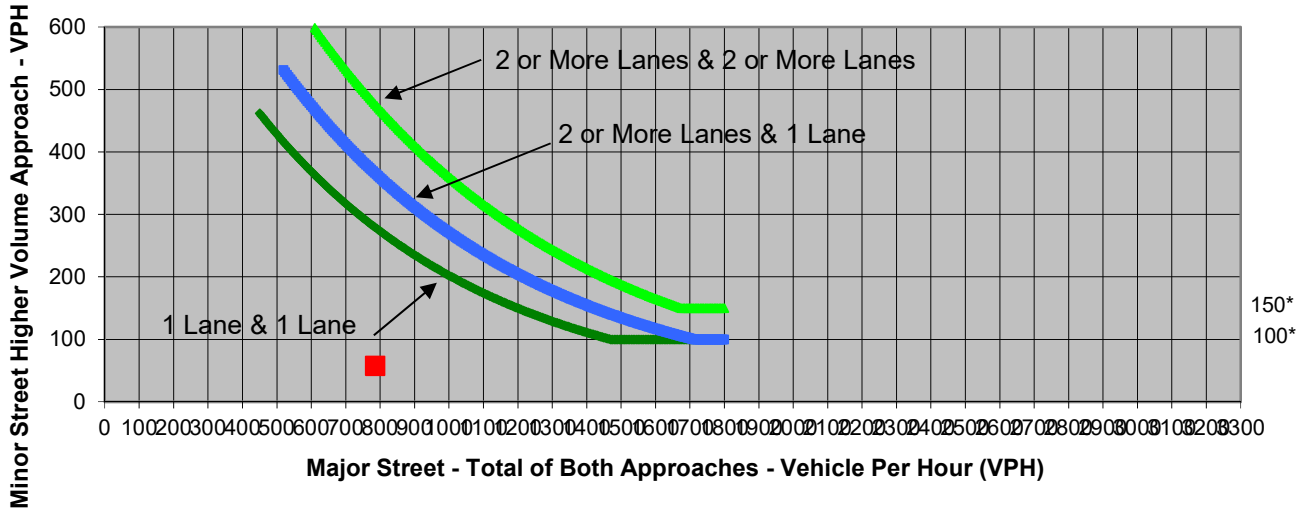
Major Street	Whipple Road	Project	MidPen TIA
Minor Street	2nd Street	Scenario	Existing
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	23	0	0	8
Through	0	0	306	470
Right	35	0	2	0
Total	58	0	308	478

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Whipple Road	2nd Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**786**	**58**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

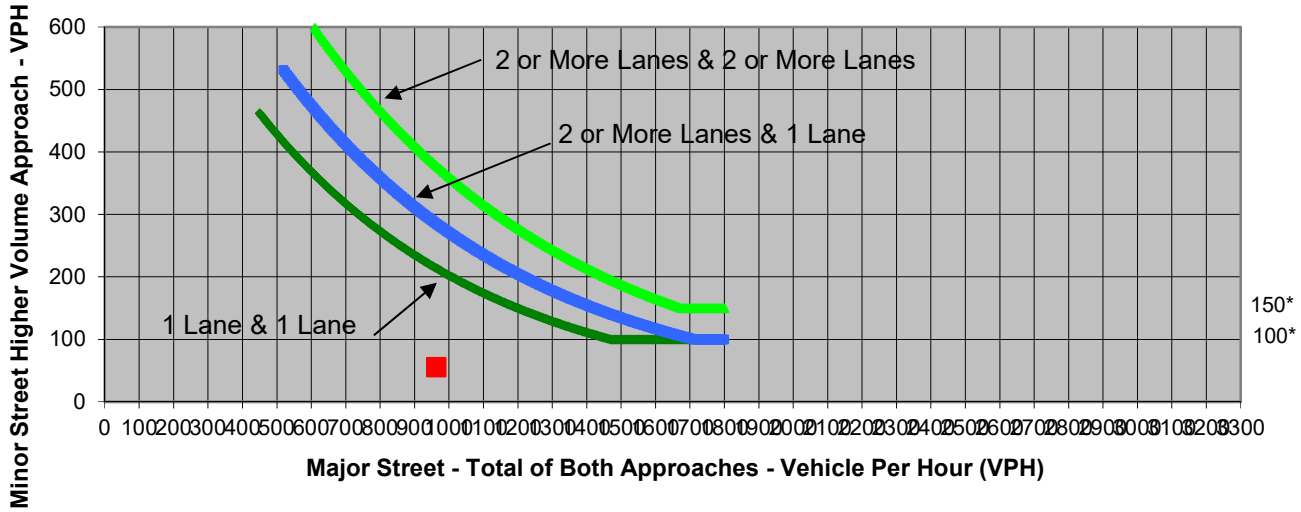
Major Street	Whipple Road	Project	MidPen TIA
Minor Street	2nd Street	Scenario	Existing
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	22	0	0	10
Through	0	0	468	472
Right	34	0	13	0
Total	56	0	481	482

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Whipple Road	2nd Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**963**	**56**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	2nd Street
Minor Street	D Street

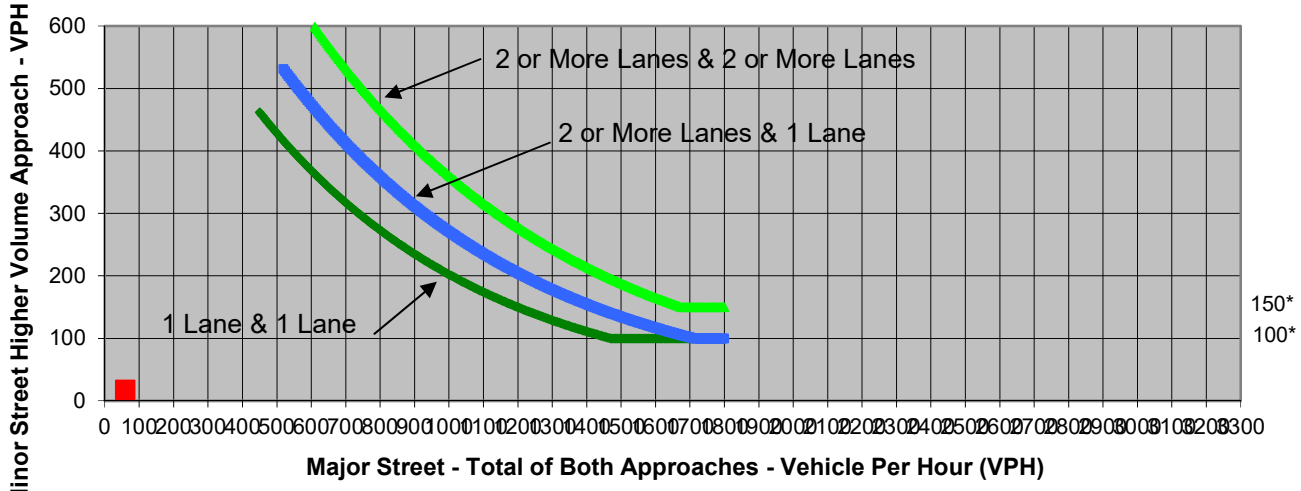
Project	MidPen TIA
Scenario	Existing
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	6	2
Through	45	13	11	2
Right	1	1	1	3
Total	46	14	18	7

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	D Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**60**	**18**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

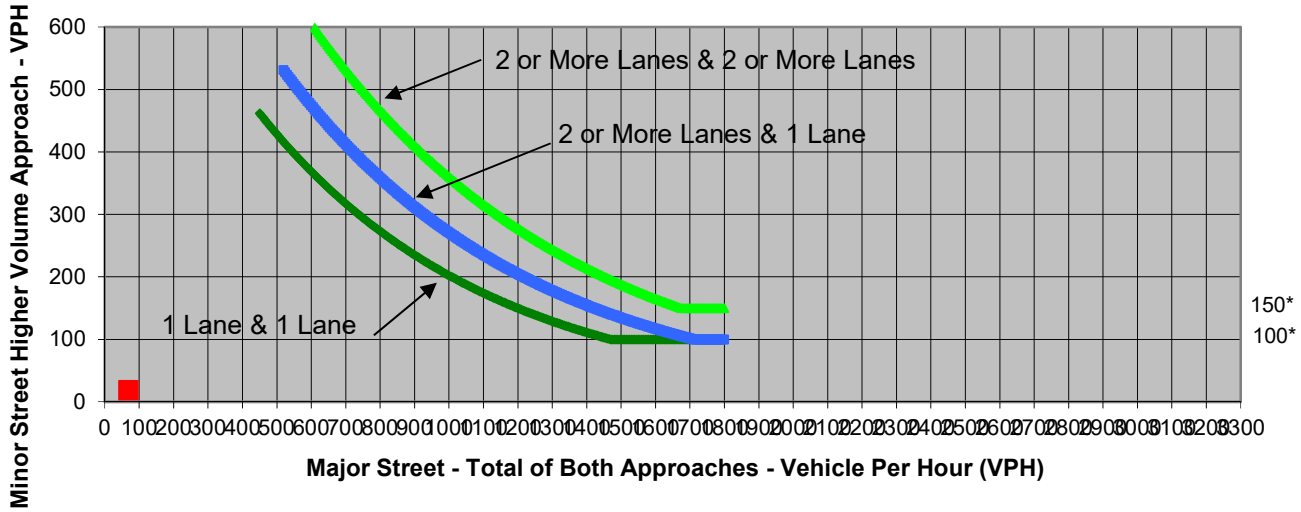
Major Street	2nd Street	Project	MidPen TIA
Minor Street	D Street	Scenario	Existing
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	4	2	4	0
Through	43	15	14	9
Right	2	3	1	5
Total	49	20	19	14

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	D Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**69**	**19**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

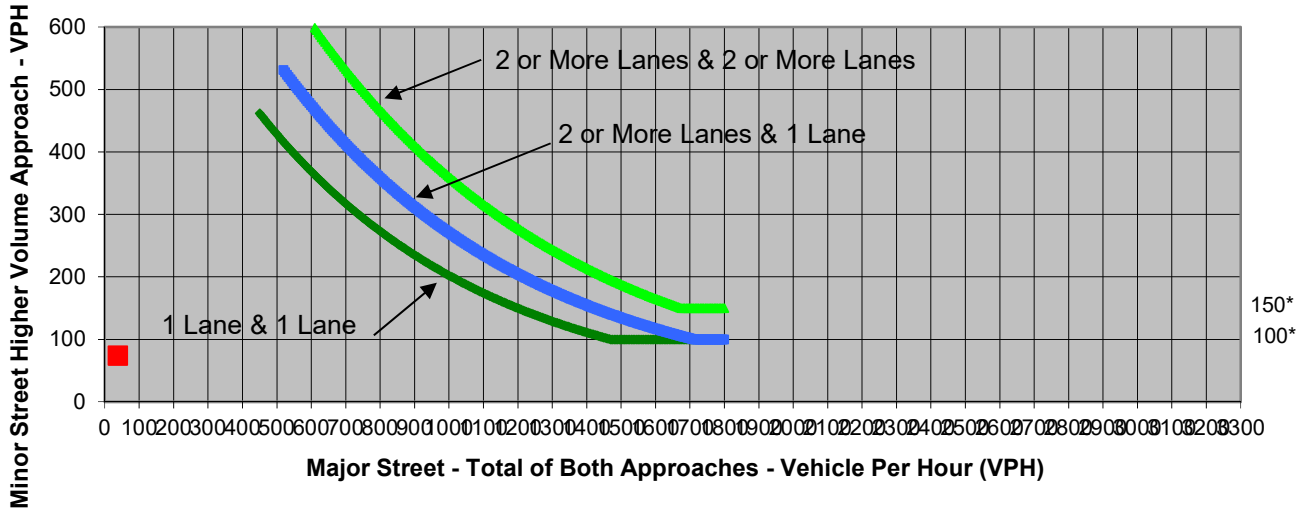
Major Street	2nd Street	Project	MidPen TIA
Minor Street	E Street	Scenario	Existing
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	3	2	20	4
Through	19	9	33	63
Right	0	5	2	7
Total	22	16	55	74

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	E Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**38**	**74**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	2nd Street
Minor Street	E Street

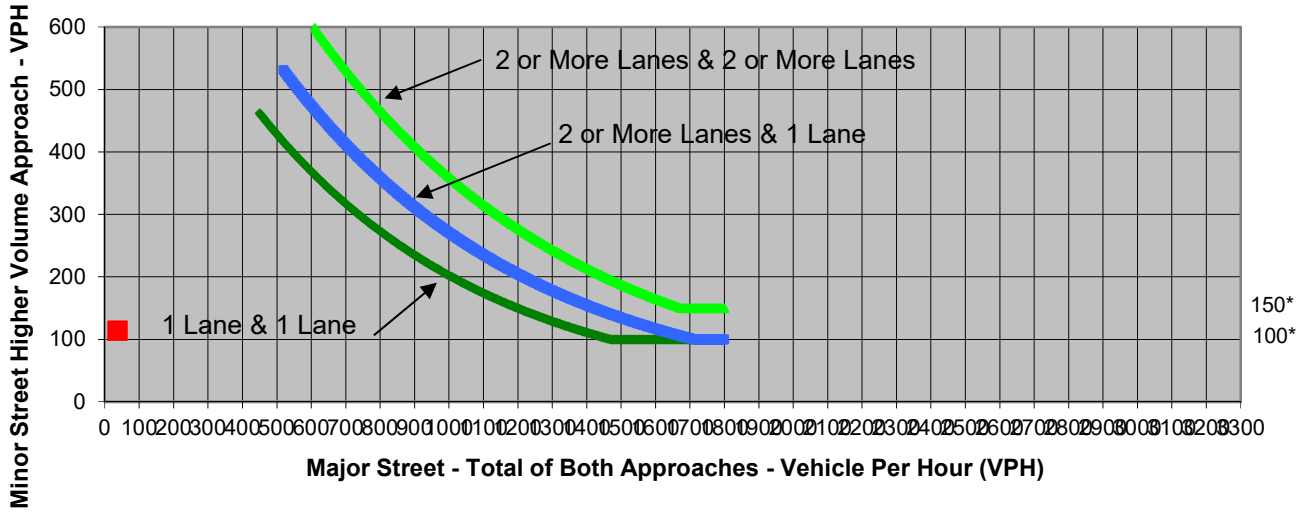
Project	MidPen TIA
Scenario	Existing
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	2	4	12	4
Through	20	8	24	94
Right	0	3	3	16
Total	22	15	39	114

