DRAFT ENVIRONMENTAL IMPACT REPORT

201 HASKINS WAY PROJECT

CITY OF SOUTH SAN FRANCISCO
STATE CLEARINGHOUSE NO.: 2018042047

DRAFT EIR PUBLICATION DATE: OCTOBER 12, 2018
DRAFT EIR PUBLIC HEARING DATE: NOVEMBER 15, 2018
DRAFT EIR PUBLIC COMMENT PERIOD: OCTOBER 12, 2018 - NOVEMBER 26, 2018



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List of Acronyms and Abbreviations

AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACS	American Community Survey
ADA	Americans with Disabilities Act
ADOE	Archaeological Determinations of Eligibility
ADWF	Average Dry Weather Flow
AFY	acre-feet per year
AHAPs	acutely hazardous air pollutants
ALUCs	Airport Land Use Commissions
ALUCP	*Airport Land Use Compatibility Plan*
ASCE	American Society of Civil Engineers
ATCMs	Airborne Toxic Control Measures
APN	Assessor's Parcel Number
ARE	Alexandria Real Estate Equities
BAAQMD	Bay Area Air Quality Management District
BACAP	*Bay Area Clean Air Plan*
BART	Bay Area Rapid Transit
BBTU/yr	billion British thermal units per year
BC	Business Commercial
BCDC	San Francisco Bay Conservation and Development Commission
bgs	below the ground surface
bhp	brake horse power
BMPs	Best Management Practices
BTP	Business Technology Park
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standard
CalEEMod	California Emissions Estimator Model
CA MUTCD	*California Manual on Uniform Traffic Control Devices*
Cal Water	California Water Service Company
CAP	*Climate Action Plan*
CARB	California Air Resources Board
Caltrans	California Department of Transportation
CC	Coastal Commercial
C/CAG	City/County Association of Governments of San Mateo County
CCC	California Coastal Commission
CCF	cubic feet per year
CC/MI	Coastal Commercial/Mixed Industrial
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEMP	Construction Emissions Minimization Plan
CEQA	California Environmental Quality Act

CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CH_4	methane
CHL	California Historical Landmarks
CHRIS	California Historical Resources Information System
CHSC	California Health and Safety Code
CIWMA	California Integrated Waste Management Act
CMP	Congestion Management Program
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPPA	California Native Plant Protection Act
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2e	CO_2 equivalent
CPHI	California Points of Historical Interest
CRHR	California Register of Historic Places
CRPR	California Rare Plant Ranking system
CUP	Conditional Use Permit
CWA	Clean Water Act
dB	decibel
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EOP	Emergency Operations Plan
ERPG	Emergency Response Planning Guidelines
FAA	Federal Aviation Administration
FAR	floor area ratio
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FIRM	Flood Insurance Rate Maps
GHG	greenhouse gas
gpm	gallons per minute
gsf	gross square feet
HCM	*Highway Capacity Manual*
HMP	Hazard Mitigation Plan
HOV	high-occupancy vehicle
HRI	California State Historic Resources Inventory
HRA	Health Risk Assessment
in/sec	inches per second
ITE	Institute of Transportation Engineers
KSF	1,000 square feet
lb/day	pounds per day
LDV Rule	Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards Rule
LEED v4	Leadership in Energy and Environmental Design Version 4

LEV program	Low Emission Vehicle program
LID	low-impact development
LOS	level of service
LRP	Legally Responsible Person
MBTA	Migratory Bird Treaty Act
MCA	Medieval Climatic Anomaly
mgd	million gallons per day
MI	Mixed Industrial
mm/sec	millimeters per second
MRF	Materials Recovery Facility
MSL	mean sea level
MTS	Metropolitan Transportation System
MT/yr	metric tons per year
$MTCO_2e/SP/yr$	$MTCO_2e$ per Service Population per year
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NOC	Notice of Completion
NOD	Notice of Determination
NOI	Notice of Intent
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
N_2O	nitrous oxide
NWIC	Northwestern Information Center
OPR	State Office of Planning and Research
PCB	polychlorinated biphenyl
PeMS	Caltrans Performance Measurement System
PG&E	Pacific Gas and Electric Company
PM_{10}	respirable particulate matter with a diameter less than 10 microns
$PM_{2.5}$	fine particulate matter with a diameter less than 2.5 microns
ppm	parts per million
PPV	Peak Particle Velocity
PWWF	Peak Wet Weather Flows
QSD	Qualified SWPPP Developer
R&D	Research and Development
RHNA	Regional Housing Need Allocation
RMS	Root Mean Square
RPS	Renewables Portfolio Standard
RWQCBs	Regional Water Quality Control Boards
SamTrans	San Mateo County Transit District

SB	Senate Bill
SCS	Sustainable Communities Strategy
SMCEHD	San Mateo County Environmental Health Department
SEI	Structural Engineering Institute
SFBAAB	San Francisco Bay Area Air Basin
SFO	San Francisco International Airport
SFPUC	San Francisco Public Utilities Commission
SIP	State Implementation Plan
SLF	Sacred Lands File
SO_2	sulfur dioxide
SP	service population
sq. ft.	square feet
SSFFD	South San Francisco Fire Department
SSFPD	South San Francisco Police Department
SSMP	*Sewer System Management Plan*
STOPP	Stormwater Pollution Prevention Program
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	toxic air contaminants
TAZ	transportation analysis zone
TDM	Transportation Demand Management
tpy	tons per year
TIA	Traffic Impact Analysis
TSM	transportation system management
2012 SFO ALUCP	*2012 Comprehensive Airport Land Use Compatibility Plan* prepared for the San Francisco Airport
USC	United States Code
U.S. EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USTs	underground storage tanks
UWMP	*Urban Water Management Plan*
VOCs	volatile organic compounds
VMT	vehicle miles traveled
WDRs	Waste Discharge Requirements
WEAP	Worker Environmental Awareness Program
WHO	World Health Organization
WQCP	Water Quality Control Plant
WSA	Water Supply Assessment

1 INTRODUCTION

Chapter 1, Introduction, presents a summary of the 201 Haskins Way Project (project), outlines the purpose of this Environmental Impact Report (EIR), summarizes the environmental review process, and describes the organization of the EIR.

1.1 Project Summary

The project site is part of the City of South San Francisco's (City's) "East of 101" planning area, bounded by the San Francisco Bay on the east and U.S. 101 and railway lines on the west. The project site is composed of eight parcels encompassing approximately 18.2 acres of land bounded by East Grand Avenue to the north, Haskins Way to the west, San Francisco Bay to the south, and a recycling center and the Genentech campus to the east. Six of the parcels have trucking, warehouse, and distribution uses, one is used for parking, and one has office/research and development (R&D) use.

The proposed project would involve rezoning seven parcels from the Mixed Industrial (MI) district to a Business Technology Park (BTP) district and one parcel from the Business Commercial (BC) district to the BTP district. The project would allow development at a floor area ratio (FAR) of 1.0 or a total of approximately 677,600 gross square feet (gsf) of new BTP office use. It is assumed that the additional office/R&D space would be built out in two phases. Alexandria Real Estate Equities (ARE) is proposing a specific development application for the proposed Phase 1 area site plan; however, currently there is no site-specific development program proposed for the Phase 2 area. For the purposes of analysis under the California Environmental Quality Act (CEQA), this EIR assumes the project would be constructed in two phases with the proposed Phase 1 site plan and a conceptual Phase 2 development for buildout of the project site.

In the Phase 1 area, ARE would construct 336,368 gsf of new BTP office use on 201 Haskins Way and 400-450 East Jamie Court. The Phase 1 project would demolish a 24,075-gsf building at 201 Haskins Way which previously contained a light industrial trucking use, and construct a new 311,368-gsf office building (201 Haskins Way Building) with a 63-foot-tall, three-story wing and a 95-foot-tall, five-story wing; a 720-stall, five-level parking structure (up to 48 feet in height); and 183 surface parking spaces. At 400-450 East Jamie Court, ARE would construct an approximately 25,000-gsf, two-story addition to the existing western building. Construction in the Phase 1 area would begin in 2019 and occur over approximately 18 months, for anticipated completion in 2021.

The Phase 2 area includes two additional parcels along Haskins Way, two additional parcels along East Jamie Court, two parcels along East Grand Avenue, and additional development on the 400-450 East Jamie Court parcel (also in the Phase 1 area). At this time, no specific development in the Phase 2 area is proposed. Development of Phase 2 would require subsequent project-level site design.

The proposed rezoning of the parcels in the Phase 2 area would allow the existing uses to continue indefinitely and would allow redevelopment at 1.0 FAR in accordance with the BTP rezoning. The

Phase 2 project rezoning would allow up to a total of 341,232 gsf of new BTP office use on 101 and 151 Haskins Way, 410 and 430 East Grand Avenue, 451 East Jamie Court, and an unaddressed parcel at Assessor's Parcel Number (APN) 015-102-290. Five of the parcels contain five existing one- to two-story light industrial buildings totaling approximately 157,995 gsf that would be removed. A portion of the 451 East Jamie Court parcel and APN 015-102-290 contain a parking lot that would be removed. The EIR evaluates the impacts of development of the maximum 341,232 gsf of new BTP use. For illustrative purposes, the EIR identifies a conceptual Phase 2 area development plan that would include construction of a new 256,232-gsf three- and five-story office building (East Grand Building) of up to 95 feet in height. In addition, in the conceptual plan, the parking garage would be expanded to two parcels to the east at 451 East Jamie Court (APN 015-102-240 and APN 015-102-290) to accommodate a total of 1,060 stalls (340 additional stalls), and a total of 243 additional surface parking stalls would be constructed (see **Figure 3.7: Conceptual Project Site Plan – Project Buildout**, in Chapter 3, Project Description, p. 3.26). It is uncertain when or if such development for the Phase 2 area would occur or whether it would occur as a single redevelopment of all Phase 2 parcels together, or as individual development projects on one or more Phase 2 area parcels. To provide a conservative analysis of construction impacts in the EIR, it is assumed that construction in the Phase 2 area would commence in 2021 (immediately after completion of construction in the Phase 1 area) and would occur over an 18-month period.

Phase 2 of the project would also allow future development potential at 400-450 East Jamie Court based on the remaining balance of FAR-defined square footage after implementation of the planned approximately 25,000-gsf building addition to 400-450 East Jamie Court that would occur in the Phase 1 area. It is assumed that the BTP use developed at 400-450 East Jamie Court during Phase 2 would result in up to 85,000 gsf of development.

1.2 Purpose of this Draft EIR

This EIR has been prepared by the South San Francisco Planning Division in the City of South San Francisco, the Lead Agency for the proposed project, in compliance with the provisions of CEQA and the CEQA Guidelines (California Public Resources Code Section 21000 et seq., and California Code of Regulations Title 14, Section 15000 et seq., "CEQA Guidelines"). The lead agency is the public agency that has the principal responsibility for carrying out or approving a project.

As stated in CEQA Guidelines Section 15121(a), an EIR is an informational document intended to inform public agency decision-makers and the public of the significant environmental effects of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project. This EIR assesses potentially significant impacts as defined in CEQA Guidelines Section 15382 as substantial, or potentially substantial, adverse changes in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

The degree of specificity required in an EIR should "correspond to the degree of specificity involved in the underlying activity which is described in the EIR" (CEQA Guidelines Section 15146). Pursuant to CEQA Guidelines Section 15161, this is a project-level EIR, defined as an EIR that examines the physical

environmental impacts of a specific development project. As stated above, the EIR analyzes a specific Phase 1 area development plan and a conceptual Phase 2 area development plan.

Before any discretionary project approvals may be granted for the proposed project, the South San Francisco City Council must certify that the EIR was completed in compliance with CEQA, that the decision-making body reviewed and considered the information in the final EIR, and that the EIR reflects the City's independent judgement and analysis. EIR adequacy is defined in CEQA Guidelines Section 15151, which states "[a]n EIR should be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences."

CEQA requires that public agencies not approve projects until all feasible means available have been employed to substantially lessen the significant environmental effects of such projects. City decision-makers will use the certified EIR, along with other information and public processes, to determine whether to approve, modify, or disapprove the proposed project, and to require any feasible mitigation measures as conditions of project approval.

1.3 Environmental Review Process

The environmental review process for the proposed project includes a number of steps: publication and circulation of a Notice of Preparation (NOP) for public comment, publication of a Draft EIR for public review and comment, preparation and publication of responses to public and agency comments on the Draft EIR, and certification of the Final EIR. These steps are described below.

1.3.1 Notice of Preparation

The City of South San Francisco Planning Division of the Economic and Community Development Department (Planning Division), issued an NOP of an EIR for the proposed 201 Haskins Way Project on April 18, 2018, in compliance with Title 14, Sections 15082(a), 15103, and 15375 of the California Code of Regulations (CCR). The NOP review period commenced on April 18, 2018, and concluded on May 18, 2018, and a scoping meeting was held on May 3, 2018. No commenters spoke at the meeting. The Planning Division received four comment letters from interested parties during the public review and comment period. The Planning Division has considered the comments made by the public in preparation of the Draft EIR for the proposed project. Comments on the NOP raised the following issues:

Transportation and Circulation

- Compliance with the San Mateo County Congestion Management Program (CMP) Traffic Impact Analysis (TIA) Policy and Land Use Guidelines as provided by the City/County Association of Governments (C/CAG), including preparation of a forecast and discussion of the expected impacts of the project on the Congestion Management Program roadway network, the immediate project area, and other areas.
- Project-related traffic generation and mitigation measures should the project generate a net of 100 or more peak-hour trips on the CMP roadway network. Inclusion of potential mitigation strategies documented in the C/CAG Land Use Guidelines policy such as reducing project scope, building

roadway and/or transit improvements, collecting traffic mitigation fees, and requiring project sponsors to implement Transportation Demand Management (TDM) programs.

- C/CAG consultation regarding the scope and parameters of the analysis, and C/CAG review and comment on the TIA, EIR and TDM plan.
- Project-related construction traffic impacts on the existing 451 East Jamie Court uses, and mitigation measures to minimize construction traffic during construction of the 201 Haskins Way Building and parking garage.
- Traffic and circulation impacts on Haskins Way, East Grand Avenue, Littlefield Avenue, and the northbound U.S. 101 on-ramp from East Grand Avenue during p.m. peak hours as a result of operation of the project, and mitigation measures to improve traffic and circulation.
- Analysis of implementing a TDM program as mitigation for vehicle miles traveled impacts, including design features, programs, and monitoring.
- Cumulative regional transportation impacts and mitigation through fair share contributions toward multi-modal and regional transit improvements.
- Project-related impacts on transit, pedestrians, bicycles, and disabled travelers, including analysis of mitigation for increased VMT, and design features that encourage the use of alternative transportation modes including transit and shuttles, such as improvements to shelters or benches, as well as pedestrian and bicycle design features.

Project Description

- Confirmation of where the project would occur within the San Francisco Bay (Bay) or the San Francisco Bay Conservation and Development Commission (BCDC) 100-foot shoreline jurisdictional band.
- Confirmation of the proposed public access to the Bay Trail and Bay shoreline per existing BCDC permits on-site and BCDC public access requirements.

Greenhouse Gas Emissions

- Analysis of implementing a TDM program as mitigation for greenhouse gas emission impacts, including design features, programs, and monitoring.

Noise

- Project-related construction noise impacts on the existing 451 East Jamie Court uses and mitigation measures to minimize construction noise during construction of the 201 Haskins Way Building and parking garage.

Land Use

- Project-related impacts on the continuation of existing business operations of parcels within the project site, including future property and building maintenance under the proposed rezoning.
- Project-related impacts on the potential for future development of parcels in the Phase 2 area as separate and individual parcels in compliance with the proposed rezoning, and the implications of development alternatives for each parcel not currently owned by the developer.

Recreation

- Project-related impacts on shoreline access due to an increased on-site worker population, and whether the proposed public access areas would be adequate to accommodate these additional users, in recognition of existing BCDC permits and BCDC public access requirements.

Aesthetics

- Project-related impacts on scenic views of the Bay in consideration of the height of the proposed buildings and parking structure.
- Project-related shadow on the existing 451 East Jamie Court Building and existing and planned roof solar photovoltaic systems.
- Project-related impacts on existing wind hazards and whether the project includes mitigation measures to reduce project-related wind impacts.

Hydrology and Water Quality

- Whether project impacts related to sea level rise would occur on transportation facilities in the project area due to higher water levels, including increased erosion, changing environmental characteristics that affect material durability, increased groundwater levels, change in sediment movement along shorelines, and soil pore pressure at dikes and levees on which transportation facilities are constructed.

1.3.2 Draft Environmental Impact Report

This Draft EIR has been prepared on behalf of the City of South San Francisco, the Lead Agency, in accordance with CEQA. It provides an analysis of the physical environmental impacts of construction and operation of the proposed project, and the project's contribution to the environmental impacts from foreseeable cumulative development in the project site vicinity and the City as a whole. It considers all environmental topic areas in Appendix G of the CEQA Guidelines and takes into consideration NOP comments.

Copies of the Draft EIR, all documents referenced in this Draft EIR, and the distribution list for the Draft EIR are available at the Planning Counter, South San Francisco Planning Division, 315 Maple Avenue, South San Francisco, CA 94080. The Draft EIR is also available for viewing or downloading at www.ssf.net/ceqadocuments under 201 Haskins Way. You may also request that a copy be sent to you by calling (650) 877-8535 or emailing Ryan Wassum, at Ryan.Wassum@ssf.net.

HOW TO COMMENT ON THE DRAFT ENVIRONMENTAL IMPACT REPORT

The City, on **October 12, 2018**, filed a Notice of Completion (NOC) with the State Clearinghouse, indicating that this Draft EIR has been completed and is available for review and comment. This Draft EIR will be available for review by the public and interested parties, agencies, and organizations for a review period of at least 45 days, as required by California law. Pursuant to state law (Public Resources Code Section 21091(d)(3)) the City will accept email comments in lieu of mailed or hand-delivered comments; however, reviewers are encouraged to follow up any email comments with letters. Reviewers should focus on the document's adequacy in identifying and analyzing the proposed project's significant

effects on the environment and ways in which the significant effects of the proposed project might be avoided or mitigated (California Code of Regulations Section 15204(a)).

The 45-day review period for the Draft EIR is from October 12, 2018 to November 26, 2018. Comments should be submitted in writing during this review period to:

Mr. Ryan Wassum, Associate Planner
Planning Division, Economic and Community Development Department
City of South San Francisco
315 Maple Avenue
South San Francisco, California 94080
Ryan.Wassum@ssf.net

There will be a public hearing before the Planning Commission during the 45-day public review and comment period for this EIR to solicit oral comments on the adequacy and accuracy of information presented in this Draft EIR. The public hearing on this Draft EIR has been scheduled before the Planning Commission for **November 15, 2018**, in the Community Room, Municipal Services Building, 33 Arroyo Drive beginning at 7:00 p.m. or later.

1.3.3 Final Environmental Impact Report

Following the close of the Draft EIR public review and comment period, the City will prepare responses to comments, which will contain a summary of oral comments and a copy of all written comments received on this Draft EIR and the City's responses to those comments and any necessary changes to the text. Responses to comments will be prepared and published in a Final EIR. The Final EIR will be available to all commenting agencies at least 10 days prior to the certification hearing, in accordance with CEQA requirements. The South San Francisco City Council will review the Final EIR documents and will determine whether or not the Final EIR provides a full and adequate appraisal of the project and its alternatives.

The City Council will review the Final EIR for adequacy and certify that the EIR has been completed in compliance with CEQA and that it reflects the City's independent judgment pursuant to the requirements of CEQA Guidelines Section 15090. The City will consider certification of the Final EIR and then consider the project separately for approval or denial. Findings on the feasibility of avoiding or reducing the project's significant environmental effects will be made and, if necessary, a Statement of Overriding Considerations will be prepared, balancing the benefits achieved by the proposed project against unavoidable environmental impacts, should the City choose to approve the project with remaining significant impacts that cannot be avoided.

A Notice of Determination (NOD) will be prepared and filed with the State Clearinghouse if the City approves the proposed project. The NOD will include a description of the project, the date of approval, and an indication of whether Findings and Statements of Overriding Considerations were prepared. The NOD will also provide the address where the EIR and record of project approval are available for review.

1.4 Report Organization

This Draft EIR is organized into the following chapters.

- Chapter 1, Introduction, summarizes the purpose and organization of the Draft EIR and the environmental review process.
- Chapter 2, Executive Summary, summarizes the proposed project and environmental consequences that would result from the implementation of the project (including significant and unavoidable impacts that cannot be mitigated to a level of less than significant, impacts reduced to a level of less than significant through mitigation, and impacts determined not to be significant), the alternatives to the proposed project that were analyzed, and a summary table of project impacts and mitigation measures.
- Chapter 3, Project Description, describes the existing setting, the project sponsor's objectives, the proposed project, and required approvals and actions including the agencies involved in the actions.
- Chapter 4, Environmental Setting, Impacts, and Mitigation, begins with Section 4.1, Approach to Environmental Analysis, which presents the methodology for environmental analysis, including a list of baseline projects and cumulative projects. Sections 4.2 through 4.10 are each devoted to a particular environmental topic. Each section describes the environmental setting, including applicable plans and policies, provides an analysis of the potential environmental impacts of the project and cumulative impacts, and identifies mitigation measures to reduce significant impacts. The following topics are analyzed:
  - Air Quality (Section 4.2)
  - Biological Resources (Section 4.3)
  - Cultural and Paleontological Resources (Section 4.4)
  - Greenhouse Gas Emissions (Section 4.5)
  - Hydrology and Water Quality (Section 4.6)
  - Land Use and Planning (Section 4.7)
  - Noise and Vibration (Section 4.8)
  - Transportation and Traffic (Section 4.9)
  - Utilities and Service Systems (Section 4.10)

  Section 4.11, Less-than-Significant Impacts, summarizes the environmental effects found not to be significant. After an introduction to the section (Subsection 4.11.1), the following topics are discussed:
  - Agriculture and Forest Resources (Subsection 4.11.2)
  - Aesthetics, including discussion of wind and shadow design guidelines (Subsection 4.11.3)
  - Geology and Soils (Subsection 4.11.4)
  - Hazards and Hazardous Materials (Subsection 4.11.5)
  - Mineral Resources (Subsection 4.11.6)
  - Population and Housing (Subsection 4.11.7)
  - Public Services (Subsection 4.11.8)
  - Recreation (Subsection 4.11.9)
- Chapter 5, Alternatives, summarizes two alternatives to the proposed project and the comparative environmental consequences and benefits of each alternative. The "No Project" alternative and

one reduced development alternative are analyzed. This chapter also identifies the environmentally superior alternative. It discusses any alternatives that were considered for analysis in the EIR but rejected and gives the reasons for their rejection.

- Chapter 6, Other CEQA Considerations, contains the discussion of mandatory findings of significance (including cumulative impacts), growth-inducing impacts, significant impacts that cannot be avoided, significant irreversible environmental changes, and areas of known controversy and project-related issues that have not been resolved.
- Chapter 7, Report Preparers, identifies the Lead Agency, organizations, and individuals consulted during preparation of this Draft EIR. In addition, the project sponsors, their attorneys, and any consultants working on their behalf are listed.

Appendices to this Draft EIR are as follows:

- Appendix A. Notice of Preparation and Comments
- Appendix B. Transportation Appendix
- Appendix C. Land Use Compatibility Analysis
- Appendix D. Water Supply Assessment
- Appendix E. Noise Technical Memo
- Appendix F. Air Quality and Greenhouse Gas Emissions Technical Memo

2 EXECUTIVE SUMMARY

This summary chapter is intended to highlight major areas of importance in the environmental analysis as required by Section 15123 of the California Environmental Quality Act (CEQA) Guidelines. This chapter briefly summarizes the 201 Haskins Way Project (project). Following the summary description of the proposed project, a summary table presents the environmental impacts of the proposed project, and mitigation measures identified to reduce significant impacts. Following the summary table is a description of the alternatives to the proposed project that are addressed in this EIR, including a description of the environmentally superior alternative. The final subsection in this chapter is a summary of environmental issues to be resolved and areas of known controversy.

2.1 Summary Description

This Draft EIR analyzes the potential for environmental impacts resulting from implementation of the proposed 201 Haskins Way Project. The proposed project would involve redevelopment of light industrial uses into office/research and development (R&D) uses and intensifying the buildout of existing office/R&D.[1] The applicants are Alexandria Real Estate Equities (ARE) and the City of South San Francisco (City). The Lead Agency is the City of South San Francisco. The applicants are seeking amendments of the City's Zoning Code as well as entitlements to enable development of the project area, including but not limited to approval of a subdivision map, design review, a Transportation Demand Management (TDM) Plan, and Conditional Use Permit to enable redevelopment of the 201 Haskins Way Project.

The proposed project site encompasses approximately 18.2 acres on eight parcels of privately owned light industrial and research and development area in South San Francisco's East of 101 Area. The site is bounded by East Grand Avenue to the north, Haskins Way to the west, San Francisco Bay (Bay) to the south, an existing recycling center to the southeast, and the Genentech campus to the northeast. The project site includes six parcels with trucking, warehouse, and distribution uses, one parcel used for parking, and one parcel with existing office/R&D use.

The proposed project would involve removal of existing light industrial uses and associated parking on seven parcels (101, 151, and 201 Haskins Way; 410 and 430 East Grand Avenue; 451 East Jamie Court; and one parcel with no address [Assessor's Parcel Number {APN} 015-102-290]), the construction of new office/R&D use on those seven parcels, and the expansion of existing office/R&D use on one parcel (400-450 East Jamie Court). The proposed project would be constructed in at least two development phases. ARE has submitted an application for Phase 1 development that would include demolition of approximately 24,075 gross square feet (gsf) of light industrial space and development of approximately 336,368 gsf of new office/R&D space. The City proposes rezoning of Phase 2, but there is no specific development application submitted or anticipated for Phase 2 at this time. For the purposes of analysis,

[1] In the 2000s, the 400-450 East Jamie Court parcel was developed into a business and technology office use at approximately 0.6 floor area ratio (FAR) under a previous project, which included the construction of a new segment of the San Francisco Bay Trail.

this EIR assumes the project would be constructed in two phases with the proposed Phase 1 site plan and a conceptual Phase 2 development for buildout of the project site.

This EIR presents separate analysis of the project impacts of Phase 1 development, and the project impacts of Phase 1 and 2 development combined (referred to as "project buildout" in this EIR). The EIR includes analysis of the maximum potential development in Phase 2 associated with the proposed rezoning those affected parcels. In addition, this EIR analyzes a conceptual Phase 2 development plan that includes demolition of approximately 157,995 gsf of light industrial space and development of approximately 341,232 gsf of new office/R&D space.[2]

2.2 201 Haskins Way Project Impacts and Mitigation Measures

Table 2.1: Summary of Project Impacts, Mitigation Measures, and Improvement Measures, beginning on p. 2.3, provides an overview of the following:

- Environmental impacts with the potential to occur as a result of the proposed project
- Level of significance of the environmental impacts before implementation of any applicable mitigation measures
- Mitigation measures that would avoid or reduce significant environmental impacts
- Improvement measures that would further reduce less-than-significant impacts
- The level of significance for each impact after the mitigation measures are implemented

[2] Gross square feet (gsf) is calculated separately from floor area and FAR, which excludes areas defined under Sections 20.040.008 and 20.040.009 of the zoning ordinance.

Legend: NI = No Impact; LS = Less-than-significant impact; LSM = Less-than-significant impact with mitigation; S = Significant; SU = Significant and unavoidable impact; SUM = Significant and unavoidable impact with mitigation

Table 2.1: Summary of Project Impacts, Mitigation Measures, and Improvement Measures

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Aesthetics			
Impact AE-1: The proposed project would not have a substantial adverse effect on a scenic vista.	LS	None required.	LS
Impact AE-2: The proposed project would not substantially degrade the existing visual character or quality of the site and its surroundings.	LS	None required.	LS
Impact AE-3: The proposed project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.	LS	None required.	LS
Impact C-AE-1: The proposed project would not result in a cumulatively considerable contribution to significant cumulative impacts on aesthetics.	LS	None required.	LS
Impact AE-4: The proposed project would not alter wind conditions in a manner that would substantially, adversely affect public safety.	LS	None required.	LS
Impact AE-5: The proposed project would not create new shadow in a manner that would substantially, adversely affect the use of public open space.	LS	None required.	LS
Agriculture and Forest Resources			
Impact AG-1: The proposed project would not convert designated farmland under the Farmland Mapping and Monitoring Program, nor would it conflict with any existing agricultural zoning or a Williamson Act contract, nor would it involve any changes to the environment that would result in the conversion of designated farmland.	NI	No impact	NI

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Impact AG-2: The proposed project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland, nor would it result in the loss of or conversion of forest land to non-forest uses.	NI	No impact	NI
Impact C-AG-1: The proposed project would not result in a cumulatively considerable contribution to a significant cumulative impact on agricultural resources or forest land or timberland.	NI	No impact	NI
Air Quality			
Impact AQ:1: The proposed project would violate air quality standards or contribute substantially to an existing or projected air quality violation.	S	**Mitigation Measure MM-AQ-1a: Off-road Equipment Standards and Construction Emissions Minimization Plan** Off-road equipment greater than 25 horsepower used during construction shall meet the Tier 4 Final off-road emission standards. Should the utilization of equipment meeting this standard prove to be technically infeasible, the construction contractor will select the lowest-emitting off-road equipment available. The construction contractor shall develop a Construction Emissions Minimization Plan (CEMP) which establishes the process used to select the lowest-emitting off-road equipment, specify the steps that will be taken to reduce emissions of criteria air pollutants and precursors, and provide analysis showing that NOx emissions for the applicable construction phase would remain below 54 lb/day, where feasible. The CEMP will be submitted to the City's Planning Division and approved prior to utilizing off-road equipment greater than 25 horsepower that does not meet Tier 4 Final off-road emission standards. **Mitigation Measure MM-AQ-1b: Implement BAAQMD Basic Construction Mitigation Measures** BAAQMD Basic Construction Mitigation Measures are as follows: • 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. • 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.	LSM

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
		• Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. • 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. • Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.	
Impact AQ:2: The proposed project would not expose sensitive receptors to substantial pollutant concentrations.	S	Implement **Mitigation Measure MM-TR-9**, below..	LSM
Impact AQ:3: The proposed project buildout would not create objectionable odors affecting a substantial number of people.	LS	None required.	LS
Impact AQ:4: The proposed project would conflict with the BAAQMD's 2017 Clean Air Plan.	S	Implement **Mitigation Measures MM-AQ-1a and MM-AQ-1b**, above.	LSM
Impact C-AQ-1: The proposed project would make a cumulatively considerable contribution to significant cumulative impacts with respect to nonattainment pollutants, including ozone precursors impacts.	S	Implement **Mitigation Measures MM-AQ-1a and MM-AQ-1b**, above.	LSM
Impact C-AQ-2: The proposed project would not make a cumulatively considerable contribution to significant cumulative impacts from pollutant concentrations exposure to sensitive receptors.	LS	None required.	LS
Impact C-AQ-3: The proposed project operations would not make a cumulatively considerable contribution to significant cumulative worsening of ambient odor impacts, nor affect a substantial number of people.	LS	None required.	LS

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Impact C- AQ-4: The proposed project would make a cumulatively considerable contribution to cumulative impacts to long term air pollution reduction goals of the BAAQMD's 2017 Clean Air Plan.	S	Implement **Mitigation Measures MM-AQ-1a and MM-AQ-1b**, above.	LSM
Biological Resources			
Impact BI-1: The proposed project would have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service; and the proposed project would not interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	S	**Mitigation Measure MM-BI-1a: Pre-construction Nesting Bird Surveys and Buffer Areas** Nesting birds and their nests shall be protected during construction by implementation of the following measures for each construction phase: a. To the extent feasible, conduct initial activities including, but not limited to, vegetation removal, tree trimming or removal, ground disturbance, building demolition, site grading, and other construction activities which may compromise breeding birds or the success of their nests outside of the nesting season (February 15 – September 15). b. If construction during the bird nesting season cannot be fully avoided, a qualified wildlife biologist* shall conduct a pre-construction nesting survey within 14 days prior to the start of construction or demolition at areas that have not been previously disturbed by project activities or after any construction breaks of 14 days or more. The survey shall be performed in suitable habitat within 100 feet of the applicable construction phase area in order to locate any active nests of passerine species and within 300 feet of the applicable construction phase area to locate any active raptor (birds of prey) nests. c. If active nests are located during the preconstruction nesting bird survey, a qualified biologist shall evaluate if the schedule of construction activities could affect the active nests and if so, the following measures would apply: i. If the qualified biologist determines that construction is not likely to affect the active nest, construction may proceed without restriction; however, a qualified biologist shall regularly monitor the nest at a frequency determined appropriate for the surrounding construction activity to confirm there is no adverse effect. Spot-check monitoring frequency would be determined on a nest-by-nest basis considering the particular construction activity, duration, proximity to the nest, and physical barriers which may screen activity from the nest. ii. If it is determined that construction may affect the active nest, the qualified biologist shall establish a no-disturbance buffer around the nest(s) and all project work shall halt within the buffer until a qualified biologist determines the nest is no longer in use. Typically, these buffer distances are 100 feet for passerines and 300 feet for raptors; however, the buffers may be adjusted if an obstruction, such as a building, is within line-of-sight between the nest and construction.	LSM

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
		iii. Modifying nest buffer distances, allowing certain construction activities within the buffer, and/or modifying construction methods in proximity to active nests shall be done at the discretion of the qualified biologist and in coordination with the Planning Division. Necessary actions to remove or relocate an active nest(s) shall be coordinated with the Planning Division in compliance with the California Fish and Game Code and other applicable laws. iv. Any work that must occur within established no-disturbance buffers around active nests shall be monitored by a qualified biologist. If adverse effects in response to project work within the buffer are observed and could compromise the nest, work within the no-disturbance buffer(s) shall halt until the nest occupants have fledged. v. Any birds that begin nesting within the project area and survey buffers amid construction activities are assumed to be habituated to construction-related or similar noise and disturbance levels, so exclusion zones around nests may be reduced or eliminated in these cases as determined by the qualified biologist in coordination with the Planning Division. Work may proceed around these active nests as long as the nests and their occupants are not directly impacted. d. In the event inactive nests are observed within or adjacent to the project site during construction at any time throughout the year, any removal or relocation of the inactive nests shall be at the discretion of the qualified biologist in coordination with the Planning Division and in compliance with the California Fish and Game Code and other applicable laws, as appropriate. Work may proceed around these inactive nests. * Typical experience requirements for a "qualified biologist" include a minimum of 4 years of academic training and professional experience in biological sciences and related resource management activities, and a minimum of 2 years of experience conducting surveys for each species that may be present within the project area. **Mitigation Measure MM-BI-1b: Lighting Measures to Reduce Impacts on Birds** During design, a qualified biologist experienced with bird strikes and building/lighting design issues shall identify lighting-related measures to minimize the effects of the building's lighting on birds. Such measures, which may include the following and/or other measures, shall be incorporated into the building's design and operation. • Use strobe or flashing lights in place of continuously burning lights for obstruction lighting. Use flashing white lights rather than continuous light, red light, or rotating beams. • Install shields onto light sources not necessary for air traffic to direct light towards the ground. • Extinguish all exterior lighting (i.e., rooftop floods, perimeter spots) not required for public safety.	

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
		• When interior or exterior lights must be left on at night, the operator of the buildings shall examine and adopt alternatives to bright, all-night, floor-wide lighting, which may include installing motion-sensitive lighting, using desk lamps and task lighting, reprogramming timers, or using lower-intensity lighting. • Windows or window treatments that reduce transmission of light out of the building shall be implemented to the extent feasible. **Mitigation Measure MM-BI-1c: Building Design Measures to Minimize Bird Strike Risk** During design, a qualified biologist experienced with bird strikes and building/lighting design issues shall identify measures related to the external appearance of the building to minimize the risk of bird strikes. Such measures, which may include the following and/or other measures, shall be incorporated into the building's design. • Minimize the extent of glazing. • Use low-reflective glass and/or patterned or fritted glass. • Use window films, mullions, blinds, or other internal or external features to "break up" reflective surfaces rather than having large, uninterrupted areas of surfaces that reflect, and thus to a bird may not appear noticeably different from, vegetation or the sky. **Mitigation Measure MM-BI-1d: Pre-construction Bat Survey for Roosting Bats and Roosting Habitat Abatement (Phase 2)** Prior to Phase 2 building demolition or tree removal activities, no more than 2 weeks prior to the start of any such demolition or removal activities, a qualified bat biologist shall conduct a pre-construction survey to identify if bats are roosting within vacant buildings and trees located on the Phase 2 project site. If no roosting sites or bats are observed during the survey, no further mitigation is necessary. If roosting bats or indications of bat roosts are observed within Phase 2 buildings or structures to be demolished, the qualified bat biologist shall be consulted to determine if bat roost replacement is required. If required, roost replacement shall be implemented before bat exclusion devices are installed on structures. Roost replacement, if required, will be implemented using suggested strategies such as those described in the Caltrans' report California Bat Mitigation Techniques, Solutions, and Effectiveness and will be based on species-specific roosting requirements. If bat exclusion is required, a wildlife removal specialist under the guidance of the qualified bat biologist shall conduct humane bat exclusion using methods such as one-way doors and installing physical barriers to entry. To reduce potential effects on roosting bats, exclusion shall be conducted between September 1 and March 31, but will not occur during long periods of inclement or cold weather (as determined by the qualified bat biologist) when prey are not available or bats are in torpor. For Phase 2 building demolition, eviction shall be initiated by either opening the roosting area to allow air flow through the roost cavity or installing a one-way exclusion device (e.g., one-way door) to evict the bats. Following bat	

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
		exclusion device installation, the qualified bat biologist shall conduct biweekly inspections of each excluded structure until the structure(s) is demolished to ensure that physical exclusion devices are maintained. If roosting bats or indications of bat roosts are observed within Phase 2 project trees to be removed, tree removal shall be conducted between September 1 and March 31, but will not occur during long periods of inclement or cold weather (as determined by the qualified bat biologist) when prey are not available or bats are in torpor, to avoid impacts on maternal bat roosts. During Phase 2 tree removal and where potential bat roosts were identified, the qualified bat biologist shall be present and tree removal shall begin with portions of the tree that do not provide suitable roost habitat (e.g., low limbs lacking forage). Trees shall be removed at a speed in coordination with the on-site qualified bat biologist that allows any roosting bats to vacate the tree.	
Impact BI-2: The proposed project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	LS	None required.	LS
Impact C-BI-1: The proposed project would result in a cumulatively considerable contribution to significant cumulative impacts on biological resources.	S	Implement **Mitigation Measures MM-BI-1a, MM-BI-1b, MM-BI-1c, and MM-BI-1d**, above.	LSM
Cultural Resources			
Impact CR-1: Construction activities for the proposed project would not cause a substantial adverse change in the significance of an historic architectural resource as defined in Section 15064.5.	NI	No Impact	NI
Impact CR-2: Construction activities for the proposed project would cause a substantial adverse change in the significance of archaeological resources, if such resources are present within the project site.	S	**Mitigation Measure MM-CR-2a: Cultural Resources Worker Environmental Awareness Program (WEAP)** A qualified archaeologist should conduct a WEAP training for all construction personnel on the project site prior to construction and ground-disturbing activities. The training should include basic information about the types of artifacts that might be encountered during construction activities, and procedures to follow in the event of a discovery. This training should be provided for any additional personnel added to the project even after the initiation of construction and ground disturbing activities. **Mitigation Measure MM-CR-2b: Cultural Resources Monitoring During Ground-Disturbing Activities** A qualified archaeologist shall monitor all ground-disturbing activities within native sediments within the project. This monitoring will continue for the duration of the project or until culturally sterile sediments are reached (e.g., bedrock). A qualified archaeologist may determine to	LSM

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
		decrease or increase monitoring efforts based on sediments observed, findings, or number of large ground disturbing machines in operation. **Mitigation Measure MM-CR-2c: Halt Construction Activity, Evaluate Find, and Implement Mitigation** In the event that previously unidentified paleontological, archaeological, historical, or tribal resources are uncovered during site preparation, excavation, or other construction activity, all such activity within 25 feet of the discovery shall cease until the resources have been evaluated by a qualified professional, and specific measures can be implemented to protect these resources in accordance with sections 21083.2 and 21084.1 of the California Public Resources Code. If the find is significant, the archaeologist will excavate the find in compliance with state law, keeping project delays to a minimum. If the qualified archaeologist determines the find is not significant then proper recordation and identification will ensue and the project will continue without delay.	
Impact CR-3: Construction activities for the proposed project would disturb human remains, including those interred outside of formal cemeteries, if such remains are present within the project site.	S	**Mitigation Measure MM-CR-3: Halt Construction Activity, Evaluate Remains, and Take Appropriate Action in Coordination with Native American Heritage Commission** In the event that human remains are uncovered during site preparation, excavation, or other construction activity, all such activity within 25 feet of the discovery shall cease until the remains have been evaluated by the County Coroner, and appropriate action taken in coordination with the NAHC, in accordance with section 7050.5 of the CHSC or, if the remains are Native American, section 5097.98 of the California Public Resources Code.	LSM
Impact CR-4: Construction activities for the proposed project would cause a substantial adverse change in the significance of a tribal cultural resource, as defined in Public Resources Code Section 21074, if such resources are present within the project site.	S	Implement **Mitigation Measures CR-2a, CR-2b, CR-2C and CR-3**, above.	LSM
Impact CR-5: Construction activities for the proposed project would not directly or indirectly destroy a unique paleontological resources or site or unique geologic feature.	NI	No impact	NI
Impact C-CR-1: The proposed project would make a cumulatively considerable contribution to a significant cumulative impact on historic or archaeological resources.	S	Implement **Mitigation Measures CR-2a, CR-2b, CR-2c, and CR-3**, above.	LSM
Impact C-CR-2: The proposed project would make a cumulatively considerable contribution to a significant cumulative impact on tribal cultural resources.	S	Implement **Mitigation Measures CR-2a, CR-2b, CR-2c, and CR-3**, above.	LSM

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Geology and Soils			
Impact GE-1: The proposed project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, liquefaction, or landslides, with implementation of regulatory compliance measures.	LS	None required.	LS
Impact GE-2: The proposed project would not result in substantial soil erosion or the loss of topsoil.	LS	None required.	LS
Impact GE-3: The proposed project would be located on expansive soils but would not create substantial risk to life or property with implementation of standard regulatory measures.	LS	None required.	LS
Impact GE-4: The proposed project would be located on a geologic unit or soil that is unstable, but would not result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse with implementation of standard regulatory measures.	LS	None required.	LS
Impact C-GE-1: The proposed project would not result in a cumulatively considerable contribution to a significant adverse cumulative impact on geology and soils.	LS	None required.	LS
Greenhouse Gas Emissions			
Impact GHG-1: The proposed project would result in GHG emissions; however, the emissions from the project would be below the applicable thresholds of significance.	LS	None required.	LS
Impact GHG-2: The proposed project's contribution to significant cumulative impacts related to GHGs would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.	LS	None required.	LS

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Hazards and Hazardous Materials			
Impact HZ-1: The proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	LS	None required.	LS
Impact HZ-2: The proposed project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	LS	None required.	LS
Impact HZ-3: The proposed project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LS	None required.	LS
Impact HZ-4: The proposed project is not located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would not create a significant hazard to the public or the environment with compliance of applicable regulations.	LS	None required.	LS
Impact HZ-5: The proposed project is located within an airport land use plan, but would not result in a safety hazard for people residing or working in the project area.	LS	None required.	LS
Impact HZ-6: The proposed project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	NI	No Impact	NI
Impact C-HZ-1: The proposed project would not result in a cumulatively considerable contribution to a significant adverse cumulative impact related to hazards and hazardous materials.	LS	None required.	LS

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Hydrology and Water Quality			
Impact HY-1: Construction activities and operation of the proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality.	LS	None required.	LS
Impact HY-2: The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.	LS	None required.	LS
Impact HY-3: Construction of the proposed project would not substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on or off site, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site.	LS	None required.	LS
Impact HY-4: The proposed project would not create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.	LS	None required.	LS
Impact HY-5: Operation of the proposed project would not place structures within a future 100-year flood zone that would impede or redirect flood flows, nor would it expose of people or structures to a significant risk or loss, injury, or death involving flooding.	LS	None required.	LS
Impact HY-6: The proposed project would not expose people or structures to substantial risk of loss, injury, or death due to inundation by seiche, tsunami, or mudflow.	LS	None required.	LS
Impact C-HY-1: The proposed project would not make a cumulatively considerable contribution to significant cumulative impacts related to hydrology and water quality.	LS	None required.	LS

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Land Use and Planning			
Impact LU-1: The proposed project would not physically divide an established community.	LS	None required.	LS
Impact LU-2: The proposed project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect.	LS	None required.	LS
Impact C-LU-1: The proposed project would not make a cumulatively considerable contribution to a significant cumulative impact on land use and planning.	LS	None required.	LS
Mineral Resources			
Impact ME-1: The proposed project would not have a significant adverse impact on the availability of a known mineral resource and/or a locally important mineral resource recovery site.	NI	No Impact	NI
Impact C-ME-1: The proposed project would not result in a cumulatively considerable contribution to a significant adverse cumulative impact on mineral and energy resources.	LS	None required.	LS
Noise			
Impact NO-1: Construction activities for the proposed project would not generate noise that would substantially increase temporary noise levels at uses in the vicinity of the site.	LS	**Improvement Measure IM-NO-1: Construction Noise Minimization and Notification** In order to minimize disruption and potential annoyance during project construction, the project sponsor shall implement the following construction minimization and notifications measures: • All construction equipment shall be equipped with mufflers and sound control devices (e.g., intake silencers and noise shrouds) that are in good condition and appropriate for the equipment. • Maintain all construction equipment to minimize noise emissions. • Stationary equipment shall be located on the site to maintain the greatest possible distance to the existing office buildings, where feasible. • Unnecessary idling of internal combustion engines should be strictly prohibited.	LS

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
		• Provide advance notification to surrounding land uses disclosing the construction schedule, including the various types of activities that would be occurring throughout the duration of the construction period. • The construction contractor shall provide the name and telephone number an on-site construction liaison. If construction noise is found to be intrusive to the community (complaints are received), the construction liaison shall investigate the source of the noise and require that reasonable measures be implemented to correct the problem. • Schedule high noise-producing activities during times when they would be least likely to interfere with the noise sensitive activities of the neighboring land uses, when possible.	
Impact NO-2: Construction of the proposed project would create a substantial temporary increase in groundborne vibration levels in the project vicinity above existing conditions	S	**Mitigation Measure MM-NO-2: Groundborne Vibration Minimization and Avoidance** Prior to issuance of a site permit, the project sponsor shall identify areas of potential building damage from construction vibration and determine the distance at which construction equipment would be used during implementation of the proposed project. For any equipment use that would be located near enough to a building to exceed the Caltrans/FTA building damage threshold of 0.5 in/sec, the project sponsor shall prepare a mitigation plan that provides a procedure for limiting vibration on potentially affected structures based on an assessment of each structure's ability to withstand the loads and displacements due to construction vibrations. The project sponsor shall also prepare and implement a compliance monitoring program to ensure construction vibrations near buildings do not exceed the threshold of 0.5 in/sec, and identify site-specific control measures in consideration of equipment location and processes including, but not limited to, the following examples. • Operate earth-moving equipment on the work site as far away from existing buildings and human-occupied sites as possible. • Avoid simultaneous operation of vibration-causing construction equipment for demolition, earth-moving, or ground-impacting activities within approximately 50 feet existing buildings, where possible. • Avoid operation of vibratory rollers and packers within approximately 50 feet of existing buildings, where possible.	LSM
Impact NO-3: Operation of the proposed project mechanical equipment would create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions.	S	**Mitigation Measure MM-NO-3: Mechanical Equipment Noise Requirements** Analysis of noise from the project's mechanical equipment shall be conducted to determine if the equipment will exceed the maximum permissible L50 sound levels 60 dB between 10 p.m. and 7 a.m. and 65 dB between 7 a.m. and 10 p.m. when measured at any receiving property as determined by Table 8.32.030 of the Municipal Code forC-1, P-C, Gateway, and Oyster Point Marina specific plan districts and what, if any, noise control measures must be included in the design to meet the City's requirements. Typical noise control measures include barriers, enclosures, silencers and acoustical louvers at vent openings. Prior to issuance of any building permits, the project applicant shall submit a report showing that noise levels calculated for project mechanical equipment will be no greater than maximum permissible sound levels provided in Municipal Code Chapter 8.32 and Table 8.32.030 on receiving properties.	LSM

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Impact NO-4: Traffic volumes generated by operation of the proposed project would not create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions.	LS	None required.	LS
Impact C-NO-1: Construction of the proposed project would not make a cumulatively considerable contribution to significant cumulative construction noise impacts (i.e. that would substantially increase temporary noise levels at uses in the vicinity of the site).	LS	None required.	LS
Impact C-NO-2: Construction of the proposed project would make a cumulatively considerable contribution to significant cumulative groundborne vibration impacts (i.e., that would substantially increase temporary vibration at uses in the vicinity of the site).	S	Implement **Mitigation Measures MM-NO-2** above.	LSM
Impact C-NO-3: Operation of the proposed project's mechanical equipment would not make a cumulatively considerable contribution to significant cumulative noise impacts (i.e., noise that would create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions).	LS	None required.	LS
Impact C-NO-4: Traffic volumes generated by operation of the proposed project would not make a cumulatively considerable contribution to significant cumulative traffic noise impacts (i.e., traffic noise that would create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions).	LS	None required.	LS
Population and Housing			
Impact PH-1: The proposed project would not induce substantial population growth in an area, either directly or indirectly.	LS	None required.	LS
Impact PH-2: The proposed project would not displace housing or people, and would not necessitate the construction of replacement housing elsewhere.	LS	None required.	LS

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Impact C-PH-1: The proposed project would not result in a cumulatively considerable contribution to significant cumulative population and housing impacts.	LS	None required.	LS
Public Services			
Impact PS-1: Operation of the proposed project would not require the provision of new or physically altered fire and emergency medical services in order to maintain acceptable service ratios, response times, or other performance objectives.	LS	None required.	LS
Impact PS-2: Operation of the proposed project would not require the provision of new or physically altered police protection services in order to maintain acceptable service ratios, response times, or other performance objectives.	LS	None required.	LS
Impact PS-3: Operation of the proposed project would not require the provision of new or physically altered schools or other public facilities in order to maintain acceptable service ratios, response times, or other performance objectives.	LS	None required.	LS
Impact C-PS-1: Operation of the proposed project would not require the provision of new or physically altered public services in order to maintain acceptable service ratios, response times, or other performance objectives.	LS	None required.	LS
Recreation			
Impact RE-1: The proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS	None required.	LS
Impact RE-2: The proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS	None required.	LS

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Impact C-RE-1: The proposed project, would not result in a cumulatively considerable contribution to significant cumulative impacts on recreation.	LS	None required.	LS
Transportation and Traffic			
Impact TR-1: The proposed project (Phase 1 or buildout) would cause the intersection of Littlefield Avenue and East Grand Avenue to exceed LOS D operations during the AM peak hour, and the project (Phase 1 or buildout) would contribute more than 2 percent of the total traffic through the intersection.	S	**Mitigation Measure MM-TR-1: Add a Northbound Right-Turn Lane at the Intersection of Littlefield Avenue and East Grand Avenue.** The City of South San Francisco shall restripe the northbound approach on Littlefield Avenue to provide a separate right-turn lane in addition to the existing left-through-right lane. The additional turn lane may require removal of on-street parking and/or acquisition of right-of-way along Littlefield Avenue approaching East Grand Avenue. This improvement is included in the East of 101 Area Traffic Impact Fee. Therefore, the project's payment of East of 101 Traffic Impact Fees will represent the project's required contribution towards this mitigation.	LSM
Impact TR-2: The proposed project (Phase 1 or buildout) would cause the intersection of Allerton Avenue and East Grand Avenue to exceed LOS D operations during the PM peak hour, and the project would contribute more than 2 percent of the total traffic through the intersection.	S	No mitigation feasible.	SU
Impact TR-3: The proposed project (Phase 1 or buildout) would contribute more than 2 percent of the total traffic through the intersection of Gateway Boulevard/South Airport Boulevard/Mitchell Avenue, which operates at LOS E during the PM peak hour without the project.	S	**Mitigation Measure MM-TR-3: Widen and Restripe the Southbound, Eastbound and Westbound Approaches at the Intersection of Gateway Boulevard/South Airport Boulevard/Mitchell Avenue.** The City of South San Francisco shall widen the southbound approach on Gateway Boulevard to provide a second right-turn lane, widen the eastbound approach on South Airport Boulevard to provide a second left-turn lane and replace the existing shared through-right lane with one through lane and a second right-turn lane, and widen the westbound approach on Mitchell Avenue to replace the existing shared through-right lane with three through lanes and a right-turn lane. This improvement is included in the East of 101 Area Traffic Impact Fee. Therefore, the project's payment of East of 101 Traffic Impact Fees will represent the project's required contribution towards this mitigation.	LSM
Impact TR-4: The proposed project (Phase 1 or buildout) would add less than 1 percent of traffic to the right-turn lane from the southbound U.S. 101 flyover off-ramp at Gateway Boulevard/Oyster Point Boulevard where the 95th percentile queue currently exceeds the ramp's storage length in the AM peak hour.	LS	None required.	LS

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Impact TR-5: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic to the westbound left-turn movement on East Grand Avenue at Gateway Boulevard where the 95th percentile queue currently exceeds the available storage length during the AM and PM peak hours without the project.	S	**Mitigation Measure MM-TR-5: Adjust Signal Timing at Gateway Boulevard and East Grand Avenue.** The City of South San Francisco shall adjust signal timing at the intersection of Gateway Boulevard with East Grand Avenue to reduce the 95th percentile queue length in the westbound left-turn lane by the amount increased by the project. Improvements at this intersection are included in the East of 101 Area Traffic Impact Fee. Therefore, the project's payment of East of 101 Traffic Impact Fees will represent the project's required contribution towards this mitigation.	LSM
Impact TR-6: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic to the westbound left turn movement on Airport Boulevard at San Mateo Avenue/Produce Avenue where the 95th percentile queue currently exceeds the available storage length during the PM peak hour without the project.	S	**Mitigation Measure MM-TR-6: Adjust Signal Timing at the intersection of Airport Boulevard/San Mateo Avenue/Produce Avenue.** The City of South San Francisco shall adjust signal timing at the intersection of Airport Boulevard and San Mateo Avenue/Produce Avenue to reduce the 95th percentile queue length in the westbound left-turn lane by the amount increased by the project. Improvements at this intersection are included in the East of 101 Area Traffic Impact Fee. Therefore, the project's payment of East of 101 Traffic Impact Fees will represent the project's required contribution towards this mitigation.	LSM
Impact TR-7: The proposed project (Phase 1 or buildout) would cause the existing 95th percentile queue to exceed the available storage capacity in the AM peak hour at the southbound left-turn lane on Airport Boulevard at Grand Avenue.	S	**Mitigation Measure MM-TR-7: Adjust Signal Timing at Airport Boulevard and Grand Avenue.** The City of South San Francisco shall adjust signal timing at the intersection of Airport Boulevard with Grand Avenue to reduce the 95th percentile queue length in the southbound left-turn lane to be within the available 300 feet of storage length. Improvements at this intersection are included in the East of 101 Area Traffic Impact Fee. Therefore, the project's payment of East of 101 Traffic Impact Fees will represent the project's required contribution towards this mitigation.	LSM
Impact TR-8: The proposed project (Phase 1 or buildout) would add traffic to freeway ramps, but not in numbers that would exceed the capacity of the freeway ramps.	LS	None required.	LS
Impact TR-9: The proposed project (Phase 1 or buildout) would generate more than 100 peak hour vehicle trips, exceeding the threshold in the San Mateo County CMP.	S	**Mitigation Measure MM-TR-9: Implement Transportation Demand Management measures listed in San Mateo County Congestion Management Program Appendix I.** The project shall implement a TDM program consistent with the City's TDM ordinance and using trip credits in compliance with C/CAG's CMP sufficient to account for all net new peak hour trips.	LSM
Impact TR-10: The proposed project (Phase 1 or buildout) would not add more than 1 percent of total traffic to any study segment of U.S. 101 during the AM or PM peak hours, which would operate at LOS F without the project.	LS	None required.	LS

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Impact TR-11: The proposed project (Phase 1 or buildout) would not introduce hazardous design features within the project site or on the adjacent streets.	LS	None required.	LS
Impact TR-12: The proposed project (Phase 1 or buildout) would provide adequate emergency access.	LS	None required.	LS
Impact TR-13: The proposed project (Phase 1 and buildout) may exceed the capacity of the existing shuttle services serving the East of 101 Area.	S	**Mitigation Measure MM-TR-13: Expand local shuttle services.** The project sponsor shall participate in Commute.org's Employer/Property Manager Consortium and contribute a fair share of funding as required to ensure that shuttle buses serving the project site can accommodate peak hour transit passengers added by the proposed project. If the Commute.org shuttles do not adequately meet commuter needs or ridership exceeds capacity as a result of the proposed project, the project sponsor shall explore options to enhance the Commute.org shuttle program or augment shuttle services with other shuttle providers or mobility solutions.	LSM
Impact TR-14: The proposed project (Phase 1 or buildout) would add transit riders at bus stops without amenities.	S	**Mitigation Measure MM-TR-14: Provide shuttle stop amenities for Phase 2.** For Phase 2 buildout, the project sponsor shall coordinate with shuttle providers to install amenities for transit passengers including seating, shelters and signage at shuttle bus stops, as well as transit information for employees in the new and expanded structures. The project sponsor shall contribute its fair share to the cost of these amenities.	LSM
Impact TR-15: The proposed project (Phase 1 or buildout) would add pedestrians and bicyclists to local street segments, but not in numbers that would exceed the capacity of sidewalks or streets.	LS	None required.	LS
Impact TR-16: The proposed project (Phase 1 or buildout) would add VMT to the regional transportation system, but the VMT per employee would be less than a threshold of 15 percent below the regional average, with the region defined as employees working in San Mateo County.	LS	None required.	LS
Impact C-TR-1: The proposed project (Phase 1 or buildout) would not contribute considerably to significant cumulative traffic impacts in the AM and PM peak hours at the intersection of Gateway Boulevard/Oyster Point Boulevard/U.S. 101 southbound Off-Ramp Flyover.	LS	None required.	LS

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Impact C-TR-2: Phase 1 of the proposed project would not contribute considerably to significant cumulative traffic impacts in the AM or PM peak hour at the intersection of Airport Boulevard/Grand Avenue.	LS	None required.	LS
Impact C-TR-3: Buildout of the proposed project (Phases 1 & 2) would contribute considerably to the significant cumulative impact at the intersection of Airport Boulevard and Grand Avenue during the AM peak hour.	S	**Mitigation Measure C-TR-3: Add a Third Eastbound Lane on Grand Avenue at Airport Boulevard.** The City of South San Francisco shall widen the eastbound approach on Grand Avenue to provide a third eastbound lane, with the approach striped as a shared left-through lane, a through lane and a right-turn lane. Measure not included in existing East of 101 Traffic Impact Fee (TIF) and Capital Improvement Program (CIP). No City mechanism for funding and City cannot guarantee that this measure will be implemented. Thus, the measure would not eliminate the significant cumulative impact.	SU
Impact C-TR-4: Buildout of the proposed project (Phases 1 & 2) would contribute considerably to a significant cumulative impact the intersection of Dubuque Avenue and Grand Avenue during the PM peak hour.	S	**Mitigation Measure MM-C-TR-4: Adjust Signal Timing for Pedestrian Crossings at the intersection of Dubuque Avenue and Grand Avenue.** The City of South San Francisco shall adjust existing signal timings for pedestrian crossings for cumulative traffic demands to reduce vehicle delay. Measure not included in existing TIF and CIP. No City mechanism for funding and City cannot guarantee that this measure will be implemented.	SU
Impact C-TR-5: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact the intersection of East Grand Avenue and Grand Avenue Overcrossing during the PM peak hour.	S	**Mitigation Measure MM-C-TR-5: Add a Second Northbound Left-Turn Lane to the northbound approach on East Grand Avenue at the Grand Avenue Overcrossing.** The City of South San Francisco shall restripe the northbound approach on East Grand Avenue to provide a second left-turn lane, and implement curb and traffic signal modifications as required. Measure not included in existing TIF and CIP. No City mechanism for funding and City cannot guarantee that this measure will be implemented.	SU
Impact C-TR-6: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Gateway Boulevard and East Grand Avenue during the PM peak hour.	S	**Mitigation Measure MM-C-TR-6: Add a Westbound Right-Turn Lane and a Northbound Left-Turn Lane at the intersection of Gateway Boulevard and East Grand Avenue.** The City of South San Francisco shall restripe or widen the westbound approach on East Grand Avenue to provide a separate right-turn lane in addition to the existing three through lanes and planned two left-turn lanes. Widen the northbound approach on Gateway Boulevard to provide a second left-turn lane.	SU

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
		Measure not included in existing TIF and CIP. No City mechanism for funding and City cannot guarantee that this measure will be implemented.	
Impact C-TR-7: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Harbor Way/Forbes Boulevard and East Grand Avenue in both the AM and PM peak hours.	LS	**Mitigation Measure MM-C-TR-7: Add a Fourth Westbound Through Lane on East Grand Avenue and Restripe Northbound and Southbound Approaches to the Intersection of Harbor Way/Forbes Boulevard/East Grand Avenue.** The City of South San Francisco shall widen the westbound approach on East Grand Avenue at Harbor Way/Forbes Boulevard to provide a fourth through lane. Restripe southbound Forbes Boulevard from the planned improvements to provide one left-turn lane, two through lanes and one right-turn lane. Restripe northbound Harbor Boulevard from the planned improvements to provide two left-turn lanes, one through lane and one right-turn lane, with signal modifications as required. Measure not included in existing TIF and CIP. No City mechanism for funding and City cannot guarantee that this measure will be implemented.	SU
Impact C-TR-8: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Littlefield Avenue and East Grand Avenue in the AM peak hour.	S	No mitigation feasible.	SU
Impact C-TR-9: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Allerton Avenue and East Grand Avenue in the PM peak hour.	S	**No mitigation feasible.**	SU
Impact C-TR-10: The proposed project at buildout (Phase 1 & 2) would contribute considerably to a significant cumulative impact at the intersection of Airport Boulevard/Produce Avenue/San Mateo Avenue in the PM peak hour.	S	**Mitigation Measure MM-C-TR-10: Reconstruct the Southbound Approach on Airport Boulevard at San Mateo Avenue.** The City of South San Francisco shall reconstruct southbound Airport Boulevard at San Mateo Avenue to convert the right-turn lane to a shared through-right lane, so that the southbound approach provides one left-turn lane, two through lanes and a shared through-right lane, and implement curb and traffic signal modifications as required. Measure not included in existing TIF and CIP. No City mechanism for funding and City cannot guarantee that this measure will be implemented.	SU
Impact C-TR-11: The proposed project at buildout (Phase 1 & 2) would contribute considerably to a significant cumulative impact at the intersection of Gateway Boulevard/South Airport Boulevard/Mitchell Avenue in the PM peak hour.	S	No mitigation feasible.	SU

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Impact C-TR-12: The proposed project at buildout (Phase 1 & 2) would contribute considerably to a significant cumulative impact at the freeway ramp intersection of South Airport Boulevard and U.S. 101 Northbound Hook Ramps/Wondercolor Lane in the AM peak hour.	S	**No mitigation feasible.**	SU
Impact C-TR-13: The proposed project at buildout (Phase 1 & 2) would contribute considerably to a significant cumulative impact at the intersection of South Airport Boulevard and Utah Avenue in the AM peak hour.	S	**Mitigation Measure MM-C-TR-13: Restripe the Northbound Approach on South Airport Boulevard at Utah Avenue.** The City of South San Francisco shall restripe northbound South Airport Boulevard at Utah Avenue to convert the rightmost through lane to a shared through-right lane, so that the northbound approach provides one left-turn lane, one through lane, one shared through-right lane and one right-turn lane, and implement traffic signal modifications as required. Measure not included in existing TIF and CIP. No City mechanism for funding and City cannot guarantee that this measure will be implemented.	SU
Impact C-TR-14: The proposed project (Phase 1 or buildout) would add less than 1 percent of traffic to the right-turn movement from the southbound U.S. 101 off-ramp at Oyster Point Boulevard/Gateway Boulevard where cumulative queues would exceed storage length without the project in the AM peak hour, and therefore would not contribute considerably to a significant cumulative traffic impact.	LS	None required.	LS
Impact C-TR-15: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impacts on the southbound left turn movement in the AM and PM peak hours and the westbound right-turn movement in the PM peak hour at the intersection of Airport Boulevard and Grand Avenue where the 95th percentile queues with future cumulative growth in 2040 would exceed the available storage length without the project.	S	**Mitigation Measure MM-C-TR-15: At the intersection of Airport Boulevard and Grand Avenue, widen Grand Avenue to provide a third eastbound approach lane at the intersection and adjust signal timing.** The City of South San Francisco shall widen Grand Avenue to provide a third lane on the eastbound approach (Mitigation Measure MM-C-TR-3) and adjust signal timing at the intersection of Airport Boulevard and Grand Avenue to reduce the 95th percentile queue length in the southbound left-turn lane and westbound right-turn lane. Measure not included in existing TIF and CIP. No City mechanism for funding and City cannot guarantee that this measure will be implemented.	SU
Impact C-TR-16: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute	S	**Mitigation Measure MM-C-TR-16: Add a Westbound Right-Turn Lane and a Northbound Left-Turn Lane and Adjust Signal Timing at the Intersection of Gateway Boulevard and East Grand Avenue.**	SU

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
considerably to the significant cumulative impacts on the eastbound and westbound through movements in the PM peak hour and westbound left turn movement in the AM and PM peak hours on East Grand Avenue at Gateway Boulevard where the 95th percentile queues would exceed the available storage lengths during these peak hours without the proposed project.		The City of South San Francisco shall add a westbound right-turn lane on East Grand Avenue and a northbound left-turn lane on Gateway Boulevard, and adjust signal timing at the intersection of Gateway Boulevard with East Grand Avenue to reduce the 95th percentile queue length in the eastbound through lane and westbound left-turn lane. Measure not included in existing TIF and CIP. No City mechanism for funding and City cannot guarantee that this measure will be implemented.	
Impact C-TR-17: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the westbound left turn movement on Airport Boulevard at the intersection of Airport Boulevard/Produce Avenue where the 95th percentile queue would exceed the available storage length during the AM and PM peak hours in 2040 without the proposed project.	S	**Mitigation Measure MM-C-TR-17: Adjust Signal Timing at the Intersection of Airport Boulevard/Produce Avenue and San Mateo Avenue/Airport Boulevard.** The City of South San Francisco shall reconstruct the southbound approach on Airport Boulevard at San Mateo Avenue to convert the right-turn lane to a shared through-right lane, so that the southbound approach provides one left-turn lane, two through lanes and a shared through-right lane, and implement curb and traffic signal modifications and adjust signal timing at the intersection of Airport Boulevard and San Mateo Avenue to reduce the 95th percentile queue length in the westbound left-turn lane. Measure not included in existing TIF and CIP. No City mechanism for funding and City cannot guarantee that this measure will be implemented.	SU
Impact C-TR-18: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the eastbound left turn movement on the northbound U.S. 101 off-ramp at South Airport Boulevard/Wondercolor Lane where the 95th percentile queue would exceed the available storage length during the AM peak hour in 2040 without the proposed project.	S	**Mitigation Measure MM-C-TR-18: Adjust Signal Timing at the Intersection of South Airport Boulevard and U.S. 101 Hook Ramps at Wondercolor Lane.** The City of South San Francisco shall coordinate with Caltrans to adjust signal timing at the intersection of South Airport Boulevard and the U.S. 101 hook ramps at Wondercolor Lane. Measure not included in existing TIF and CIP. No City mechanism for funding and City cannot guarantee that this measure will be implemented.	SU
Impact C-TR-19: The freeway segments serving the proposed project site would operate at unacceptable LOS F in the future with forecast development in 2040, resulting in a significant cumulative impact. The proposed project at buildout (Phases 1 & 2) would add more than 1 percent of total traffic to two freeway segments during the PM peak hour which would operate at LOS F under cumulative conditions without the project.	S	No mitigation feasible.	SU
Impact C-TR-20: The proposed project (Phase 1 or buildout) would add more than 1 percent	S	No mitigation feasible.	SU

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
of total traffic and therefore would contribute considerably to the significant cumulative impact on the northbound U.S. 101 off-ramp at South Airport Boulevard/Wondercolor Lane where the volume would exceed the available capacity during the AM peak hour in 2040 without the proposed project.			
Impact C-TR-21: The proposed project (Phase 1 or buildout) would add traffic volumes which would cause total traffic to exceed capacity and therefore would contribute considerably to the significant cumulative impact on the southbound U.S. 101 on-ramp from Produce Avenue where the volume would not exceed the available capacity during the PM peak hour in 2040 without the proposed project.	S	No mitigation feasible.	SU
Utilities and Service Systems			
Impact UT-1: Implementation of the proposed project would not exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board; would not exceed the capacity of the wastewater treatment provider that would serve the project site; and would not require the construction of new, or expansion of existing, wastewater treatment facilities, the construction of which could cause significant effects.	LS	None required.	LS
Impact UT-2: Implementation of the proposed project would not require the construction of new, or expansion of existing, stormwater drainage facilities, the construction of which could cause significant environmental effects.	LS	None required.	LS
Impact UT-3: Cal Water has sufficient water supply available to serve the project site from existing entitlements and resources and would not require new or expanded water supply resources or entitlements.	LS	None required.	LS
Impact UT-4: The proposed project would be served by a landfill with sufficient permitted capacity and would comply with all applicable statutes and regulations related to solid waste.	LS	None required.	LS

Potential Environmental Impacts	Level of Significance before Mitigation	Recommended Mitigation Measures and Improvement Measures	Level of Significance after Mitigation
Impact C-UT-1: The proposed project would not result in a cumulatively considerable contribution to significant cumulative impacts on utilities and service systems.	LS	None required.	LS

Note: Legend: NI = No Impact; LS = Less than Significant; LSM = less than significant with mitigation; S = Significant; SU = Significant and unavoidable impact; SUM = Significant and unavoidable impact with mitigation.