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	E Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**37**	**114**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Major Street	Mission Boulevard
Minor Street	D Street

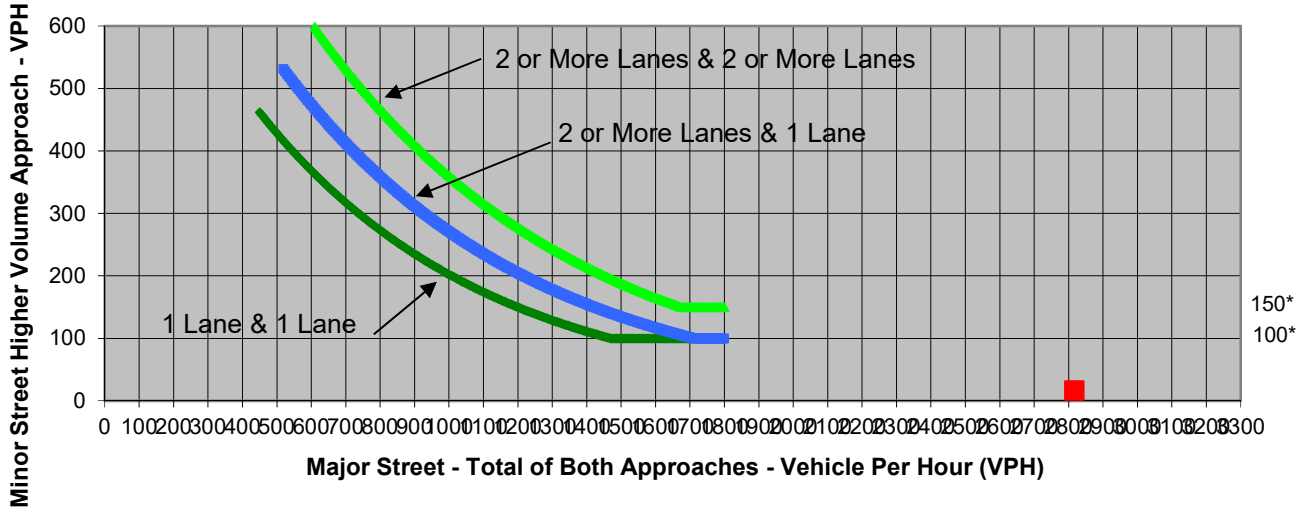
Project	MidPen TIA
Scenario	Existing Plus Project
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	0	0
Through	907	1,899	0	0
Right	0	11	17	0
Total	907	1,910	17	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	D Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**2,817**	**17**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Major Street	Mission Boulevard
Minor Street	D Street

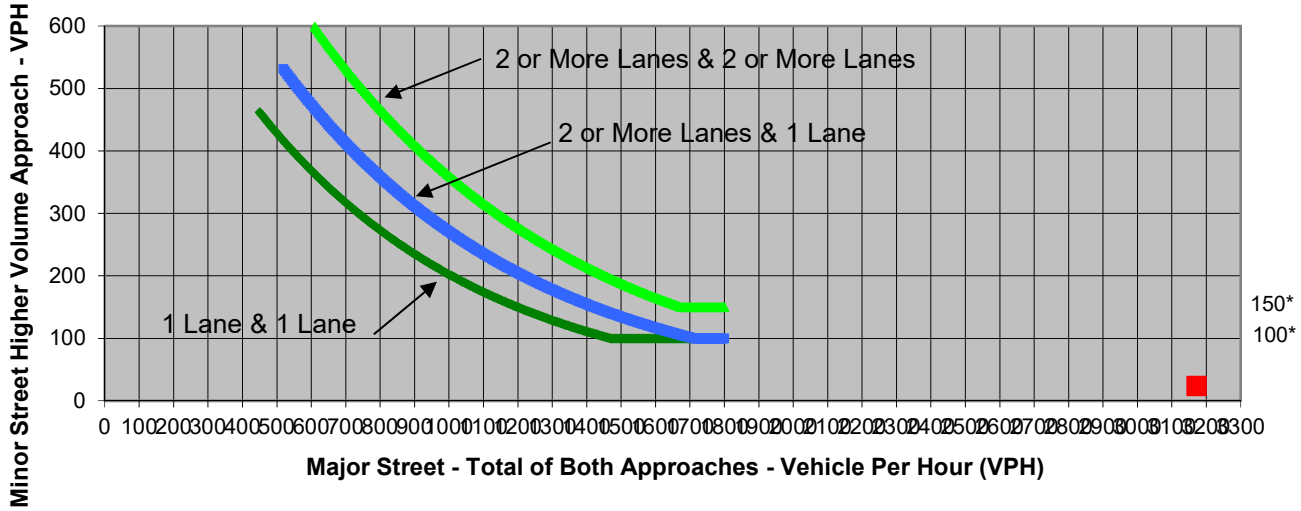
Project	MidPen TIA
Scenario	Existing Plus Project
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	0	0
Through	1,962	1,196	0	0
Right	0	14	24	0
Total	1,962	1,210	24	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	D Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**3,172**	**24**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

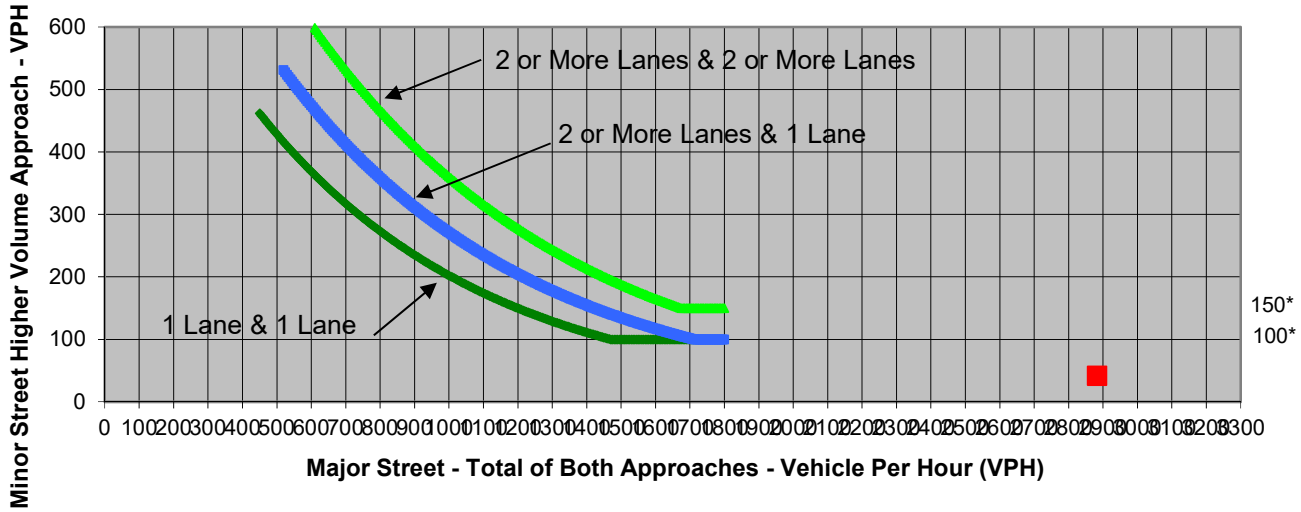
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	E Street	Scenario	Existing Plus Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	53	0	0	0
Through	907	1,887	0	0
Right	0	36	42	0
Total	960	1,923	42	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	E Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**2,883**	**42**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

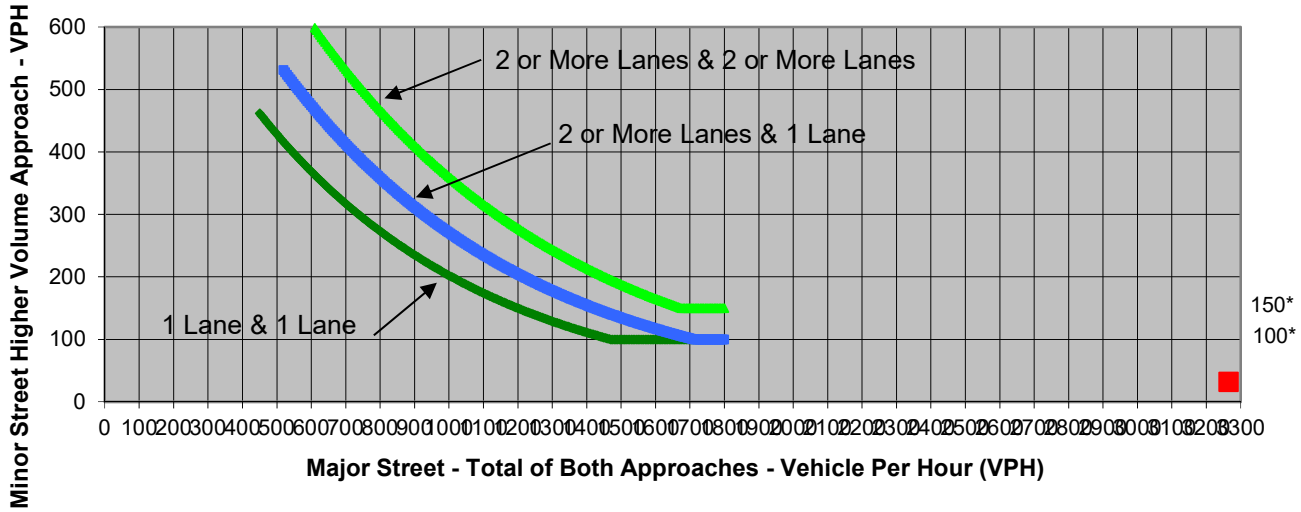
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	E Street	Scenario	Existing Plus Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	83	0	0	0
Through	1,962	1,172	0	0
Right	0	48	32	0
Total	2,045	1,220	32	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	E Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**3,265**	**32**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

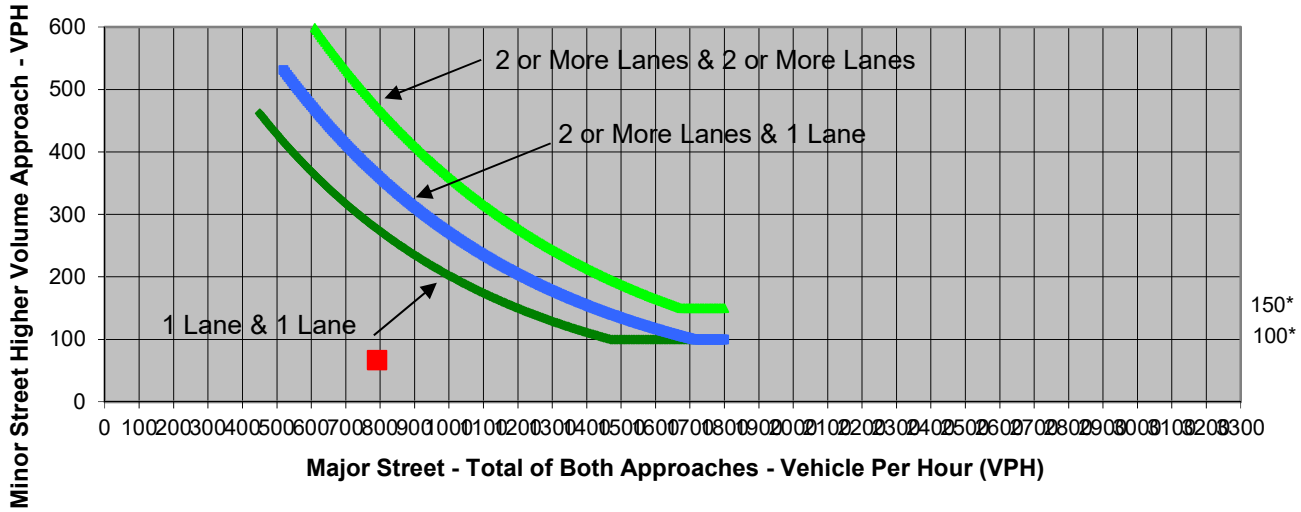
Major Street	Whipple Road	Project	MidPen TIA
Minor Street	2nd Street	Scenario	Existing Plus Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	27	0	0	8
Through	0	0	306	470
Right	40	0	7	0
Total	67	0	313	478

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Whipple Road	2nd Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**791**	**67**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

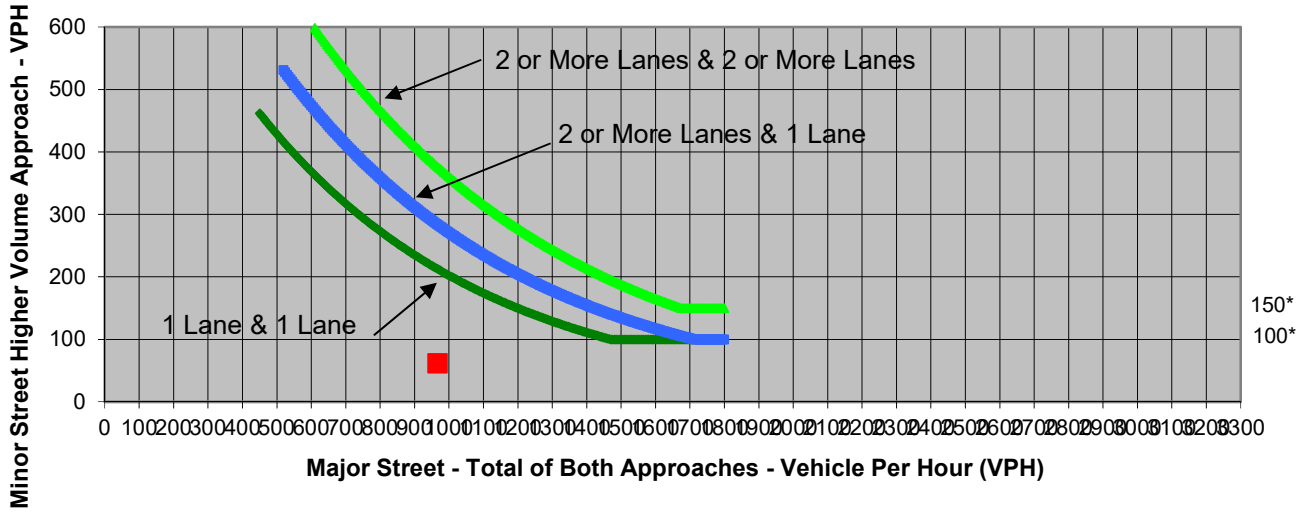
Major Street	Whipple Road	Project	MidPen TIA
Minor Street	2nd Street	Scenario	Existing Plus Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	25	0	0	10
Through	0	0	468	472
Right	37	0	17	0
Total	62	0	485	482