Source: SWCA (2018)

2.2.1 Alternatives

As described in Chapter 5, two alternatives are evaluated in this EIR: the No Project Alternative and the Reduced Development Alternative. As also described in Chapter 5, the EIR also evaluated four alternatives that were considered by the City but rejected as infeasible during the scoping process. The alternatives that were considered, but ultimately rejected, included an off-site alternative, an alternative design option, a further reduced density alternative, and an alternative land use alternative.

ALTERNATIVE A: NO PROJECT

Under Alternative A: No Project Alternative, the existing land uses and site conditions at the project site would not change. The existing seven buildings on the project site would remain along with existing ingress and egress points and surface parking. The project site would not be rezoned to Business Technology Park (BTP) and the FAR would remain 0.4 or 1.0 for the various parcels. The No Project Alternative would not preclude potential future development of the project site with a range of land uses that are permitted at the project site.

None of the impacts associated with the proposed project, as described in Chapter 4, would occur. However, development and growth would continue within the vicinity of the project site as reasonably foreseeable future projects are approved, constructed, and occupied. These projects could contribute to cumulative impacts in the vicinity, but under the No Project Alternative, land use activity on the project site would not contribute to these cumulative impacts beyond existing levels.

Alternative A: No Project Alternative –would not meet any of the basic project objectives.

ALTERNATIVE B: REDUCED DEVELOPMENT ALTERNATIVE

Alternative B: Reduced Development Alternative would comply with the existing City zoning code and regulations established for this site. The existing light industrial uses and associated parking on seven parcels (101, 151, and 201 Haskins Way; 410 and 430 East Grand Avenue; 451 East Jamie Court; and one parcel with no address [APN 015-102-290]) would be removed, new office/R&D use would be constructed on those seven parcels, and the existing office/R&D use on one parcel (400-450 East Jamie Court) would be expanded. The 201 Haskins Way Building would be constructed (Phase 1), as would the conceptual East Grand Building development at project buildout (Phase 2), with reduced density and lower heights (three stories, as compared to five stories under the proposed project conceptual Phase 2 development plan). The Reduced Development Alternative would result in the construction of approximately 193,459 square feet of office/R&D use during Phase 1 development, and approximately 231,418 square feet during Phase 2 development.

The Reduced Development Alternative would reduce impacts related to vehicle trips and, to some degree, construction-period impacts, such as air quality emissions, traffic, and noise. The Reduced Development Alternative would also avoid significant and unavoidable impacts due to the reduced number of vehicle trips for Impact C-TR-3, Impact C-TR-5 (Phase 1 only), Impact C-TR-10 (buildout), Impact C-TR-11 (buildout), Impact C-TR-12 (buildout), Impact C-TR-13 (buildout), Impact C-TR-19 (buildout), and

Impact C-TR-20 (Phase 1 only). However, the Reduced Development Alternative would not result in the avoidance or lessening of any other significant and unavoidable impacts to a less-than-significant level (Impacts TR-2, C-TR-4, C-TR-5 [buildout only], C-TR-6, C-TR-7, C-TR-8, C-TR-9, C-TR-15, C-TR-16, C-TR-17, C-TR-18, C-TR-20 [buildout only], and C-TR-21).

Alternative B: Reduced Development Alternative would only attain the project objectives to a lesser or partial extent.

2.2.2 Environmentally Superior Alternative

CEQA Guidelines Section 15126.6(e)(2) requires identification of an environmentally superior alternative (the alternative that has the fewest significant environmental impacts) from among the other alternatives evaluated if the proposed project has significant impacts that cannot be mitigated to a less-than-significant level. If Alternative A, the No Project Alternative, is found to be the environmentally superior alternative, the EIR must identify an environmentally superior alternative among the other alternatives.

Alternative A, the No Project Alternative, would not result in any change to existing environmental conditions. Alternative B, the Reduced Development Alternative, would result in an overall reduction of impacts identified for the proposed project. Alternative B would have less square footage (by 218,086 square feet, or 32 percent less) of office/R&D land use than the proposed project. As such, it would result in lower trip generation than the proposed project and reduced impacts related to transportation and circulation. Alternative B's buildout would result in one project-level traffic impact and this impact would remain significant and unavoidable. The proposed project's contribution to 12 cumulative traffic impacts would remain cumulatively considerable under Alternative B and these impacts would remain significant and unavoidable. However, due to the reduced number of vehicle trips, Alternative B's contribution to eight significant cumulative impacts, that would be cumulatively considerable under the proposed project, would be reduced to a less-than-significant level under Alternative B. A detailed discussion of the traffic impact analysis and applicable mitigation measures for Alternative B, the Reduced Development Alternative, is provided in Section 5.3.2 under "Transportation and Circulation".

2.2.3 Areas of Known Controversy and Issues to Be Resolved

The City of South San Francisco Planning Division of the Economic and Community Development Department (Planning Division), issued a Notice of Preparation (NOP) of an EIR for the proposed 201 Haskins Way Project on April 18, 2018, in compliance with Title 14, Sections 15082(a), 15103, and 15375 of the California Code of Regulations. The NOP review period commenced on April 18, 2018, and concluded on May 18, 2018, and a scoping meeting was held on May 3, 2018. No commenters spoke at the meeting. The Planning Division received four comment letters from interested parties during the public review and comment period. The Planning Division has considered the comments made by the public in preparation of the Draft EIR for the proposed project. Comments on the NOP raised the following issues:

Transportation and Circulation

- Compliance with the San Mateo County Congestion Management Program (CMP) Traffic Impact Analysis (TIA) Policy and Land Use Guidelines as provided by the City/County Association of Governments (C/CAG), including preparation of a forecast and discussion of the expected impacts of the project on the Congestion Management Program roadway network, the immediate project area, and other areas.
- Project-related traffic generation and mitigation measures should the project generate a net of 100 or more peak-hour trips on the CMP roadway network. Inclusion of potential mitigation strategies documented in the C/CAG Land Use Guidelines policy such as reducing project scope, building roadway and/or transit improvements, collecting traffic mitigation fees, and requiring project sponsors to implement Transportation Demand Management (TDM) programs.
- C/CAG consultation regarding the scope and parameters of the analysis, and C/CAG review and comment on the TIA, EIR and TDM plan.
- Project-related construction traffic impacts on the existing 451 East Jamie Court uses, and mitigation measures to minimize construction traffic during construction of the 201 Haskins Way Building and parking garage.
- Traffic and circulation impacts on Haskins Way, East Grand Avenue, Littlefield Avenue, and the northbound U.S. 101 on-ramp from East Grand Avenue during p.m. peak hours as a result of operation of the project, and mitigation measures to improve traffic and circulation.
- Analysis of implementing a TDM program as mitigation for vehicle miles traveled (VMT) impacts, including design features, programs, and monitoring.
- Cumulative regional transportation impacts and mitigation through fair share contributions toward multi-modal and regional transit improvements.
- Project-related impacts on transit, pedestrians, bicycles, and disabled travelers, including analysis of mitigation for increased VMT, and design features that encourage the use of alternative transportation modes including transit and shuttles, such as improvements to shelters or benches, as well as pedestrian and bicycle design features.

Project Description

- Confirmation of where the project would occur within the Bay or the San Francisco Bay Conservation and Development Commission (BCDC) 100-foot shoreline jurisdictional band.
- Confirmation of the proposed public access to the Bay Trail and Bay shoreline per existing BCDC permits on-site and BCDC public access requirements.

Greenhouse Gas Emissions

- Analysis of implementing a TDM program as mitigation for greenhouse gas (GHG) emission impacts, including design features, programs, and monitoring.

Noise

- Project-related construction noise impacts on the existing 451 East Jamie Court uses and mitigation measures to minimize construction noise during construction of the 201 Haskins Way Building and parking garage.

Land Use

- Project-related impacts on the continuation of existing business operations of parcels within the project site, including future property and building maintenance under the proposed rezoning.
- Project-related impacts on the potential for future development of parcels in the Phase 2 area as separate and individual parcels in compliance with the proposed rezoning, and the implications of development alternatives for each parcel not currently owned by the developer.

Recreation

- Project-related impacts on shoreline access due to an increased on-site worker population, and whether the proposed public access areas would be adequate to accommodate these additional users, in recognition of existing BCDC permits and BCDC public access requirements.

Aesthetics

- Project-related impacts on scenic views of the Bay in consideration of the height of the proposed buildings and parking structure.
- Project-related shadow on the existing 451 East Jamie Court Building and existing and planned roof solar photovoltaic systems.
- Project-related impacts on existing wind hazards and whether the project includes mitigation measures to reduce project-related wind impacts.

Hydrology and Water Quality

- Whether project impacts related to sea level rise would occur on transportation facilities in the project area due to higher water levels, including increased erosion, changing environmental characteristics that affect material durability, increased groundwater levels, change in sediment movement along shorelines, and soil pore pressure at dikes and levees on which transportation facilities are constructed.

3 PROJECT DESCRIPTION

3.1 Overview

The proposed 201 Haskins Way Project (project) site encompasses approximately 18.2 acres on eight parcels of privately owned light industrial and research and development (R&D) area in South San Francisco's East of 101 Area. The site is bounded by East Grand Avenue to the north, Haskins Way to the west, San Francisco Bay (Bay) to the south, an existing recycling center to the southeast, and the Genentech campus to the northeast. The project site includes six parcels with trucking, warehouse, and distribution uses; one parcel used for parking; and one parcel with existing office/ R&D use.

The proposed project would involve redevelopment of light industrial uses into office/R&D uses and intensifying the buildout of existing office/R&D[1]. Alexandria Real Estate Equities (ARE) and the City of South San Francisco (City) propose rezoning the eight parcels to the Business Technology Park (BTP) district. ARE would seek a rezoning of two parcels, 201 Haskins Way and 400-450 East Jamie Court, and is proposing a specific development plan for these parcels (herein referred to as the Phase 1 site plan). Currently, there is no site-specific development program proposed for the remaining six parcels, and the City would initiate a rezoning of these six parcels. This EIR presents a conceptual Phase 2 development for buildout of these six parcels (herein referred to as the Phase 2 area) and assumes the project would be constructed in two phases (Phase 1 and Phase 2).[2]

The existing *City of South San Francisco General Plan* (General Plan) designations of Coastal Commercial (CC) and Mixed Industrial (MI) would remain unchanged for all eight parcels. The combined CC/MI designation allows existing uses to remain under the MI land use designation, whereas new R&D uses would be consistent with the existing CC land use designation.

The proposed zoning text amendment would amend Table 20.110.002, "Land Use Regulations – Employment Districts," of the *South San Francisco Municipal Code* (Municipal Code) to clarify that for parcels with a dual General Plan designation of CC and MI, new BTP development would be considered consistent with and would be subject to the development standards applicable to the CC designation. In contrast, the continuation of pre-existing freight forwarding, customs brokering, wholesale, warehousing, and distribution uses would be considered consistent with and would be subject to the development standards applicable to the MI designation.

Under the proposed BTP district, the proposed project would allow a total of approximately 634,796 square feet (sq. ft.) of floor area for new BTP use and off-street parking. ARE is proposing a specific

[1] In the 2000s, the 400-450 East Jamie Court parcel was developed into a business and technology office use at approximately 0.6 floor area ratio (FAR) under a previous project, which included the construction of a new segment of the San Francisco Bay Trail.

[2] It is uncertain when or if development in the Phase 2 area would occur, or whether it would occur as a single redevelopment of all parcels or as separate redevelopment of one or more parcels. Therefore, the proposed project could be constructed in more than two development phases. However, this EIR assumes only two phases, Phase 1 and Phase 2.

development application for the proposed Phase 1 area site plan; however, the proposed rezoning of the parcels in the Phase 2 area would continue to allow the existing light industrial uses to continue[3] as well as permit redevelopment at 1.0 floor area ratio (FAR) in accordance with the proposed BTP rezoning.

Under the development application, Phase 1 development would include:

(1) demolition of approximately 24,075 gross sq. ft. (gsf) of light industrial space on the approximately 6.45-acre parcel at 201 Haskins Way (Assessor's Parcel Number [APN] 015-102-230) and development of a new 311,368-gsf office/R&D building and a new five-story parking garage; and

(2) construction of an addition to an existing office/R&D building on the approximately 6.13-acre parcel at 400-450 East Jamie Court (APN 015-102-250) with approximately 25,000 sq. ft. of floor area.

Because detailed information about Phase 2 development is not known at this time, the EIR considers the maximum potential development that could occur on those parcels under the proposed rezoning. Phase 2 development would require subsequent project-level site design review. For illustrative purposes, the EIR includes a conceptual Phase 2 development plan. The Phase 2 development plan would include:

(1) demolition of approximately 157,995 gsf of light industrial space on four additional parcels north of the 201 Haskins Way parcel, located at 101 and 151 Haskins Way, and 410 and 430 East Grand Avenue (APNs 015-102-210, 015-102-220, 015-102-180, 105-102-160), and development of a new 256,232-gsf office/R&D building fronting East Grand Avenue;

(2) expansion of the five-story parking garage constructed in Phase 1 to two parcels at 451 East Jamie Court (APNs 015-102-240 and 015-102-290); and

(3) future office/R&D development capacity up to approximately 85,000 sq. ft. of floor area on the 400-450 East Jamie Court parcel (APN 015-102-250).

It is uncertain when or if Phase 2 development would occur or whether it would occur as a single redevelopment of all Phase 2 area parcels (such as illustrated in the conceptual development plan) or as separate redevelopment of one or more Phase 2 area parcels. The EIR presents separate analyses of the project impacts of Phase 1 development, and the project impacts of Phase 1 and 2 development combined (referred to as "project buildout" in this EIR).

3.1.1 Project Objectives

ARE seeks to achieve the following objectives by undertaking the proposed project in furtherance of the City's General Plan and City's policies for developing the East of 101 Area:

- Create state-of-the-art R&D facilities consistent with the General Plan designation of the site, and General Plan goals and policies
- Promote the City's ongoing development of the East of 101 Area into a nationally recognized biotechnology and R&D center that will attract other life science uses

[3] City of South San Francisco, 2018. Municipal Code Table 20.110.002, Note 10.

- Further the City's policies of developing the East of 101 Area with new opportunities for continued evolution from manufacturing and warehousing/distribution to biotechnology and R&D
- Redevelop underutilized parcels within the project site at a higher density to take advantage of the opportunities offered in the East of 101 Area to create a vibrant R&D campus
- Develop an R&D campus with a high level of design quality as called for in the Design Policies and Guidelines of the *East of 101 Area Plan*
- Build a project that creates quality jobs for the City
- Provide sufficient space for tenants to employ key scientific and business personnel in proximity to each other to foster efficient collaboration and productivity
- Capitalize on the project's proximity to the City's Bay shoreline and San Francisco Bay Trail (Bay Trail) by providing views and access to the waterfront
- Enhance the visual quality of development around the Bay shoreline and take advantage of the attractive setting it provides
- Promote alternatives to automobile transportation to further the City's transportation objectives by emphasizing linkages, Transportation Demand Management (TDM), and pedestrian access and ease of movement between buildings
- Enhance vehicular, bicycle, and pedestrian circulation and access in the area surrounding the project site
- Build a project that is viable in the East of 101 Area based upon market conditions and project service requirements for the area
- Incorporate flexibility for office and R&D uses to ensure that the project is responsive to tenant demands based on market conditions
- Provide a positive fiscal impact on the City through the creation of jobs, enhancement of property values, and generation of property tax and other development fees
- Retain the flexibility to build the project in phases that respond to market conditions
- Allow for the continued operation of existing manufacturing and warehousing/distribution uses until new development occurs, consistent with City policies

3.1.2 Project Location

The project site is comprised of eight parcels located in the City. The City of South San Francisco is located south of the City of Brisbane and north of the City of San Bruno. The City is built on the Bay plain and on the northern foothills of the Coastal range. The City is located along major transportation routes, including U.S. 101, Interstate 380, Interstate 280, and the Union Pacific Railroad.

The project site is within the City's East of 101 Area, as shown on **Figure 3.1: Regional Site Location**. The East of 101 Area consists of roughly 1,700 acres of land and is bounded by the Bay on the east, U.S. 101 and railway lines on the west, the City of Brisbane on the north, and the Bay and San Francisco International Airport (SFO) on the south.



Source: City of South San Francisco, SWCA (2017)

201 HASKINS WAY PROJECT

FIGURE 3.1: REGIONAL SITE LOCATION

3.2 Existing Setting

The project site is located in a light industrial and R&D area of the City's East of 101 Area. **Figure 3.2: Existing Site Plan** shows the project site location and regional vicinity. The project site is generally bounded by East Grand Avenue to the north, Haskins Way to the west, the Bay Trail and shoreline to the south, and adjacent parcels containing a recycling center and portions of the Genentech campus to the east. The project site is served by East Grand Avenue as the primary arterial road, fed by Haskins Way running north to south and East Jamie Court running east to west.

3.2.1 Regional Setting

The area that became the City was originally used for cattle grazing and dairy operations. The meat industry was the City's first industrial development, eventually leading to the development of an industrial town. The arrangement of residential and industrial uses intentionally took advantage of stable ground and Bay access at Point San Bruno, as well the prevailing winds from San Bruno Gap that blew offensive odors away from residential areas and over the Bay.[4] The construction of the Southern Pacific Railroad line between San Francisco and San Jose further expanded opportunities for goods shipping, and industries such as steel mills grew near these transportation corridors.

The City's development pattern began with industries to the east and homes and businesses to the west, evolving over time during industrial growth and after World War II. Development was limited by mountain topography to the west and marshland to the east. Fill and drainage projects further expanded available land for development. Much of this industrial development and Bay marshland fill occurred in the City's East of 101 Area. In the post-war and modern era, steel production and other heavy industries have largely been replaced by warehousing, research, development, and biotechnology.

The City encompasses approximately 4,298 acres and is largely composed of single-use areas, with industry in the eastern and southeastern portions of the City and single-family homes to the north and west. Limited vacant land in the City precipitates new growth to take the form of redevelopment and intensification. Land in the East of 101 Area and some western parts of the City are unsuitable for residential development because of aircraft operations at SFO. Due to its historical and existing industrial uses, the City considers the East of 101 Area highly suitable for the expansion of industrial uses and for new opportunities for continued evolution from manufacturing and warehousing/distribution to high technology and biotechnology. The General Plan notes that business parks for high-technology R&D are one of the City's highest priority land uses.

[4] City of South San Francisco, *City of South San Francisco General Plan*. Chapter 1, Introduction and Overview, p. 1-3.



Source: City of South San Francisco, SWCA (2018)

201 HASKINS WAY PROJECT

FIGURE 3.2: EXISTING PROJECT SITE

3.2.2 Surrounding Land Uses

The project site is near the southern terminus of Haskins Way, served by East Grand Avenue as the primary arterial road, as shown on Figure 3.2, p. 3.6. In the surrounding area to the west of Haskins Way, there are several existing light industrial manufacturing and distribution uses, generally containing one- to two-story buildings. To the north and northwest, the land use shifts from industrial uses to biotechnology uses, most dominantly the Genentech campus north of East Grand Avenue. The Genentech campus is composed of three- to six-story office and R&D buildings. The campus also includes amenities such as a five-story parking garage, retail uses, and child care. To the east of the project site are the South San Francisco Scavenger Company and Blue Line Transfer, Inc. buildings, which provide waste collection and recycling service uses. To the south, the existing industrial development meets the Bay shoreline and the Bay Trail.

3.2.3 Site Setting

The project site encompasses eight parcels divided into two development phase areas, as follows:

- The Phase 1 area includes two parcels: the 6.45-acre 201 Haskins Way parcel (APN 015-102-230) located on the north side of East Jamie Court, which contains a one-story terminal building previously occupied by a light industrial trucking terminal use, and the 6.13-acre 400-450 East Jamie Court parcel (APN 015-102-250), which is currently occupied by two three-story office/R&D buildings.
- The Phase 2 area includes the 400-450 East Jamie Court parcel (APN 015-102-250, also part of the Phase 1 area), plus six additional parcels: 101 and 151 Haskins Way, 410 and 430 East Grand Avenue (APNs 015-102-210, 015-102-220, 015-102-180, 105-102-160), 451 East Jamie Court (APN 015-102-240), and an unaddressed parcel (APN 015-102-290). Five of the six parcels contain one- to two-story light industrial buildings totaling approximately 157,995 gsf. A portion of the 451 East Jamie Court parcel and APN 015-102-290 contain a parking lot.

The existing lot size, land use, parking, and building heights of the eight parcels within the project site are described in **Table 3.1: Summary of Existing Site Characteristics**. The proposed project site totals 791,796 sq. ft. of lot area (18.2 acres) and contains approximately 339,070 sq. ft. of existing buildings.

EXISTING LAND USE DESIGNATIONS

General Plan Designation

The project site is identified in the General Plan as a combined CC/MI land use designation, with the exception of one parcel in the Phase 2 area (APN 015-102-290) which is designated as CC only. The dual CC/MI designation allows existing freight forwarding and warehousing uses under the MI land use designation, whereas other uses, including R&D, would be allowed under the CC land use designation, as specified below. The existing General Plan land use and zoning designations of the project site and surrounding parcels are illustrated in **Figure 3.3: Existing General Plan Land Use and Zoning Designations**.

Table 3.1: Summary of Existing Site Characteristics

APN / Address	Lot Size (sq. ft.)	General Plan Land Use / Zoning	Existing Buildings (sq. ft. [FAR[1]])	Parking Spaces	Building Height / No. of Stories
Phase 1 Area					
015-102-230 201 Haskins Way	280,765	**GP:** CC / MI **Zoning:** MI	24,075 (0.09)	Car lot (56 spaces), semi-tractors (20 spaces), semi-trailers (35 spaces), loading docks	21 ft. / 1
015-102-250 400-450 East Jamie Court[2]	267,000	**GP:** CC / MI **Zoning:** BC	157,000 (0.59)	464 spaces	65 ft. / 3
Subtotal Phase 1 Area	***547,765***		***181,075***		
Phase 2 Area					
015-102-250 400-450 East Jamie Court[3]	-	-	-	-	-
015-102-210 101 Haskins Way	24,535	**GP:** CC / MI **Zoning:** MI	7,000 (0.29)	10 spaces	22 ft. / 1
015-102-220 151 Haskins Way	28,602	**GP:** CC / MI **Zoning:** MI	11,599 (0.41)	14 spaces	21 ft. / 1
015-102-180 410 East Grand Avenue	40,384	**GP:** CC / MI **Zoning:** MI	27,300 (0.63)	10 spaces	18 ft. / 1
015-102-160 430 East Grand Avenue	72,076	**GP:** CC / MI **Zoning:** MI	37,096 (0.52)	12 spaces	26 ft. / 1
015-102-240 451 East Jamie Court	62,087	**GP:** CC / MI **Zoning:** MI	75,000 (1.2)	24 spaces (+ tractor lot)	24 ft. / 2
015-102-290 No Address	16,347	**GP:** CC **Zoning:** MI	N/A	44 spaces	0 ft.
Subtotal Phase 2 Area	***244,031***		***157,995***		
Total	**791,796**		**339,070**		

Notes:

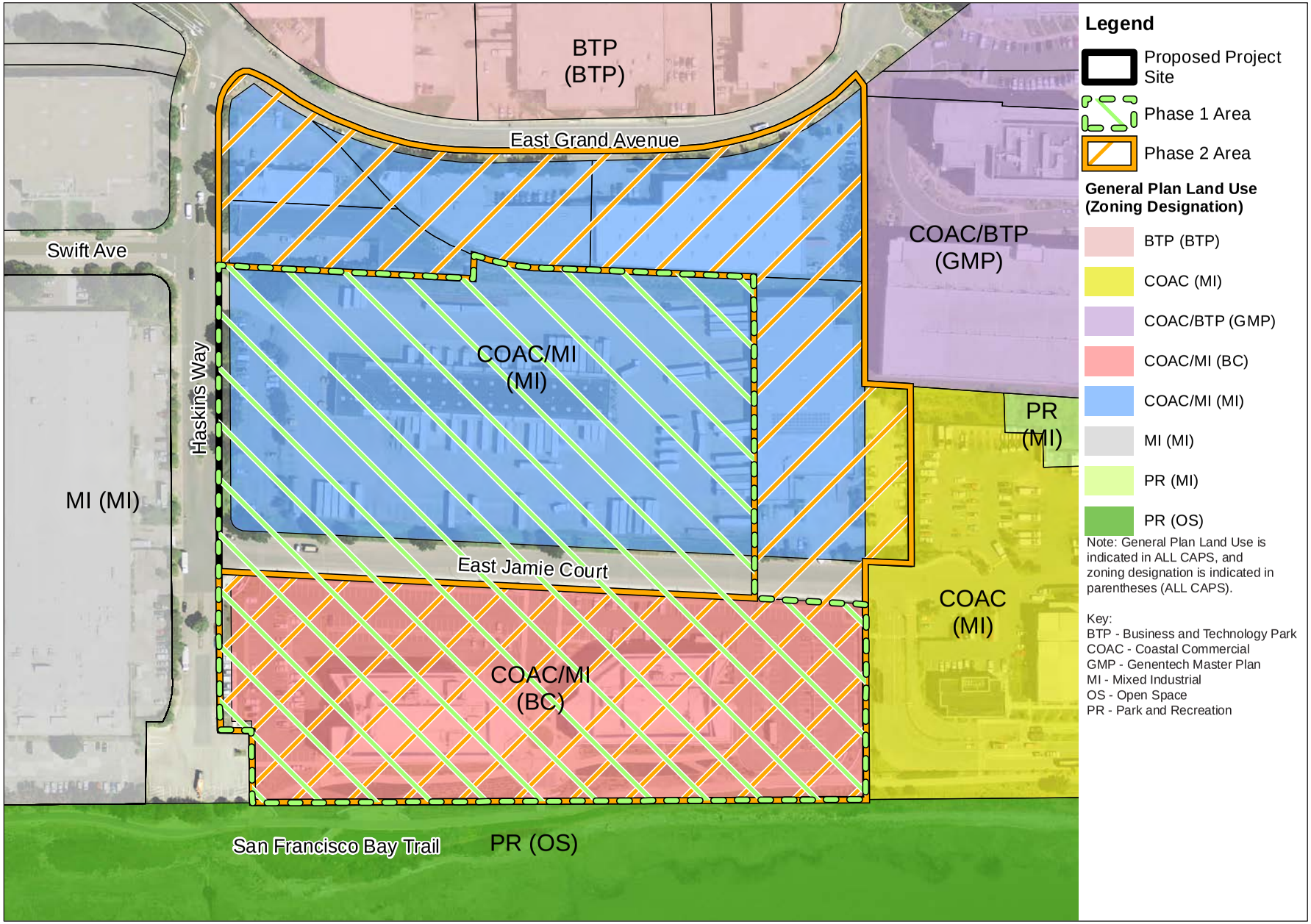
[1] Floor Area Ratio (FAR) is the relationship between the total amount of usable floor area that a building has, or has been permitted for the building, and the total area of the lot on which the building stands. A higher number is more likely to indicate a dense or urban construction. The South San Francisco Municipal Code Sections 20.040.008 and 20.40.009, allow certain areas to be excluded from the calculation of square feet of Floor Area and FAR.

[2] Development activity would occur on 400-450 E. Jamie Court (015-102-250) during both Phase 1 development and Phase 2 development.

[3] The 400-450 East Jamie Court parcel is described under Phase 1 Area. Lot size and existing building square footage of the 400-450 East Jamie Court parcel is not included in the Phase 2 Area subtotal.

GP = General Plan, CC = Coastal Commercial, MI = Mixed Industrial, BC = Business Commercial

Source: ARE, RBF, City of South San Francisco (2017)



Source: City of South San Francisco, SWCA (2018)

201 HASKINS WAY PROJECT

FIGURE 3.3: EXISTING GENERAL PLAN LAND USE AND ZONING DESIGNATIONS

The MI land use designation under the General Plan is intended to provide and protect existing industrial lands for a wide range of manufacturing, industrial processing, general service, warehousing, storage and distribution, and service commercial uses up to 0.4 FAR.[5] For uses with low employment intensity, such as wholesaling, warehousing, and distribution, the maximum permitted FAR can be increased with incentives and bonuses up to 0.6 FAR.[6]

The CC land use designation under the General Plan allows a maximum FAR of 0.5 for retail, recreation facilities, R&D facilities, marinas, and eating and drinking establishments; 1.0 for offices; and 1.6 for hotels.[7] In addition, CC land uses allow incentive-based FAR bonuses for implementation of a TDM program and other specified design standards, allowing up to a total of 1.0 FAR for retail, 1.6 FAR for office, and 2.2 FAR for hotel uses.[8]

East of 101 Area Plan Designations

The project site is designated Light Industrial in the *East of 101 Area Plan*, but the 400-450 East Jamie Court parcel designation is a combined CC/Light Industrial district. However, the General Plan classifies the project site as a combined CC/MI designation, with the exception of the unaddressed parcel east of 451 East Jamie Court (APN 015-102-290).

The City interprets the *East of 101 Area Plan* as a design-level document. Development standards and density determinations, including FAR, are established in the General Plan, which was updated after the adoption of, and takes precedence over, the *East of 101 Area Plan*. Moreover, when East of 101 Area Plan policies are in conflict with or inconsistent with the General Plan, the General Plan policies supersede requirements outlined in the *East of 101 Area Plan*. Applicable design-level policies of the *East of 101 Area Plan* include all policies of the Design Element; Land Use Element policies LU-6C (off-site parking structures in Light Industrial districts), LU-24 (retail and personal services), LU-26 (childcare facilities), and LU-31 (above-ground fuel tanks); and Conservation Element Policy CON-7 (new development adjacent to sensitive resource areas).[9]

Redevelopment Plan Designation

The 400-450 East Jamie Court parcel is located in the 1988 Downtown/Central Redevelopment Plan (Redevelopment Plan) Area.[10] The Redevelopment Plan was prepared by the former South San Francisco Redevelopment Agency to provide a process and a basic framework within which specific redevelopment plans could be developed for areas of the City identified as having economic disuse, stagnation, blight, and inadequately served by public utilities and services. As amended, the term of the Redevelopment Plan extends until July 12, 2030, for purposes of land use controls, and until July 12, 2040, for receipt of

[5] General Plan. Chapter 2, p. 2-25.
[6] General Plan. Chapter 2, Table 2.2-2: Standards for Density and Development Intensity, p. 2-13.
[7] General Plan. Chapter 2, p. 2-22.
[8] General Plan. Chapter 2, Table 2.2-2: Standards for Density and Development Intensity, p. 2-13.
[9] Sensitive resources refers to natural resources (e.g., plant or animal species and wetlands).
[10] General Plan, Figure 2-7, p. 2-37.

property taxes and repayment of indebtedness. The Redevelopment Plan provides that permitted land uses in the Plan Area include commercial and industrial uses, and may include any use permitted by the General Plan and City ordinances for that area.[11] Under the Redevelopment Plan, the type, size, and height of buildings in the Plan Area are limited by applicable "federal, state and local statutes and ordinances."[12] The Redevelopment Plan provides that the Redevelopment Agency was authorized to establish limits on height, land coverage, setbacks, design criteria, traffic, and parking through adoption of subsequent resolutions, but the Redevelopment Plan does not impose additional development standards for the Plan Area.[13]

Zoning Designation

The existing zoning designations of the project site and surrounding parcels are illustrated in Figure 3.2, p. 3.6. The 101, 151, and 201 Haskins Way parcels; the 410 and 430 East Grand Avenue parcels; the 451 East Jamie Court parcel; and the adjacent parcel (APN 015-102-290) are zoned MI. The 400-450 East Jamie Court parcel is zoned Business Commercial (BC). The MI and BC districts are two of the City's employment districts. The City's current land use regulations for base employment districts are set forth in Section 20.110.002 of the Municipal Code, which recognizes existing legally approved freight forwarding, customs brokering, wholesale, warehousing, and distribution uses to be legal conforming uses, which may convert to other industrial uses, in accordance with General Plan Policy 3.5-I-1 and Resolution 84-97 (see note 10 of Table 20.110.002). However, such existing uses may not expand, convert to, re-convert to, or establish a freight forwarding use. **Table 3.2: Existing Land Use and Development Standards by Zoning Designation** outlines the development standards for the MI and BC districts for lot size, building height, minimum setbacks, lot coverage, FAR, and landscaping coverage.[14] The purposes of the MI and BC zoning districts as defined by the City are described below.

The MI zoning district is intended to provide areas for a wide range of manufacturing, industrial processing, general service, warehousing, storage and distribution, and service commercial uses and to protect areas where such uses currently exist. Industries that use or produce substantial amounts of hazardous materials or generate noise, odor, or other pollutants are not permitted. Conventional residential and/or group residential development are also prohibited, but live-work uses such as artists' studios are allowed in designated areas. Small-scale retail and service uses serving local employees, residents, and visitors may be permitted as secondary uses. The MI zoning district is consistent with the General Plan's MI designation. The maximum FAR is 0.4, but increases may be permitted up to a total FAR of 0.6 for development that meets specified design and green building measures subject to approval of a CUP.[15]

[11] City of South San Francisco, 1989. *Redevelopment Plan for the Downtown Central Redevelopment Project* (Downtown/Central Redevelopment Plan), adopted July 12, 1989.

[12] Downtown/Central Redevelopment Plan, Section 413, p. 21.

[13] Downtown/Central Redevelopment Plan, Section 420, p. 22.

[14] Section 20.110.004 of the City zoning ordinance provides additional district-specific regulations regarding outdoor employee eating areas; landscaped setback of parking areas; access locations; limitations on curb cuts and driveways; and locations and screening of truck docks, loading, and service areas.

[15] City of South San Francisco Zoning Ordinance, 2017. Table 20.110.003(C). Applies to MI projects that include high quality, innovative design and product type, and maximum provisions for pedestrian and bicycle use or provision of green building measures over and above the applicable green building compliance threshold requirements pursuant to Municipal Code Title 15.

Table 3.2: Existing Land Use and Development Standards by Zoning Designation

	Mixed Industrial (MI)	Business Commercial (BC)
Lot Standards		
Minimum Lot Size (sq. ft.)	43,560	Same as MI
Minimum Lot Width (ft.)	50	Same as MI
Building Form and Location		
Maximum Height	Up to 161 feet above sea level, subject to FAA Part 77[1]	Same as MI
Minimum Setbacks (ft. from lot line)		
Front	20	Same as MI
Interior Side	10; 0 if along MI district boundary	0; 10 along R district boundary
Street Side	10	Same as MI
Rear	10; 0 if along MI district boundary	0; 10 along R district boundary
Maximum Lot Coverage (% of lot)	60	50
Maximum Floor Area Ratio (FAR)	0.40/0.60[2]	0.50 / 1.0[3]
Minimum Amount of Landscaping (% of site)	10	15

Notes:

[1] Building heights east of 101 are allowed the maximum height limits permissible under Federal Aviation Regulations Part 77. General Plan Figure 2-2 establishes a 161-foot height limit in the project area, whereas Exhibit IV-13 of the 2012 SFO Comprehensive Airport Land Use Compatibility Plan establishes a 163-foot height limit.

[2] Maximum Floor Area Ratio in the MI district is 0.4, but increases may be permitted up to a total of 0.6 for developments that meet specific design and/or green building standards per the Incentives Program, subject to approval of a conditional use permit (CUP) as provided in Section 20.110.003(C) of the zoning ordinance. TDM Plans are required for nonresidential development expected to generate 100 or more average daily trips, based on the Institute of Traffic Engineers trip generation rates.

[3] Maximum Floor Area Ratio in the BC district is 0.5, but increases may be permitted up to a total of 1.0 for developments that meet specific Travel Demand Management (TDM), or design and/or green building standards per the Incentives Program, subject to approval of a CUP as provided in Section 20.110.003(C) of the zoning ordinance. TDM Plans are required for nonresidential development expected to generate 100 or more average daily trips, based on the Institute of Traffic Engineers trip generation rates.

Source: City of South San Francisco Zoning Ordinance, 2017, Table 20.110.003.

The BC zoning district is intended for business and professional offices, visitor service establishments, and retail uses with an emphasis on larger and regional-serving uses, largely in commercial areas west of U.S. 101. A wide range of nonresidential uses is appropriate, including administrative, financial, business, professional, medical, and public offices, and visitor-oriented and regional commercial activities such as warehouse clubs and other large-format retail uses. The maximum base FAR is 0.5, but increases may be permitted up to a total FAR of 1.0 for R&D establishments or development that meets specific TDM, and design and green building standards, subject to approval of a CUP.[16] The maximum FAR for hotels is 1.2 with increases to a total of 2.0 FAR for development that meets specified criteria consistent with General Plan policies. Section 20.110.004 of the zoning ordinance also provides requirements for BC districts regarding the orientation of the primary building entrance; building transparency and required openings; and building design features including architectural articulation, entries, and materials.

[16] City of South San Francisco Zoning Ordinance, 2017. Table 20.110.003(C).

Height Limits

Development of office buildings on the project site and surroundings in the East of 101 Area is not restricted by the zoning ordinance or General Plan. In general, height limitations or restrictions in the East of 101 Area are defined by the SFO sphere of influence.[17]

Development east of U.S. 101 and south of East Grand Avenue is limited to 161 feet in height by elevation according to the *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport* prepared in 2012,[18] but may be further restricted based on notification and consultation with the Federal Aviation Administration (FAA) under Part 77.9 of the Code of Federal Regulations (CFR).

EXISTING PARKING, CIRCULATION, AND ACCESS

The proposed project site currently contains two driveways on East Grand Avenue, four driveways on Haskins Way, and three driveways on East Jamie Court that serve the existing light industrial and R&D uses. The 451 East Jamie Court driveway provides access to the surface parking lot on the adjacent parcel to the east (APN 015-102-290).

Phase 1 Area

Vehicles access the 201 Haskins Way parcel via a curb cut on Haskins Way near Swift Avenue and, from the driveway, travel to a 56-stall parking lot for site workers and visitors to the south or to a trucking terminal area to the west with 20 semi-tractor spaces, 35 semi-trailer spaces, and loading docks surrounding a central terminal building. No off-street parking is permitted on the north side of East Jamie Court fronting the 201 Haskins Way parcel. Approximately 200 feet of unmarked curb on Haskins Way is currently available for on-street parking.

The 400-450 East Jamie Court parcel is occupied by two three-story office/R&D buildings with a basement parking level on the southern and central portion of the parcel, and surface parking on the north, west, and east portions of the parcel. Vehicles access the existing 400-450 East Jamie Court parcel via two driveways: one on East Jamie Court and one at the terminus of Haskins Way. The existing surface parking lots and basement parking garage level provide a total of 459 parking spaces. A passenger loading area is adjacent to the plaza between the two existing buildings. Each building includes one off-street service loading bay. Pedestrian and bicycle access to the Bay Trail is located on the southern portion of the parcel.

The 400-450 East Jamie Court parcel is also included in the Phase 2 Area, which is described below.

[17] City of South San Francisco Zoning Ordinance, 2017. 20.110.003(A)

[18] City/County Association of Governments of San Mateo County, 2012. *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport*, Exhibit IV-13, p. IV-43.

Phase 2 Area

In addition to the existing parking, circulation, and access on the 400-450 East Jamie Court parcel as described above, the remaining Phase 2 area contains existing driveways serving existing light industrial uses on five of the six additional Phase 2 parcels, including two driveways on East Grand Avenue, two driveways on Haskins Way, and one driveway on East Jamie Court. Five of these parcels (101 and 151 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court) contain a small surface parking area with between 10 and 24 parking spaces, each generally serving worker vehicles and providing loading bays and staging areas for larger trucking or delivery vehicles. The sixth parcel (APN 015-102-290) is a surface parking lot with 44 parking spaces. Access to this lot is available from the 451 East Jamie Court driveway. Parking spaces by parcel are summarized in Table 3.1, p. 3.8.

EXISTING LANDSCAPING

In general, landscaping on the project site is limited to street trees, ornamental landscaping features such as parking and building buffers, and ruderal areas between buildings. The project site contains approximately 185 existing trees.

The 201 Haskins Way parcel in the Phase 1 area includes 20-foot-wide landscaped areas along the East Jamie Court and Haskins Way frontage that feature stone pine street trees and ornamental ground cover. Trees that provide screening are planted between the site worker parking lot and the trucking terminal. An approximately 20-foot-wide landscaped buffer is located along the northern boundary of the parcel. In total, the 201 Haskins Way parcel contains approximately 30 trees.

The 400-450 East Jamie Court parcel, located in the Phase 1 area and Phase 2 area, includes street-facing landscaping buffers with street trees along East Jamie Court and Haskins Way, surface parking lot trees, and landscaped open space adjacent to the Bay Trail. The parcel contains approximately 80 trees, including approximately 35 street trees.

The six additional parcels in the Phase 2 area contain a total of approximately 75 trees, distributed along East Grand Avenue in a landscaped building setback area, within parking lot landscaping in the 101 and 151 Haskins Way parcels and the 451 East Jamie Court and APN 015-102-290 parcels.

EXISTING UTILITY INFRASTRUCTURE

Potable Water

The project site is served by the California Water Service Company, which purchases most of its water from the San Francisco Public Utilities Commission. Existing water supply piping is located under Haskins Way, East Grand Avenue, and East Jamie Court. Three fire hydrants are located on the south side of East Jamie Court north of and adjacent to 400-450 East Jamie Court, one is west of Haskins Way on the east side of the 390 Swift parcel, and another is on the north side of East Grand Avenue south of 415 East Grand Avenue.

Stormwater

Stormwater runoff from the project site is generally directed to the west and south, tying into the 24-inch-diameter storm drain line on East Jamie Court and the 48-inch-diameter storm drain line on Haskins Way. Runoff flows south along Haskins Way and into a catch basin, then through a 48-inch-diameter outfall pipe before being discharged into the Bay. The pipe is designed to operate throughout a range of high tide conditions in the Bay to prevent flooding near the terminus of the system.

Within the 201 Haskins Way parcel, 12-inch-diameter storm drains are located along the parcel's northern and southern boundaries in an east-west direction. Storm flows from the northern portion of the project site run west and connect to the 48-inch-diameter stormwater line on Haskins Way. Two 12-inch-diameter connections to the Haskins Way storm drainage are also located on the western portion of the site. There is one connection from the southern on-site storm drain to the 24-inch East Jamie Court storm drain.

Sanitary Sewer

The project site is served by the existing sanitary sewer system. There are 8-inch-wide sanitary sewer lines on Haskins Way and East Jamie Court along the project site frontage and 8-inch-wide sanitary sewer lines on East Grand Avenue. On Haskins Way, near Swift Avenue, the 8-inch line on Haskins Way expands to a 15-inch line running northwest.

Within the 201 Haskins Way parcel, a 10-foot-wide sewer easement with a 15-inch-wide sanitary sewer line runs along the parcel's northern boundary. Where the Haskins Way line meets the northern 15-inch-diameter line, the lines merge into the 15-inch-wide sanitary sewer line near Swift Avenue, which continues to the northwest.

Natural Gas and Electric

The project site is served by natural gas and electric service provided by Pacific Gas and Electric Company (PG&E). Each of these services is provided in underground dry utility conduits. On the 201 Haskins Way parcel, existing electrical lines and gas lines are located under the southern portion of East Grand Avenue, the east and west portions of Haskins Way, and the north and south portions of East Jamie Court. These existing conduits serve the existing light industrial and office/R&D uses on the project site.

Refuse and Recycling

The project site is served by South San Francisco Scavenger Company and Blue Line Transfer, Inc., which lies immediately to the east. Each of the existing light industrial buildings on the project site (101, 151, and 201 Haskins Way; 410 and 430 East Grand Avenue; and 451 East Jamie Court) have off-street parking and loading areas that are primarily used for warehouse and delivery activities and may also accommodate refuse service vehicles. The two office/R&D buildings on 400-450 East Jamie Court have off-street loading bays for trash and recycling pick-up services.

EXISTING SUBSURFACE CONDITIONS

The project site is located on historic Bay tidelands that were subject to fill and development in the post-war industrial period. The Bay tidelands are underlain by slope debris deposits and rocks of the Franciscan Complex, which crop out in the northern half of the project area, including 101, 151 and the northern portion of 201 Haskins Way; 410 and 430 East Grand Avenue; and the northern portion of 451 East Jamie Court. The remainder of the project site to the south is underlain by imported fill over compressible marine clay (also known as Bay Mud).[19] The project site is highly disturbed and consists of a series of modern industrial buildings (warehouse/distribution buildings and a truck terminal facility, each of which were built after 1975, and two office/R&D buildings built in the 2000s).

Phase 1 Area

201 Haskins Way

The approximately 6.45-acre 201 Haskins way site is improved with an approximately 24,075-sq.-ft. building. The southern half of the site was originally part of the Bay and was filled with imported material from unknown sources during the 1960s and 1970s. Historic site development included at least one structure as early as 1915, and additional structures may have been present in the 1940s. By 1977, historical structures were demolished and replaced with the current building.

Three underground storage tanks (USTs) had been previously removed from the site: a 2,000-gallon waste oil UST and two 10,000-gallon diesel USTs. Groundwater sampling in 1987 identified low concentrations of volatile organic compounds (VOCs) including chlorinated solvents 1,1-dichloroethane, trichloroethene, benzene, and toluene. The waste oil was removed in 1987, and the San Mateo County Environmental Health Department issued closure (No Further Action determination) for the site, acknowledging that limited hazardous materials remain in soil and groundwater beneath the site.

400-450 East Jamie Court

The 400-450 East Jamie Court parcel was developed in the early 2000s and included the construction of two office/R&D buildings, a subsurface parking structure, and surface parking. Although previous investigation of this parcel indicated several metals were present within the soils, the most recent soil samples collected were found to be within naturally occurring background concentration levels.[20] Groundwater sampling did not detect metals, VOCs, or petroleum hydrocarbons at or above any level of regulatory limit. It is assumed that any known environmental conditions from historic uses were handled appropriately in compliance with all applicable regulations when the parcel was developed with those uses.

[19] Langan, 2017. *Preliminary Geotechnical Investigation, 201 Haskins Way, South San Francisco, California.*

[20] City of South San Francisco, 2002. *East Jamie Court Project Initial Study*, pp. 42-43; and Environ, 2001. *Report of Phase II Subsurface Investigation, East Jamie Court, South San Francisco, California*, p. 7.

Phase 2 Area

In addition to the existing subsurface conditions of the 400-450 East Jamie Court parcel as described above, five of the six additional parcels included in the Phase 2 area are currently occupied by five one- to two-story buildings constructed in the 1980s and occupied by light industrial uses, including a kiteboarding equipment distribution warehouse, a packaging manufacturer, a van rental service, audio and visual equipment rental services, and a janitorial equipment supplier. A portion of 451 East Jamie Court and APN 015-102-290 are developed with a surface parking lot containing 44 parking spaces. Most of these sites are north of the presumed fill line established on 201 Haskins Way and are assumed to have been constructed over Bay Mud, although historic land uses on these sites are unknown.

Since the existing buildings were largely constructed after 1980, after building materials such as asbestos, lead-based paint, and PCBs were banned, it is assumed that hazardous building materials are possible but not likely. Existing subsurface environmental conditions, such as USTs or groundwater VOCs, are unknown. However, it is assumed potential subsurface environmental concerns may be present on one or more of the six parcels, similar to conditions found on the 201 Haskins Way parcel, as described above.

3.3 Description of the Proposed Project

Under the proposed project, ARE and the City propose to rezone eight parcels in the East of 101 Area to a BTP district to allow for new development of office/R&D uses. The parcels are located at 101, 151, and 201 Haskins Way (APNs 015-102-210, 015-102-220, and 015-102-230); 410 and 430 East Grand Avenue (APNs 015-102-160 and 105-102-180); 400-450 and 451 East Jamie Court (APNs 015-102-250 and 015-102-240); and one parcel without an address east of 451 East Jamie Court (APN 105-102-290). The eight parcels encompass a total of approximately 18.2 acres of land.

New R&D uses up to 1.0 FAR are allowed under the CC General Plan land use designation of the existing combined CC/MI district on the project site; however, the existing zoning of most of the project site is MI, which only allows R&D uses up to 0.6 FAR.[21] The proposed zoning text amendment would codify the permitted dual use under the General Plan, including the development potential of 1.0 FAR provided by the CC district, by including a footnote to Table 20.110.002, "Land Use Regulations – Employment Districts," of the Municipal Code.

The EIR includes analysis of the maximum allowable development associated with the proposed rezoning of those affected parcels. It is assumed that the proposed project would be constructed in two development phases (Phase 1 and Phase 2). ARE is proposing a specific development plan for the proposed Phase 1 site. Currently, there is no site-specific development program proposed for Phase 2; development of Phase 2 would require subsequent project-level site design. Therefore, the EIR presents separate analyses of the project impacts of Phase 1, and the project impacts of Phase 1 and 2 combined (project buildout). The EIR includes analysis of the maximum potential development in Phase 2 associated with the proposed rezoning of those affected parcels.

[21] The 400-450 East Jamie Court parcel is zoned Business Commercial (BC), which allows for R&D uses.

3.3.1 Proposed Project Buildout

The proposed project would rezone the following seven parcels from an MI district to a BTP district: 101, 151, and 201 Haskins Way; 410 and 430 East Grand Avenue; and 451 East Jamie Court and the parcel to its east (APN 105-102-290). The proposed project would also rezone the 400-450 East Jamie Court parcel from BC district to a BTP district.

The proposed newly rezoned BTP parcels would provide new BTP development potential of 0.5 FAR, or up to 1.0 FAR with development and implementation of a TDM Plan and design and green building standards, subject to approval of a CUP. Under the proposed new BTP districts, the proposed project would allow a total of approximately 634,796 sq. ft. of gross new BTP use by total floor area, as shown in **Table 3.3: Proposed BTP Development under the Proposed Project**.[22]

The 400-450 East Jamie Court parcel contains two existing three-story buildings with a total of approximately 157,000 sq. ft. of office/R&D use. This parcel was previously permitted to an FAR of approximately 0.6 with implementation of an existing TDM Plan. However, the BC zoning designation allows for development up to a total of 1.0 FAR with implementation of TDM and design and green building standards.[23] The proposed rezoning would maintain the maximum FAR of the parcel (1.0). Under the proposed rezoning, the proposed project would allow for an additional 110,000 sq. ft. of BTP office/R&D use, of which approximately 25,000 sq. ft. of floor area would be built during Phase 1 development. The remaining development potential would be implemented during Phase 2, with 85,000 sq. ft. of floor area to be built on the 400-450 East Jamie Court parcel.

3.3.2 Proposed Site Plan

The proposed project involves removal of existing light industrial uses and associated parking on seven parcels (101, 151, and 201 Haskins Way; 410 and 430 East Grand Avenue; 451 East Jamie Court; and one parcel with no address [APN 015-102-290]), the construction of new office/R&D use on those seven parcels, and the expansion of existing office/R&D use on one parcel (400-450 East Jamie Court). It is assumed that the proposed project would be constructed in two development phases. Phase 1 development includes demolition of approximately 24,075 gsf of light industrial space and development of approximately 336,368 gsf of new office/R&D space. Phase 2 development includes demolition of approximately 157,995 gsf of light industrial space, and development of approximately 341,232 gsf of new office/R&D space, as shown in Table 3.3.[24]

[22] The floor area of a building is the sum of the gross horizontal areas of all floors of a building or other enclosed structure. Certain areas defined under Sections 20.040.008 and 20.040.009 of the zoning ordinance, such as mechanical and electrical equipment rooms, usable open space, parking areas, and basements, are excluded from calculating floor area. See Table 3.3, Notes 2 and 3.

[23] City of South San Francisco and Alexandria Real Estate Equities, Inc., 2006. *East Jamie Court Transportation Demand Management Plan*.

[24] Gross square feet (gsf) is calculated separately from floor area and FAR, which excludes areas defined under Sections 20.040.008 and 20.040.009 of the zoning ordinance.

Table 3.3: Proposed BTP Development under the Proposed Project

	Total Floor Area			Gross Square Feet		
Parcel Address (APN)	**Phase 1 Development (sq. ft.)**	*Phase 2 Development (sq. ft.)*	**Project Buildout (sq. ft.)**	**Phase 1 Development (gsf)**	*Phase 2 Development (gsf)*	**Project Buildout (gsf)**
201 Haskins Way (015-102-230)	280,765	-	280,765	311,368		311,368
400-450 East Jamie Court (015-102-250)	25,000	*85,000*[1,2]	110,000[1,2]	25,000	*85,000*[1]	110,000[3]
101 Haskins Way (015-102-210)	-	*24,535*	24,535	-	*25,762*	25,762
151 Haskins Way (015-102-220)	-	*28,602*	28,602	-	*30,032*	30,032
410 East Grand Avenue (015-102-180)	-	*40,384*	40,384	-	*42,403*	42,403
430 East Grand Avenue (015-102-160)	-	*72,076*	72,076	-	*75,680*	75,680
451 East Jamie Court (015-102-240)	-	*62,087*	62,087	-	*65,191*	65,191
(015-102-290)	-	*16,347*	16,347	-	*17,164*	17,164
Total	**305,765**	*329,031*	**634,796**	***336,368***	*341,232*	**677,600**

Notes:

[1] The proposed rezoning would allow for an additional 110,000 sq. ft. of BTP office/R&D use to be constructed on 400-450 East Jamie Court at full buildout of the proposed project. The total floor area of the building addition proposed to be constructed during Phase 1 development on 400-450 East Jamie Court is approximately 25,000 sq. ft. Therefore, it is assumed that Phase 2 development would result in 85,000 sq. ft. total floor area of additional BTP use on 400-450 East Jamie Court. Site-specific, project-level design of Phase 2 would be subject to a separate plan review and discretionary approval process.

[2] Section 20.040.008 of the zoning ordinance specifies that floor area includes, but is not limited to, habitable (as defined in the California Building Code) basements and cellars that are below the roof and within the outer surface of the main walls of principal or accessory buildings or the centerlines of party walls separating such buildings or portions thereof or within lines drawn parallel to and two feet within the roof line of any building without walls. In the case of a multi-story building that has covered or enclosed stairways, stairwells or elevator shafts, the horizontal area of such features shall be counted only once at the floor level of their greatest area of horizontal extent. The ordinance specifies that floor area does not include mechanical, electrical, and communication equipment rooms that do not exceed two percent of the building's gross floor area; bay windows or other architectural projections where the vertical distance between the lowest surface of the projection and the finished floor is 30 inches or greater; areas that qualify as usable open space; and areas used for off-street parking spaces or loading spaces, driveways, ramps between floors of a multi-level parking garage, and maneuvering aisles that are located below the finish grade of the property. In addition, nonresidential gross floor area does not include arcades, porticoes, and similar open areas that are located at or near street level and are accessible to the general public but are not designed or used as sales, display, storage, service, or production areas.

[3] Currently, there is no site-specific development program proposed for Phase 2; therefore, the conceptual Phase 2 design is not yet sufficiently detailed and gsf cannot be calculated. Therefore, the total floor area (sq. ft.) is used as an approximation of gsf for the conceptual Phase 2 development.

Source: ARE (2017)

The EIR presents separate analysis of the project impacts of Phase 1 development, and the project impacts of Phase 1 and 2 development combined (referred to as "project buildout" in this EIR). The EIR includes analysis of the maximum potential development in Phase 2 associated with the proposed rezoning of those affected parcels; at this time there is no specific development application for Phase 2 submitted or anticipated.

PHASE 1 DEVELOPMENT

Phase 1 development encompasses the demolition of one one-story, 24,075-gsf former trucking terminal building at the 201 Haskins Way parcel and the development of approximately 336,368 gsf of space at this parcel (one three- and five-story, 311,368-gsf office/R&D building) and at the 400-450 East Jamie Court parcel (one two-story, approximately 25,000-sq.-ft. addition to an existing office/R&D building), as shown in Table 3.3, p. 3.19, and **Figure 3.4: Proposed Project Site Plan – Phase 1**.

201 Haskins Way

During Phase 1 development, the existing one-story, 24,075-gsf terminal building at 201 Haskins Way and all existing surface parking and truck lots on that parcel would be demolished. An approximately 311,368-gsf, office/R&D building (referred to in this EIR as the "201 Haskins Way Building") would be constructed along the southern parcel boundary fronting East Jamie Court. The new building would be made up of three connected elements: a five-story, 99-foot-tall building to the west; a three-story, 66-foot-tall building to the east; and a center core building connector, as shown on Figure 3.4. Proposed building elevations are illustrated in **Figure 3.5: Proposed 201 Haskins Way Building Elevations (North and South)**. The main building entrance would be located on the north side of the center core building, adjacent to the surface parking lot and the Central Plaza. The center core building would also have a building entrance on the south side, off East Jamie Court.

The proposed 201 Haskins Way Building, which would contain office/R&D uses, would be situated along the southern property line so that it would be in close proximity to the existing office/R&D buildings across East Jamie Court. The proposed central atrium space would be in line with the proposed north-south visual and pedestrian connector between the 201 Haskins Way parcel and the break line between the two existing buildings on 400-450 East Jamie Court and through to the Bay. The proposed five-story building wing would extend west of the existing 400 East Jamie Court building to provide additional views of the Bay.

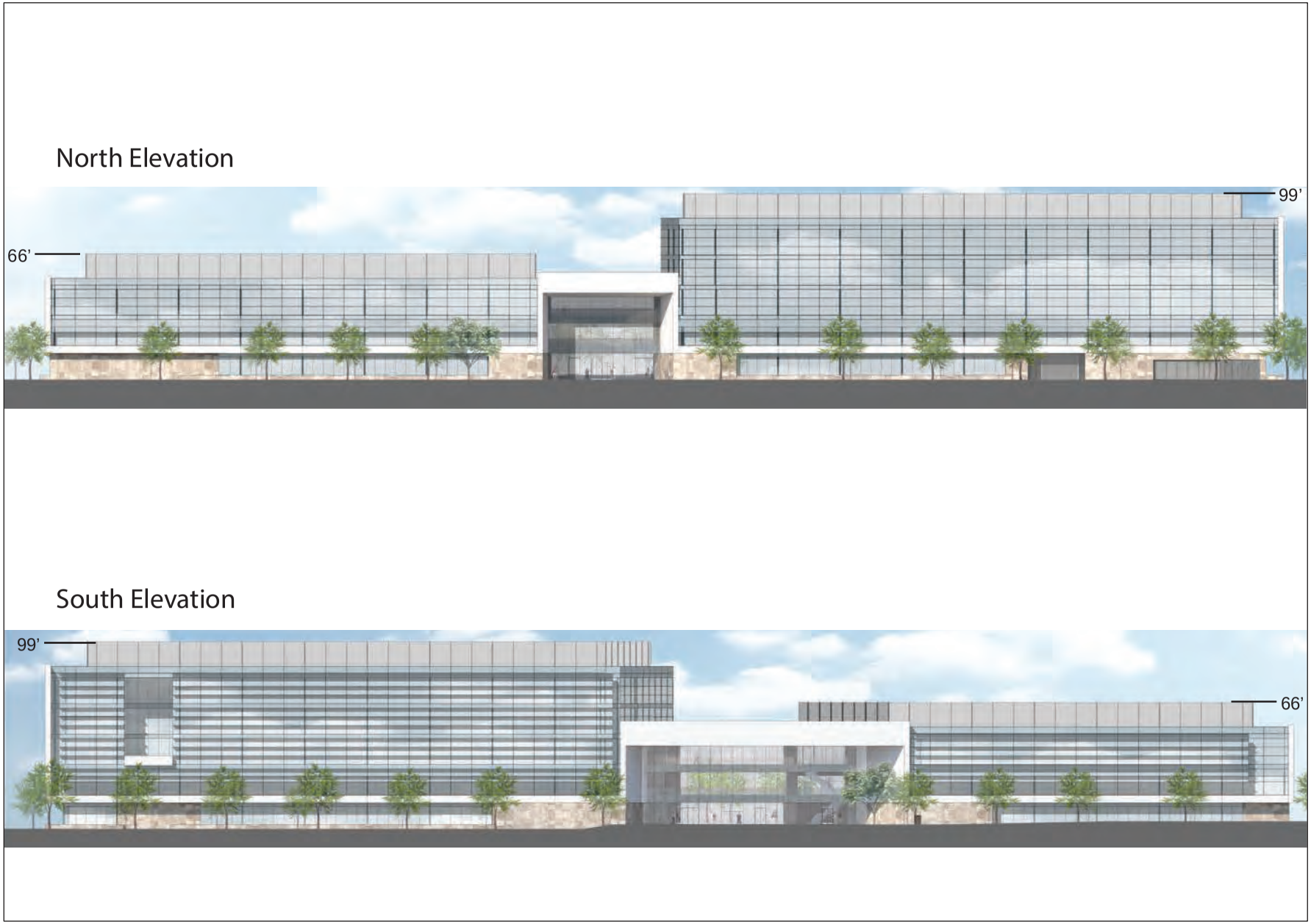
Phase 1 development also includes the construction of a five-level, 720-stall parking structure at the northeast corner of the site. Proposed garage elevations are illustrated in **Figure 3.6: Proposed Parking Structure Elevations – Phase 1 (South and West)**. The garage massing would be set back from Haskins Way and East Jamie Court. A new surface parking lot with an additional 183 parking stalls would be constructed on the northwestern portion of the parcel fronting Haskins Way and adjacent to the parking structure. A new Central Plaza would serve as a pedestrian connector between the surface parking lot, the parking garage, and the office/R&D building. An outdoor seating area and art display would be provided on the northwest corner of the parcel on Haskins Way.



Source: City of South San Francisco, SWCA (2018)

201 HASKINS WAY PROJECT

FIGURE 3.4: PROPOSED PROJECT SITE PLAN - PHASE 1



Source: WRNS (2018)

201 HASKINS WAY PROJECT

FIGURE 3.5: PROPOSED 201 HASKINS WAY BUILDING ELEVATIONS (NORTH AND SOUTH)

South Elevation



West Elevation



Source: WRNS (2018)

201 HASKINS WAY PROJECT

FIGURE 3.6: PROPOSED PARKING STRUCTURE ELEVATIONS - PHASE 1 (SOUTH AND WEST)

Materials proposed for the 201 Haskins Way Building would consist of primarily limestone, precast concrete, aluminum, and glass. The ground-floor façade would consist of limestone and the upper floors of the building, constructed of precast concrete frame laid with grey solar glass, would contrast with the stone of the ground floor. The atrium space would be plated with smart-tinting glass that can change from clear (to highlight the visual spine) to black for privacy during conferences and meetings. The rooftop mechanical areas would be faced with painted corrugated metal screen on painted metal framing. The primary materials for the garage would consist of concrete, stainless steel mesh, and aluminum panels.

400-450 EAST JAMIE COURT

During Phase 1 development, an approximately 25,000-sq.-ft., two-story, 32-foot-tall addition would be added to the northern face of the existing west building (400 East Jamie Court) for office/R&D use, as illustrated on Figure 3.4, p. 3.21. The building addition would be situated directly north of the existing building and would be generally bounded by the existing extent of the building's east-west massing. Its location was designed to maintain the central visual and pedestrian line between the 201 Haskins Way parcel and the Bay. The building addition materials would include glass, bronze anodized aluminum, board-formed concrete, and wood panels.

Amenities within the addition are conceptual at this time, but it would include a dedicated space that would be used as a café for employees. Dedicated employee-serving retail/amenity space would be excluded from FAR-determined square footage calculations provided that such development includes adequate parking and does not exceed 10 percent of the building square footage.[25,26,27]

During Phase 1 development, the existing surface parking lot would be partially reconfigured, with the removal of approximately 40 parking spaces and some existing landscaping and approximately 16 trees to make room for a wider two-way driveway and planter area. Additional parking spaces, to replace the removed parking spaces, would be provided in the proposed new 201 Haskins Way parking garage. The new planter would include new landscaping and trees. A new mid-block crosswalk on East Jamie Court, between the southern entrance of the proposed 201 Haskins Way Building and the existing 400-450 East Jamie Court buildings, would provide a pedestrian connection between these office/R&D buildings.

PHASE 2 DEVELOPMENT

Beyond construction of the 25,000-sq.-ft. building addition at 400-450 East Jamie Court during Phase 1 development, no specific Phase 2 development is proposed at 400-450 East Jamie Court or the six additional Phase 2 Parcels, and it is uncertain when or if such development would occur. If Phase 2

[25] Municipal Code Section 20.110.004(J)(1) provides that business, technology, and office parks containing 80,000 sq. ft. or more of floor area shall provide retail and service commercial uses, where feasible, that will serve employees of the park. Such commercial uses may occupy up to 10 percent of the total floor area within any project area.

[26] Municipal Code Section 20.400.004(B)(6) provides that projects subject to TDM requirements may implement onsite amenities including day care, cafeteria, limited food service establishment, dry cleaners, exercise facilities, and convenience retail as chosen by the applicant and determined appropriate by the Chief Planner.

[27] The 400-450 East Jamie Court parcel is located within a combined CC/Light Industrial land use category under the *East of 101 Area Plan*. Policy LU-24 of the plan states that dedicated retail space may be included in a development without being applied to the allowed FAR, provided that such development includes adequate parking and does not exceed 10 percent of the building square footage for Light Industrial and Planned Industrial Categories.

development occurs, it is uncertain whether it would occur as a single redevelopment of all Phase 2 area parcels (such as illustrated in the conceptual development plan discussed below) or as separate specific redevelopment of one or more Phase 2 area parcels. The proposed rezoning of the six additional Phase 2 area parcels would allow the existing light industrial uses to continue indefinitely, and alternatively would allow redevelopment at 1.0 FAR in accordance with the BTP rezoning.

The proposed Phase 2 development's uses, buildings, and facilities discussed below are conceptual and reflect potential development that could be constructed as a result of rezoning the Phase 2 area parcels.

Under the conceptual Phase 2 development plan, the proposed Phase 2 project would involve construction of a second new office/R&D building north of 201 Haskins Way along East Grand Avenue (referred to as the "East Grand Building" in this EIR), as shown in **Figure 3.7: Conceptual Project Site Plan – Project Buildout**. In the conceptual plan, the East Grand Building would contain approximately 256,232 gsf of office/R&D use. The remaining balance of FAR-defined square footage on the 400-450 East Jamie Court parcel would also be developed in Phase 2. It is assumed that, under the rezoning proposed by the project, the Phase 2 BTP development on the 400-450 East Jamie Court parcel would result in development of up to 85,000 sq. ft. of floor area.[28]

400-450 East Jamie Court

Under the proposed rezoning, the proposed project would allow for an additional 110,000 sq. ft. of BTP office/R&D use to be constructed on site. After development of the approximately 25,000 sq. ft. of floor area for the building addition during Phase 1, the remaining 85,000 sq. ft. of floor area on the 400-450 East Jamie Court parcel would be implemented in Phase 2. The Phase 2 development on this parcel is conceptual at this time. Site-specific, project-level design of Phase 2 would be subject to a separate plan review and discretionary approval process.[29]

East Grand Building and Parking Garage

Five of the parcels in the Phase 2 area (101 and 151 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court) are occupied by a one- to two-story building containing light industrial uses, including a kiteboarding equipment distribution warehouse, a packaging manufacturer, a van rental service, audio and visual equipment rental services, and a janitorial equipment supplier. A small surface parking lot serves each building. The parcel at APN 015-102-290 contains only a parking lot. Existing site lot sizes, land uses, parking, and heights are shown in Table 3.1, p. 3.8. During Phase 2 development, the five existing buildings would be demolished and the existing surface parking areas on these six parcels would be removed.

[28] FAR-defined square footage excludes areas defined under Sections 20.040.008 and 20.040.009. Floor area does not include areas such as mechanical, electrical, and communication equipment rooms; bay windows or other architectural projections; usable open space; and areas used for off-street parking spaces or loading spaces, driveways, or ramps.

[29] The final gross square footage of BTP use under Phase 2 would be determined by future design. Future development may also include FAR-excluded accessory uses such as dedicated retail space or child care, to be determined in coordination with the City and upon completion of final design.



Source: City of South San Francisco, SWCA (2018)

201 HASKINS WAY PROJECT

FIGURE 3.7: CONCEPTUAL PROJECT SITE PLAN - PROJECT BUILDOUT

In the conceptual plan for Phase 2 development, a new, approximately 256,232-gsf office/R&D building (the East Grand Building) would be constructed facing East Grand Avenue. The East Grand Building would have a three-story, 63-foot-tall wing to the west, a five-story, 95-foot-tall wing to the east, and center core building connector, as shown in **Figure 3.8: Conceptual East Grand Building Elevations (North and South)**.

The main building entrance would be on the north side of the center core building, adjacent to the surface parking lot and the Central Plaza. Under the conceptual plan, the center core building would also have a building entrance on the south side, off East Jamie Court.

Under the conceptual Phase 2 development plan, the smaller parking structure (the garage that would be constructed during Phase 1 development) would be expanded into parcels to the east to accommodate a total of 1,060 parking stalls at project buildout. Conceptual expanded garage elevations are illustrated in **Figure 3.9: Conceptual Parking Structure Elevations – Full Buildout (South and West)**. In the conceptual plan for Phase 2 development, an additional 243 parking stalls would also be provided in a new surface parking lot on the northeastern portion of the parcel fronting East Grand Avenue and adjacent to the parking structure, and east of the 201 Haskins Way Building.