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Whipple Road	2nd Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**967**	**62**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Major Street	2nd Street
Minor Street	D Street

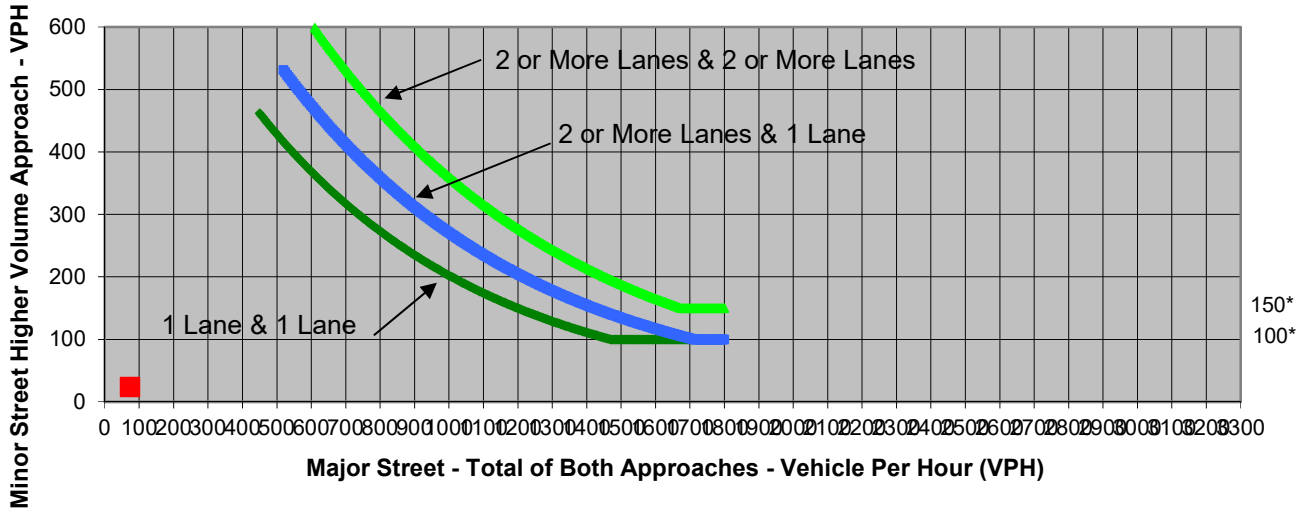
Project	MidPen TIA
Scenario	Existing Plus Project
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	2	6	4
Through	50	15	17	5
Right	6	1	1	7
Total	56	18	24	16

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	D Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**74**	**24**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	2nd Street
Minor Street	D Street

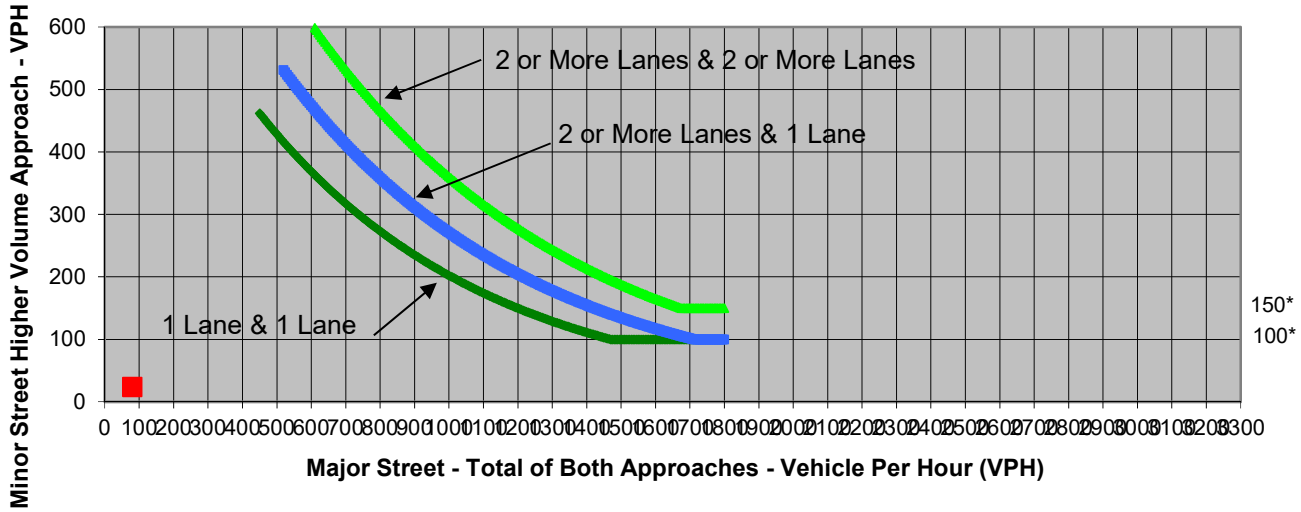
Project	MidPen TIA
Scenario	Existing Plus Project
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	4	4	4	2
Through	46	17	19	11
Right	6	3	1	8
Total	56	24	24	21

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	D Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**80**	**24**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR & PEERS

Major Street	2nd Street
Minor Street	E Street

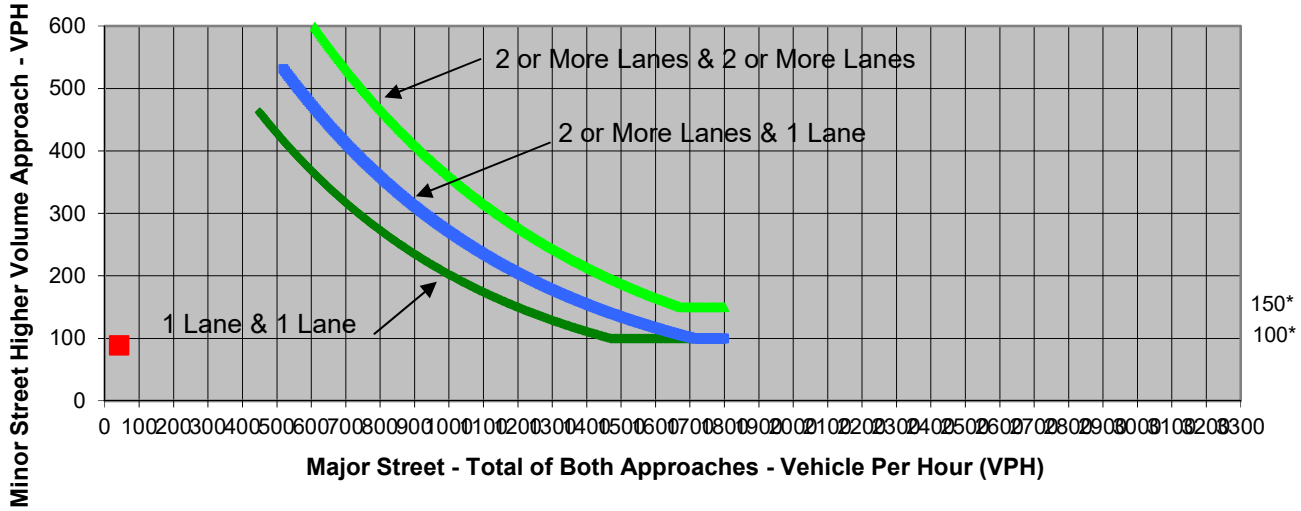
Project	MidPen TIA
Scenario	Existing Plus Project
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	3	4	20	6
Through	19	11	39	66
Right	0	5	2	17
Total	22	20	61	89

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	E Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**42**	**89**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	2nd Street
Minor Street	E Street

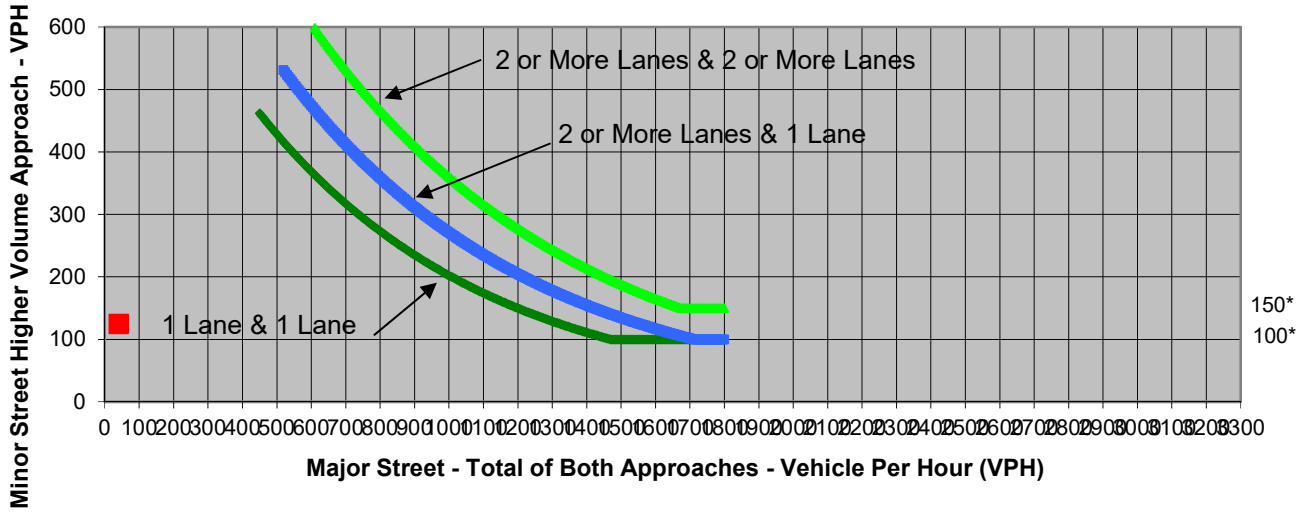
Project	MidPen TIA
Scenario	Existing Plus Project
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	2	4	12	6
Through	20	10	29	96
Right	0	5	3	23
Total	22	19	44	125

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	E Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**41**	**125**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

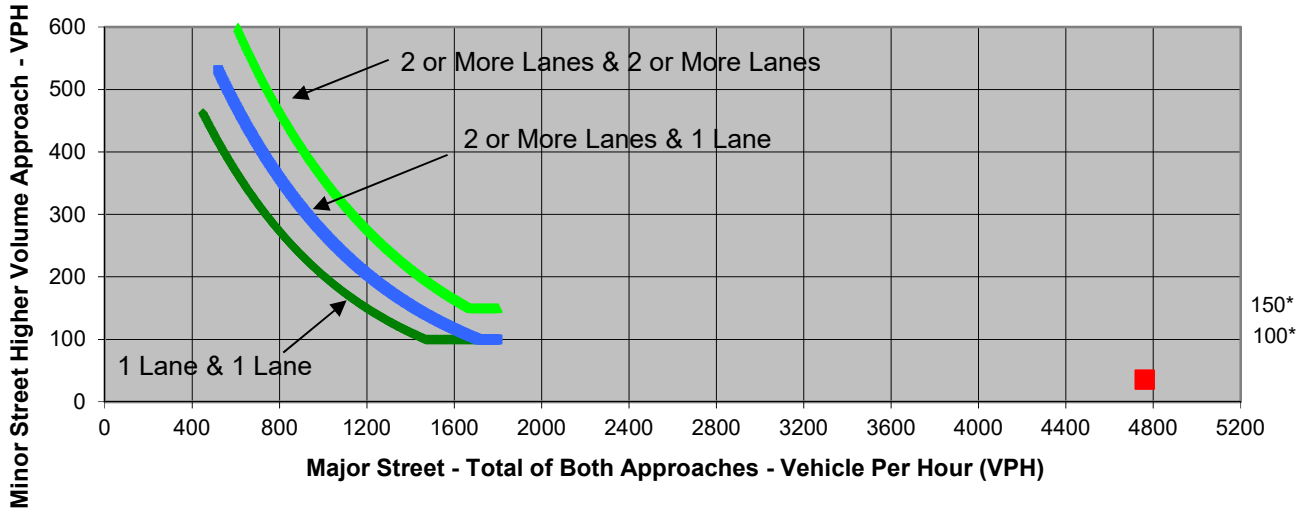
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	D Street	Scenario	2040 No Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	0	0
Through	1,600	3,136	0	0
Right	0	26	36	0
Total	1,600	3,162	36	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	D Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**4,762**	**36**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

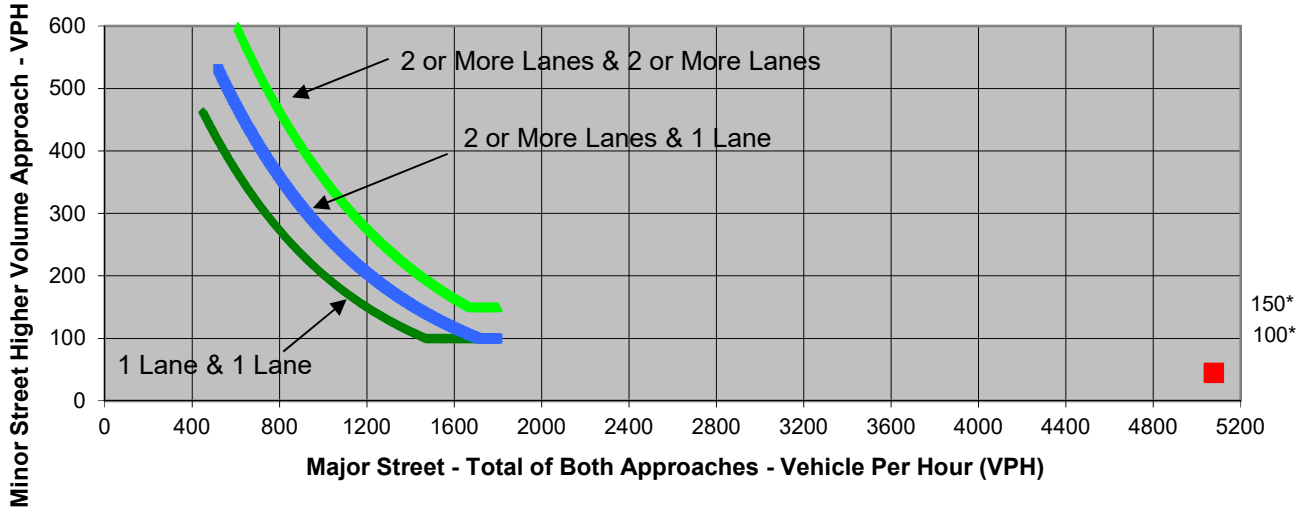
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	D Street	Scenario	2040 No Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	0	0
Through	3,190	1,847	0	0
Right	0	41	45	0
Total	3,190	1,888	45	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	D Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**5,078**	**45**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