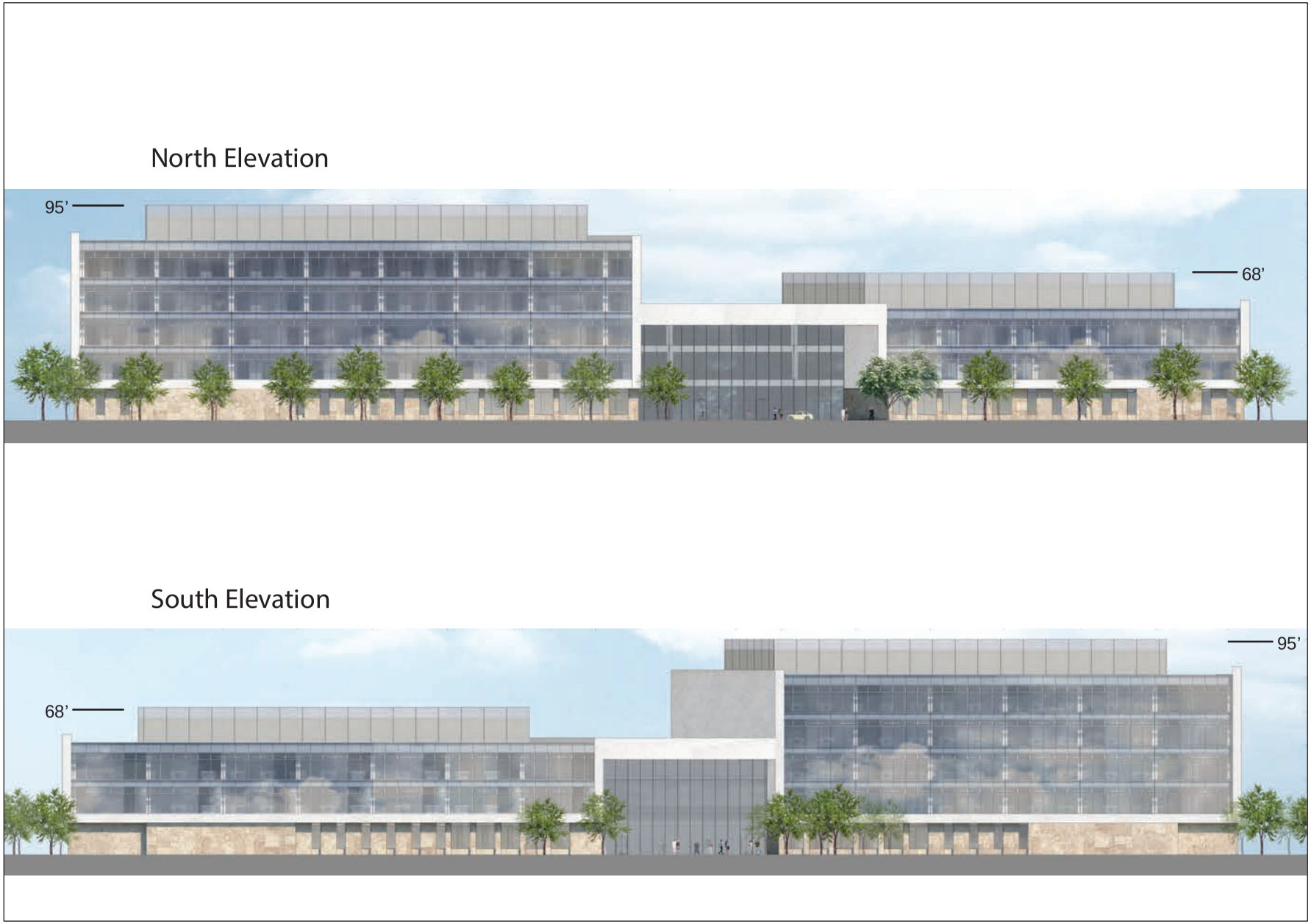
The Phase 2 conceptual development plan would strengthen and complete the central visual spine and the pedestrian link from East Grand Avenue to the East Grand Building, the 201 Haskins Way Building, the 400-450 East Jamie Court buildings, and the Bay. Under the conceptual site plan, the proposed three-story central atrium building connector in the East Grand Building would provide a visual link and a pedestrian path directly into the Central Plaza and central atrium of the proposed 201 Haskins Way office/R&D building. Development of new sidewalks along East Grand Avenue and south from the corner of East Grand Avenue and Haskins Way would provide further pedestrian links between the project site and adjacent uses.

CIRCULATION AND PARKING

The proposed project would remove existing driveways and off-street parking and construct new driveways, off-street parking, and bicycle and pedestrian amenities. The Phase 1 and conceptual Phase 2 development plans are designed to provide a unified campus where new amenities such as sidewalks would interconnect the proposed uses. Similarly, the project parking plan calls for a shared parking resource that would serve all eight parcels, and the quantity and location of parking stalls is designed in consideration of the balance between each of the proposed uses and parking requirements. This section describes the circulation and parking elements associated with the conceptual Phase 2 development plan, but actual details regarding circulation and parking for Phase 2 would be determined during the subsequent project-specific design review process.

Vehicle Circulation and Access

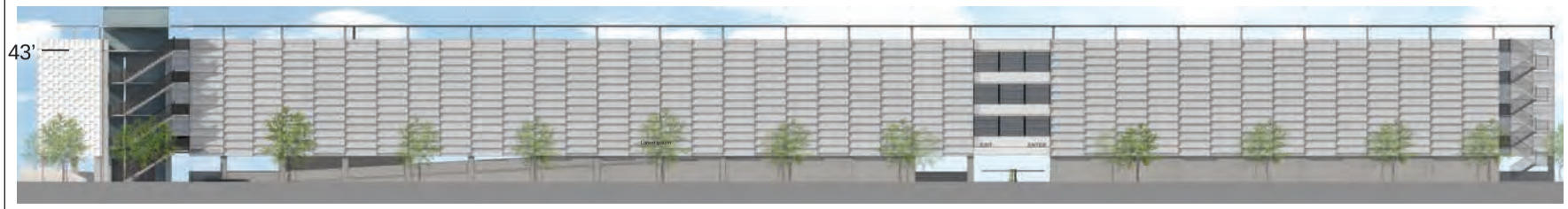
At project buildout, including the conceptual Phase 2 development plan, a total of six driveways would be removed: three driveways on Haskins Way, two driveways on East Grand Avenue, and one driveway on

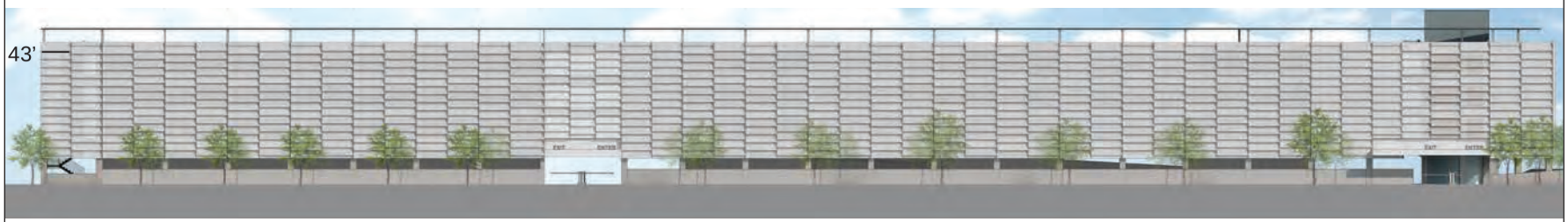


Source: WRNS (2017)

201 HASKINS WAY PROJECT

FIGURE 3.8: CONCEPTUAL EAST GRAND BUILDING ELEVATIONS (NORTH AND SOUTH)





Source: WRNS (2018)

201 HASKINS WAY PROJECT

FIGURE 3.9: CONCEPTUAL PARKING STRUCTURE ELEVATIONS - PROJECT BUILDOUT (SOUTH AND NORTH)

East Jamie Court. Four new driveways would be constructed at project buildout: two new driveways on Haskins Way, one new driveway on East Jamie Court, and one new driveway on East Grand Avenue, as shown on Figure 3.7, p. 3.26.

During Phase 1 development, the driveway on Haskins Way fronting the 201 Haskins Way parcel would be removed. Two new driveways would be constructed on Haskins Way fronting 201 Haskins Way, and one driveway would be constructed on the easternmost side of the parcel on East Jamie Court. The new driveways would provide vehicle access to the parking garage and surface parking lot. A new passenger loading roundabout (or "porte cochère") would be constructed in the center of the parcel from East Jamie Court. New sidewalks would be added along the southern parcel boundary at East Jamie Court Haskins Way along the parcel boundary.

During Phase 2 development, as illustrated in the conceptual plan in Figure 3.7, p. 3.26, the two existing driveways fronting 101 and 151 Haskins Way, and the two existing driveways fronting 410 and 430 East Grand Avenue would be removed, and a new driveway would be constructed on the easternmost boundary of the project site on East Grand Avenue. A passenger loading zone serving the East Grand Building would be constructed. New sidewalks would be constructed along East Grand Avenue, Haskins Way, and East Jamie Court.

Off-Street Parking

At project buildout (including the conceptual Phase 2 development plan), the project site would contain a total of approximately 1,930 parking stalls to serve the Phase 1 and conceptual Phase 2 areas of the project and the existing office buildings at 400-450 East Jamie Court:[30] 446 new parking stalls in three surface parking lots (a northeast lot, a southeast lot, and a west lot), 1,060 new parking stalls in a new, five-level, parking structure at the northeast corner of the site, and 424 existing parking stalls at 400-450 East Jamie Court (140 stalls in basement garage and 284 stalls in surface parking lot), as shown on Figure 3.7, p. 3.26, and Figure 3.6, p. 3.23.

During Phase 1 development, a total of 903 new parking stalls would be constructed on the 201 Haskins Way parcel. A new five-level parking structure with 720 parking stalls would be constructed at the northeast corner of the site, as shown on Figure 3.4, p. 3.21, and Figure 3.6, p. 3.23. A new surface parking lot would be constructed on the northwestern portion of 201 Haskins Way parcel, and some additional stalls would be constructed adjacent to the parking structure, totaling 183 spaces. One hundred and sixty spaces, or 12 percent of spaces provided during Phase 1 development, would be provided for electric vehicles, carpool, van pool, and other shared vehicles. These spaces would be located closest to building entrances for maximum convenience for those who carpool.

The existing 400-450 East Jamie Court parcel contains 324 surface parking stalls and a 140-stall basement parking garage. To construct the approximately 25,000-sq.-ft. building addition on 400-450

[30] Required off-street vehicle parking is calculated at a rate of one stall per 350 sq. ft. of office and R&D uses. The Planning Commission may approve a conditional use permit (CUP) to reduce onsite parking requirements if it finds that special conditions exist that will reduce parking demand at the project site, including: (1) proximity to frequent transit service; (2) transportation characteristics of persons residing, working, or visiting the site; or (3) or because the applicant has undertaken a TDM Plan.

East Jamie Court during Phase 1 development and reconfigure the East Jamie Court driveway on the 400-450 East Jamie Court parcel, approximately 40 existing surface parking spaces on that parcel would be removed (for a proposed total of 284 surface parking stalls in addition to the 140-stall basement parking garage on 400-450 East Jamie Court). The proposed 201 Haskins Way parking structure is designed to accommodate replacement spaces to serve the existing 400-450 East Jamie Court uses.

During Phase 2 development, as depicted in the conceptual plan, 603 additional stalls would be constructed in the six additional parcels in the Phase 2 area: 243 additional surface parking stalls in the Phase 2 portion of the project site and 360 additional stalls within the existing Phase 1 parking garage on the 201 Haskins Way parcel, which would be expanded east into the parcels located at 451 East Jamie Court and APN 015-102-290, as illustrated in Figure 3.9, p. 3.29.

On-Street Parking

At project buildout (as illustrated in the conceptual Phase 2 development plan on Figure 3.7, p. 3.26) the existing driveways on Haskins Way would be removed and the on-street parking area on Haskins Way would be increased by approximately 280 feet (one driveway during Phase 1 development and two driveways during conceptual Phase 2 development), for a total of approximately 580 feet of unmarked on-street parking area on Haskins Way. There is no existing on-street parking on East Jamie Court, and no new on-street parking on East Jamie Court would be made available during Phase 1 development or at project buildout. There are no existing marked parking spaces along East Grand Avenue, and no new on-street parking would be made available on East Grand Avenue.

Pedestrian Access

As shown on Figure 3.4, p. 3.21, new sidewalks with street trees and landscaping buffers would be constructed along East Jamie Court, Haskins Way, and East Grand Avenue at project buildout (portions of Haskins Way and East Jamie Court during Phase 1 development, and the remaining areas during Phase 2 development, as depicted in the conceptual plan). New entryways connecting the office/R&D buildings and sidewalks would be constructed on East Jamie Court and on East Grand Avenue (one entryway on East Jamie Court during Phase 1 and one entryway on East Grand Avenue, as illustrated in the conceptual plan). An outdoor eating area located along Haskins Way would also be used as pedestrian access through the northwest frontage of the 201 Haskins Way parcel.

Bicycle Facilities

Both of the proposed office/R&D buildings (the 201 Haskins Way Building and the conceptual East Grand Building) would include showers and clothes locker facilities, and short-term and long-term bicycle parking spaces. The proposed project would include bicycle parking in accordance with the state's Title 24 Green Building Standards (CALGreen) Section 5.106.4.1.2, and would meet Leadership in Energy and Environmental Design Version 4 (LEED v4) bicycle parking standards.[31] Approximately 150

[31] CALGreen Section 5.106.4.1.2 requires new nonresidential buildings to include long-term bicycle parking equal to 5 percent of vehicle spaces. LEED v4 indicates that long-term bicycle parking should be equal to 5 percent of building occupants. Per

short-term bicycle parking spaces would be provided within 50 feet of the main entrance to the office/R&D buildings (80 spaces at the 201 Haskins Way Building, and 70 spaces at the conceptual East Grand Building).[32] The proposed project would also include approximately 81 long-term secured bicycle parking spaces (45 spaces at the 201 Haskins Way Building during Phase 1 development and 36 spaces at the East Grand Building during conceptual Phase 2 development). At least 31 spaces would be provided as covered parking (17 spaces at the 201 Haskins Way Building and 14 spaces at the conceptual East Grand Building).[33] The final location, design, and number of bicycle parking spaces would be informed by the final TDM Plan and plan review process.

Site Landscaping and Open Space

The proposed project (including the conceptual Phase 2 development plan) would involve the removal of existing landscaping and a total of approximately 121 existing trees on the project site. During Phase 1 development, approximately 30 trees on the 201 Haskins Way parcel and 16 trees on 400-450 East Jamie Court would be removed; during conceptual Phase 2 development, approximately existing 75 trees on the six remaining parcels in the Phase 2 area would be removed, as illustrated in the conceptual plan on Figure 3.7, p. 3.26. At project buildout, the parcel boundaries fronting East Grand Avenue, Haskins Way, and East Jamie Court would be landscaped with street trees 30 feet apart and the interior of the site would be landscaped. In total, approximately 263 new trees would be planted. The Phase 1 and project buildout, as illustrated in the conceptual plan, include at least 15 percent lot coverage for landscaping.

In addition, a new Central Plaza would be constructed on the 201 Haskins Way parcel during Phase 1 development, serving as a pedestrian connector between the surface parking lot, the parking garage, and the office/R&D building. This plaza would include landscaping, seating areas, and a basketball court.

INFRASTRUCTURE

The project site is serviced by existing potable water, stormwater, sanitary sewer, natural gas, electric, and trash and recycling services. New on-site facilities would be connected to existing services along East Grand Avenue, Haskins Way, and East Jamie Court. No expansion or increased capacity of off-site infrastructure would occur. Detailed descriptions of existing utility infrastructure are provided below.

Potable Water

Each new building would be connected to the existing potable water system and would have water-efficient plumbing fixtures and appliances to reduce the use of potable drinking water. Firefighting water would be provided from the existing fire hydrants on East Grand Avenue, Haskins Way, and East Jamie

Municipal Code Section 20.330.008, non-residential uses require a ratio of one long-term bicycle parking space per 25 vehicle spaces.

[32] Per Municipal Code Section 20.330.008, projects in Commercial land use classifications must include short-term bicycle parking spaces at a rate of 10 percent of the number of required automobile parking spaces.

[33] Per Municipal Code Section 20.330.008, all long-term bicycle parking must be secured in an enclosed bicycle locker; a fenced, covered, locked or guarded storage area; or a rack or stand inside a building within view of an attendant or visible from employee work areas. Over 50 percent of long-term bicycle parking spaces must be covered. Covered parking can be provided inside buildings, under roof overhangs or awnings, in bicycle lockers, or within or under other structures.

Court, described in Existing Utility Infrastructure, p. 3.14, as well as from new fire hydrants that would be constructed on site. The new hydrants would connect with existing firefighting water supplies.

Stormwater

The proposed project would change the configuration of pervious and impervious surfaces on site, but would not generate any substantial increase or decrease in peak stormwater flow compared to existing conditions during Phase 1 development or at project buildout as depicted in the conceptual plan. The project site would continue to be served by existing storm drains on Haskins Way, East Jamie Court, and East Grand Avenue. Each of these drains flows to Haskins Way and the Bay outfall south of the project site. No expansions of existing off-site stormwater infrastructure are anticipated to be required.

During Phase 1 development, new on-site storm drains would be constructed on the 201 Haskins Way parcel, with one 24-inch connection to the existing 48-inch-diameter Haskins Way drain and two secondary storm drain connections to the existing 24-inch-diameter storm drain in East Jamie Court. On site, two new storm drains would flow to the new 24-inch Haskins Way connector: one 18-inch line constructed along the center of the site from east to west, and one 18-inch line constructed along the northern portion of the site running east and south to the same connection. One 12-inch storm drain connection would be constructed form the southern portion of the 201 Haskins Way Building to meet the 24-inch East Jamie court stormwater line. On the 400-450 East Jamie Court parcel, existing-onsite 12-inch storm drains would be reconfigured to accommodate the new 25,000-gsf building addition using the existing 15-inch connector to the 48-inch Haskins Way storm drain.

During Phase 2 development, it is anticipated that a similar on-site storm drain system would be constructed, generally flowing west and south to Haskins Way. Additional connections to the existing storm drain on East Grand Avenue may also be required for drainages fronting the northern project site boundary.

Under both phases of development (including the conceptual Phase 2 development plan), the proposed project would be designed to conserve resources and protect water quality through the management of stormwater runoff as part of green infrastructure through low-impact development (LID). This approach implements engineered controls to allow stormwater filtering, storage, and flood control. The proposed project (including the conceptual Phase 2 plan) involves minor grading to allow controlled stormwater flows through paved areas into designated bioretention areas or storm drains. Portions of roof areas would also be designed as green roofs that would provide filtration. Stormwater received through all proposed roof areas would be routed to the ground level through downspouts and conveyed to bioretention areas. The bioretention areas would be designed to allow water to evaporate, and provide pre-treatment of pollutants such as trash, debris, and larger sediments, as well as filtration of other pollutants. After collection, filtered stormwater would be allowed to infiltrate into groundwater or to storm drainage conveyances. The proposed new office/R&D uses would adhere to LEED, City, and National Pollutant Discharge Elimination System conservation measures applicable to water conservation, LID, and landscaping requirements.

Sanitary Sewer

New on-site sanitary sewer lines would connect to the existing 15-inch-diameter sewer line that runs along the northern parcel boundary of 201 Haskins Way, or to the existing 8-inch-diameter sanitary sewer lines beneath East Grand Avenue, Haskins Way and East Jamie Court that feed into the 15-inch-diameter sewer line. During Phase 1, new on-site sewer lines would be constructed in an east-west direction near the new 201 Haskins Way Building on the southern portion of the site, connecting to the existing 8-inch sewer line on Haskins Way. On the 400-450 East Jamie Court parcel, existing on-site sewer lines would be reconfigured to accommodate the new 25,000-gsf building addition using the existing connection to the 8-inch East Jamie Court sewer line. During Phase 2, new on-site sewer lines would be constructed with connection to the existing 15-inch-diameter sewer line that runs along the northern parcel boundary of 201 Haskins Way.

Natural Gas and Electric

Electrical and natural gas service to the project site would be provided by PG&E from a joint dry utility conduit containing electric and telecommunication distribution lines and existing natural gas lines under East Grand Avenue, Haskins Way and East Jamie Court.[34,35] The new 201 Haskins Way Building, conceptual East Grand Building, and 400-450 East Jamie Court additions would connect to the PG&E grid. The joint trench would tie in to the existing electric lines on East Grand Avenue at the intersection of East Grand Avenue and Haskins Way, and the conduit would continue south on Haskins Way. The proposed tie-in to the electric and gas lines would be located on Haskins Way near the northwest corner of the proposed 201 Haskins Way Building. New tie-in facilities, including conduits, underground transformers, and splice boxes, would be constructed using temporary pot holes, bell holes or trenches in the street right-of-way.[36] Similar tie-ins would be conducted serving the conceptual East Grand Building and the proposed building addition and future buildout of the 400-450 East Jamie Court parcel. The proposed project would comply with CALGreen requirements for energy efficiency in new buildings and would also be designed to meet LEED v4 standards.

Refuse and Recycling

The project site is served by the South San Francisco Scavenger Company and Blue Line Transfer, Inc. located immediately east of the project site. In the proposed Haskins Way Building and conceptual East Grand Building, trash processing and loading areas would be located in the west wing and in the east wing of each building. Loading docks would be on-site and away from street circulation.

[34] Pacific Gas and Electric Company, 2018. 201 Haskins Way Will-Serve Letter from Tosin Ladeinde, Industrial Power Engineer, September 5, 2018.
[35] RGA Design and WRNS Studio, 2018. Haskins Biotech Campus – South San Francisco – Joint Trench Intent, August 10, 2018.
[36] A bell hole is dug over and along the side of buried pipelines or in a trench to allow room for persons to perform maintenance-related work on the pipeline (i.e., coating repairs, welding, connections, or pipe replacement). Smaller holes are called pot holes.

SUSTAINABILITY

The proposed project would be designed to enhance resource efficiency and ensure good indoor environmental quality, as well as reduce energy consumption, water consumption, and waste. Proposed design elements, including shuttle connectivity and bicycle facilities, would encourage alternative transportation modes. The project would be designed to meet the standards of the Municipal Code and CALGreen building requirements and CALGreen Tier 2 energy efficiency requirements, as well as LEED v4 "Gold" design standards. The project would also be designed to meet International WELL and FITWELL Building Institute Standards and may also be certified thereto.[37] The proposed project would include construction of rooftop solar photovoltaic panel-ready connectivity located on the proposed parking garage.

CONSTRUCTION

Construction Schedule

It is assumed the proposed project would be constructed in two development phases. For the purposes of evaluation under this EIR, project build-out is assumed to occur over two phases and approximately 4 years after project entitlements, if executed from start to finish. Construction would not commence until the existing uses within each phase area have vacated.

Phase 1 development encompasses the construction of the 201 Haskins Way parcel (the 201 Haskins Way Building, the parking garage, and surface parking lot) and the building addition on 400-450 East Jamie Court. Construction is anticipated to take approximately 18 months after project entitlements. The preliminary construction schedule assumes 2019 as the start of construction and 2021 as the end of construction.

The proposed rezoning of the Phase 2 area parcels would allow the existing uses to continue[38] or alternatively, would allow redevelopment at 1.0 FAR in accordance with the BTP rezoning. At this time, no specific Phase 2 development is proposed, and it is uncertain when or if such development would occur. Nonetheless, in order to provide a conservative (worst-case) analysis of construction impacts for CEQA purposes, it is assumed for purposes of this EIR that Phase 2 construction would commence in 2021 (immediately after completion of Phase 1 construction) and would occur over an 18-month period. Although it is unlikely that Phase 2 development would occur both this soon and this quickly, these assumptions provide for a conservative analysis because they assume continuous construction over a shorter time period (i.e., more concentrated). Development during Phase 2 as depicted in the conceptual development plan would include the expansion of the parking garage built in Phase 1, and construction of the new East Grand Building and surface parking lots. Construction would not commence until the existing uses have vacated.

[37] The proposed project would be designed to meet WELL standards, but may not formally certify. The WELL Standards were developed by a public benefit corporation through the integration of scientific and medical research and literature on environmental health, behavioral factors, health outcomes and demographic risk factors that affect health with leading practices in building design and management. WELL also references existing standards and best practice guidelines set by governmental and professional organizations.

[38] Pursuant to City of South San Francisco Municipal Code Section 20.110.002.

Construction-related activities would typically occur Monday through Friday, between 8 a.m. and 8 p.m., although some work is anticipated to occur on Saturdays between 9 a.m. and 8 p.m. or on Sundays between 10 a.m. and 6 p.m. The hours of construction would be stipulated by the Building Division, and the contractor would be required to comply with the South San Francisco Noise Ordinance. Nighttime construction work is not anticipated, nor is construction anticipated to occur on major legal holidays.

Demolition, Site Grading, and Preparation

The proposed project (including the conceptual Phase 2 plan) would result in the generation of approximately 9,000 tons of demolition debris (2,000 tons of debris during Phase 1 development, and 7,000 tons of debris during conceptual Phase 2 development) and 10,000 cubic yards of concrete and asphalt debris (5,000 cubic yards in Phase 1, and 5,000 cubic yards in conceptual Phase 2 development). Excavation below existing grade would result in a total of approximately 19,000 cubic yards of soils off-haul generated during the construction period (11,000 cubic yards of soil during Phase 1 development, and 8,000 cubic yards of soil during conceptual Phase 2 development), and construction would result in a total of approximately 25,000 cubic yards of imported soils (15,000 cubic yards during Phase 1 development, and 11,000 cubic yards during conceptual Phase 2 development). All construction materials would be stored on the project site; no off-site staging areas would be needed. Construction workers would park on the project site or use existing on-street parking on Haskins Way.

During Phase 1 development, to address existing environmental issues on the 201 Haskins Way site described above in Existing Subsurface Conditions, soil excavation would generally occur to a depth of approximately 2 feet beneath the proposed future building footprints. Excavation may also include removal of the former UST hot spot area to a depth of 13 feet below ground surface.

A Phase I Environmental Site Assessment of the additional six Phase 2 area parcels has not been conducted. However, it is assumed that similar environmental conditions related to subsurface contaminated soils may be present.

Based on the results of a preliminary geotechnical evaluation, the 201 Haskins Way parcel contains highly variable subsurface conditions including undocumented fill, varying thickness of compressible soil, and varying depth to bedrock; potential for seismic hazards; the presence of groundwater at shallow depths; and settlement.[39] A geotechnical evaluation of the additional six Phase 2 area parcels has not been conducted. The proposed project would be designed based on site-specific conditions, and may include deep foundations consisting of augured-cast-in-place piles, or drilled shafts. To limit the amount of spoils produced, drilled displacement piles, a type of cast-in-place pile that uses a displacement tool during installation, may be used. A detailed geotechnical investigation would be performed prior to development of final plans.

On the project site, groundwater depths ranging from approximately 8 to 15 feet below ground surface have been encountered, generally shallowest in the southern areas of the site. Based on the results of the preliminary geotechnical evaluation completed for the 201 Haskins Way parcel, deep foundations may be

[39] Langan, 2017. *Preliminary Geotechnical Evaluation, 201 Haskins Way, South San Francisco, California*, September 22, 2017.

required and dewatering may be needed. A detailed geotechnical investigation would be performed prior to development of final plans. It is assumed that excavation during Phase 2 development may also encounter groundwater and require dewatering.

3.3.3 Transportation Demand Management Plan

Both Phase 1 and conceptual Phase 2 development would require submittal of a TDM Plan to the Planning Division for review and approval. The proposed TDM Plan may be refined during the planning review process for project entitlements. The plan would be designed to achieve three basic goals: (1) convert single-occupant vehicle trips to an alternative mode of transportation (e.g., transit, carpools or vanpools, bicycling); (2) provide technological solutions (e.g., compressed natural gas, electric/hybrid vehicles, or other zero emission vehicles); and (3) eliminate trips (e.g., compressed work weeks, telecommute), consistent with the requirements of the zoning ordinance. Efficacy of the TDM Plan is subject to monitoring and enforcement through an annual commuter survey, annual summary report, and a triennial report. If the required alternative mode use is still not achieved after the second triennial report, the City may assess a penalty established by City Council resolution on the basis of the project size and actual percentage alternative mode use as compared to the percent alternative mode use established in the TDM Plan.

3.3.4 Lead Agency Approvals

CITY OF SOUTH SAN FRANCISCO

Planning Division

- Zoning Map Amendments
- Design Review
- Transportation Demand Management (TDM) Plan Approval
- Conditional Use Permit(s) (CUP)
- Subdivision Map(s)
- CEQA Document Approval

Engineering Division

- Grading Permits
- Encroachment Permits
- Plan Check

Building Division

- Building Permits
- Certificate of Occupancy

Parks and Recreation Department

- Protected Tree Removal Application

Other

- Fire Code Compliance

OTHER AGENCY AUTHORITIES

- Bay Area Regional Water Quality Control Board – Issuance of a National Pollution Discharge Elimination System Permit with Storm Water Pollution Prevention Plan
- Bay Area Air Quality Management District – Ensure all applicable federal and state air quality standards are achieved and maintained
- San Mateo County Department of Environmental Heath – Ensure compliance with regulations related to site cleanup and Hazardous Materials Business Plans
- Federal Aviation Administration – Notice of Proposed Construction and Alteration and FAA Determination per CFR Title 14, Part 77.9
- Airport Land Use Commission – Referral to ALUC regarding rezoning of the Property to ensure consistency with the relevant policies of the 2012 SFO Comprehensive Airport Land Use Compatibility Plan
- San Francisco Bay Conservation and Development Commission (BCDC) – Ensure compliance with the San Francisco Bay Plan and BCDC Permit issued for 400-450 East Jamie Court

4 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION

4.1 Approach to Environmental Analysis

The proposed 201 Haskins Way Project (project) would be constructed in at least two development phases. Alexandria Real Estate Equities is proposing a specific development plan for the proposed Phase 1 site. Currently, there is no site-specific development program proposed for Phase 2; development of Phase 2 would require subsequent project-level site design. For the purposes of analysis under the California Environmental Quality Act (CEQA), this Environmental Impact Report (EIR) assumes the project would be constructed in two phases with the proposed Phase 1 site plan and a conceptual Phase 2 development for buildout of the project site. Where applicable, the EIR presents separate analysis of the project impacts of the Phase 1 development in order to differentiate Phase 1 project impacts and/or identify any necessary, feasible mitigation measures. When separate, phased project analysis is not necessary, the EIR presents project impacts of Phase 1 and 2 development combined (referred to as "project buildout" in this EIR).

4.1.1 Introduction to Analysis

This section describes the format of the environmental analysis in each environmental topic section of the chapter; discusses the effect of Public Resources Code Section 21099 on the scope of CEQA analysis for the project; and explains the general approaches to baseline setting and cumulative analysis in this EIR.

4.1.2 Format of the Environmental Analysis

Sections 4.2 through 4.11 address the physical environmental effects of the proposed project on the required CEQA environmental topics, as follows:

- Section 4.2, Air Quality
- Section 4.3, Biological Resources
- Section 4.4, Cultural Resources
- Section 4.5, Greenhouse Gas Emissions
- Section 4.6, Hydrology and Water Quality
- Section 4.7, Land Use and Planning
- Section 4.8, Noise and Vibration
- Section 4.9, Transportation and Traffic
- Section 4.10, Utilities and Service Systems
- Section 4.11, Less-than-Significant Impacts
  - 4.11.1, Introduction
  - 4.11.2, Agriculture and Forest Resources
  - 4.11.3, Aesthetics
  - 4.11.4, Geology and Soils
  - 4.11.5, Hazards and Hazardous Materials
  - 4.11.6, Minerals and Energy Resources
  - 4.11.7, Population and Housing
  - 4.11.8, Public Services
  - 4.11.9, Recreation

Sections 4.2 through 4.10 contain the following subsections: Environmental Setting, Regulatory Framework, and Impacts and Mitigation Measures, described below. Topics discussed in Section 4.11 include a brief description of the regulatory framework, significance criteria, approach to analysis, and impacts.

ENVIRONMENTAL SETTING

The Environmental Setting subsection for each environmental topic defines and describes the existing conditions in the project site and vicinity as they relate specifically to that topic. The description of existing environmental conditions serves as the "baseline" for measuring the changes to the environment that would result from the project and for determining whether those environmental effects would be significant. In general, existing conditions are the physical conditions that existed at the time that the Notice of Preparation (NOP) for the proposed project is issued (CEQA Guidelines Section 15125(a)). However, the EIR may include projects that are approved and under construction and are reasonably likely to be completed and occupied or in operation when the proposed project is expected to be implemented. The EIR may also take into account former conditions or circumstances that have changed prior to publication of the NOP as the baseline for evaluating an impact(s). As further described below in Section 4.1.4, Approach to Baseline Setting, the modified existing conditions serve as the baseline for the analysis of environmental impacts.

REGULATORY FRAMEWORK

The Regulatory Framework subsection describes federal, state, regional, and local regulatory requirements that are directly applicable to the environmental topic.

IMPACTS AND MITIGATION MEASURES

The Impacts and Mitigation Measures subsection describes the physical environmental impacts of the proposed project for each topic, as well as any mitigation measures that could reduce potentially significant impacts to less-than-significant levels. This subsection begins with a listing of the significance criteria used to assess the severity of the environmental impacts for that particular topic based on the CEQA Guidelines Appendix G checklist. Environmental topic sections also include a topic-specific "Approach to Analysis," explaining the parameters, assumptions, and data used in the analysis.

Under the "Impact Evaluation" discussion, the project-level impact analysis for each topic begins with an impact statement that reflects the applicable significance criteria. Some significance criteria may be combined in a single impact statement, if appropriate. Each impact statement is keyed to a subject area abbreviation (e.g., AQ for Air Quality) and an impact number (e.g., 1, 2, 3) for a combined alpha-numeric code (e.g., Impact AQ-1, Impact AQ-2, Impact AQ-3). When potentially significant impacts are identified, mitigation measures are presented, if feasible, to avoid, eliminate, or reduce significant adverse impacts of the project. Each mitigation measure is numbered to correspond to the impact statement to which it pertains (e.g., Mitigation Measure MM-AQ-1 corresponds to Impact AQ-1). If there is more than one mitigation measure for the same impact statement, the mitigation measure numbers include a lowercase letter suffix (e.g., Mitigation Measures MM-AQ-1a and AQ-1b).

Each impact statement describes the impact that would occur without mitigation. The level of significance of the impact is indicated in parentheses at the end of the impact statement based on the following terms:

- No Impact – No adverse physical changes (or impacts) to the environment are expected.
- Less than Significant – Impact that does not exceed the defined significance criteria or would be eliminated or reduced to a less-than-significant level through compliance with existing local, state, and federal laws and regulations.
- Less than Significant with Mitigation – Impact that is reduced to a less-than-significant level through implementation of the identified mitigation measures.
- Significant and Unavoidable with Mitigation – Impact that exceeds the defined significance criteria and can be reduced through compliance with existing local, state, and federal laws and regulations and/or implementation of all feasible mitigation measures, but cannot be reduced to a less-than-significant level.
- Significant and Unavoidable – Impact that exceeds the defined significance criteria and cannot be eliminated or reduced to a less-than-significant level through compliance with existing local, state, and federal laws and regulations and for which there are no feasible mitigation measures.

The proposed project's cumulatively considerable contributions to significant cumulative impacts are described in a separate subsection following the project-level impact analysis for each environmental topic. Cumulative impact statements are numbered consecutively for each impact statement with a combined alpha-numeric code to signify it is a significant cumulative impact. For example, C-AQ-1 refers to the first significant cumulative impact for Air Quality.

4.1.3 Public Resources Code Section 21099

Public Resources Code Section 21099 requires that the State Office of Planning and Research (OPR) amend the CEQA Guidelines to provide an alternative to level of service (LOS) for evaluating traffic impacts of proposed projects. The new Guidelines must establish criteria that "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." Public Resources Code Section 21099(b)(2) states that upon certification of the revised guidelines for determining transportation impacts pursuant to Section 21099(b)(1), automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion, shall not be considered a significant impact on the environment under CEQA.