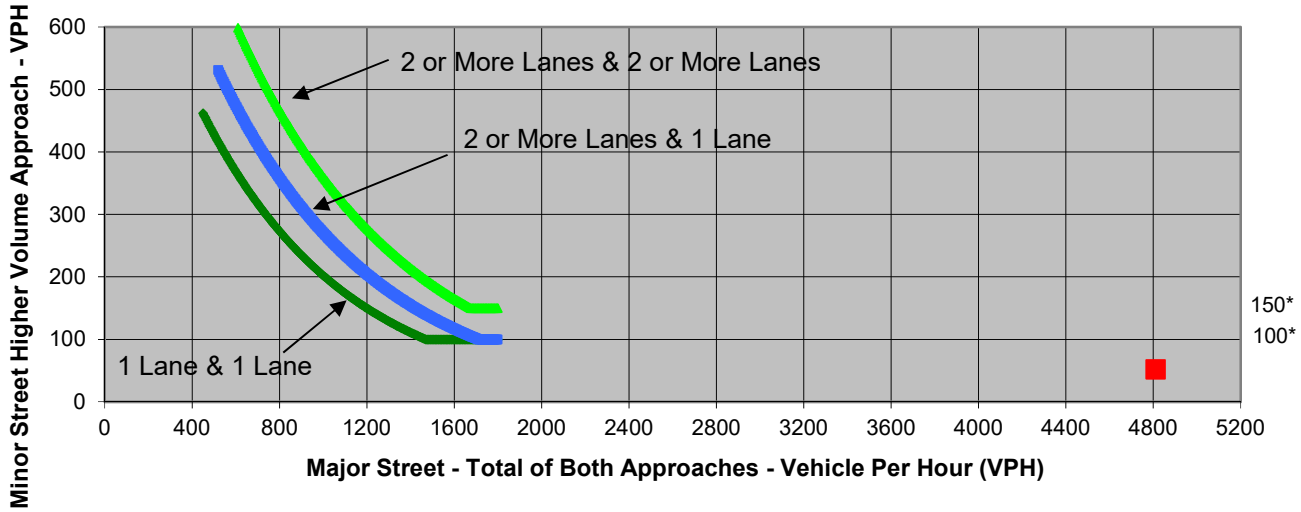
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	E Street	Scenario	2040 No Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	39	0	0	0
Through	1,600	3,126	0	0
Right	0	46	52	0
Total	1,639	3,172	52	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	E Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**4,811**	**52**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

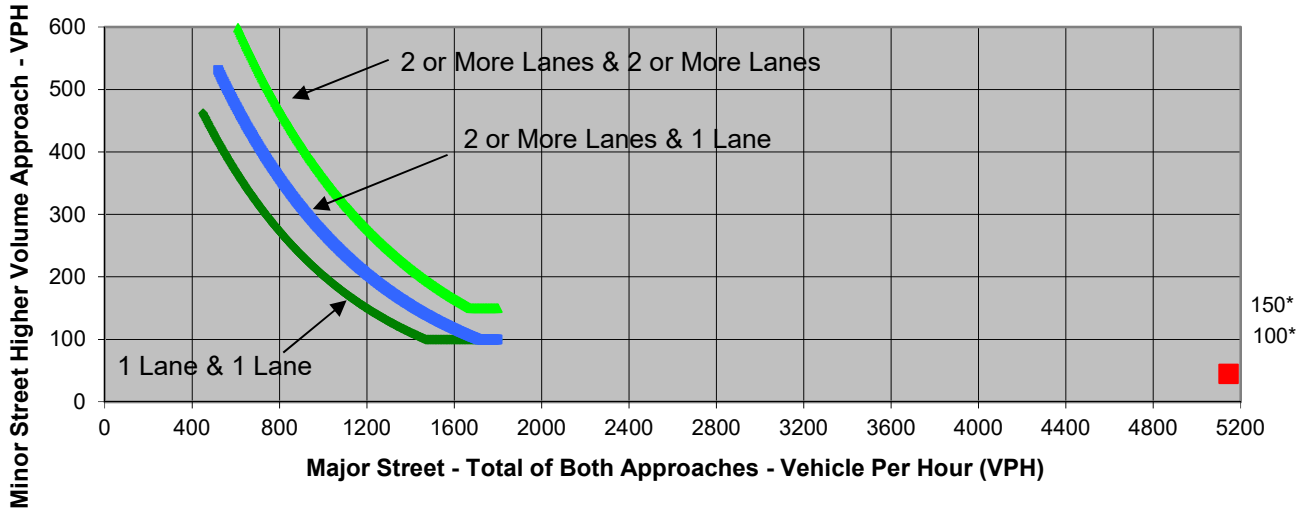
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	E Street	Scenario	2040 No Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	72	0	0	0
Through	3,190	1,816	0	0
Right	0	67	45	0
Total	3,262	1,883	45	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	E Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**5,145**	**45**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

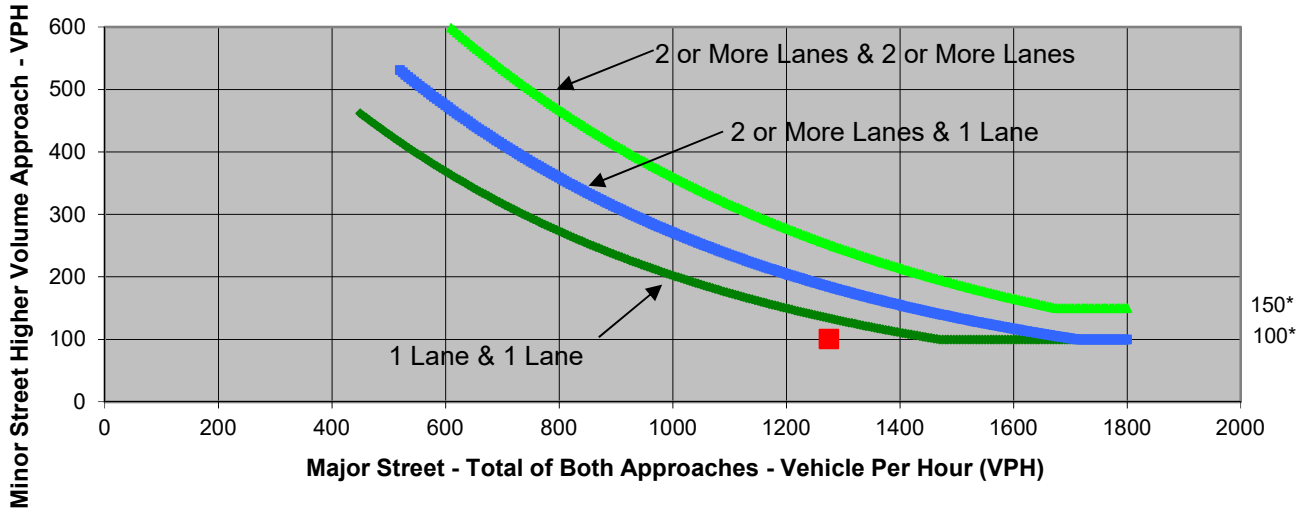
Major Street	Whipple Road	Project	MidPen TIA
Minor Street	2nd Street	Scenario	2040 No Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	26	0	0	20
Through	0	0	640	600
Right	75	0	15	0
Total	101	0	655	620

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Whipple Road	2nd Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**1,275**	**101**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

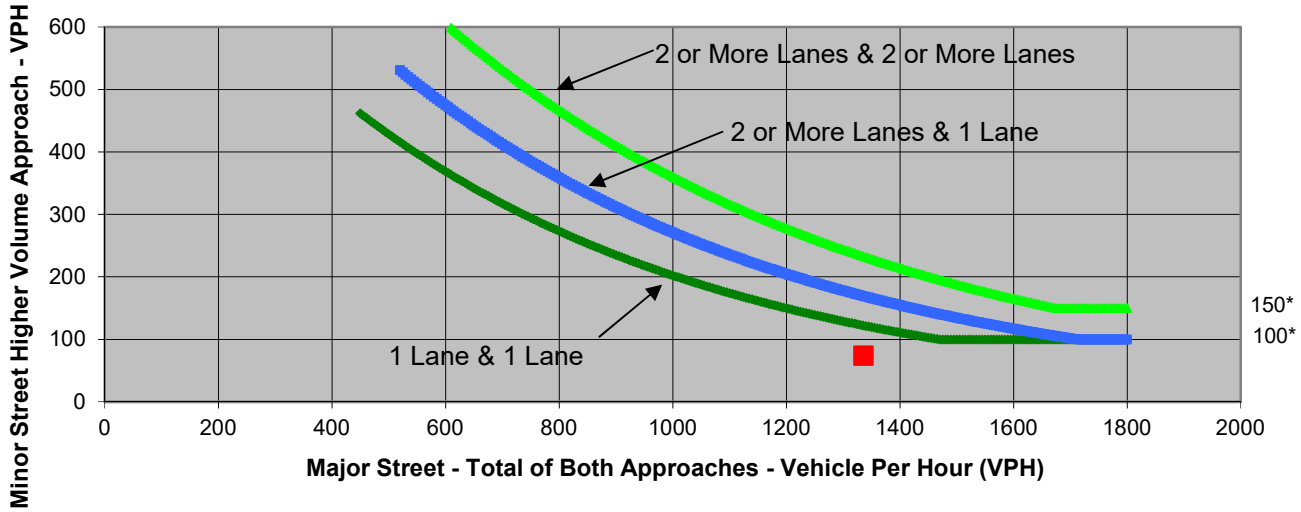
Major Street	Whipple Road	Project	MidPen TIA
Minor Street	2nd Street	Scenario	2040 No Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	27	0	0	20
Through	0	0	490	810
Right	47	0	16	0
Total	74	0	506	830

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Whipple Road	2nd Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**1,336**	**74**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	2nd Street
Minor Street	D Street

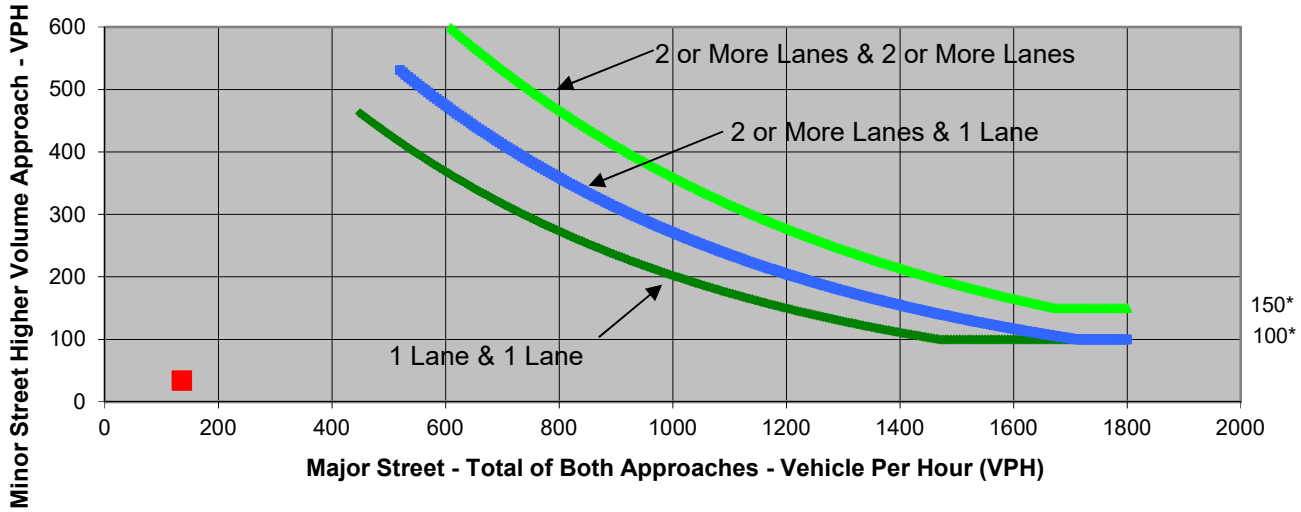
Project	MidPen TIA
Scenario	2040 No Project
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	10	8	10	8
Through	85	18	14	7
Right	5	10	10	6
Total	100	36	34	21

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	D Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**136**	**34**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	2nd Street
Minor Street	D Street

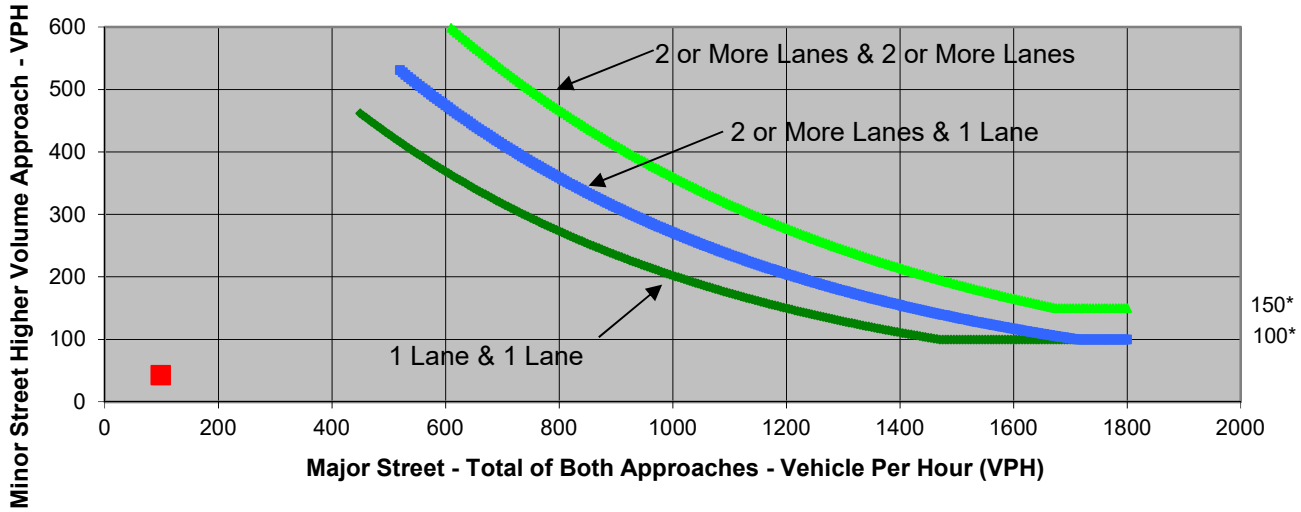
Project	MidPen TIA
Scenario	2040 No Project
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	10	8	10	8
Through	47	18	15	18
Right	6	10	10	17
Total	63	36	35	43

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	D Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**99**	**43**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	2nd Street
Minor Street	E Street

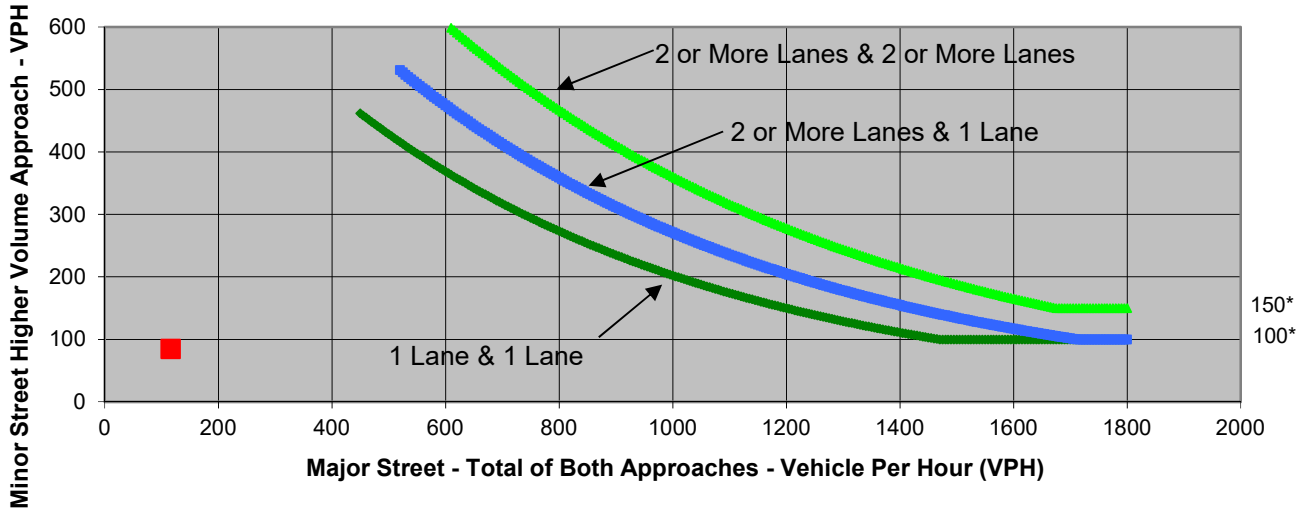
Project	MidPen TIA
Scenario	2040 No Project
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	10	8	30	8
Through	60	18	34	67
Right	10	10	10	10
Total	80	36	74	85

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	E Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**116**	**85**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	2nd Street
Minor Street	E Street

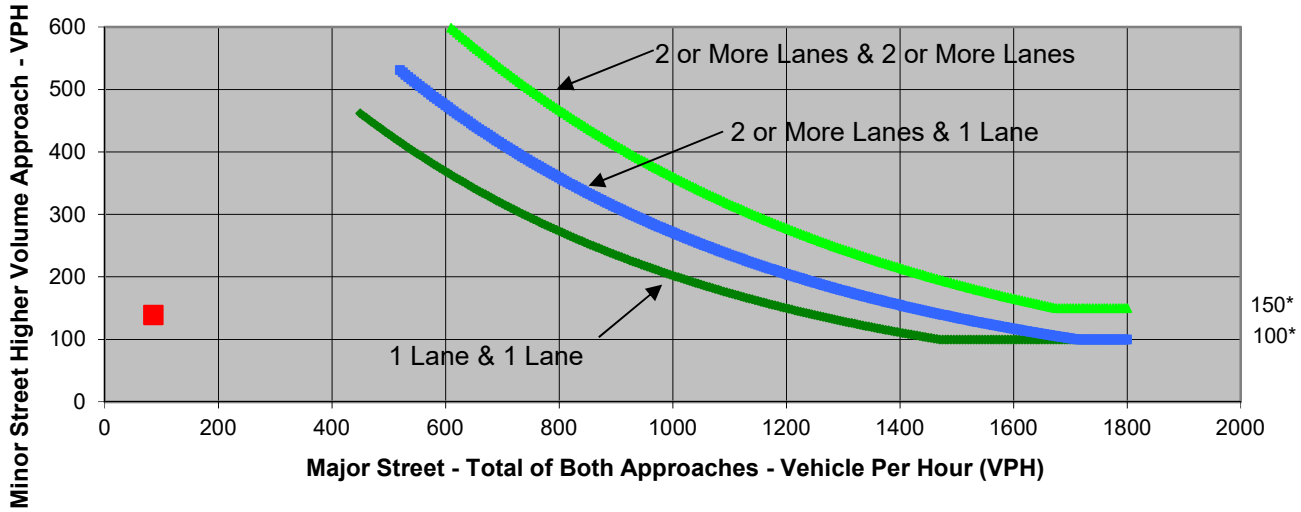
Project	MidPen TIA
Scenario	2040 No Project
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	10	10	20	18
Through	30	18	25	108
Right	10	8	10	13
Total	50	36	55	139

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	E Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**86**	**139**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

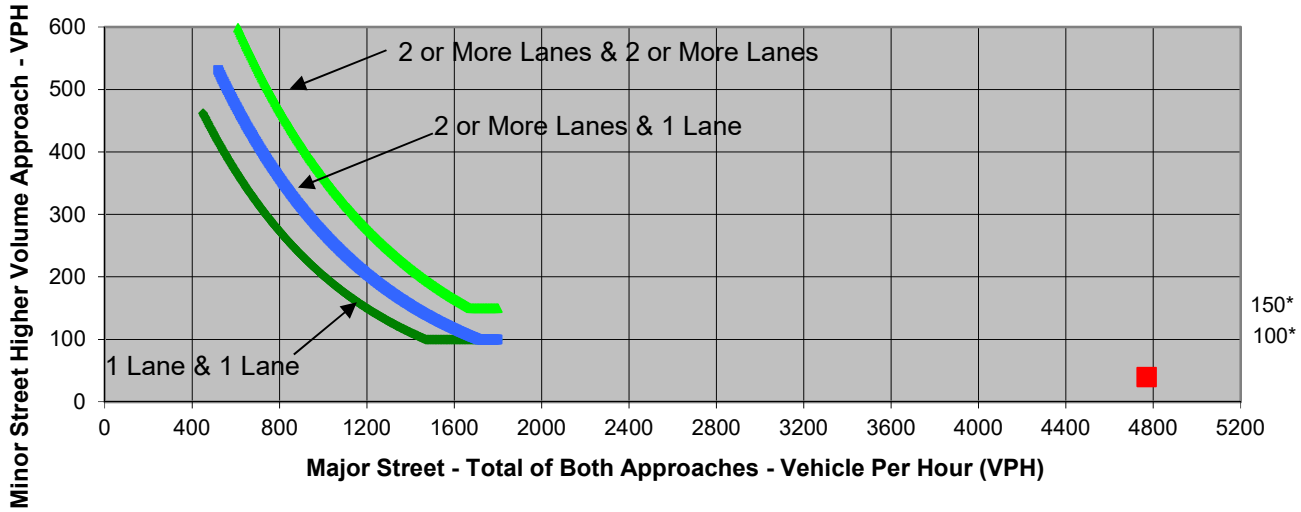
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	D Street	Scenario	2040 Plus Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	0	0
Through	1,600	3,140	0	0
Right	0	30	40	0
Total	1,600	3,170	40	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	D Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**4,770**	**40**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

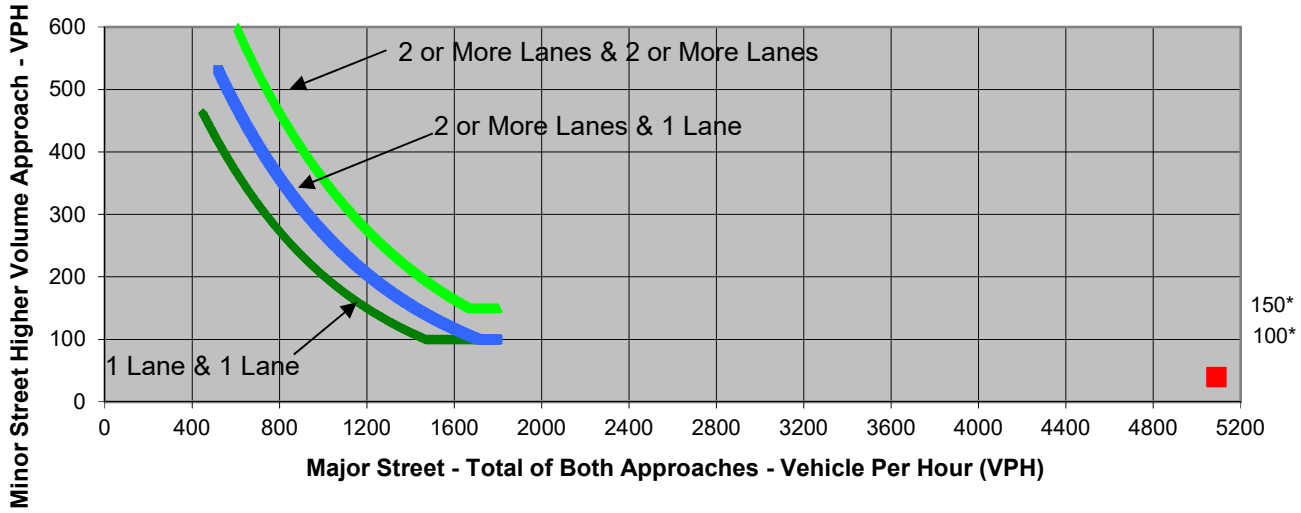
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	D Street	Scenario	2040 Plus Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	0	0	0
Through	3,190	1,850	0	0
Right	0	50	40	0
Total	3,190	1,900	40	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	D Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**5,090**	**40**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

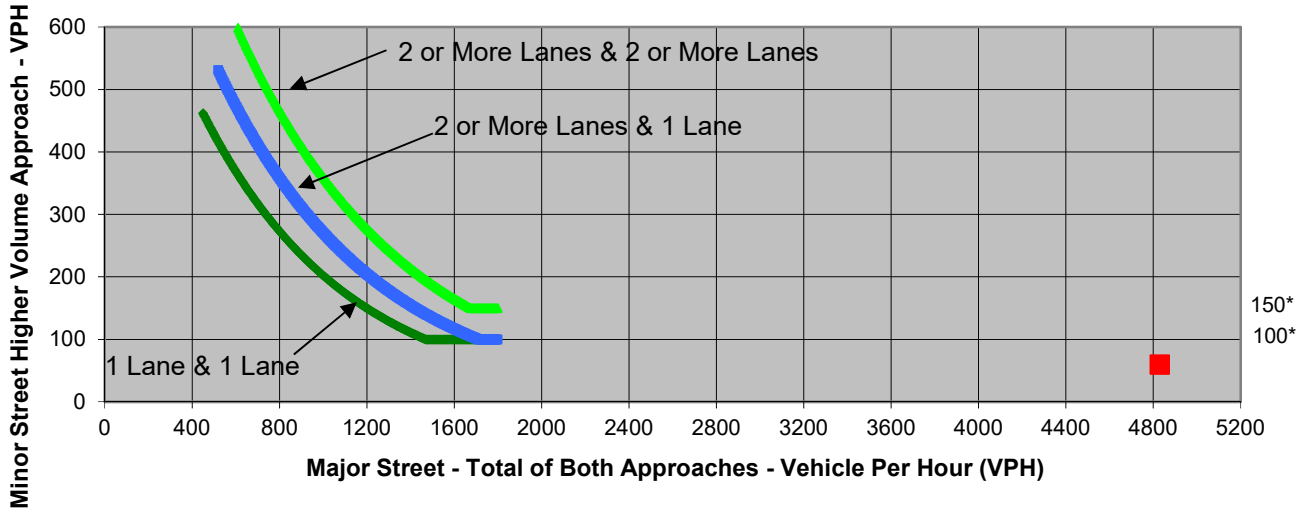
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	E Street	Scenario	2040 Plus Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	50	0	0	0
Through	1,600	3,130	0	0
Right	0	50	60	0
Total	1,650	3,180	60	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	E Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**4,830**	**60**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

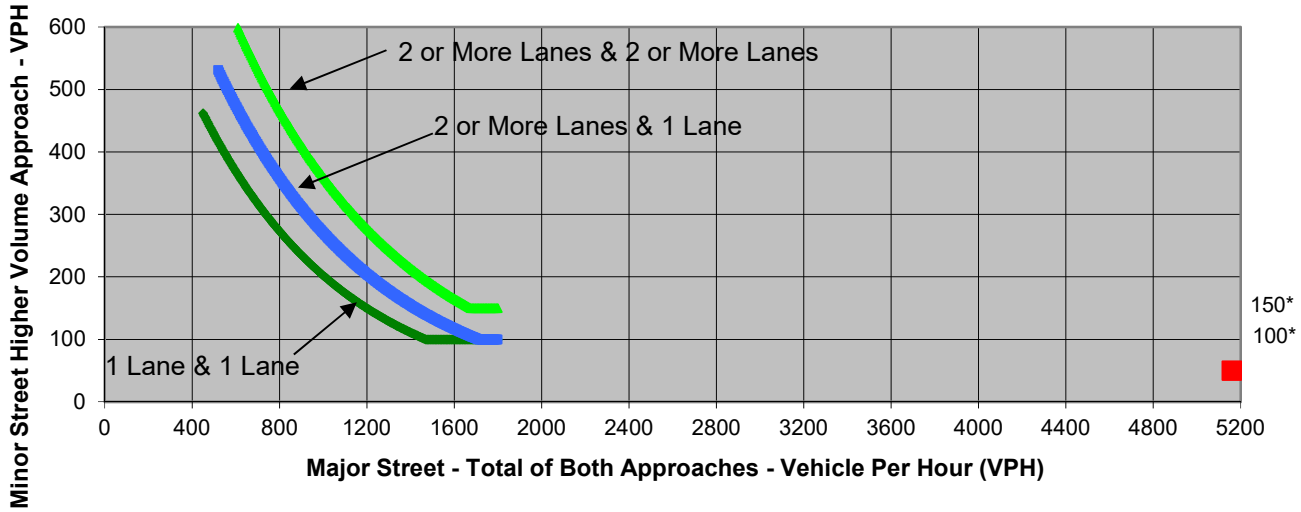
Major Street	Mission Boulevard	Project	MidPen TIA
Minor Street	E Street	Scenario	2040 Plus Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	80	0	0	0
Through	3,190	1,820	0	0
Right	0	70	50	0
Total	3,270	1,890	50	0