In January 2016, OPR published for public review and comment a "Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA," recommending that transportation impacts for projects be measured using a vehicle miles traveled (VMT) metric, and in November 2017 OPR published a "Technical Advisory on Evaluating Transportation Impacts in CEQA." A VMT and induced automobile travel impact analysis is provided in Section 4.9, Transportation and Traffic. The topic of automobile delay, nonetheless, may be considered by decision-makers, independent of the environmental review process, as part of their decision to approve, modify, or disapprove the proposed project. Therefore, a discussion of automobile delay is provided for informational purposes. The VMT metric does not apply to the analysis of impacts on non-automobile modes of travel such as riding transit, walking, and bicycling.

4.1.4 Approach to Baseline Setting

Project development characteristics are typically compared to the existing physical environment to isolate impacts caused by the project on its surroundings. In other words, the existing condition (also referred to as the environmental setting) is normally the baseline against which the project's impacts are measured to determine whether impacts are significant. Therefore, the Environmental Setting subsection of each topic describes existing conditions on and around the project site. These existing conditions are ordinarily established as of the date that the NOP is published. In some circumstances, however, it is appropriate to use a different baseline to identify project impacts to account for circumstances that can change over time during the course of the environmental review, project construction, and operation.

The baseline setting for the proposed project includes the existing uses on the Phase 1 and Phase 2 parcels. An EIR also may take into account former conditions or circumstances that have changed prior to publication of the NOP as the baseline for evaluating an impact(s). The baseline setting for the proposed project includes the historical light industrial trucking use at 201 Haskins Way, which was recently vacated prior to publication of the NOP.

Presented below is a list of the development projects that are approved and expected to be operational prior to construction of the proposed project and would affect the environmental setting of the East of 101 Area. For these reasons, the development projects are considered part of the baseline condition against which the proposed project is evaluated for environmental impacts. The number of each project listed corresponds to its numbered location on **Figure 4.1.1: Location of Baseline and Cumulative Projects**. The figure shows the location of baseline projects within the vicinity of the project site. Figure 4.1.1 also corresponds to the locations of projects for which the City of South San Francisco (City) had an application on file, but for which construction had not commenced as of the date the NOP for the proposed project was published. Such projects are considered additional reasonably foreseeable future projects and are discussed below in Section 4.1.5, Approach to Cumulative Impact Analysis, on pp. 4.1.7-4.1.9.

For several physical environmental topics, project-related impacts are unlikely to interact with conditions greater than a 0.5-mile radius from the project site, such as aesthetics, geology and soils, hazards and hazardous materials, and noise and vibration. However, some impacts related to air quality, greenhouse gas emissions, biological resources, population growth, and water quality can affect existing conditions on a more regional scale. Several other City projects are located more than 0.5 mile from the project site but within the East of 101 Area and are confined by the same infrastructure network, particularly with regard to transportation and circulation, public services, and utilities and service systems. Therefore, the impacts generated by these projects have also been considered to provide a final adjusted baseline in order to properly reflect conditions against which the proposed project is analyzed.



Key	Project
Baseline Projects	
1	249 East Grand Avenue
2	Genentech Childcare Facility
3	Genentech Building B-40
4	213-221 East Grand Avenue
5	475 Eccles Avenue
6	560 Eccles Avenue
7	550 Gateway Boulevard
8	127 West Harris Avenue
9	Britannia Cove at Oyster Point
10	Oyster Point Specific Plan Phase I
11	Gateway Business Park Phase I
12	Caltrain Station Improvements Project
Cumulative Projects	
13	494 Forbes Boulevard
14	328 Roebling Road
15	Gateway Business Park Phases II-V
16	Oyster Point Specific Plan Phases II-IV
	Genentech Master Plan Update
	Downtown Station Area Plan

Source: City of South San Francisco, SWCA (2018)

Miles
0 0.125 0.25 0.5

201 HASKINS WAY PROJECT

FIGURE 4.1.1: LOCATION OF BASELINE AND CUMULATIVE PROJECTS

The following baseline projects are located within a 0.5-mile radius of the project site (the numbers are keyed to Figure 4.1.1):

1. **249 East Grand Avenue.** The project includes construction of four office/research and development (R&D) buildings totaling approximately 540,000 square feet (sq. ft.), and a four-level parking garage on a 15.75-acre site. *(Entitled October 2017, final building to be completed Quarter 1 of 2019.)*
2. **Genentech Childcare Facility.** The project includes construction of an 11,000-sq.-ft. administrative building and four 11,300-sq.-ft. classrooms serving up to 500 children and 175 staff members. *(Entitled August 2017, construction completed June 2018.)*
3. **Genentech Building B-40.** The project includes construction of an eight-story, 160,000-sq.-ft. office and amenity building. *(Entitled March 2017, construction to be completed in Quarter 4 of 2019.)*

The following baseline projects are located in the East of 101 Area (the numbers are keyed to Figure 4.1.1):

4. **213-221 East Grand Avenue (Merck Campus Buildings 1-3).** The project includes construction of a nine-story, 291,000-sq.-ft. office/R&D building, and a multi-level parking garage on a 6.2-acre site. *(Entitled June 2017, construction to be completed in Quarter 1 of 2019.)*
5. **475 Eccles Avenue.** The project includes construction of two four-story office/R&D buildings totaling 262,287 sq. ft., and a five-level parking garage on a 6.1-acre site. *(Entitled June 2017, site preparation underway, construction completion date TBD.)*
6. **560 Eccles Avenue (USDA Office Building).** The project includes construction of a 21,807-sq.-ft. office building on a 3.62-acre site. *(Entitled December 2017, construction initiated winter 2017, construction to be completed in Quarter 2 of 2019.)*
7. **550 Gateway Boulevard.** The project includes construction of a five-story hotel with 151 rooms and 87,120 sq. ft. on a 2-acre site. *(Entitled September 2016, construction to be completed in Quarter 1 of 2019.)*
8. **127 West Harris (Marriott Fairfield Inn & Suites).** The project includes construction of a five-story hotel with 128 rooms on a 64,117-sq.-ft. site. *(Entitled August 2015, construction to be completed in Quarter 4 of 2018.)*
9. **Britannia Cove at Oyster Point.** The project includes construction of seven office/R&D buildings totaling 88,344 sq. ft.; a 200-room, 126,000-sq.-ft. hotel building; 20,000 sq. ft. of retail and restaurant uses; and an eight-story parking structure. *(Entitled February 2014, construction to be completed in Quarter 3 of 2019.)*
10. **Oyster Point Redevelopment Plan Phase 1.** The project includes a multi-phased development of the 81-acre Oyster Point site. Phase I includes 508,000 sq. ft. of office/R&D use. *(Phase 1 approved and under construction, estimated to be completed in Quarter 3 of 2020.)*
11. **Gateway Business Park Master Plan Phase 1 (850-900 Gateway Boulevard).** The Phase I Gateway Business Park project involves construction of two business park buildings, totaling 451,485 sq. ft., with a two-level basement parking garage and a 47,938-sq.-ft. amenity building on a 6.3-acre site at 850-900 Gateway Boulevard. *(Phase 1 entitled April 2013, construction to be completed in Quarter 3 of 2019.)*

12. **Caltrain Station Improvement Project.** The project will realign the existing South San Francisco Caltrain station to allow easier pedestrian access to downtown, as well as improve station safety and disabled access. An underpass and plaza will be constructed to allow pedestrians access from downtown to the newly renovated station and to the east side of U.S. 101. *(Construction initiated Q4 2017, estimated to be completed in 2020.)*

4.1.5 Approach to Cumulative Impact Analysis

Cumulative impacts are two or more individual effects which, when considered together, are considerable or which compound or increase environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. Cumulative impacts are impacts of the project in combination with other closely related past, present, and reasonably foreseeable probable future projects (CEQA Guidelines Section 15355(a)(b)). The following factors are considered to determine the level of cumulative analysis in this EIR:

- Similar Environmental Impacts – A relevant project contributes to effects on resources that are also affected by a proposed project. A relevant future project is defined as one that is "reasonably foreseeable," such as a proposed project for which an application has been filed with the approving agency or has approved funding.
- Geographic Scope and Location – A relevant project is located within the geographic area within which effects could combine. The geographic scope varies on a resource-by-resource basis. For example, the geographic scope for evaluating cumulative effects on air quality consists of the affected air basin, while the geographic scope for evaluating cumulative effects on traffic typically consists of the roadways within a reasonable distance from the project site that could carry additional vehicles as a result of vehicle trips generated by the proposed project.
- Timing and Duration of Implementation – Effects associated with activities for a relevant project (e.g., short-term construction or demolition, or long-term operations) would likely coincide in timing with the related effects of a proposed project.

CEQA Guidelines Section 15130(b)(1) sets forth two primary approaches to the analysis of cumulative impacts. The analysis can be based on (1) a list of past, present, and probable future projects producing related impacts that could combine with those of a proposed project, or (2) a summary of projections contained in a general plan or related planning document. For the purposes of this EIR, past projects are established within existing conditions and present projects approved or under construction but not yet fully operational as of NOP publication are discussed as a part of the baseline as established above. Any additional reasonably foreseeable probable future projects are considered further in cumulative impact analysis. Cumulative impact analysis in this EIR generally employs either a list-based approach or a projections approach, depending on which approach best suits the individual resource topic being analyzed.

The cumulative analyses for those topics using a list-based approach typically consider individual projects from a list of nearby future projects anticipated in the project area. The particular projects to be considered in the cumulative analysis for each topic vary by environmental topic, and are appropriately tailored to the particular environmental topic based on the potential for combined localized environmental impacts under the topic.

Presented below is a numbered list of reasonably foreseeable probable future projects. Generally, these are projects for which the City had an application on file as of publication of the NOP for the proposed project (April 18, 2018), but for which construction would not be complete prior to construction of the proposed project, are not yet entitled, and/or projects that the City has otherwise determined are reasonably foreseeable. These projects are mapped on Figure 4.1.1 on p. 4.1.5.

For some physical environmental topics, project-related impacts are unlikely to interact with conditions greater than a 0.5-mile radius from the project site, such as aesthetics, geology and soils, hazards and hazardous materials, and noise and vibration. However, some impacts related to air quality, biological resources, greenhouse gas emissions, population growth, and water quality can affect existing conditions on a more regional scale. Several other City projects are located more than 0.5 mile from the project site but within the East of 101 Area and are confined by the same infrastructure network, particularly with regard to transportation and circulation, public services, and utilities and service systems.

The following cumulative projects are located within a 0.5-mile radius of the project site (the number is keyed to Figure 4.1.1):

13. **494 Forbes Boulevard.** The project would involve construction of two five-story office/R&D buildings totaling 326,020 sq. ft. and a three-level parking structure on a 7.48-acre site. *(Construction completion date to be determined.)*

The following cumulative projects are located in the East of 101 Area (the numbers are keyed to Figure 4.1.1):

1. **328 Roebling Road.** The project would involve construction of two office/R&D buildings totaling 105,536 sq. ft., and at grade and basement parking on a 2.97-acre site. *(Construction completion date to be determined.)*
2. **Gateway Business Park Master Plan – Phases 2 through 5.** The project involves multi-phased development of up to six business park buildings totaling approximately 1,230,570 sq. ft., and parking structures on four parcels totaling a 22.6-acre site. Phases II-V are conceptual and involve construction of three to four buildings totaling 779,085 sq. ft. with surface parking in a 16.3-acre area. *(Construction of Phases II-V to be determined.)*
3. **Oyster Point Redevelopment.** The project includes a multi-phased development of the 81-acre Oyster Point site. Phases II though IV would involve construction of a total of approximately 1,742,000 sq. ft. of office/R&D use, a 350-room hotel, 40,000 sq. ft. of retail/restaurant space, and new park and recreation and marina uses. *(Construction of Phases II through IV to be determined.)*

The Genentech Master Plan Update project addresses the planned expansion of the Genentech campus, which now includes the approximately 162 acres identified in the prior 2007 Master Plan, as well as approximately 45 acres which have since been added to the campus and have been incorporated into the City of South San Francisco's Genentech Master Plan overlay zoning district. It would establish a higher density and development potential within the campus by removing the 2007 Master Plan's temporary growth limitations, yet remaining within the limits of the City's underlying zoning standards (i.e., a floor area ratio of 1.0). At a 1.0 floor area ratio, the approximately 207-acre campus will have an overall buildout potential of just over 9 million sq. ft., enabling construction of approximately 4.3 million sq. ft. of net new office/R&D building space over the 4.7 million sq. ft. of existing building space.

The *Downtown Station Area Specific Plan* in the Eastern Neighborhood would involve an increase in development potential in Transit Office/R&D Core and Business Commercial zones, an expanded street network, pedestrian and bicycle improvements, new public open space, and a U.S.101 under-crossing connection. The Specific Plan would allow development of new office/R&D uses (1,185,049 sq. ft.), Business Commercial uses (511,780 sq. ft.), Commercial uses (268,800 sq. ft.), and Industrial uses (21,250 sq. ft.). The Specific Plan would also involve the development of up to 1,400 housing units.

Projection-based cumulative analysis relies on population forecasts presented in Association of Bay Area Government (ABAG) Citywide growth in *Projections 2013*. ABAG forecasts account for projects that are currently in various stages of the entitlement process, construction, and occupation, as well as future development to accommodate projected employment and residential growth not accounted for in known development that is currently under review or under construction. Cumulative analyses based on projections from ABAG include those in Population and Housing, Public Services, and Air Quality.

The traffic analysis for the proposed project is based on the City's traffic modeling system initially applied to the *Oyster Point Specific Plan Subsequent Environmental Impact Report*, as revised by ongoing updates associated with future development assumptions. The traffic modeling system includes a travel demand forecasting model to estimate traffic volumes based on known and assumed future development. The travel demand forecast model covers the East of 101 Area and the downtown area. It also includes assumptions for traffic growth at the boundaries of those areas based on traffic forecasts from the regional travel forecast model maintained by the Metropolitan Transportation Commission in coordination with ABAG. For cumulative conditions, the 2040 traffic forecasts from the City model were used as a base (without project) scenario, and the project traffic was added to the 2040 base scenario.

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4.2 Air Quality

4.2.1 Introduction

Section 4.2, Air Quality, evaluates the potential significance of air quality impacts related to construction and subsequent operation of the 201 Haskins Way Project (project). This section describes the existing conditions at the project site and the regulatory framework for this analysis. Air quality impacts are presented and mitigation measures are identified as required to mitigate air quality impacts, including cumulatively considerable contributions to significant cumulative impacts. Appendix F discusses the methodologies used to assess the significance level of impacts related to air quality in detail.

4.2.2 Environmental Setting

EXISTING CONDITIONS

The project site is made up of eight parcels, which encompass approximately 18.2 acres. The parcel at 201 Haskins Way had a trucking distribution use that recently relocated out of South San Francisco. Five of the parcels currently have warehouse and distribution uses, one parcel is used for parking, and one parcel has an existing office/research and development (office/R&D) use. Seven of these parcels are currently zoned as mixed industrial and one is zoned as business commercial. There is a one-story, 24,075- gross-square-foot (gsf) former trucking terminal building at the 201 Haskins Way parcel, two three-story office/R&D buildings on the 400-450 East Jamie Court parcel, and one- to two-story light industrial buildings on each of the parcels located at 101 Haskins Way, 151 Haskins Way, 410 East Grand Avenue, 430 East Grand Avenue, and 451 East Jamie Court. Additionally, there is a parking lot on a portion of the 451 East Jamie Court parcel and parcel Assessor's Parcel Number 015-102-240, which has no address.

REGIONAL AIR QUALITY

The current air pollutant emissions within the San Francisco Bay Area Air Basin (SFBAAB) are the result of stationary and mobile source emissions. Stationary sources include both point source and non-point source emissions. Point sources include combustion equipment such as large industrial boilers or engines or stationary process equipment associated with industrial operations. Point source emissions occur at a discrete location, or points. Non-point, or area source emissions, include sources emitting smaller quantities of emissions emanating from wide areas and may include residential or commercial water heaters, painting operations, lawn mowers, landfills, and consumer product use. Mobile source emissions occur from on- or off-road vehicles in the form of tailpipe emissions from fuel combustion or evaporative loss, emissions from vehicle wear-and-tear, and generation of fugitive dust from vehicle travel over paved and unpaved roadways. Pollutants emitted from these sources may impact health and welfare within an urban environment and are referred to as criteria pollutants. Both the California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (U.S. EPA) have established ambient air quality standards called California Ambient Air Quality Standard (CAAQS) and National Ambient Air Quality Standards (NAAQS), respectively, for the following criteria pollutants:

- **Carbon Monoxide (CO)**. CO is a colorless, odorless gas primarily produced by incomplete combustion in stationary and mobile sources.
- **Nitrogen Dioxide (NO_2)**. NO_2 is a compound primarily produced by the combustion of fossil fuels in stationary and mobile sources. Some oxides of nitrogen (NO_x) convert into NO_2 after being emitted, and are thus regulated as precursor pollutants.
- **Ozone**. Ozone is rarely directly emitted to the atmosphere from sources. Rather, ozone is formed by chemical reactions between NO_x and reactive organic gases[1] (ROG) in the presence of sunlight. NO_x and ROG are regulated as precursor pollutants.
- **Respirable Particulate Matter with a diameter less than 10 microns (PM_{10}) and Fine Particulate Matter with a diameter less than 2.5 microns ($PM_{2.5}$)**. PM_{10} and $PM_{2.5}$ are emitted from a variety of sources including agricultural operations, industrial processes, combustion, construction and demolition activities, road dust, windblown dust, and wildfires.
- **Sulfur Dioxide (SO_2)**. SO_2 is a sulfur compound emitted by power plants, industrial facilities, combustion in mobile sources, and natural sources such as volcanoes.

Standards also exist for lead, sulfates, hydrogen sulfide, and vinyl chloride, but these pollutants are generally not relevant to regional air quality or the proposed project.

The Bay Area Air Quality Management District (BAAQMD) maintains an ambient air monitoring network of over 30 stations that collect local air quality data, including concentrations of air pollutants.[2] The meteorological and topographical conditions coupled with relatively high mobile and stationary source emissions of NO_x and ROG in the SFBAAB result in ambient concentrations that represent nonattainment with the NAAQS and CAAQS for ozone. The region is also considered to be in nonattainment with CAAQS for PM_{10} and $PM_{2.5}$. Area sources generate the majority of these airborne particulate emissions. The SFBAAB is considered in attainment or unclassified with respect to the CO, NO_2 and SO_2 NAAQS and CAAQS. **Table 4.2.1: Ambient Air Quality Standards** shows the Ambient Air Quality Standards for criteria pollutants potentially impacted by the project established by CARB and the U.S. EPA along with the San Francisco Bay Area's attainment status.

LOCATIONS OF SENSITIVE RECEPTORS

Sensitive receptors, as defined by the BAAQMD, include places where members of the population who are particularly sensitive to the effects of air pollutants, such as children, the elderly, and the infirm, tend to spend a significant amount of time. Examples of sensitive receptors include hospitals, daycare centers, schools, and residences.[3] There is an existing childcare facility approximately 1,800 feet northwest of the proposed project area and there is a plan to construct an additional childcare facility around 1,200 feet

[1] Reactive Organic Gases (ROGs) include surface ozone, carbon monoxide (CO), volatile organic compounds (VOCs), oxidized nitrogen compounds (NO_x and NO_y), and sulfur dioxide (SO_2).

[2] BAAQMD, 2017. Air Quality Standards and Attainment Status. Available online at: http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status. Accessed May 29, 2018

[3] BAAQMD, 2017. *California Environmental Quality Act Air Quality Guidelines*, Updated May 2017, Glossary p. E.-4, (hereafter cited as "BAAQMD CEQA Air Quality Guidelines"). Available online at http://www.baaqmd.gov/~/media/files/planning-and- research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed May 29, 2018.

Table 4.2.1: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards		National Standards	
		Concentration	Attainment Status	Concentration	Attainment Status
Ozone	**8-Hour**	**0.070 ppm**	Non-Attainment	0.070 ppm	Non-Attainment
	1-Hour	**0.09 ppm**	Non-Attainment	-	N/A
Carbon Monoxide	**8-Hour**	**9.0 ppm**	Attainment	9.0 ppm	Attainment
	1-Hour	**20.0 ppm**	Attainment	35.0 ppm	Attainment
Nitrogen Dioxide	**1-Hour**	0.18 ppm	Attainment	0.100 ppm	See Footnote #1
	Annual	**0.03 ppm**	Attainment	0.053 ppm	Attainment
Sulfur Dioxide	**24-Hour**	**0.04 ppm**	Attainment	0.14 ppm	Attainment/ Unclassified
	1-Hour	**0.25 ppm**	Attainment	0.075 ppm	Attainment/ Unclassified
	Annual	**-**	N/A	0.030 ppm	Attainment/ Unclassified
Particulates less than 10 microns	**24-Hour**	50 µg/m^3	Non-Attainment	-	N/A
	Annual	20 µg/m^3	Non-Attainment	150 µg/m^3	Unclassified
Particulates less than 2.5 microns	**24-Hour**	12 µg/m^3	Non-Attainment	12 µg/m^3	See Footnote #2
	Annual	**-**	N/A	**35** µg/m^3	Non-Attainment

Concentrations: ppm = parts per million µg/m^3 = micrograms per cubic meter

[1]To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100ppm (effective January 22, 2010). The US Environmental Protection Agency (U.S. EPA) expects to make a designation for the Bay Area by the end of 2017.

[2] In December 2012, the U.S. EPA strengthened the annual $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) from 15.0 to 12.0 micrograms per cubic meter (µg/m3). In December 2014, the U.S. EPA issued final area designations for the 2012 primary annual PM 2.5 NAAQS. Areas designated "unclassifiable/attainment" must continue to take steps to prevent their air quality from deteriorating to unhealthy levels. The effective date of this standard was April 15, 2015.

Source: Bay Area Air Quality Management District, Air Quality Standards and Attainment Status. Available online: http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status. Accessed 6/8/2018.

northwest of the project area. However, there are no sensitive receptors in the zone of influence[4] of the project area (defined as within 1,000 feet of the project border).

The proposed project would encompass the construction of an office/R&D park and the rezoning of the project site from Mixed Industrial (MI) and Business Commercial (BC) to Business Technology Park (BTP). No new sensitive receptors would be sited as part of the project.

[4] According to the BAAQMD, *CEQA Air Quality Guidelines*, it is recommended to assess impacts with respect to risks and hazards from project construction and operation within 1,000 feet of a new source fence line (p. 5-2). The Guidelines specify that diesel particulate matter from the operation of off-road construction equipment should be evaluated up to 1,000 feet from the site. The 1,000-foot zone of influence for traffic-related pollutants, which would comprise a majority of project operational emissions, is supported by the research findings in CARB's *Land Use Compatibility Handbook* (2005) and by Health & Safety Code §42301.6 (Notice for Possible Source Near School).

4.2.3 Regulatory Framework

This section provides a summary of the air quality plans and policies of the City of South San Francisco (City), and regional, state, and federal agencies that have policy and regulatory control over the project site.

FEDERAL

Federal Clean Air Act

The Clean Air Act (CAA) is a federal law enacted to control air pollution on a national level.[5] The CAA originated with the Clean Air Act of 1963. Amendments to the CAA in 1970 greatly expanded its scope and required comprehensive regulations for stationary and mobile sources. The U.S. EPA was also established in 1970 in part to help implement the CAA. Significant amendments to the CAA were also made in 1990 to primarily address acid rain, ozone depletion, toxic air pollution, and stationary source major permitting.

Certain types of emission sources remain the exclusive jurisdiction of the U.S. EPA under the CAA, including aircraft, ships, and certain locomotives. The U.S. EPA establishes emissions standards for new motor vehicles. Under federal law, California is allowed to enact stricter emission standards for new motor vehicles under waiver from U.S. EPA.[6] The U.S. EPA has also established regulations for various type of nonroad engines including small spark-ignition engines, heavy equipment with spark-ignition engines, and heavy equipment with compression-ignition (diesel) engines. In particular, the U.S. EPA established four different tiers of emission standards for nonroad diesel engines that apply to manufacturers phased in over time with increasing stringency. To enable emission control technologies sensitive to sulfur for Tier 4 engines, the U.S. EPA mandated reductions in the sulfur content of diesel fuels. The off-road engines that would be used to construct in this project are subject to the U.S. EPA regulatory scheme.

Stationary sources are regulated under the CAA through a system of cooperative federalism between the U.S. EPA and state agencies. Under the CAA, the U.S. EPA is responsible for setting and enforcing the NAAQS. Individual states develop a State Implementation Plan (SIP) for approval by the U.S. EPA that consists of regulations, permitting programs, and other measures used to ensure compliance with the NAAQS. As mentioned on p. 4.2.2, the Bay Area is classified as attainment of all federal NAAQS with the exception of the 8-hour ozone standard and $PM_{2.5}$ (refer to Table 4.2.1 on p. 4.2.3), for which it is considered a marginal nonattainment area.

The U.S. EPA is also granted the authority under the CAA to establish New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) that apply nationwide. Title 40 of the Code of Federal Regulations (40 CFR), Part 60, Subpart IIII, is a NSPS that

[5] U.S. EPA, Overview of the Clean Air Act and Air Pollution. Available online at: https://www.epa.gov/clean-air-act-overview. Accessed May 29, 2018.

[6] U.S. EPA, Vehicle Emissions California Waivers and Authorizations. Available online at: https://www.epa.gov/state-and-local-transportation/vehicle-emissions-california-waivers-and-authorizations. Accessed June 8, 2018.

applies to stationary compression ignition internal combustion engines, and 40 CFR, Part 63, Subpart ZZZZ, is a NESHAP that applies to stationary reciprocating internal combustion engines. Both regulations may apply to the emergency generators installed as part of the proposed project.

STATE

California Air Resources Board

Air pollution control efforts in California date back to the middle of the 20th century due to the state's unique geography and meteorology.[7] In 1959, California enacted legislation empowering the Department of Public Health to set statewide air quality standards for total suspended particulates, photochemical oxidants, sulfur dioxide, nitrogen dioxide, and carbon monoxide that became known as the CAAQS. CARB was created in 1967 and assumed authority over the CAAQS. Regional Air Quality Management Districts were formed in 1976. The California Clean Air Act was enacted in 1988. In addition to the CAAQS, CARB conducts research, provides oversight of local air management programs, prepares the SIP, and sets statewide emission standards for vehicles, equipment, fuels, and consumer products. Currently, ozone, PM_{10}, and $PM_{2.5}$ are considered to be in nonattainment with the CAAQS. All other pollutants are classified as attainment under the CAAQS (refer to Table 4.2.1 on p. 4.2.3).

CARB maintains a fuels program that regulates the formulation of different fuels such as gasoline, diesel, and alternative fuels to reduce emissions of criteria pollutants, toxic air contaminants (TACs), and greenhouse gases (GHGs) from their use.

CARB sets vehicle tailpipe emission standards, under waiver from the federal CAA by the U.S. EPA, through its Low Emission Vehicle (LEV) program. The LEV program sets vehicle emission standards that increase in stringency over time. CARB administers a program for reducing evaporative and refueling emissions from on-road motor vehicles. In addition to on-road motor vehicles, CARB also administers programs aimed at reducing air emissions from off-road and on-road heavy-duty vehicles, cargo handling equipment, commercial harbor craft, ground support equipment, locomotives, commercial marine vessels, and recreational marine vessels.

In 1998, CARB identified particulate emissions from diesel-fueled engines (diesel PM) as a TAC and developed diesel risk reduction plans. This led to the creation of Airborne Toxic Control Measures (ATCMs) for stationary and portable diesel engines that apply statewide. CARB maintains a statewide Portable Equipment Registration Program that allows owners and operators to register their equipment (powered by diesel engines rated at 50 brake horse power [bhp] or larger) to operate throughout California without having to obtain individual permits from local air districts.

CARB established the Large Spark-Ignition Engine Fleet Requirements Regulation in 2006 that applies to operators of forklifts, sweeper/scrubbers, industrial tow tractors, and airport ground support equipment to achieve fleet average emission level standards that become more stringent over time.

[7] CARB, History. Available online at: https://ww2.arb.ca.gov/about/history. Accessed May 29, 2018.

CARB adopted exhaust emissions standards in 1990 for small off-road engines (spark-ignition engine rated at or less than 19 kilowatts) such as those used in lawn and garden equipment, outdoor power equipment, and specialty vehicles. Over time, the small off-road engines program has been strengthened for exhaust emission standards and expanded to include evaporative emission requirements.

CARB also adopts regulatory requirements for chemically formulated consumer products, fuel containers, and indoor air cleaning products to reduce volatile organic compounds (VOCs), TACs, and GHGs. The Consumer Products Regulatory Program establishes regulations for chemically formulated consumer products such as detergents, cleaning products, polishes, floor finishes, and aerosol paints.

REGIONAL

Bay Area Air Quality Management District

BAAQMD was created by the California Legislature in 1955.[8] It is tasked with adopting air management policies and regulating certain sources of air pollution in the nine counties that surround the San Francisco Bay. BAAQMD works with local governments, commissions, state agencies, and federal agencies to enact policies aimed at improving air quality in the Bay Area. It is governed by a Board of Directors composed of 22 elected officials from each of the nine counties. BAAQMD develops rules and administers a permitting program for stationary sources, conducts inspections of emission sources, and enforces requirements through orders and fines, if necessary. The emergency generators considered under this project would fall under the purview of BAAQMD for stationary source permitting and regulation.

BAAQMD periodically develops air quality plans that outline the regional strategy to improve air quality and protect the climate. The most recent plan, *2017 Bay Area Clean Air Plan,* includes a wide range of control measures designed to reduce emissions of air pollutants and GHGs, including the following examples that may be relevant to this project:[9] reduce emissions of toxic air contaminants by adopting more stringent limits and methods for evaluating toxic risks; implement pricing measures to reduce travel demand; accelerate the widespread adoption of electric vehicles; promote the use of clean fuels; promote energy efficiency in both new and existing buildings; and promote the switch from natural gas to electricity for space and water heating in Bay Area buildings.

BAAQMD also publishes *CEQA Air Quality Guidelines* to assist lead agencies in evaluating air quality impacts of projects and plans proposed in the Bay Area Air Basin.[10] The Guidelines address evaluating, measuring, and mitigating air quality impacts generated from land development construction and operation activities. The Guidelines focus on criteria air pollutant, GHG, TAC, and odor emissions generated by projects and plans. For projects, the Guidelines provide Thresholds of Significance and Screening Criteria to determine the level of analysis needed, and assessment methods and mitigation measures for operational-related, local community risk and hazards, local CO, odors, and construction-

[8] BAAQMD, About the Air District. Available online: http://www.baaqmd.gov/about-the-air-district. Accessed May 29, 2018.
[9] BAAQMD, 2017. *Final 2017 Clean Air Plan*. Adopted April 19, 2017.
[10] BAAQMD, 2017. *CEQA Air Quality Guidelines.* Updated May 2017. Available on-line at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed May 29,2018

related impacts. The most recent version of the BAAQMD Air Quality Guidelines, published in May 2017, has been used in the evaluation of air quality impacts from the proposed project.

LOCAL

City of South San Francisco General Plan

The *City of South San Francisco General Plan* (General Plan) contains policies designed to protect environmental resources, some of which address air quality and GHG emissions. Policies that pertain to air quality are excerpted below; those that address GHG emissions are presented in Section 4.5, Greenhouse Gas Emissions, in "Regulatory Framework," pp. 4.5.7-4.5.9.

Guiding Policies: Air Quality

7.3-G-1: Continue to work toward improving air quality and meeting all national and State ambient air quality standards and by reducing the generation of air pollutants both from stationary and mobile sources, where feasible.

7.3-G-3: Reduce energy use in the built environment.

7.3-G-4: Encourage land use and transportation strategies that promote use of alternatives to the automobile for transportation, including bicycling, bus transit, and carpooling.

7.3-G-5: Promote clean and alternative fuel combustion in mobile equipment and vehicles.

7.3-G-6: Minimize conflicts between sensitive receptors and emissions generators by distancing them from one another.

Implementing Policies: Air Quality

7.3-I-1: Cooperate with the Bay Area Air Quality Management District to achieve emissions reductions for nonattainment pollutants and their precursors, including carbon monoxide, ozone, and PM_{10}, by implementation of air pollution control measures as required by State and federal statutes.

7.3-I-2: Use the City's development review process and the CEQA regulations to evaluate and mitigate the local and cumulative effects of new development on air quality and GHG emissions.

7.3-I-3: Adopt the standard construction dust abatement measures included in BAAQMD's CEQA Guidelines.

7.3-I-4: Require new residential development and remodeled existing homes to install clean-burning fireplaces and wood stoves.

7.3-I-9: Promote land uses that facilitate alternative transit use, including high-density housing, mixed uses, and affordable housing served by alternative transit infrastructure.

7.3-I-14: Ensure that design guidelines and standards support operation of alternative fuel facilities, vehicles, and equipment.

The City also maintains the *East of 101 Area Plan,* which encompasses the project area and is primarily used as a design policy document with some land use and conservation element policies still in effect.[11] The overall goal of this plan is to regulate development in a manner that protects and enhances the area's

[11] City of South San Francisco, 1994. *East of 101 Area Plan.* Available online at: http://www.ssf.net/departments/economic-community-development/planning-division/planning-documents/approved-policy-documents. Accessed May 29, 2018.

physical, economic, and natural resources. The air quality goals and policies generally follow those in the General Plan; specific refined policies are excerpted below:

- Encourage bicycling and walking as transportation modes in the East of 101 Area.
- The City of South San Francisco shall support transportation demand management (TDM) and transportation system management (TSM) programs in coordination with the Multi City Transportation System Management Agency or any other applicable transportation management agencies.
- Promote water and energy conservation in all new development.

In accordance with these plans and the BAAQMD CEQA Guidelines, the City assesses the air quality impacts of new development projects and requires mitigation of significant air quality impacts if feasible mitigation measures are available.

4.2.4 Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

CEQA Guidelines Appendix G includes a list of potentially significant project impacts. The proposed project would have a significant air quality impact if it would:

a. conflict with or obstruct the implementation of the applicable air quality plan;
b. violate any air quality standards or contributes to an existing or projected air quality violation;
c. 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors);
d. expose sensitive receptors to substantial pollutant concentrations; or
e. create objectionable odors affecting a substantial number of people.

To aid in the evaluation of impacts, BAAQMD has established Thresholds of Significance (thresholds) which can be used to quantitatively assess project potential impacts with respect to the items listed above. The thresholds established by BAAQMD are listed below and shown in Table 1-1 of Appendix F on p. F-4:

- Daily average ROG, NO_x, and $PM_{2.5}$ emissions of greater than 54 pounds per day (lb/day) during project construction or operation;
- Daily average PM_{10} emissions of greater than 82 lb/day during project construction or operation;
- No specific thresholds are established for $PM_{2.5}$ and PM_{10} from construction fugitive dust; however, if best management practices are implemented during construction, then it is assumed that these emissions are below the thresholds.
- Maximum annual ROG, NO_x, and $PM_{2.5}$ emissions of greater than 10 tons per year (tpy) resulting from project operation;
- Maximum annual PM_{10} emissions of greater than 15 tpy resulting from project operation;

- One-hour average ambient CO concentration of greater than 20 parts per million (ppm) or eight-hour average ambient CO concentration of greater than 9.0 ppm;
- Increased cancer risk of greater than 10.0 in a million, increased non-cancer risk of greater than 1.0 Hazard Index, and increased annual average ambient $PM_{2.5}$ concentration greater than 0.3 micrograms per meter cubed within the zone of influence (1,000 feet) resulting from TAC emissions during construction and project operation;
- Increased cancer risk of greater than 100.0 in a million, increased non-cancer risk of greater than 10.0 Hazard Index, and increased annual average ambient $PM_{2.5}$ concentration greater than 0.8 micrograms per meter cubed within the zone of influence (1,000 feet) resulting from TAC emissions during construction and operation of all local sources including the project;
- Storage or use of acutely hazardous materials locating near receptors, or new receptors locating near stored or used acutely hazardous materials; and
- At least 5 confirmed complaints regarding odors per year averaged over 3 years.