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Mission Boulevard	E Street	
Number of Approach Lanes	**3**	**1**	**NO**
Traffic Volume (VPH) *	**5,160**	**50**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

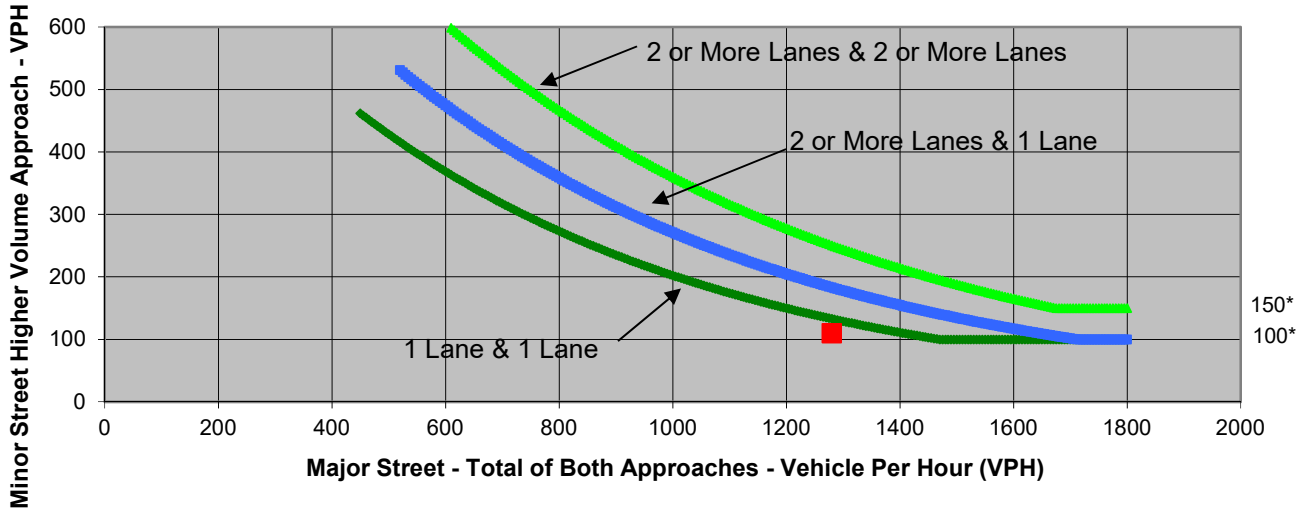
Major Street	Whipple Road	Project	MidPen TIA
Minor Street	2nd Street	Scenario	2040 Plus Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	30	0	0	20
Through	0	0	640	600
Right	80	0	20	0
Total	110	0	660	620

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Whipple Road	2nd Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**1,280**	**110**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

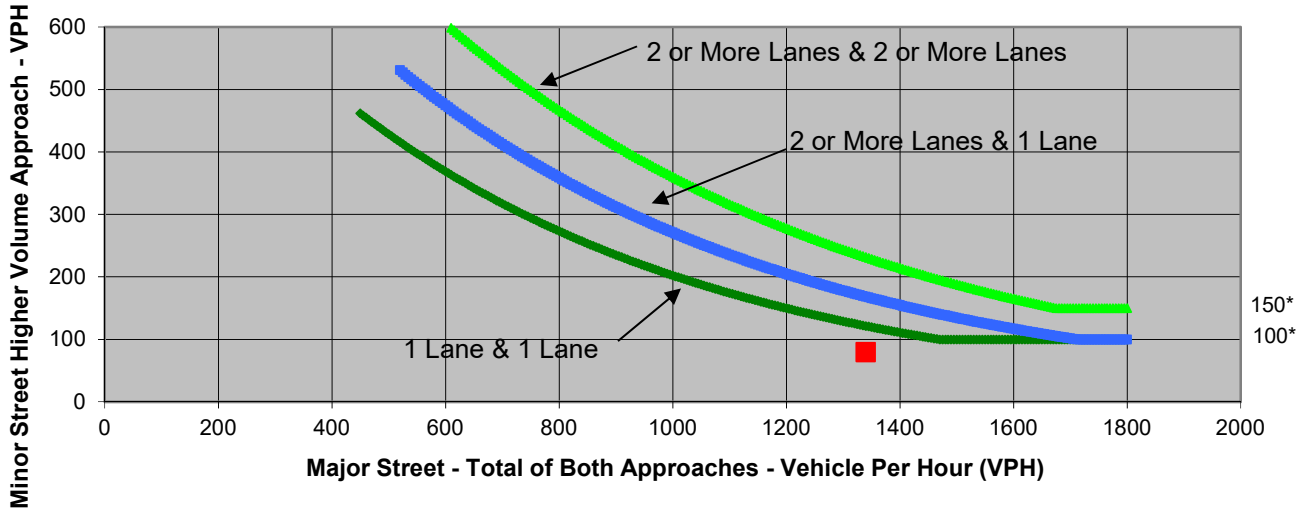
Major Street	Whipple Road	Project	MidPen TIA
Minor Street	2nd Street	Scenario	2040 Plus Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	30	0	0	20
Through	0	0	490	810
Right	50	0	20	0
Total	80	0	510	830

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Whipple Road	2nd Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**1,340**	**80**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	2nd Street
Minor Street	D Street

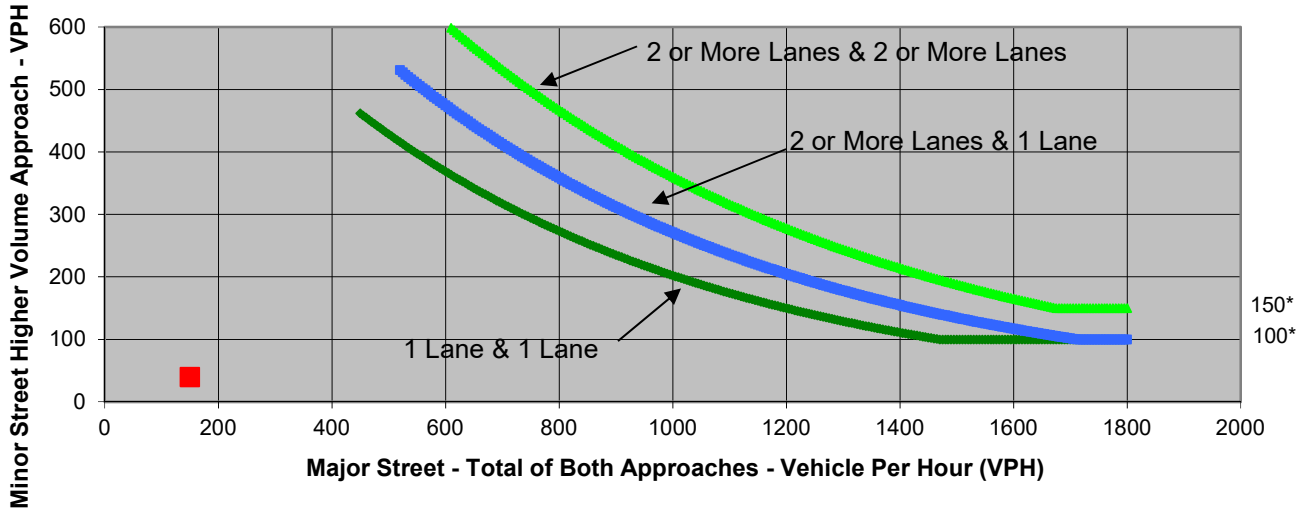
Project	MidPen TIA
Scenario	2040 Plus Project
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	10	10	10	10
Through	90	20	20	10
Right	10	10	10	10
Total	110	40	40	30

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	D Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**150**	**40**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

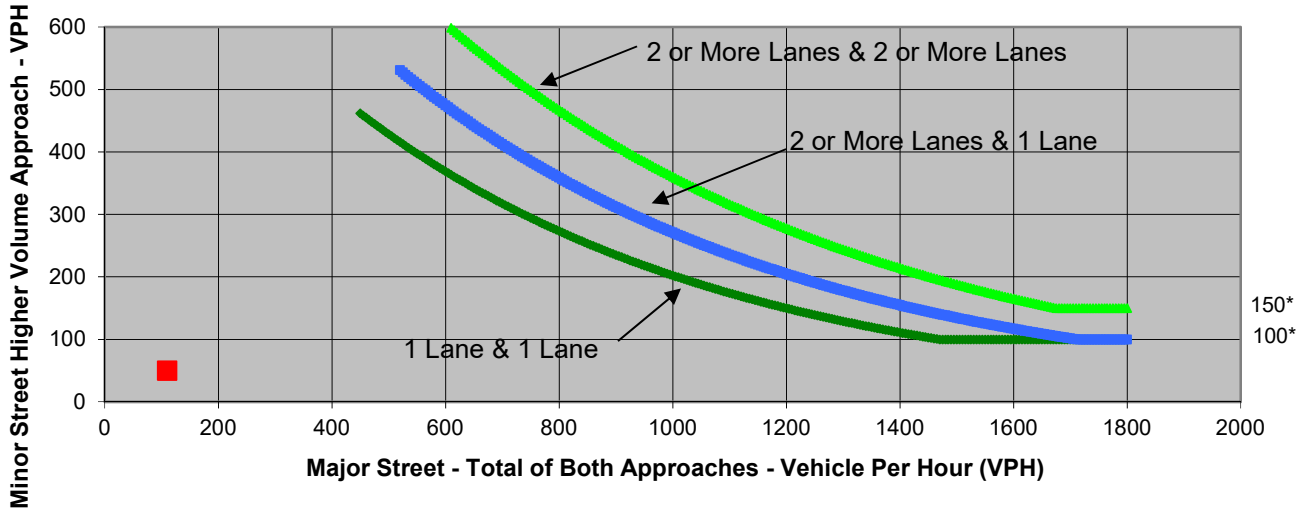
Major Street	2nd Street	Project	MidPen TIA
Minor Street	D Street	Scenario	2040 Plus Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	10	10	10	10
Through	50	20	20	20
Right	10	10	10	20
Total	70	40	40	50

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	D Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**110**	**50**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	2nd Street
Minor Street	E Street

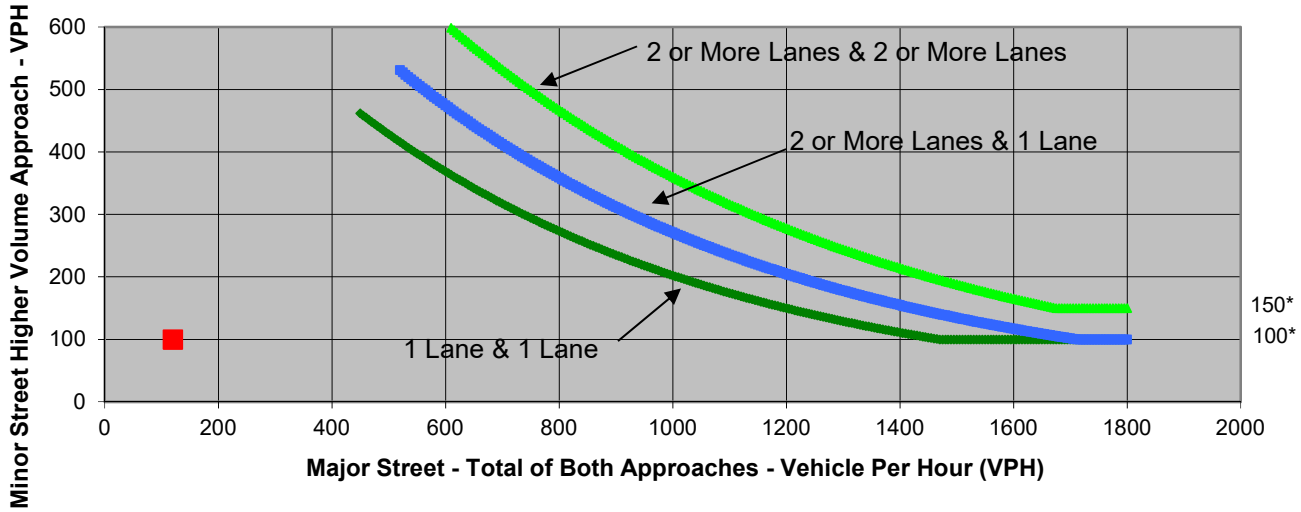
Project	MidPen TIA
Scenario	2040 Plus Project
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	10	10	30	10
Through	60	20	40	70
Right	10	10	10	20
Total	80	40	80	100

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	E Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**120**	**100**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	2nd Street
Minor Street	E Street

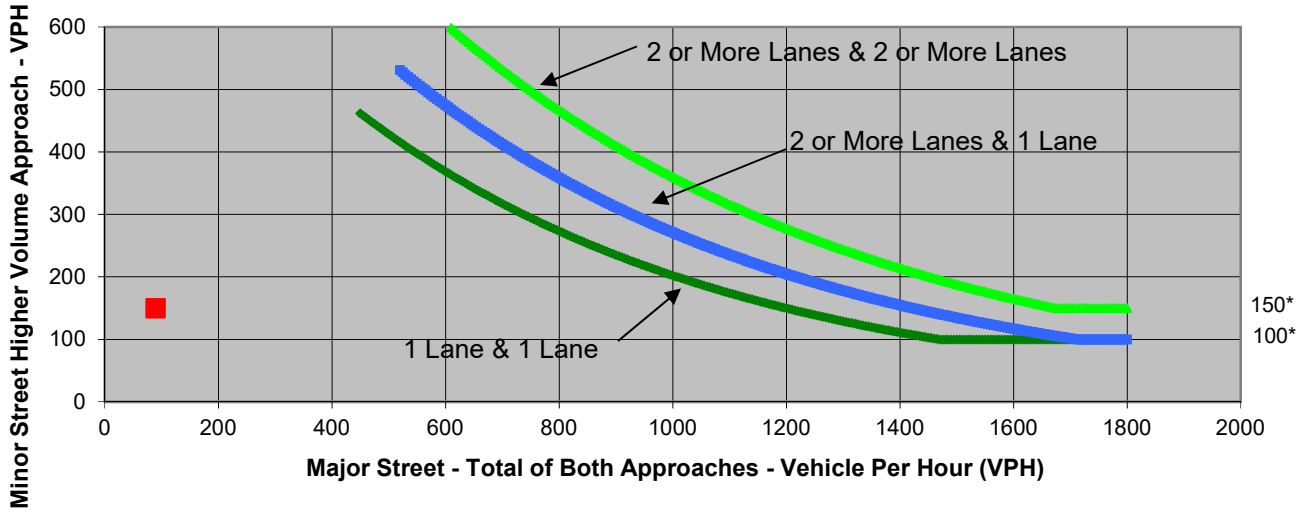
Project	MidPen TIA
Scenario	2040 Plus Project
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	10	10	20	20
Through	30	20	30	110
Right	10	10	10	20
Total	50	40	60	150

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	2nd Street	E Street	
Number of Approach Lanes	**1**	**1**	**NO**
Traffic Volume (VPH) *	**90**	**150**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

Appendix D: Cumulative (Year 2040) Intersection Analysis Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	10	549	40	30	20	440	1150	10	30	2613	151
Future Volume (veh/h)	156	10	549	40	30	20	440	1150	10	30	2613	151
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1845	1900	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	164	11	578	42	32	21	463	1211	11	32	2751	159
Adj No. of Lanes	0	1	1	0	1	0	2	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	376	23	507	124	90	48	567	2595	24	113	1958	111
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.32	0.17	0.50	0.50	0.06	0.40	0.39
Sat Flow, veh/h	965	69	1555	241	277	147	3408	5146	47	1757	4867	275
Grp Volume(v), veh/h	175	0	578	95	0	0	463	790	432	32	1878	1032
Grp Sat Flow(s),veh/h/ln	1034	0	1555	665	0	0	1704	1679	1836	1757	1679	1784
Q Serve(g_s), s	0.0	0.0	37.2	4.5	0.0	0.0	15.0	17.4	17.4	2.0	45.9	45.9
Cycle Q Clear(g_c), s	19.6	0.0	37.2	24.0	0.0	0.0	15.0	17.4	17.4	2.0	45.9	45.9
Prop In Lane	0.94		1.00	0.44		0.22	1.00		0.03	1.00		0.15
Lane Grp Cap(c), veh/h	398	0	507	262	0	0	567	1693	926	113	1351	718
V/C Ratio(X)	0.44	0.00	1.14	0.36	0.00	0.00	0.82	0.47	0.47	0.28	1.39	1.44
Avail Cap(c_a), veh/h	398	0	507	262	0	0	887	1763	964	242	1351	718
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.5	0.0	38.4	34.2	0.0	0.0	45.9	18.3	18.3	50.9	34.1	34.2
Incr Delay (d2), s/veh	0.8	0.0	84.5	0.8	0.0	0.0	3.4	0.2	0.4	1.3	180.4	204.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	27.8	2.7	0.0	0.0	7.3	8.1	8.9	1.0	55.0	63.3
LnGrp Delay(d),s/veh	33.2	0.0	123.0	35.1	0.0	0.0	49.3	18.5	18.7	52.2	214.5	238.7
LnGrp LOS	C		F	D			D	B	B	D	F	F
Approach Vol, veh/h		753			95			1685			2942	
Approach Delay, s/veh		102.1			35.1			27.0			221.2	
Approach LOS		F			D			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.3	61.5		41.2	23.0	49.9		41.2
Change Period (Y+Rc), s	3.7	4.9		* 4.2	* 4.7	4.9		* 4.2
Max Green Setting (Gmax), s	16.0	59.0		* 37	* 29	45.0		* 37
Max Q Clear Time (g_c+I1), s	4.0	19.4		26.0	17.0	47.9		39.2
Green Ext Time (p_c), s	0.0	9.8		0.4	1.3	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	141.8
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	36	0	1600	3136	26
Future Vol, veh/h	0	36	0	1600	3136	26
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	37	0	1633	3200	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1616	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	78	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	78	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	86.9	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	78	-	-
HCM Lane V/C Ratio	-	0.471	-	-
HCM Control Delay (s)	-	86.9	-	-
HCM Lane LOS	-	F	-	-
HCM 95th %tile Q(veh)	-	1.9	-	-

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	52	39	1600	3126	46
Future Vol, veh/h	0	52	39	1600	3126	46
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	54	40	1649	3223	47

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1637	3272	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	5.36	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	3.13	-	-	-
Pot Cap-1 Maneuver	0	76	~ 27	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	76	~ 27	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	125.5	13.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	~ 27	-	76	-	-
HCM Lane V/C Ratio	1.489	-	0.705	-	-
HCM Control Delay (s)	$ 566.9	-	125.5	-	-
HCM Lane LOS	F	-	F	-	-
HCM 95th %tile Q(veh)	4.8	-	3.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	640	15	20	600	26	75
Future Vol, veh/h	640	15	20	600	26	75
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	780	18	24	732	32	91

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	802	0	1573	793
Stage 1	-	-	-	-	793	-
Stage 2	-	-	-	-	780	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	817	-	121	387
Stage 1	-	-	-	-	444	-
Stage 2	-	-	-	-	450	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	814	-	114	386
Mov Cap-2 Maneuver	-	-	-	-	114	-
Stage 1	-	-	-	-	442	-
Stage 2	-	-	-	-	428	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	25.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	114	386	-	-	814	-
HCM Lane V/C Ratio	0.278	0.237	-	-	0.03	-
HCM Control Delay (s)	48.3	17.2	-	-	9.6	0
HCM Lane LOS	E	C	-	-	A	A
HCM 95th %tile Q(veh)	1	0.9	-	-	0.1	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	14	10	8	7	6	10	85	5	8	18	10
Future Vol, veh/h	10	14	10	8	7	6	10	85	5	8	18	10
Conflicting Peds, #/hr	2	0	0	0	0	2	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	13	18	13	10	9	8	13	106	6	10	23	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	197	189	31	200	192	111	37	0	0	112	0	0
Stage 1	51	51	-	135	135	-	-	-	-	-	-	-
Stage 2	146	138	-	65	57	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	760	704	1040	756	701	940	1567	-	-	1471	-	-
Stage 1	959	850	-	866	783	-	-	-	-	-	-	-
Stage 2	854	780	-	943	845	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	736	692	1039	723	689	938	1566	-	-	1471	-	-
Mov Cap-2 Maneuver	736	692	-	723	689	-	-	-	-	-	-	-
Stage 1	949	843	-	858	776	-	-	-	-	-	-	-
Stage 2	828	773	-	906	838	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	9.9	0.7	1.7
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1566	-	-	783	760	1471	-	-
HCM Lane V/C Ratio	0.008	-	-	0.054	0.035	0.007	-	-
HCM Control Delay (s)	7.3	0	-	9.9	9.9	7.5	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	34	10	8	67	10	10	60	10	8	18	10
Future Vol, veh/h	30	34	10	8	67	10	10	60	10	8	18	10
Conflicting Peds, #/hr	1	0	1	1	0	1	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	38	43	13	10	84	13	13	75	13	10	23	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	98	0	0	57	0	0	258	245	51	282	245	94
Stage 1	-	-	-	-	-	-	127	127	-	112	112	-
Stage 2	-	-	-	-	-	-	131	118	-	170	133	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1489	-	-	1541	-	-	693	655	1014	668	655	960
Stage 1	-	-	-	-	-	-	874	789	-	891	801	-
Stage 2	-	-	-	-	-	-	870	796	-	830	784	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1488	-	-	1540	-	-	647	632	1013	585	632	957
Mov Cap-2 Maneuver	-	-	-	-	-	-	647	632	-	585	632	-
Stage 1	-	-	-	-	-	-	850	768	-	867	795	-
Stage 2	-	-	-	-	-	-	827	790	-	720	763	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3	0.7	11.4	10.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	665	1488	-	-	1540	-	-	684
HCM Lane V/C Ratio	0.15	0.025	-	-	0.006	-	-	0.066
HCM Control Delay (s)	11.4	7.5	0	-	7.4	0	-	10.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	217	20	300	20	20	20	640	2520	30	20	1614	170
Future Volume (veh/h)	217	20	300	20	20	20	640	2520	30	20	1614	170
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1845	1900	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	228	21	316	21	21	21	674	2653	32	21	1699	179
Adj No. of Lanes	0	1	1	0	1	0	2	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	241	17	472	39	38	19	756	2820	34	84	1731	182
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.22	0.55	0.54	0.05	0.38	0.37
Sat Flow, veh/h	605	56	1549	0	124	62	3408	5128	62	1757	4610	484
Grp Volume(v), veh/h	249	0	316	63	0	0	674	1734	951	21	1236	642
Grp Sat Flow(s),veh/h/ln	661	0	1549	186	0	0	1704	1679	1833	1757	1679	1736
Q Serve(g_s), s	0.0	0.0	21.8	0.0	0.0	0.0	23.4	58.8	59.3	1.4	44.5	44.8
Cycle Q Clear(g_c), s	37.2	0.0	21.8	37.2	0.0	0.0	23.4	58.8	59.3	1.4	44.5	44.8
Prop In Lane	0.92		1.00	0.33		0.33	1.00		0.03	1.00		0.28
Lane Grp Cap(c), veh/h	258	0	472	96	0	0	756	1846	1008	84	1261	652
V/C Ratio(X)	0.97	0.00	0.67	0.66	0.00	0.00	0.89	0.94	0.94	0.25	0.98	0.98
Avail Cap(c_a), veh/h	258	0	472	96	0	0	828	1846	1008	226	1261	652
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.1	0.0	37.1	35.2	0.0	0.0	46.1	25.6	25.8	56.1	37.7	37.9
Incr Delay (d2), s/veh	46.6	0.0	3.7	15.3	0.0	0.0	11.2	10.0	16.5	1.6	20.6	31.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.7	0.0	9.8	1.9	0.0	0.0	12.2	29.5	34.5	0.7	24.2	27.1
LnGrp Delay(d),s/veh	92.6	0.0	40.8	50.5	0.0	0.0	57.4	35.6	42.3	57.7	58.3	69.3
LnGrp LOS	F		D	D			E	D	D	E	E	E
Approach Vol, veh/h		565			63			3359			1899	
Approach Delay, s/veh		63.6			50.5			41.9			62.0	
Approach LOS		E			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	71.2		41.2	31.1	49.9		41.2
Change Period (Y+Rc), s	3.7	4.9		* 4.2	* 4.7	4.9		* 4.2
Max Green Setting (Gmax), s	16.0	59.0		* 37	* 29	45.0		* 37
Max Q Clear Time (g_c+I1), s	3.4	61.3		39.2	25.4	46.8		39.2
Green Ext Time (p_c), s	0.0	0.0		0.0	1.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	50.5
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	36	0	3190	1847	47
Future Vol, veh/h	0	36	0	3190	1847	47
Conflicting Peds, #/hr	0	0	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	37	0	3289	1904	48

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	981	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	212	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	211	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.7	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	211	-	-
HCM Lane V/C Ratio	-	0.176	-	-
HCM Control Delay (s)	-	25.7	-	-
HCM Lane LOS	-	D	-	-
HCM 95th %tile Q(veh)	-	0.6	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	45	72	3190	1816	67
Future Vol, veh/h	0	45	72	3190	1816	67
Conflicting Peds, #/hr	0	0	4	0	0	4
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	46	73	3255	1853	68

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	965	1925	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	5.36	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	3.13	-	-	-
Pot Cap-1 Maneuver	0	217	135	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	216	134	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.1	1.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	134	-	216	-	-
HCM Lane V/C Ratio	0.548	-	0.213	-	-
HCM Control Delay (s)	60.5	-	26.1	-	-
HCM Lane LOS	F	-	D	-	-
HCM 95th %tile Q(veh)	2.7	-	0.8	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	490	16	20	810	27	47
Future Vol, veh/h	490	16	20	810	27	47
Conflicting Peds, #/hr	0	4	4	0	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	544	18	22	900	30	52

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	566	0	1501	559
Stage 1	-	-	-	-	557	-
Stage 2	-	-	-	-	944	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1001	-	133	527
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	377	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	997	-	127	524
Mov Cap-2 Maneuver	-	-	-	-	127	-
Stage 1	-	-	-	-	570	-
Stage 2	-	-	-	-	360	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	23.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	127	524	-	-	997	-
HCM Lane V/C Ratio	0.236	0.1	-	-	0.022	-
HCM Control Delay (s)	41.9	12.6	-	-	8.7	0
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	0.9	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	15	10	8	18	17	10	47	6	8	18	10
Future Vol, veh/h	10	15	10	8	18	17	10	47	6	8	18	10
Conflicting Peds, #/hr	3	0	0	0	0	3	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	12	18	12	9	21	20	12	55	7	9	21	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	153	135	29	145	138	64	35	0	0	64	0	0
Stage 1	47	47	-	85	85	-	-	-	-	-	-	-
Stage 2	106	88	-	60	53	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	812	754	1043	822	751	998	1570	-	-	1532	-	-
Stage 1	964	854	-	920	822	-	-	-	-	-	-	-
Stage 2	897	820	-	949	849	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	767	740	1041	788	737	993	1567	-	-	1529	-	-
Mov Cap-2 Maneuver	767	740	-	788	737	-	-	-	-	-	-	-
Stage 1	954	847	-	911	814	-	-	-	-	-	-	-
Stage 2	847	812	-	913	842	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	9.6	1.2	1.6
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1567	-	-	816	832	1529	-	-
HCM Lane V/C Ratio	0.008	-	-	0.05	0.061	0.006	-	-
HCM Control Delay (s)	7.3	0	-	9.6	9.6	7.4	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	20	25	10	18	108	13	10	30	10	10	18	8
Future Vol, veh/h	20	25	10	18	108	13	10	30	10	10	18	8
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	6	6	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	25	31	12	22	133	16	12	37	12	12	22	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	150	0	0	43	0	0	288	281	43	304	279	142
Stage 1	-	-	-	-	-	-	87	87	-	186	186	-
Stage 2	-	-	-	-	-	-	201	194	-	118	93	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1425	-	-	1559	-	-	662	626	1025	646	627	903
Stage 1	-	-	-	-	-	-	918	821	-	813	744	-
Stage 2	-	-	-	-	-	-	799	738	-	884	816	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1424	-	-	1559	-	-	620	605	1019	589	606	902
Mov Cap-2 Maneuver	-	-	-	-	-	-	620	605	-	589	606	-
Stage 1	-	-	-	-	-	-	901	806	-	798	732	-
Stage 2	-	-	-	-	-	-	755	726	-	813	801	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.8	1	11	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	662	1424	-	-	1559	-	-	648
HCM Lane V/C Ratio	0.093	0.017	-	-	0.014	-	-	0.069
HCM Control Delay (s)	11	7.6	0	-	7.3	0	-	11
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	10	550	40	30	20	440	1150	10	30	2620	150
Future Volume (veh/h)	160	10	550	40	30	20	440	1150	10	30	2620	150
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1845	1900	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	168	11	579	42	32	21	463	1211	11	32	2758	158
Adj No. of Lanes	0	1	1	0	1	0	2	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	373	20	507	120	88	46	567	2595	24	113	1959	110
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.32	0.17	0.50	0.50	0.06	0.40	0.39
Sat Flow, veh/h	956	63	1555	230	269	141	3408	5146	47	1757	4869	273
Grp Volume(v), veh/h	179	0	579	95	0	0	463	790	432	32	1882	1034
Grp Sat Flow(s),veh/h/ln	1019	0	1555	640	0	0	1704	1679	1836	1757	1679	1785
Q Serve(g_s), s	0.0	0.0	37.2	4.5	0.0	0.0	15.0	17.4	17.4	2.0	45.9	45.9
Cycle Q Clear(g_c), s	20.4	0.0	37.2	24.9	0.0	0.0	15.0	17.4	17.4	2.0	45.9	45.9
Prop In Lane	0.94		1.00	0.44		0.22	1.00		0.03	1.00		0.15
Lane Grp Cap(c), veh/h	393	0	507	254	0	0	567	1693	926	113	1351	718
V/C Ratio(X)	0.46	0.00	1.14	0.37	0.00	0.00	0.82	0.47	0.47	0.28	1.39	1.44
Avail Cap(c_a), veh/h	393	0	507	254	0	0	887	1763	964	242	1351	718
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.8	0.0	38.4	34.6	0.0	0.0	45.9	18.3	18.3	50.9	34.1	34.2
Incr Delay (d2), s/veh	0.8	0.0	85.3	0.9	0.0	0.0	3.4	0.2	0.4	1.3	181.6	205.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.0	27.9	2.7	0.0	0.0	7.3	8.1	8.9	1.0	55.3	63.6
LnGrp Delay(d),s/veh	33.6	0.0	123.7	35.5	0.0	0.0	49.3	18.5	18.7	52.2	215.7	240.0
LnGrp LOS	C		F	D			D	B	B	D	F	F
Approach Vol, veh/h		758			95			1685			2948	
Approach Delay, s/veh		102.4			35.5			27.0			222.4	
Approach LOS		F			D			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.3	61.5		41.2	23.0	49.9		41.2
Change Period (Y+Rc), s	3.7	4.9		* 4.2	* 4.7	4.9		* 4.2
Max Green Setting (Gmax), s	16.0	59.0		* 37	* 29	45.0		* 37
Max Q Clear Time (g_c+I1), s	4.0	19.4		26.9	17.0	47.9		39.2
Green Ext Time (p_c), s	0.0	9.8		0.4	1.3	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	142.6
HCM 2010 LOS	F