To assess project effects on air quality, it is assumed that if the project emissions are below the applicable thresholds established by BAAQMD following the implementation of necessary mitigation, that the impacts would be less than significant with respect to the associated air quality impact. A brief explanation of this approach is presented below.

Clean Air Plan Consistency

The primary goals of the 2017 *Bay Area Clean Air Plan* (BACAP) are to (1) attain air quality standards, (2) protect public health by facilitating the attainment of air quality standards and reducing population exposure to air pollutants in the Bay Area, and (3) to reduce GHG emissions[12] and protect the climate. BAAQMD recommends that consistency with BAAQMD CEQA thresholds be confirmed to assess whether the project would hinder the Bay Area from attaining air quality standards or add to air pollutants. If approval of a project would not result in significant and unavoidable air quality impacts after the application of all feasible mitigation, the project would be considered consistent with the 2010 CAP.[13] In addition, projects are considered consistent with the BACAP if they incorporate all applicable and feasible control measures from the BACAP and would not disrupt or hinder implementation of any BACAP control measures.

Ambient Air Quality Standards

BAAQMD thresholds were determined based on BAAQMD determination of what level of emissions would result in cumulatively considerable impacts on ambient air quality. Therefore, should the project emissions prove to be less than the applicable thresholds after mitigation, then it is assumed the project would not lead to deterioration of ambient air quality in a significant manner.

[12] This aspect of the project's consistency with the *Bay Area Clean Air Plan* is discussed in EIR Chapter 4.5, Greenhouse Gas Emissions, on pp. 4.5.14-4.5.17.

[13] BAAQMD, *CEQA Air Quality Guidelines.* Updated May 2017. Available online: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed May 29, 2018.

Cumulatively Considerable Net Increase of Nonattainment Pollutants

As mentioned, BAAQMD set the thresholds such that no cumulatively considerable contribution to a significant effect on ambient air quality would occur due to project emissions below these levels. Therefore, if project emissions after necessary mitigation of nonattainment criteria pollutants are below the thresholds established by BAAQMD, it is assumed that the impacts of the project with respect to nonattainment pollutants would be less than significant.

Exposure of Sensitive Receptors to Substantial Pollutant Concentrations

Local CO concentrations near congested intersections may adversely affect the local ambient air quality and expose sensitive receptors to unacceptable levels of CO. BAAQMD has established a threshold for local CO concentrations based on the 1-hour and 8-hour CAAQS. Additionally, BAAQMD has established screening criteria to assess the impact of local CO from a project based on the anticipated traffic volumes at intersections located near the project area. If the screening criteria are met, then the impact of local CO on sensitive receptors would be considered less than significant.

BAAQMD has established thresholds for individual project and cumulative cancer risk, non-cancer health index, and $PM_{2.5}$ concentration. BAAQMD recommends that concentrations of TACs at sensitive receptors within the 1,000-foot zone-of-influence of the project be used to assess the risks and health impacts of project construction and operation. Should concentrations of TACs resulting from the project or the project's contributions to significant cumulative impacts from past, present, and foreseeable probable future sources be less than BAAQMD thresholds, the project will be considered less than significant regarding impact on sensitive receptor risks and hazards. The risks and hazards assessment should also be completed if the project would site a new sensitive receptor within 1,000 feet of off-site TAC emission sources.

Exposure of sensitive receptors to substantial pollutant concentrations may also occur due to accidental release of acutely hazardous air pollutants (AHAPs). If the project is below the threshold for accidental release of AHAPs, the project impacts will be considered less than significant regarding exposure of sensitive receptors to substantial pollutant concentrations due to accidental release of AHAPs.

Objectionable Odors

The BAAQMD-established threshold for odor impacts is based on complaints received during the course of project operation. Should five confirmed complaints per year averaged over 3 years be received regarding project operation, the project would be determined to have a significant impact with respect to objectionable odors. BAAQMD has not established a significance threshold for odor impacts from construction. Refer to the "Approach to Analysis" section on p. 4.2.13 for discussion of how construction-related odor impacts were assessed for the project.

APPROACH TO ANALYSIS

The proposed project would rezone all eight existing parcels to a BTP district and allow construction of BTP office/R&D facilities and associated parking. The proposed development of the rezoned area would be built out in two phases, as described below.

During Phase 1, Alexandria Real Estate Equities (ARE) would construct 336,368 gsf of new BTP office use on 201 Haskins Way and 400-450 East Jamie Court. The Phase 1 project would demolish a 24,075-gsf building at 201 Haskins Way that previously contained a light industrial trucking use, and construct a new 311,368-gsf office/R&D building (201 Haskins Way Building) with a 63-foot-tall, three-story wing and a 95-foot-tall, five-story wing; a 720-stall, five-level parking structure (up to 48 feet in height); and 183 surface parking spaces. At 400-450 East Jamie Court, ARE would construct an approximately 25,000-gsf, two-story addition to the existing western building.

During Phase 2, development of two additional parcels along Haskins Way, two additional parcels along East Jamie Court, two parcels along East Grand Avenue, and additional development on the 400-450 East Jamie Court parcel (also in the Phase 1 area) would occur. Though this phase of the project is still conceptual, the tentative development plan discussed in the Notice of Preparation (NOP) and reasonable assumptions regarding the construction equipment and schedule from the Phase 1 project plans were used to assess air quality impacts from this phase of development. The conceptual Phase 2 development plan is based on the maximum square footage of development allowable to obtain a floor area ratio of 1.0. This would necessitate demolition of 157,995 gsf of existing light industrial buildings and associated parking lots on five existing parcels and allow a total of 341,232 gsf of new BTP use within the Phase 2 area. Specifically, it is assumed that the conceptual Phase 2 area development plan that would include construction of a new 256,232-gsf 3- and 5-story office building (East Grand Building) up to 95 feet in height, a parking garage expansion of the Phase 1 parking garage to two parcels to the east at 451 East Jamie Court (APN 015-102-240 and APN 015-102-290) to accommodate a total of 1,060 stalls (340 additional stalls), and a total of 243 additional surface parking stalls. At 400-450 East Jamie Court, it is anticipated that ARE would construct an additional 85,000 gsf of office/R&D space. To provide a conservative analysis of construction impacts in the EIR, it is assumed that the construction of Phase 2 would occur immediately upon completion of the Phase 1 development.

In order to be conservative about project impacts, existing operational emission levels from the mixed industrial activities on the project site have not been subtracted from the calculated operational emission levels from the proposed project to determine impacts.

As mentioned on pp. 4.2.8-4.2.10, each CEQA air quality impact was assessed based on comparison of pollutant emissions, concentrations, or quantifiable risk with the applicable threshold established by BAAQMD.

To determine project impacts resulting from criteria pollutant emissions, the construction and operation emissions were quantified and compared with BAAQMD's established thresholds of significance. The size of the construction and operating area would be greater than the screening level sizes established by BAAQMD to evaluate criteria air pollutant impacts, so the project would exceed the screening criteria

established by BAAQMD and must assess impacts through comparison against thresholds of significance for each criteria pollutant. All construction and operation emissions except for stationary source emergency generator emissions project were quantified using California Emissions Estimator Model Version 2016.3.2 (CalEEMod).[14] To be conservative, emissions from the new office building diesel-powered emergency generator engines were quantified using the engine specifications and the U.S. EPA's Tier 2 exhaust emission standards for nonroad compression-ignition engines.

Local CO concentrations were compared against the BAAQMD's established screening criteria. According to the BAAQMD CEQA Guidelines, if the preliminary screening procedure for a pollutant impact is followed and all screening criteria are met, the proposed project is assumed to result in a less-than-significant impact on air quality for the pollutant being screened. The screening criteria for local CO concentration are based on traffic volumes at nearby intersections, which were quantified as part of the traffic analysis conducted for the proposed project, the results of which are included as an attachment to Appendix F of this EIR.

BAAQMD CEQA Guidelines recommend assessment of risks and hazards on receptors within 1,000 feet. Since there are no sensitive receptors located within a 1,000-foot radius of the site, a Health Risk Assessment (HRA) to assess the project's impact on increased cancer risk, non-cancer hazard index, and ambient $PM_{2.5}$ concentrations at sensitive receptor locations was not conducted. A cumulative HRA was also not conducted due to lack of sensitive receptors within the zone of influence. It can be reasonably assumed that no significant impact on sensitive receptors would occur based solely on the proposed project location.

The project would not site new sensitive receptors near stored or used hazardous materials. In addition, though the operation of the project may involve the use of regulated hazardous materials related to biomedical research and development and common commercial products used for cleaning and maintenance purposes, all transport and disposal procedures for the handling of waste must meet the applicable legal requirements discussed in Section 4.11.4, Hazards and Hazardous Materials, of Section 4.11, Less-than-Significant Impacts, on pp. 4.11.26 – 4.11.38. The project would not store sufficient quantities of acutely hazardous materials that could become airborne and result in acutely hazardous air emissions that could affect the nearest sensitive receptor to a degree that all individuals could be exposed for up to 1 hour and experience or develop irreversible or other serious health effects or symptoms which could impair ability to take protective action.[15] Therefore, due to the nature of the project, it can be reasonably assumed that there would be no significant air quality impact with regard to accidental release of acutely hazardous air emissions, and no in-depth analysis of accidental release of acutely hazardous air pollutants was conducted.

[14] California Emissions Estimator Model. Developed for the California Air Pollution Control Officers Association (CAPCOA) in Collaboration with California Air Districts. The model can be downloaded from: http://caleemod.com/. Accessed May 29, 2018.

[15] BAAQMD *CEQA Air Quality Guidelines* currently recommend that the lead agency evaluate potential impacts on any receptors being within the Emergency Response Planning Guidelines (ERPG) exposure level 2 (Appendix D, p. D-42). Should a sensitive receptor be within the ERPG exposure level 2, the project is considered to have significant air quality impact. The proposed project is not close enough to a sensitive receptor and does not house a sufficiently large quantity of acutely hazardous materials to subject any receptor to ERPG exposure level 2 conditions.

To evaluate potential odor impacts, a qualitative evaluation was conducted taking into account the nature of the project construction and operation. Typically, odor impact evaluations are more applicable to land uses with associated manufacturing, refining, painting/coating, food processing, or waste treatment activities, which, due to the nature of the operations, are large point-sources of odor emissions. There are no large odor point sources associated with the proposed office and R&D uses, so odor complaints by nearby receptors are unlikely. In addition, no sensitive receptors are located in the vicinity of the project site. It is evident through qualitative analysis that during construction and operation, substantial numbers of people would not be adversely impacted by objectionable odors and thus odor impacts associated with this project would be less than significant. However, a qualitative discussion assessing potential odor impacts is included in the impacts discussion.

IMPACT EVALUATION

Ambient Air Quality Standards

Impact AQ-1: The proposed project would violate air quality standards or contribute substantially to an existing or projected air quality violation. ***(Less than Significant with Mitigation)***

The impacts of the project with respect to ambient air quality standards are assessed based on the comparison of project-generated criteria air pollutant and precursor emissions to the applicable thresholds for criteria air pollutants and precursors established by BAAQMD. The project construction for both Phases 1 and 2 would have a significant impact on ambient air quality because NO_x emissions would be above the threshold of significance without mitigation. However, after mitigation measures are applied, the project construction impacts would be less than significant. Project operation for Phase 1, Phase 2, and project buildout would not require mitigation, as both the average daily and maximum annual criteria pollutant emissions were determined to be below the thresholds. Therefore, project operation would have a less-than-significant impact without any mitigation applied. Traffic volumes at local intersections are not expected to exceed the screening criteria levels used by BAAQMD to assess local CO impacts. Therefore, impacts on local CO concentrations are expected to be less than significant.

Project Construction Emissions

Construction of Phase 1 and Phase 2 would result in the release of criteria pollutants and precursors in the form of ROG, NO_x, CO, exhaust emissions of PM_{10} and $PM_{2.5,}$ and fugitive dust emissions of PM_{10} and $PM_{2.5}$. These pollutant emissions were compared to the applicable thresholds to determine if air quality impacts would be significant.[16] Construction emissions were quantified using CalEEMod separately for both Phase 1 and Phase 2. The maximum average daily emissions for each criteria pollutant and precursor during construction are shown in **Table 4.2.2: Construction-Related Criteria Air Pollutant and Precursor Emissions – Unmitigated (maximum average daily emissions in pounds during entire construction period)**, which displays results prior to the application of mitigation measures. Though construction of each phase would occur at different times, both phases would be similar in terms of the

[16] The thresholds of significance in Table 2-1 of the BAAQMD *CEQA Air Quality Guidelines* May 2017 does not include a threshold for construction-related CO (p. 2-2, see also Table 2-4, Thresholds of Significance for Construction-Related Criteria Air Pollutants and Precursors, on p. 2-6). Therefore, construction-related CO emissions are not presented in Tables 4.2.2 or 4.2.3 for construction-related emissions of criteria pollutants.

source and quantity of construction emissions and type of mitigation required, so the air quality effects are discussed generally below along with mitigation measures applied.

Both Phase 1 and Phase 2 of project construction would result in emissions of ROG, NO_x, CO, Exhaust PM_{10}, and Exhaust $PM_{2.5}$ emissions from diesel powered off-road equipment during onsite construction activities. Fugitive dust from demolition, site grading, bulldozing, and truck loading/unloading would also result in emissions of PM_{10} and $PM_{2.5}$. Additional criteria pollutant and precursor emissions would result from vehicles associated with construction worker, vendor, and hauler trips to and from the construction site. These on-road vehicle emissions include ROG, NO_x, CO, PM_{10}, and $PM_{2.5}$ from vehicle exhaust and wear-and-tear, and PM_{10} and $PM_{2.5}$ fugitive dust emissions from vehicles travelling over paved roads. Additional construction emissions of ROG occur during on-site architectural coating and asphalt paving activities.

Table 4.2.2: Construction-Related Criteria Air Pollutant and Precursor Emissions – Unmitigated (maximum average daily emissions in pounds during entire construction period)

Construction Phase	ROG (lb/day)	NO_x (lb/day)	Exhaust PM_{10} (lb/day)	Exhaust $PM_{2.5}$ (lb/day)	Fugitive Dust PM_{10} (lb/day)	Fugitive Dust $PM_{2.5}$ (lb/day)
Phase 1	43.00	118.86	5.37	4.98	4.47	0.93
Phase 2	39.57	108.65	4.31	3.99	3.62	0.78
BAAQMD threshold	54	54	82	54	Best Management Practices[1]	Best Management Practices[1]
Exceeded threshold Phase 1?	**No**	**Yes**	**No**	**No**	**No**	**No**
Exceeded threshold Phase 2?	**No**	**Yes**	**No**	**No**	**No**	**No**

[1] Best management practices (BMPs) in the form of BAAQMD-specified Basic Construction Mitigation Measures (see Mitigation Measure AQ-1b on p. 4.2.15) must be implemented for any construction project in order to control fugitive dust emissions. If a project implements these BMPs, then project fugitive dust impacts are considered by the BAAQMD to be less than significant.

Source: CalEEMod version 2016.3.2. See Appendix F for emission model outputs.

As shown in Table 4.2.2, all emissions of criteria pollutants and precursors would be below the thresholds established by BAAQMD prior to mitigation except for NO_x. NO_x emissions above the 54 lb/day threshold would be primarily due to the operation of off-road construction equipment. Therefore, Mitigation Measure MM-AQ-1a: Off-road Equipment Standards and Construction Emissions Minimization Plan is identified.

Mitigation Measure MM-AQ-1a: Off-road Equipment Standards and Construction Emissions Minimization Plan

Off-road equipment greater than 25 horsepower used during construction shall meet the Tier 4 Final off-road emission standards. Should the utilization of equipment meeting this standard prove to be technically infeasible, the construction contractor will select the lowest-emitting off-road equipment available. The construction contractor shall develop a Construction Emissions Minimization Plan (CEMP) which establishes the process used to select the lowest-emitting off-road equipment, specify the steps that will be taken to reduce emissions of criteria air pollutants

and precursors, and provide analysis showing that NO_x emissions for the applicable construction phase would remain below 54 lb/day, where feasible. The CEMP will be submitted to the City's Planning Division and approved prior to utilizing off-road equipment greater than 25 horsepower that does not meet Tier 4 Final off-road emission standards.

Additionally, BAAQMD recommends that for all construction projects, BAAQMD Basic Construction Mitigation Measures be implemented to reduce emissions regardless of whether impacts would exceed a threshold. The Basic Construction Mitigation Measures establish best practices during construction and implementation of these measures is considered in determining whether fugitive dust emissions from construction meet the thresholds. Mitigation Measure MM-AQ-1b: Implement BAAQMD Basic Construction Mitigation Measures presents a list of these measures.

Mitigation Measure MM-AQ-1b: Implement BAAQMD Basic Construction Mitigation Measures

BAAQMD Basic Construction Mitigation Measures are as follows:

- 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.
- 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.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- 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.
- Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Table 4.2.3: Construction-Related Criteria Air Pollutant and Precursor Emissions – Mitigated (maximum average daily emissions in pounds during entire construction period) lists the average daily criteria pollutant and precursor emissions from Phase 1 and Phase 2 construction after the application of Mitigation Measures MM-AQ-1a and MM-AQ-1b. With mitigation, impacts of criteria pollutant and precursor emissions from construction would be less than significant.

Table 4.2.3: Construction-Related Criteria Air Pollutant and Precursor Emissions – Mitigated (maximum average daily emissions in pounds during entire construction period)

Construction Phase	ROG (lb/day)	NO_x (lb/day)	Exhaust PM_{10} (lb/day)	Exhaust $PM_{2.5}$ (lb/day)	Fugitive Dust PM_{10} (lb/day)	Fugitive Dust $PM_{2.5}$ (lb/day)
Phase 1	33.34	39.55[1]	0.42	0.42	3.32	0.75
Phase 2	32.41	40.51[1]	0.32	0.32	2.69	0.64
BAAQMD threshold	54	54	82	54	BMPs[2]	BMPs[2]
Exceeded threshold Phase 1?	**No**	**No**	**No**	**No**	**No**	**No**
Exceeded threshold Phase 2?	**No**	**No**	**No**	**No**	**No**	**No**

[1] The mitigated NO_x emissions are based on the assumption that all construction equipment greater than 25 hp meets Tier 4 Final diesel engine standards. MM-AQ-1a allows the City to approve the use of non-Tier 4 Final engines in construction equipment if it is infeasible to obtain equipment with Tier 4 Final engines, but requires the applicant to show that NO_x emissions would remain below 54 lbs/day before the City authorizes the use of non-Final Tier 4 equipment, where feasible.

[2] Best management practices (BMPs) in the form of BAAQMD-specified Basic Construction Mitigation Measures (see Mitigation Measure MM-AQ-1b items on p. 4.2.15) must be implemented for any construction project in order to control fugitive dust emissions. If a project implements these BMPs, then project fugitive dust impacts are considered to be less than significant. Source: CalEEMod version 2016.3.2. See Appendix F for emission model outputs.

Project Operational Emissions

Operational impacts of the proposed new buildings constructed under the new zoning in both Phase 1, Phase 2, and project buildout were found to be less than significant with respect to criteria pollutant and precursor emissions (see the discussion under Impact AQ-2 for operational CO emissions). Average daily and maximum annual operational emissions of criteria pollutants other than local CO from project operations are shown in **Table 4.2.4: Operation-Related Criteria Air Pollutant and Precursor Emissions – Unmitigated (maximum average daily emissions in pounds during Phase 1, Phase 2, and buildout [Phase 1 + Phase 2])** and **Table 4.2.5: Operation-Related Criteria Air Pollutant and Precursor Emissions – Unmitigated (maximum annual emissions in tons during Phase 1, Phase 2, and buildout [Phase 1 + Phase 2])**, respectively. No mitigation is necessary.

Table 4.2.4: Operation-Related Criteria Air Pollutant and Precursor Emissions – Unmitigated (maximum average daily emissions in pounds during Phase 1, Phase 2, and buildout [Phase 1 + Phase 2])

Operation Phase	ROG (lb/day)	NO_x (lb/day)	Exhaust PM_{10} (lb/day)	Exhaust $PM_{2.5}$ (lb/day)	Fugitive Dust PM_{10} (lb/day)	Fugitive Dust $PM_{2.5}$ (lb/day)
Phase 1	10.86	15.45	0.63	0.60	3.68	0.98
Phase 2	10.69	13.44	0.53	0.51	3.73	1.00
Combined	21.55	28.89	1.16	1.11	7.41	1.98
BAAQMD threshold	54	54	82	54	None	None
Exceeded threshold Phase 1?	**No**	**No**	**No**	**No**	**No**	**No**
Exceeded threshold Phase 2?	**No**	**No**	**No**	**No**	**No**	**No**
Exceeded threshold for Combined Operation?	**No**	**No**	**No**	**No**	**No**	**No**

Source: CalEEMod version 2016.3.2 and emergency generator specifications. See **Appendix F** for emission model outputs and emergency generator calculations.

Table 4.2.5: Operation-Related Criteria Air Pollutant and Precursor Emissions – Unmitigated (maximum annual emissions in tons during Phase 1, Phase 2, and buildout [Phase 1 + Phase 2])

Operation Phase	ROG (ton/yr)	NO_x (ton/yr)	Exhaust PM_{10} (ton/yr)	Exhaust $PM_{2.5}$ (ton/yr)	Fugitive Dust PM_{10} (ton/yr)	Fugitive Dust $PM_{2.5}$ (ton/yr)
Phase 1	1.81	1.47	0.06	0.06	0.48	0.13
Phase 2	1.80	1.37	0.06	0.05	0.00	0.13
Combined (buildout)	3.61	2.84	0.12	0.12	0.48	0.26
BAAQMD threshold	10	10	15	10	None	None
Exceeded threshold Phase 1?	**No**	**No**	**No**	**No**	**No**	**No**
Exceeded threshold Phase 2?	**No**	**No**	**No**	**No**	**No**	**No**
Exceeded threshold for Combined Operation?	**No**	**No**	**No**	**No**	**No**	**No**

Source: CalEEMod version 2016.3.2. See **Appendix F** for emission model outputs.

Exposure of Sensitive Receptors to Substantial Pollutant Concentrations

Impact AQ-2: The proposed project would not expose sensitive receptors to substantial pollutant concentrations. ***(Less than Significant with Mitigation)***

Project Construction and Operation: Local CO

There are no thresholds of significance associated with CO concentrations with respect to construction. For project operations, the project was found to have a less-than-significant impact with regard to local CO concentrations. The BAAQMD threshold for local CO is based on 1- and 8-hour CAAQS for CO concentrations for project operations. The impacts assessment for local CO concentrations used the screening criteria established in the BAAQMD CEQA guidelines. If a project meets the following screening criteria, then detailed calculations are not necessary and the impacts from local CO concentrations are considered less than significant:

- The project is consistent with an applicable congestion management program established by the county's congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans;
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour; and
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

The San Mateo County Congestion Management program (CMP), discussed in EIR Chapter 4.9, Transportation and Circulation, requires a project-level analysis when a project adds more than 100 peak hour vehicle trips. Based on the project-level traffic analysis in Chapter 4.9, the project would have a significant impact on CMP roadway segments, but with inclusion of Mitigation Measure MM-TR-9: Implement Transportation Demand Management measures listed in San Mateo County Congestion Management Program Appendix I, the project's impacts would be less than significant and consistent

with the CMP. In addition, transportation demand management is required by South San Francisco Municipal Code Chapter 20.400. Neither Phase 1, Phase 2, nor buildout of the project would cause traffic volumes to exceed the volumes specified in the screening criteria for CO for any nearby intersection according to the analysis of traffic volumes at affected intersections conducted for this project presented in Appendix F, Table 2-5. Therefore, with transportation mitigation, operation of the project would meet the screening criteria and would not lead to a significant impact on sensitive receptors due to local CO concentrations.

Project Construction and Operation: TAC Emissions

TAC emissions in the form of $PM_{2.5}$ and diesel particulate matter generated during construction and operation were quantified using CalEEMod and emergency generator specifications.[17] However, because there are no sensitive receptors within 1,000 feet of the project fence line and the project would not result in the siting of a new receptor, the acute health risks to sensitive receptors are assumed to be below the thresholds for individual project increases in cancer risk, non-cancer health index, and $PM_{2.5}$ concentrations. Because no sensitive receptors exist within the screening radius, the project would not result in a significant adverse health impact from toxic air contaminants on nearby sensitive receptors.

Accidental Release of Acutely Hazardous Air Pollutants

The threshold for assessing the significance of risk from accidental release of AHAPs is based on whether the project would store or use acutely hazardous materials and would be located near a sensitive receptor or whether the project would result in a new sensitive receptor sited near stored or used acutely hazardous materials. The project may involve the storage and use of regulated hazardous materials related to biomedical research and development, and common commercial products used for cleaning and maintenance purposes. However, all transport and disposal procedures for the handling of waste must comply with applicable state and federal requirements relating to waste handling, storage, and disposal. The project would not store or use sufficient quantities of acutely hazardous materials to create potentially hazardous conditions at the nearest sensitive receptor, which is greater than 1,000 feet away from the project fence line, nor would the project result in the siting of a new sensitive receptor. Therefore, the impact on sensitive receptors would be less than significant. No mitigation is required.

Objectionable Odors

Impact AQ-3: The proposed project buildout would not create objectionable odors affecting a substantial number of people. ***(Less than Significant)***

There are no quantitative thresholds established to assess construction project odor impacts. Project construction would involve the operation of mobile sources of air quality emissions including off-road construction equipment and on-road mobile sources resulting from worker and vendor trips, both of which may emit objectionable odors due to the combustion of diesel fuel. Additionally, architectural

[17] The air quality modeling is based on approximately 1,046 days of construction for Phase 1 and approximately 942 days of construction for Phase 2. Information about the off-road equipment is in Table 2-2 of Appendix F. CalEEMod defaults for horsepower (hp), load factor (LF), and individual pollutant grams per horsepower-hour (g/hp-hr) were used to calculate emissions. The formula for how emissions were calculated for each piece of equipment is stated on page F-10 of Appendix F.

coatings would be applied during project construction which may also create temporary objectionable odors. However, the odor impacts during periods of construction would be intermittent and temporary, and thus unlikely to expose a substantial number of people to objectionable odors. The proposed office use and R&D operations within the project are unlikely to contribute to ambient odors affecting a substantial number of people to the degree that the BAAQMD CEQA threshold for operational odor impacts would be exceeded (i.e., that the project's operation would result in greater than five confirmed complaints per year averaged over three years) in light of the project's location near other office/R&D operations. Therefore, odor impacts would be less than significant. No mitigation is required.

Clean Air Plan Consistency

Impact AQ-4: The proposed project would conflict with the BAAQMD's 2017 *Clean Air Plan*. *(Less than Significant with Mitigation)*

As stated on p. 4.2.9 and as recommended in the BAAQMD *CEQA Air Quality Guidelines*, conformance with the 2017 BACAP is assessed by comparing air quality impacts from the project against the applicable thresholds established by BAAQMD. Multiple criteria and their respective thresholds were compared, and all air quality effects resulting from the project construction and operation were found to be less than significant or less than significant with mitigation applied as described in more detail in the discussion of air quality Impacts AQ-1 through AQ-3 and Mitigation Measures MM-AQ-1a and MM-AQ-1b. In addition, the project would incorporate applicable control measures during construction, as specified in Mitigation Measure MM-AQ-1b. The project would not disrupt or hinder implementation of any BACAP control measures, which are measures designed to reduce air emissions by discouraging single-occupancy vehicle trips. The project's TDM program, discussed in Chapter 4.9, Transportation and Circulation, is consistent with the goals of the BACAP because it would reduce the project's vehicle trips.

The project would also demonstrate consistency with the BACAP by meeting the BAAQMD's GHG emission threshold. However, this is addressed separately in the discussion of cumulative climate change impacts in Chapter 4.5, Greenhouse Gas.

CUMULATIVE IMPACTS

Ambient Air Quality Standards

Impact C-AQ-1: The proposed project would make a cumulatively considerable contribution to significant cumulative impacts with respect to nonattainment pollutants, including ozone precursors impacts. *(Less than Significant with Mitigation)*

The nonattainment pollutant emission levels of PM_{10}, $PM_{2.5}$, and the ozone precursors NO_x and ROG from construction and operation of the project are shown in Tables 4.2.2 through 4.2.5. The San Francisco Bay Area Air Basin is currently designated as nonattainment for ozone, PM_{10}, and $PM_{2.5}$, as discussed on p. 4.2.2. As discussed on pp. 4.2.13-17 regarding Impact AQ-1, all criteria air pollutant and precursor emissions would be below the thresholds once Mitigation Measures MM-AQ-1a and MM-AQ-1b are applied. If pollutant emissions are below the threshold level, the impacts from an air contaminant are not considered to be cumulatively considerable. Therefore, with mitigation, the proposed project would make

a less than cumulatively considerable contribution to significant cumulative air quality impacts from nonattainment pollutants.

Exposure of Sensitive Receptors to Pollutant Concentrations

Impact C-AQ-2: The proposed project would not make a cumulatively considerable contribution to significant cumulative impacts from pollutant concentrations exposure to sensitive receptors. ***(Less than Significant)***

As mentioned in the discussion of Impact AQ-2, there are currently no sensitive receptors within 1,000 feet of the project fence line and the project would not result in the siting of a new sensitive receptor. Therefore, long-term health risks to sensitive receptors would not reach the thresholds for individual project increases in cancer risk, non-cancer health index, and $PM_{2.5}$ concentrations. Additionally, based on a CEQAnet[18] database query and review of new applications submitted to the City, no projects potentially siting new sensitive receptors have been proposed within 1,000 feet of the Haskins Way project property line. Thus, the project would not make a cumulatively considerable contribution to a significant cumulative impact on sensitive receptors from exposure to substantial pollution concentrations, because no sensitive receptors are present or are expected to be present in the reasonably foreseeable future within the zone of influence. No mitigation is required.

Objectionable Odors

Impact C-AQ-3: The proposed project operations would not make a cumulatively considerable contribution to significant cumulative worsening of ambient odor impacts, nor affect a substantial number of people. ***(Less than Significant)***

Any increased traffic, maintenance equipment operation, or reapplication of architectural coatings associated with the long-term operations of land uses allowed in the proposed BTP zoning district, such as the project, are unlikely to create objectionable odors to the extent that more than five confirmed complaints per year averaged over three years would be received. Since this is the standard used by BAAQMD and adopted by the City to determine cumulatively considerable odor impact from a project's operation, the project would result in a less than cumulatively considerable contribution to significant cumulative odor impacts. No mitigation is required.

Clean Air Plan Consistency

Impact C-AQ-4: The proposed project would make a cumulatively considerable contribution to cumulative impacts to long term air pollution reduction goals of the BAAQMD's 2017 ***Clean Air Plan*****.** ***(Less than Significant with Mitigation)***

Air pollution is largely a cumulative impact; emissions from past, present, and future projects contribute to the region's air quality on a cumulative basis. However, no individual project by itself would be of sufficient size to cause a regional non-attainment of ambient air quality standards. All potential impacts of the project were assessed using the BAAQMD's established thresholds. BAAQMD set each threshold at a

[18] California Governor's Office of Planning and Research provides access to the CEQAnet Database. Available online at: http://www.ceqanet.ca.gov/. Accessed June 8, 2018.

level such that projects meeting the thresholds would not lead to cumulatively considerable impacts. As addressed in the discussion of air quality Impacts AQ-1 through AQ-3 and Mitigation Measures MM-AQ-1a and MM-AQ-1b, project emissions would not exceed the thresholds of significance with mitigation. Therefore, emissions associated with the project would not make a cumulatively considerable contribution to significant cumulative air quality impacts with mitigation applied.

Impacts resulting from project GHG emissions are discussed further in Chapter 4.5, Greenhouse Gas Emissions.

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4.3 Biological Resources

4.3.1 Introduction

Section 4.3, Biological Resources, begins with a description of the existing conditions for terrestrial biological resources that occur or have the potential to occur on the 201 Haskins Way Project (project) site or in the immediate vicinity. Regulations and guidelines relevant to biological resources are discussed next, followed by an impacts analysis that evaluates the potential effects on biological resources that would result from implementation of the proposed project. Mitigation measures that would avoid or reduce impacts to less-than-significant levels are identified.

4.3.2 Environmental Setting

REGIONAL SETTING

The project site is located in the San Francisco Bay Area-Delta region, which hosts a diverse variety of natural communities ranging from the open waters of San Francisco Bay (Bay) and the Delta to salt and brackish marshes to chaparral and oak woodlands. The natural communities are interrupted by suburban and urban development in much of the region. The climate is Mediterranean in nature, with relatively mild, wet winters and warm, dry summers. The high diversity of vegetation and wildlife found in the region is a result of soils, topography, and microclimate diversity that promotes relatively high levels of endemism.[1]

San Francisco Bay is the second largest estuary in the United States and supports numerous marine habitats and biological communities. It encompasses 5,509 square miles, including shallow mudflats. San Francisco Bay is divided into four main basins: San Pablo or North Bay, Suisun Bay, Central Bay, and South Bay.[2] The Bay is filled by fresh water that flows west in the Sacramento River from near Mount Shasta and in the San Joaquin River. The mixture of salt and fresh water is the foundation of the Bay's biological diversity and richness and supports hundreds of fish, mammal, and plant species. San Francisco Bay is also a critical stopover point along the Pacific Flyway migration route of shorebirds and waterfowl, which number over one million birds at the height of migration.[3]

PROJECT SITE SETTING

The majority of the project site is paved and currently developed with buildings, mainly warehouses, associated with the previous and current use of the site. The project site is surrounded by development to the north, west, and east. The site also borders the San Francisco Bay Trail to the south. The site is

[1] Endemism refers to the degree to which organisms or taxa are restricted to a geographical region or locality and are thus individually characterized as endemic to that area.
[2] San Francisco Bay Conservation and Development, 2018. San Francisco Bay and Estuary (website). Available online at: http://www.bcdc.ca.gov/bay_estuary.html. Accessed May 11, 2018.
[3] National Audubon Society, 2018. San Francisco Bay (website). Available online at: http://ca.audubon.org/conservation/conservation/seas-shores/san-francisco-bay. Accessed May 11, 2018.

landscaped with a total of 185 trees and ornamental vegetation, as well as some ruderal vegetation, and would be considered a developed/landscaped habitat, as discussed below.

Developed/Landscaped

The site area includes approximately 18.2 acres of developed and landscaped land uses comprised of hardscape roads, buildings, parking lot surfaces, paved trail surfaces, with ornamental landscaped areas. The habitat suitability for rare or native vegetation in these areas is very low. Developed habitats primarily support common, urban-adapted wildlife species, and overall wildlife abundance and diversity are low. Likewise, landscape habitats are used sparingly by most wildlife species, largely because of the small area of vegetation available, the uniform and open nature of most landscaping, and regular disturbance due to landscape maintenance and use. However, animals living in adjacent habitats and migratory birds often exploit foraging opportunities offered by landscaped habitats, and dense shrub and tree landscape components may offer sufficient cover for nesting birds and mammals.