Notes

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	40	0	1600	3140	30
Future Vol, veh/h	0	40	0	1600	3140	30
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	41	0	1633	3204	31

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1620	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	78	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	78	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	93.5	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	78	-	-
HCM Lane V/C Ratio	-	0.523	-	-
HCM Control Delay (s)	-	93.5	-	-
HCM Lane LOS	-	F	-	-
HCM 95th %tile Q(veh)	-	2.2	-	-

Intersection	
Int Delay, s/veh	9.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	60	50	1600	3130	50
Future Vol, veh/h	0	60	50	1600	3130	50
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	62	52	1649	3227	52

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1642	3281	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	5.36	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	3.13	-	-	-
Pot Cap-1 Maneuver	0	75	~ 26	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	75	~ 26	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	152.7	23.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	~ 26	-	75	-	-
HCM Lane V/C Ratio	1.983	-	0.825	-	-
HCM Control Delay (s)	$ 779.8	-	152.7	-	-
HCM Lane LOS	F	-	F	-	-
HCM 95th %tile Q(veh)	6.3	-	4.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	640	20	20	600	30	80
Future Vol, veh/h	640	20	20	600	30	80
Conflicting Peds, #/hr	0	4	4	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	780	24	24	732	37	98

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	808	0	1576	796
Stage 1	-	-	-	-	796	-
Stage 2	-	-	-	-	780	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	813	-	120	385
Stage 1	-	-	-	-	442	-
Stage 2	-	-	-	-	450	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	810	-	114	384
Mov Cap-2 Maneuver	-	-	-	-	114	-
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	428	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	26.6
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	114	384	-	-	810	-
HCM Lane V/C Ratio	0.321	0.254	-	-	0.03	-
HCM Control Delay (s)	50.8	17.5	-	-	9.6	0
HCM Lane LOS	F	C	-	-	A	A
HCM 95th %tile Q(veh)	1.3	1	-	-	0.1	-

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	20	10	10	10	10	10	90	10	10	20	10
Future Vol, veh/h	10	20	10	10	10	10	10	90	10	10	20	10
Conflicting Peds, #/hr	2	0	0	0	0	2	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	13	25	13	13	13	13	13	113	13	13	25	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	220	211	33	223	211	122	39	0	0	126	0	0
Stage 1	59	59	-	146	146	-	-	-	-	-	-	-
Stage 2	161	152	-	77	65	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	734	684	1038	731	684	926	1565	-	-	1454	-	-
Stage 1	950	844	-	854	774	-	-	-	-	-	-	-
Stage 2	839	770	-	929	839	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	702	671	1037	692	671	924	1564	-	-	1454	-	-
Mov Cap-2 Maneuver	702	671	-	692	671	-	-	-	-	-	-	-
Stage 1	941	836	-	846	767	-	-	-	-	-	-	-
Stage 2	805	763	-	882	831	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.2	10.1	0.7	1.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1564	-	-	745	747	1454	-	-
HCM Lane V/C Ratio	0.008	-	-	0.067	0.05	0.009	-	-
HCM Control Delay (s)	7.3	0	-	10.2	10.1	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

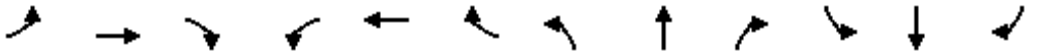
Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	40	10	10	70	20	10	60	10	10	20	10
Future Vol, veh/h	30	40	10	10	70	20	10	60	10	10	20	10
Conflicting Peds, #/hr	1	0	1	1	0	1	2	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	38	50	13	13	88	25	13	75	13	13	25	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	114	0	0	64	0	0	282	274	58	305	268	104
Stage 1	-	-	-	-	-	-	134	134	-	128	128	-
Stage 2	-	-	-	-	-	-	148	140	-	177	140	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1469	-	-	1532	-	-	668	631	1005	645	636	948
Stage 1	-	-	-	-	-	-	867	784	-	873	788	-
Stage 2	-	-	-	-	-	-	852	779	-	822	779	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1468	-	-	1531	-	-	619	607	1004	561	612	945
Mov Cap-2 Maneuver	-	-	-	-	-	-	619	607	-	561	612	-
Stage 1	-	-	-	-	-	-	843	762	-	849	780	-
Stage 2	-	-	-	-	-	-	805	771	-	712	757	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.8	0.7	11.7	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	640	1468	-	-	1531	-	-	655
HCM Lane V/C Ratio	0.156	0.026	-	-	0.008	-	-	0.076
HCM Control Delay (s)	11.7	7.5	0	-	7.4	0	-	11
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-	-	0.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	20	300	20	20	20	640	2520	30	20	1620	170
Future Volume (veh/h)	220	20	300	20	20	20	640	2520	30	20	1620	170
Number	3	8	18	7	4	14	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1845	1900	1845	1900	1845	1845	1900	1845	1845	1900
Adj Flow Rate, veh/h	232	21	316	21	21	21	674	2653	32	21	1705	179
Adj No. of Lanes	0	1	1	0	1	0	2	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	241	17	472	39	38	19	756	2820	34	84	1732	181
Arrive On Green	0.30	0.30	0.30	0.30	0.30	0.30	0.22	0.55	0.54	0.05	0.38	0.37
Sat Flow, veh/h	606	55	1549	0	124	62	3408	5128	62	1757	4611	482
Grp Volume(v), veh/h	253	0	316	63	0	0	674	1734	951	21	1240	644
Grp Sat Flow(s),veh/h/ln	661	0	1549	186	0	0	1704	1679	1833	1757	1679	1737
Q Serve(g_s), s	0.0	0.0	21.8	0.0	0.0	0.0	23.4	58.8	59.3	1.4	44.7	45.0
Cycle Q Clear(g_c), s	37.2	0.0	21.8	37.2	0.0	0.0	23.4	58.8	59.3	1.4	44.7	45.0
Prop In Lane	0.92		1.00	0.33		0.33	1.00		0.03	1.00		0.28
Lane Grp Cap(c), veh/h	258	0	472	96	0	0	756	1846	1008	84	1261	652
V/C Ratio(X)	0.98	0.00	0.67	0.66	0.00	0.00	0.89	0.94	0.94	0.25	0.98	0.99
Avail Cap(c_a), veh/h	258	0	472	96	0	0	828	1846	1008	226	1261	652
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.3	0.0	37.1	35.2	0.0	0.0	46.1	25.6	25.8	56.1	37.8	38.0
Incr Delay (d2), s/veh	51.0	0.0	3.7	15.3	0.0	0.0	11.2	10.0	16.5	1.6	21.3	32.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.2	0.0	9.8	1.9	0.0	0.0	12.2	29.5	34.5	0.7	24.4	27.3
LnGrp Delay(d),s/veh	97.3	0.0	40.8	50.5	0.0	0.0	57.4	35.6	42.3	57.7	59.1	70.1
LnGrp LOS	F		D	D			E	D	D	E	E	E
Approach Vol, veh/h		569			63			3359			1905	
Approach Delay, s/veh		65.9			50.5			41.9			62.8	
Approach LOS		E			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.8	71.2		41.2	31.1	49.9		41.2
Change Period (Y+Rc), s	3.7	4.9		* 4.2	* 4.7	4.9		* 4.2
Max Green Setting (Gmax), s	16.0	59.0		* 37	* 29	45.0		* 37
Max Q Clear Time (g_c+I1), s	3.4	61.3		39.2	25.4	47.0		39.2
Green Ext Time (p_c), s	0.0	0.0		0.0	1.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	51.0
HCM 2010 LOS	D

Notes

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	40	0	3190	1850	50
Future Vol, veh/h	0	40	0	3190	1850	50
Conflicting Peds, #/hr	0	0	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	41	0	3289	1907	52

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	985	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	211	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	210	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.3	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	210	-	-
HCM Lane V/C Ratio	-	0.196	-	-
HCM Control Delay (s)	-	26.3	-	-
HCM Lane LOS	-	D	-	-
HCM 95th %tile Q(veh)	-	0.7	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	50	80	3190	1820	70
Future Vol, veh/h	0	50	80	3190	1820	70
Conflicting Peds, #/hr	0	0	4	0	0	4
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	51	82	3255	1857	71

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	968	1932	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	5.36	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	3.13	-	-	-
Pot Cap-1 Maneuver	0	216	134	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	215	133	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	26.9	1.7	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	133	-	215	-	-
HCM Lane V/C Ratio	0.614	-	0.237	-	-
HCM Control Delay (s)	67.8	-	26.9	-	-
HCM Lane LOS	F	-	D	-	-
HCM 95th %tile Q(veh)	3.2	-	0.9	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	490	20	20	810	30	50
Future Vol, veh/h	490	20	20	810	30	50
Conflicting Peds, #/hr	0	4	4	0	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	50
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	544	22	22	900	33	56

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	570	0	1503	561
Stage 1	-	-	-	-	559	-
Stage 2	-	-	-	-	944	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	997	-	133	525
Stage 1	-	-	-	-	570	-
Stage 2	-	-	-	-	377	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	993	-	127	522
Mov Cap-2 Maneuver	-	-	-	-	127	-
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	360	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	24.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	127	522	-	-	993	-
HCM Lane V/C Ratio	0.262	0.106	-	-	0.022	-
HCM Control Delay (s)	43.1	12.7	-	-	8.7	0
HCM Lane LOS	E	B	-	-	A	A
HCM 95th %tile Q(veh)	1	0.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	10	20	10	10	20	20	10	50	10	10	20	10
Future Vol, veh/h	10	20	10	10	20	20	10	50	10	10	20	10
Conflicting Peds, #/hr	3	0	0	0	0	3	2	0	2	2	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	12	24	12	12	24	24	12	59	12	12	24	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	172	153	32	163	153	70	38	0	0	73	0	0
Stage 1	56	56	-	91	91	-	-	-	-	-	-	-
Stage 2	116	97	-	72	62	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.13	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.527	4.027	3.327	2.227	-	-	2.227	-	-
Pot Cap-1 Maneuver	789	737	1039	800	737	990	1566	-	-	1520	-	-
Stage 1	954	846	-	914	818	-	-	-	-	-	-	-
Stage 2	886	813	-	935	841	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	739	722	1037	761	722	985	1563	-	-	1517	-	-
Mov Cap-2 Maneuver	739	722	-	761	722	-	-	-	-	-	-	-
Stage 1	944	838	-	905	810	-	-	-	-	-	-	-
Stage 2	831	805	-	891	833	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	9.7	1	1.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1563	-	-	786	818	1517	-	-
HCM Lane V/C Ratio	0.008	-	-	0.06	0.072	0.008	-	-
HCM Control Delay (s)	7.3	0	-	9.9	9.7	7.4	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	20	30	10	20	110	20	10	30	10	10	20	10
Future Vol, veh/h	20	30	10	20	110	20	10	30	10	10	20	10
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	6	6	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	25	37	12	25	136	25	12	37	12	12	25	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	162	0	0	49	0	0	310	305	49	324	299	150
Stage 1	-	-	-	-	-	-	93	93	-	200	200	-
Stage 2	-	-	-	-	-	-	217	212	-	124	99	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1411	-	-	1551	-	-	641	607	1017	627	611	894
Stage 1	-	-	-	-	-	-	912	816	-	800	734	-
Stage 2	-	-	-	-	-	-	783	725	-	878	811	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1410	-	-	1551	-	-	595	585	1011	570	588	893
Mov Cap-2 Maneuver	-	-	-	-	-	-	595	585	-	570	588	-
Stage 1	-	-	-	-	-	-	896	801	-	785	720	-
Stage 2	-	-	-	-	-	-	732	711	-	808	796	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	1	11.2	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	641	1410	-	-	1551	-	-	637
HCM Lane V/C Ratio	0.096	0.018	-	-	0.016	-	-	0.078
HCM Control Delay (s)	11.2	7.6	0	-	7.4	0	-	11.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.3