WILDLIFE MOVEMENT CORRIDORS

Wildlife movement corridors are considered an important ecological resource by the California Department of Fish and Wildlife (CDFW) and under the California Environmental Quality Act (CEQA).[4] Movement corridors may provide favorable locations for wildlife to travel between larger areas of open space referred to as core habitat areas that support foraging, breeding, shelter, and preferred summer and winter range locations. Movement corridors may also function as dispersal corridors that allow animals to move between various locations within their range. Topography and other natural factors, in combination with urbanization, can fragment or separate large open-space areas. Areas of human disturbance or urban development also can fragment wildlife habitats and impede wildlife movement between areas of suitable habitat. This fragmentation can create isolated “islands” of habitat that may not provide sufficient area to accommodate sustainable wildlife populations and can adversely affect genetic and species diversity. Movement corridors mitigate the effects of this fragmentation by allowing animals to move between remaining habitats, which in turn allows depleted populations to be replenished and promotes genetic exchange between separate populations. The project site is not considered to contribute to an established wildlife movement corridor because it does not provide a connection among any core habitat areas.

Although the project site is not within a terrestrial wildlife movement corridor, the San Francisco Peninsula is an important migratory stopover for birds along the Pacific Flyway, one of the four major migratory routes in North America.[5] During fall and spring migrations raptors, songbirds, shorebirds, and waterbirds stop to forage and rest in suitable habitat along this route such as the beaches and coastal mountains in west San Mateo County, and bayside wetlands and shoreline open spaces. Although the San Francisco Peninsula’s location on the Pacific Flyway allows open spaces to host transient individuals, it does not constitute a wildlife movement corridor as these areas are isolated within an otherwise densely developed urban environment. Migrating birds may use native habitats located near San Francisco Bay

[4] , 2018. Habitat Connectivity Planning for Fish and Wildlife (website). Available online at: https://www.wildlife.ca.gov/Conservation/Planning/Connectivity.

[5] Pacific Flyway Council, 2018. About (website). Available online at: http://www.pacificflyway.gov/About.asp. Accessed May 11, 2018.

during migration; however, because the project site is developed/highly disturbed, it does not offer high-quality habitat for migrating birds.

SPECIAL-STATUS SPECIES

A number of species known to occur in the Bay Area are protected pursuant to federal and/or state endangered species laws, have been designated species of special concern by the CDFW, or are afforded certain protection through regulatory means such as the California Department of Fish and Game Code. In addition, Section 15380(b) of the CEQA Guidelines provides a definition of rare, endangered, or threatened species that are not currently included in an agency listing, but whose "survival and reproduction in the wild are in immediate jeopardy" (endangered) or which are "in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens" or "is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered 'threatened' as that term is used in the Federal Endangered Species Act."[6] Species recognized under these terms are collectively referred to as "special-status species." For the purpose of this Environmental Impact Report (EIR), special-status species include the following:

1. Species listed or proposed for listing as threatened or endangered under the Federal Endangered Species Act (FESA) (50 Code of Federal Regulations 17.12 [listed plants], 17.11 [listed animals], and various notices in the *Federal Register* [proposed species]).
2. Species that are protected under the Federal Migratory Bird Treaty Act (MBTA) (50 Code of Federal Regulations 10.13).
3. Species that are candidates for possible future listing as threatened or endangered under the FESA (61 *Federal Register* 40, February 28, 1996).
4. Species of "special concern," as designated by U.S. Fish and Wildlife Service (USFWS) or National Oceanic and Atmospheric Administration-National Marine Fisheries Service.
5. Species listed or proposed for listing by the state as threatened or endangered under the California Endangered Species Act (CESA) (Title 14 California Code of Regulations 670.5).
6. Species described by the CDFW as species of special concern.[7]
7. Species designated as "special animals" by the state.[8]
8. Species designated as "fully protected" by the state (there are about 35, most of which are also listed as either endangered or threatened).

[6] For example, the CDFW interprets Ranks 1A, 1B, 2A, and 2B of the California Native Plant Society's (CNPS's) *Inventory of Rare and Endangered Vascular Plants of California* to consist of plants that, in a majority of cases, would qualify for listing as rare, threatened, or endangered. However, the determination as to whether an impact is significant is made by the lead agency, absent the protection of other laws.

[7] A California species of special concern is one that has been extirpated from the state; meets the state definition of threatened or endangered but has not been formally listed; is undergoing or has experienced serious population declines or range restrictions that put it at risk of becoming threatened or endangered; and/or has naturally small populations susceptible to high risk from any factor that could lead to declines that would qualify it for threatened or endangered status.

[8] Species listed on the current CDFW "special animals" list (October 2015), which includes 905 species. This list includes species that CDFW considers "those of greatest conservation need" (CDFW, *Special Animals List*).

9. Raptors (birds of prey), which are specifically protected by California Fish and Game Code Section 3503.5, thus prohibiting the take, or possession of raptors and owls, their nests, and their eggs.[9]
10. Migratory nongame birds as designated in the MBTA, which are specifically protected by California Fish and Game Code, Section 3513, thus prohibiting the take or possession of any such bird.
11. Plants listed as rare or endangered under the California Native Plant Protection Act (CNPPA) (California Fish and Game Code, Section 1900 et seq.).
12. Species that meet the definitions of rare and endangered under CEQA. CEQA Guidelines Section 15380 provides that a plant or animal species may be treated as "rare or endangered" even if not on one of the official lists.
13. Plants considered by the California Native Plant Society (CNPS) to be "rare, threatened or endangered in California" under the California Rare Plant Ranking system, which includes Rank 1A, 1B, 2A, and 2B, as well as Rank 3 and 4,[10] plant species.

Table 4.3.1: Special-Status Species Recorded within a 1-Mile Radius of the Project Site lists the special-status plant and animal species that have the potential to occur within a 1-mile radius of the project site for terrestrial biological resources, compiled based on data contained in the California Natural Diversity Database (CNDDB).[11] CNDDB records within a 1-mile radius of the project site show one plant species, three bird species, one reptile species, and one fish species. No mammal or insect species were recorded.

Of the six species recorded within 1 mile of the project, only peregrine falcon (*Falco peregrinus anatum*) has potential to occur and this species would be only anticipated to occur on the project site during dispersal or migration. Peregrine falcons normally nest in a scrape on cliff edges or, in recent times, on tall human-made structures.[12] This species population has grown significantly since the 1980s due to the ban of the insecticide dichlorodiphenyltrichloroethane, commonly known as "DDT," which had previously caused significant population decline and eggshell thinning for bird species. Today, many individuals have adapted to nesting and foraging in urban environments.[13]

[9] The inclusion of birds protected by California Fish and Game Code Section 3503.5 is in recognition of the fact that these birds are substantially less common in California than most other birds, having lost much of their habitat to development, and that the populations of these species are therefore substantially more vulnerable to further loss of habitat and to interference with nesting and breeding than most other birds. It is noted that a number of raptors and owls are already specifically listed as threatened or endangered by state and federal wildlife authorities.

[10] Rank 3 plants may be analyzed under CEQA Guidelines Section 15380 if sufficient information is available to assess potential impacts on such plants. Factors such as regional rarity vs. statewide rarity should be considered in determining whether cumulative impacts on a Rank 4 plant are significant even if individual project impacts are not. California Rare Plant Ranking system (CRPR) Ranks 3 and 4 may be considered regionally significant if, for example, the potentially impacted occurrence is located at the periphery of the species' range, or exhibits unusual morphology, or occurs in an unusual habitat/substrate.

[11] California Department of Fish and Wildlife, 2018. California Natural Diversity Database results within a 1-mile radius of the project site. Available online at: https://www.wildlife.ca.gov/Data/CNDDB. Accessed May 11, 2018.

[12] National Audubon Society, 2018. Guide to North American Birds –Peregrine Falcon (website). Available online at: https://www.audubon.org/field-guide/bird/peregrine-falcon. Accessed September 27, 2018.

[13] Caballero, I. C, J. M. Bates, M. Hennen, and M. V. Ashley, 2016. *Sex in the City: Breeding Behavior of Urban Peregrine Falcons in the Midwestern US*. Available online at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0159054. Accessed October 10, 2018.

Table 4.3.1. Special-Status Species Recorded within a 1-Mile Radius of the Project Site

Species	Status	Habitat	Potential to Occur
Plants			
San Francisco owl's-clover (*Triphysaria floribunda*)	CNPS 1B.2	Coastal prairie, coastal scrub, valley and foothill grassland, serpentinite, or sandy soils.	Absent. Last recorded occurrence in 1965. It is not expected to occur on-site due to the poor quality of fill soils and lack of suitable edaphic conditions on the site.
Birds			
Alameda song sparrow (*Melospiza melodia pusillula*)	SSC	Salt marshes in the South San Francisco Bay area. Nests in emergent aquatic vegetation, dense shrubs, or other dense growth.	No potential to occur. No suitable nesting or foraging habitat on the project site.
American peregrine falcon (*Falco peregrinus anatum*)	SP	Nests on cliffs, and occasionally on buildings or bridges; forages for birds over many habitats.	Low potential to occur. Occasional dispersing or migrating individuals may move through and forage in portions of the project area, but no suitable nesting habitat occurs on the project site.
California Ridgeway's rail (*Rallus obsoletus obsoletus*)	FE, SE, FP	Restricted to salt marshes and tidal sloughs; usually associated with heavy growth of pickleweed; feeds on mollusks removed from the mud in sloughs	No potential to occur. No suitable nesting or foraging habitat on the project site or surrounding area.
Reptiles			
San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)	FE, SE, FP	Inhabits ponds, streams, rivers, and reservoirs, typically, with riparian or emergent vegetation. Requires upland areas for aestivation and nesting, usually within 100 yards of permanent water source.	No potential to occur. There is no suitable habitat on the project site.
Fish			
Longfin smelt (*Spirinchus thaleichthys)*	FC, ST, SSC		Absent. There are no waters on the project site.

Notes: FE = Federally Endangered; FC = Federal Candidate for Listing as Endangered or Threatened; SE = State Endangered; SP = State Protected ST = State Threatened; SSC = State Species of Special Concern; FP = Fully Protected Species; CNPS 1B = Plants considered by CNPS to be rare, threatened, or endangered in California, and elsewhere.

Source: CNDDB (2018)

Other Resident or Migratory Birds

Although many native birds are not considered to be special-status species, their nests are protected by the MBTA and the California Fish and Game Code. Many resident and migratory birds could nest in ruderal vegetation, ornamental trees, or on or under roof eaves of buildings on the project site. Raptor species, such as great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), and red-shouldered hawk (*Buteo lineatus*), could nest in mature trees on the project site. Cliff swallow (*Petrochelidon pyrrhonota*), barn swallow (*Hirundo rustica*), and black phoebe (*Sayornis nigricans*) could build mud nests on the outside of existing buildings. Other passerine species, such as house finch (*Haemorhous mexicanus*) and Anna's hummingbird (*Calypte anna*), could nest in shrubs or trees in the study area, while killdeer (*Charadrius vociferous*) could nest on bare or gravelly ground surfaces.

Special-Status Bats and Roosting Bats

Roosting bats, including two California species of special concern, Townsend's big-eared bat (*Corynorhinus townsendii*) and western red bat (*Lasiurus blossevillii*), have low to moderate potential to occur within the proposed project site. A Townsend's big-eared bat occurrence was recorded approximately 4 miles southwest of the project site in 2011, within a horse barn that has since been demolished.[14] Although there are no nearby records, western red bats have been observed roosting within trees in the Bay Area.

The proposed project structures, including the buildings proposed for demolition, may provide roosting habitat for bat species that roost in buildings or structures such as Townsend's big-eared bat and Mexican free-tailed bat (*Tadarida brasiliensis*). The ornamental trees within the project site provide potential roosting habitat for western red bat.

On August 24, 2018, a roosting bat survey was conducted on the 201 Haskins Way parcel in the Phase 1 area of the project site.[15] During the survey, the interior, exterior, and rooftop of the existing vacant trucking terminal building were inspected for roosting bats or signs of roosting bats such as urine staining around potential roost sites (cracks and crevices), guano piles below potential roost sites, audible or visual detection, and odor typically associated with roosting bats (guano and urine). A tree assessment was also conducted to examine cavities, crevices, and exfoliating bark for signs of bat usage, in addition to a visual assessment of the foliage for foliage-roosting bats. No signs of historical or current bat usage were found on the building or trees on the 201 Haskins Way parcel. Based on this assessment, there is no expectation that bats would move into the 201 Haskins building or on-site trees.

Rare Plants

As discussed above, the project site is largely developed and only contains limited ornamental landscaping and ruderal vegetation. The project site does not contain any native plant communities, and the limited areas of the project site that are not actively landscaped are generally too small and subject to regular disturbance such that they cannot support native plant communities. Furthermore, the project site is not adjacent to any known rare plant communities, nor does it provide suitable habitat for rare plant species.

4.3.3 Regulatory Framework

The project site does not contain any waters, wetlands or riparian habitat and the project site does not include features that are mapped in hydrography and wetlands datasets maintained by the USFWS or the

[14] California Department of Fish and Wildlife, 2018. California Natural Diversity Database results within a 1-mile radius of the project site. Available online at: https://www.wildlife.ca.gov/Data/CNDDB. Accessed May 11, 2018.
[15] H.T. Harvey & Associates, 2018. *Haskins Way Biotech Project – Roosting Bat Survey Report*, August 27, 2018.

U.S. Geological Survey (USGS).[16,17] There are no sensitive natural communities as defined by CDFW and USFWS on the project site.[18] Implementation of the proposed project would not involve construction on federally protected wetlands, riparian habitat, or sensitive natural communities protected by state or federal laws or regulations. There are no adopted habitat conservation plans, natural community conservation plans, or other approved local, state, or regional habitat conservation plans in the project area.[19] Therefore, regulations applicable to wetlands, riparian habitat, or other sensitive natural communities promulgated by USFWS and CDFW would not be applicable and are not summarized below.

FEDERAL

Federal Endangered Species Act

The FESA (16 United States Code [USC] Section 1531 et seq.) designates threatened and endangered animal and plant species, and provides measures for their protection and recovery. The "take" of listed plant or wildlife species, defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct," is prohibited without first obtaining a federal permit. The FESA also generally requires determination of critical habitat for listed species. If critical habitat has been designated, impacts on areas that contain the primary constituent elements identified for the species, whether or not the species is currently present, are also prohibited. FESA Section 7 (for actions by federal agencies) and Section 10 (for actions by non-federal agencies) provide pathways for obtaining authority to take listed species.

Migratory Bird Treaty Act

The Federal MBTA (16 USC, Section 703, Supp. I, 1989) prohibits pursuit, take or attempt to take, killing, possessing, selling, or trading in migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. This act applies to whole birds, parts of birds, and bird nests and eggs. Although the MBTA itself does not provide specific take avoidance measures, the USFWS and CDFW over time have developed a set of measures sufficient to demonstrate nesting birds take avoidance. These requirements include avoiding vegetation removal or ground disturbance during nesting season (typically February 15 – September 15), conducting preconstruction nesting bird surveys of a project area during nesting season, and establishing appropriately-sized protective buffers from construction if active nests are found.

[16] U.S. Fish and Wildlife Service, 2018. National Wetlands Inventory Wetlands Mapper (website). Available online at: https://www.fws.gov/wetlands/. Accessed May 11, 2018.
[17] U.S. Geological Survey, 2018. National Hydrography Dataset, a component of the National Map (website). Available online at: https://nhd.usgs.gov/NHD_High_Resolution.html.
[18] California Department of Fish and Wildlife, 2018. California Natural Diversity Database results within a 1-mile radius of the project site. Available online at: https://www.wildlife.ca.gov/Data/CNDDB. Accessed May 11, 2018.
[19] California Department of Fish and Wildlife, 2017. California Regional Conservation Plans Map, October 2017. Available online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=68626&inline.

STATE

California Endangered Species Act

Under the CESA, the CDFW has the responsibility for maintaining a list of threatened and endangered species (California Fish and Game Code Section 2070). The CDFW also maintains a list of candidate species, which are species formally under review for addition to either the list of endangered species or the list of threatened species. The CESA prohibits the take of plant and animal species that the California Fish and Game Commission has designated as either threatened or endangered in California. "Take" under the CESA means to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill a listed species (California Fish and Game Code Section 86). The take prohibitions also apply to candidate species. However, Section 2081 of the CESA allows the CDFW to issue permits for the minor and incidental "take" of species by an individual or permitted activity listed under the CESA.

California Native Plant Protection Act

State listing of plant species began in 1977 with the passage of the CNPPA (California Fish and Game Code Sections 1900–1913), which directed the CDFW to carry out the legislature's intent to "preserve, protect, and enhance endangered plants in this State." The CNPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting, transporting, or selling such plants. Three listing categories for plants are used in California: rare, threatened, and endangered.

California Fish and Game Code

Fully Protected Species

Certain species are considered fully protected, meaning that the California Fish and Game Code explicitly prohibits all take of individuals of these species except for take permitted for scientific research. Fully protected amphibians and reptiles, fish, birds, and mammals are listed in Sections 5050, 5515, 3511, and 4700, respectively. It is possible for a species to be protected under the California Fish and Game Code, but not be fully protected. For instance, mountain lion (*Puma concolor*) is protected under Section 4800 et seq., but is not a fully protected species.

Protection of Birds and Their Nests

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 of the California Fish and Game Code prohibits the taking, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs. Migratory non-game birds are protected under Section 3513, whereas other specified birds are protected under Section 3800.

California Rare Plant Rankings

CDFW works in collaboration with the CNPS and botanical experts to maintain an Inventory of Rare and Endangered Plants, and the similar Special Vascular Plants, Bryophytes, and Lichens List. The plant species on these lists may meet the CEQA definition of rare or endangered. CDFW advises public agencies during the CEQA process to help ensure that the actions they approve do not significantly impact such resources. The following definitions are used in the California Rare Plant Ranking system:

- Rank 1A: Plants presumed extirpated in California and either rare or extinct elsewhere.
- Rank 1B: Plants Rare, Threatened, or Endangered in California and elsewhere.
- Rank 2A: Plants presumed extirpated in California, but more common elsewhere.
- Rank 2B: Plants Rare, Threatened, or Endangered in California, but more common elsewhere.
- Rank 3: Plants about which more information is needed (a Review List).
- Rank 4: Plants of limited distribution (a Watch List).

REGIONAL

The San Francisco Bay Plan and San Francisco Bay Conservation and Development Commission

The San Francisco Bay Conservation and Development Commission (BCDC) has jurisdiction over coastal activities occurring within and around San Francisco Bay and Suisun Marsh. BCDC was created by the McAteer-Petris Act.[20] BCDC regulates fill, extraction of materials, and substantial change in use of land, water, and structures in San Francisco Bay and development within 100 feet of the Bay, as measured landward from the mean high tide line. BCDC has jurisdiction over all areas of San Francisco Bay that are subject to tidal action. BCDC prepared and adopted the *San Francisco Bay Plan* to regulate land use and activities on and adjacent to the Bay.

The *San Francisco Bay Plan* specifies goals, objectives, and policies for existing and proposed waterfront land uses and other areas under the jurisdiction of BCDC. Major policies of the *San Francisco Bay Plan* applicable to wildlife discuss the avoidance of Bay filling because it destroys the habitat of fish and wildlife. Future filling can disrupt the Bay ecology, which has already been damaged by past fills, and can endanger some species of birds and fish. The Bay Plan emphasizes that seemingly minor changes, such as new fill or dredging, may have far-reaching and sometimes highly destructive effects.

LOCAL

City of South San Francisco General Plan

The *City of South San Francisco General Plan* (General Plan), originally adopted in 1999 and as amended in 2011, provides a vision for the long-range physical and economic development for the City of South San Francisco (City), provides strategies and specific implementing actions, and establishes a basis

[20] California Government Code §66600-66682.

for judging whether specific development proposals and public projects are consistent with the City's plans and policy standards. The General Plan contains an Open Space and Conservation Element, which includes the following policies applicable to biological resources.

Policy 7.1-G-1: Protect special status species and supporting habitats within South San Francisco, including species that are State or federally listed as Endangered, Threatened, or Rare.

Policy 7.1-I-1: Cooperate with State and federal agencies to ensure that development does not substantially affect special status species appearing on any State or federal list for any rare, endangered, or threatened species. Require assessments of biological resources prior to approval of any development on sites with ecologically sensitive habitat, as depicted in Figure 7-1.

Policy 7.2-G-1: Comply with the San Francisco Bay RWQCB [Regional Water Quality Control Board] regulations and standards to maintain and improve the quality of both surface water and groundwater resources.

Policy 7.2-G-3: Discourage use of insecticides, herbicides, or toxic chemical substances within the city.

Policy 7.2-I-1: Continue working with the San Francisco Bay RWQCB in the implementation of the NPDES [National Pollutant Discharge Elimination System], and continue participation in STOPPP [San Mateo Countywide Stormwater Pollution Prevention Program] for the protection of surface water and groundwater quality.

East of 101 Area Plan

The City interprets the *East of 101 Area Plan* as a design-level document. The *East 101 Area Plan* sets forth additional and more specific land use policies for the East 101 Area, in addition to those in the General Plan. The Area Plan contains a Conservation Element with policies related to biological resources, including Policy CON-7, below.

Policy CON-7: New development adjacent to sensitive resource areas shall be required to incorporate the following measures into project design:

- Shield lights to reduce off-site glare.
- Provide buffer areas of at least 100 feet between known sensitive resources and development area.
- Landscape all on-site buffer areas with native vegetation to screen habitat areas from adjacent land uses.
- Restrict entry to habitat areas through devices such as fencing, landscaping or signage.
- Ensure that run-off from development does not adversely affect the biotic values of adjacent wetlands or other habitat areas.

City of South San Francisco Tree Preservation Ordinance

Under Chapter 13.30 of the South San Francisco Municipal Code, the City maintains a tree preservation ordinance designed to:

a. provide standards and requirements for the protection of certain large trees (trees with a circumference of 48 inches or greater at 54 inches above the natural grade) and trees and stands with unique characteristics (having been so designated by the Parks and Recreation director);

b. provide standards and requirements for planting and maintenance of trees for new development; and

c. establish recommended standards for planting and maintaining trees on property that is already developed. This chapter achieves these objectives in ways that support and encourage the reasonable economic enjoyment of private property, not in ways that prevent it. (Ord. 1271 § l (part), 2000: Ord. 1060 § l (part), 1989).

Protected trees are not to be removed or pruned without a permit from the City, and must be protected from development-related impacts such as soil compaction and underground trenching for utilities. Additionally, new developments must conform to a series of tree planting requirements.

4.3.4 Impacts and Mitigation Measures

This section describes the impact analysis related to biological resources for the proposed project. It also lists the thresholds used to conclude whether an impact would be significant and describes the approach used to determine the impacts of the proposed project. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

SIGNIFICANCE CRITERIA

Based on CEQA Guidelines Appendix G, a project is considered to have significant impacts if implementation of the project would:

a. have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or the USFWS;

b. have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS;

c. have a substantial adverse effect on federally protected wetlands, as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal wetlands, etc.), through direct removal, filling, hydrological interruption, or other means;

d. interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

e. conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or

f. conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

CEQA Guidelines Section 15380 further provides that a plant or wildlife species may be treated as “rare or endangered” even if not on one of the official lists if, for example, it is likely to become endangered in the foreseeable future.

APPROACH TO ANALYSIS

The proposed project was evaluated based on the CDFW's CNDDB, biological reports and studies from other waterfront locations in the project vicinity, as well as aerial imagery.

The project site does not contain any wetlands, riparian habitat, or other sensitive natural communities as defined by the CDFW and the USFWS. The nearest mapped water body, an unnamed riverine wetland approximately 100 feet to the east of the project site, runs along the north side of the existing recycling center southeast of the project site.[21] In addition, the Bay is located south of the Bay Trail adjacent to the 400-450 East Jamie Court parcel on the project site. The proposed project would not involve any development or activities east of the project site within the unnamed riverine wetland, or south of the Bay Trail in Bay waters or wetlands, nor would the project result in any indirect impacts on these features given the project's distance from the features. As discussed in Section 4.6, Hydrology and Water Quality, construction-related stormwater discharges would occur in accordance with the NPDES Construction General Stormwater Permit, and best management practices and monitoring must be implemented to prevent pollutants from coming into contact with stormwater and to keep all products of erosion and stormwater pollutants from moving off site into receiving waters. Therefore, implementation of the proposed project would not directly or indirectly adversely affect any federally protected wetlands, riparian habitat, or sensitive natural communities protected by state or federal laws or regulations. There is no adopted habitat conservation plan, natural community conservation plan, or other approved local, state, or regional habitat conservation plans in the project area.

Thus, criteria (b), (c), and (f) are not applicable to the proposed project and are not further discussed. In addition, the proposed project would not interfere with the movement of migratory fish species as discussed in criterion (d); therefore, the impact evaluation below focuses on terrestrial wildlife movement and corridors and migratory fish and marine species are not further discussed.

IMPACT EVALUATION

Impact BI-1: The proposed project would have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service; and the proposed project would not interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (*Less than Significant with Mitigation*)

Wildlife species are protected under the FESA, the MBTA, the CESA, and regulations concerning California Species of Special Concern. Based on a review of the current site conditions, the project site does not contain suitable habitat for any species identified as a state or federal candidate, threatened, or endangered species.

[21] U.S. Fish and Wildlife Service, National Wetlands Inventory. Available online at: https://www.fws.gov/wetlands/data/Mapper.html. Accessed May 10, 2018.

The project site and surrounding neighborhood contain light industrial and office/R&D uses. Because the project site is located within a built urban environment, it is subject to existing routine disturbances (e.g., pedestrian and vehicular activity, and landscape maintenance activities). The project site does not provide habitat for special-status plant species, yet the project site may provide suitable habitat for special status bats and foraging and nesting opportunities for bird species. Although there is open space with trees and plants on the project site, the surrounding areas have been developed with buildings, paved parking lots, and roadways. On-site vegetation is ornamental landscaping and trees and ruderal vegetation. Developed habitats primarily support common, urban-adapted wildlife species and overall wildlife abundance and diversity are low. Likewise, landscaped habitats are used sparingly by most wildlife species, largely because of the uniform, open nature of most landscaping, and regular disturbances due to landscape maintenance and use. However, animals living in adjacent habitats and migratory birds often exploit foraging opportunities offered by landscaped habitats, and dense shrub and tree landscape components may offer sufficient cover for nesting birds and mammals. The project site, in and of itself does not serve as a nursery site or corridor for native resident or migratory fish or wildlife, except potentially for birds and bats. There are no wetlands or intermittent or permanent streams on the project site. The nearest aquatic feature is the Bay shoreline and waters located south of the Bay Trail and the project site.

Of the six species recorded within 1 mile of the project, only peregrine falcon has potential to occur, and this species would be only anticipated to occur on the project site during dispersal or migration. This species nests in a scrape, normally on cliff edges or, in recent times, on tall human-made structures.[22] Due to the low-quality foraging habitat and low rise of buildings and trees on the project site, foraging and nesting activities of peregrine falcons is unlikely to occur. Nonetheless, as provided by the MBTA and Sections 3503, 3503.5, and 3513 of the California Fish and Game Code, peregrine falcon individuals, eggs, and nests are protected, as further discussed below under "Nesting and Migratory Birds."

Implementation of the proposed project would result in the demolition of some buildings and hardscape, and the removal of trees and vegetation, on the project site. The proposed project (including the Phase 2 conceptual development plan) would involve the removal of existing landscaping and a total of approximately 121 existing trees on the project site. During Phase 1 development, approximately 30 trees on the 201 Haskins Way parcel and 16 trees on 400-450 East Jamie Court would be removed; during Phase 2 development, as depicted in the conceptual development plan on Figure 3.7, p. 3.26, approximately 75 existing trees on the six remaining parcels in the Phase 2 area would be removed. At project buildout, the parcel boundaries fronting East Grand Avenue, Haskins Way, and East Jamie Court would be landscaped with street trees and the interior of the site would be landscaped. In total, approximately 263 new trees would be planted.

Therefore, the impacts of the proposed project on candidate, sensitive, or special-status species would be less than significant with the possible exception of impacts on migratory birds and special-status bat species, which are discussed below.

[22] National Audubon Society, 2018. Guide to North American Birds –Peregrine Falcon (website). Available online at: https://www.audubon.org/field-guide/bird/peregrine-falcon. Accessed September 27, 2018.

Nesting and Migratory Birds

The project site is located along the Pacific Flyway for migratory birds, and the juxtaposition in the Bay Area of wetland, shoreline, and open water habitats used by birds results in large-scale movements of birds along the edge of the Bay, both during long-distance movements (such as migration) and during daily movements between roosting and foraging habitats.

Landscaped areas within the project site may provide suitable habitat for resident and migratory birds covered under the MBTA and Sections 3503, 3503.5, and 3513 of the California Fish and Game Code. Therefore, the proposed project could result in the temporary loss of nesting and foraging habitat through the removal of onsite trees and vegetation during construction; however, nearby habitat in the Bay, in other landscaped locations in the East of 101 Area, and along the shoreline offer suitable nesting and foraging habitat for potentially displaced birds. These nearby habitats provide a more attractive environment for birds due to more expansive nesting and foraging habitat as well as lower levels of human-related disturbances. After the construction period and incorporation of site landscaping (including the planting of new trees on the project site), birds would be expected to inhabit the project site.

Tree removal and construction-related activities associated with the proposed project could adversely affect bird breeding and nest behaviors at the project site and in the immediate vicinity. Construction activities that may cause visual disturbance or alter the ambient noise environment include vegetation removal, demolition of existing buildings, and construction of foundations and new buildings. Although adult birds can escape the project site to avoid direct harm during construction, eggs or chicks associated with active nests could still be permanently affected (i.e., abandoned or killed) by project construction activities. The proposed project under Phase 1 or project buildout may result in the displacement of nesting migratory birds and/or the abandonment of active nests should construction and vegetation removal occur during the typical nesting season (January 15 – August 15). Implementation of Mitigation Measure MM-BI-1a: Pre-construction Nesting Bird Surveys and Buffer Areas, would reduce this potentially significant impact on nesting birds covered under the MBTA and California Fish and Game Code to a less-than-significant level by ensuring project activities do not result in the take of a nesting bird or an active nest.

Mitigation Measure MM-BI-1a: Pre-construction Nesting Bird Surveys and Buffer Areas

Nesting birds and their nests shall be protected during construction by implementation of the following measures for each construction phase:

a. To the extent feasible, conduct initial activities including, but not limited to, vegetation removal, tree trimming or removal, ground disturbance, building demolition, site grading, and other construction activities which may compromise breeding birds or the success of their nests outside of the nesting season (February 15 – September 15).

b. If construction during the bird nesting season cannot be fully avoided, a qualified wildlife biologist* shall conduct a pre-construction nesting survey within 14 days prior to the start of construction or demolition at areas that have not been previously disturbed by project activities or after any construction breaks of 14 days or more. The survey shall be performed in suitable habitat within 100 feet of the applicable construction phase area in

order to locate any active nests of passerine species and within 300 feet of the applicable construction phase area to locate any active raptor (birds of prey) nests.

c. If active nests are located during the preconstruction nesting bird survey, a qualified biologist shall evaluate if the schedule of construction activities could affect the active nests and if so, the following measures would apply:

    i. If the qualified biologist determines that construction is not likely to affect the active nest, construction may proceed without restriction; however, a qualified biologist shall regularly monitor the nest at a frequency determined appropriate for the surrounding construction activity to confirm there is no adverse effect. Spot-check monitoring frequency would be determined on a nest-by-nest basis considering the particular construction activity, duration, proximity to the nest, and physical barriers which may screen activity from the nest.

    ii. If it is determined that construction may affect the active nest, the qualified biologist shall establish a no-disturbance buffer around the nest(s) and all project work shall halt within the buffer until a qualified biologist determines the nest is no longer in use. Typically, these buffer distances are 100 feet for passerines and 300 feet for raptors; however, the buffers may be adjusted if an obstruction, such as a building, is within line-of-sight between the nest and construction.

    iii. Modifying nest buffer distances, allowing certain construction activities within the buffer, and/or modifying construction methods in proximity to active nests shall be done at the discretion of the qualified biologist and in coordination with the Planning Division. Necessary actions to remove or relocate an active nest(s) shall be coordinated with the Planning Division in compliance with the California Fish and Game Code and other applicable laws.

    iv. Any work that must occur within established no-disturbance buffers around active nests shall be monitored by a qualified biologist. If adverse effects in response to project work within the buffer are observed and could compromise the nest, work within the no-disturbance buffer(s) shall halt until the nest occupants have fledged.

    v. Any birds that begin nesting within the project area and survey buffers amid construction activities are assumed to be habituated to construction-related or similar noise and disturbance levels, so exclusion zones around nests may be reduced or eliminated in these cases as determined by the qualified biologist in coordination with the Planning Division. Work may proceed around these active nests as long as the nests and their occupants are not directly impacted.

d. In the event inactive nests are observed within or adjacent to the project site during construction at any time throughout the year, any removal or relocation of the inactive nests shall be at the discretion of the qualified biologist in coordination with the Planning Division and in compliance with the California Fish and Game Code and other applicable laws, as appropriate. Work may proceed around these inactive nests.

* Typical experience requirements for a “qualified biologist” include a minimum of 4 years of academic training and professional experience in biological sciences and related resource management activities, and a minimum of 2 years of experience conducting surveys for each species that may be present within the project area.

With implementation of Mitigation Measure MM-BI-1a, the proposed project would not interfere substantially with the movement of any native resident or migratory bird or other wildlife species or with established native resident or migratory bird or other wildlife corridors. This impact, therefore, would be less than significant with mitigation.

Relative to the height of the existing structures, the proposed buildings would be taller than those existing on and adjacent to the project site, creating new, somewhat larger obstacles along the flight path of migrating and foraging birds. Therefore, the proposed project could result in the creation of a new strike hazard for migrating birds. There is some potential for birds to collide during daytime and nocturnal flights with proposed buildings with features that are not easily "visible" to birds. Windows that reflect nearby vegetation and transparent areas where birds could see through two windows to vegetation beyond could present hazards to birds. In addition, lighted windows at night can attract migrating birds. Although proposed buildings are likely to be lower than the height at which most migrating birds would fly, the proposed project would create potential bird strike hazards at elevations that do not currently exist. Large-scale injury or mortality of birds due to collisions with buildings is not anticipated, but the potential for collision mortality remains and is a potentially significant impact.

Implementation of Mitigation Measures MM-BI-1b: Lighting Measures to Reduce Impacts on Birds and MM-BI-1c: Building Design Measures to Minimize Bird Strike Risk would ensure that the proposed project would avoid and minimize impacts on migrating and foraging birds as a result of increased bird strikes.

Mitigation Measure MM-BI-1b: Lighting Measures to Reduce Impacts on Birds

During design, a qualified biologist experienced with bird strikes and building/lighting design issues shall identify lighting-related measures to minimize the effects of the building's lighting on birds. Such measures, which may include the following and/or other measures, shall be incorporated into the building's design and operation.

- Use strobe or flashing lights in place of continuously burning lights for obstruction lighting. Use flashing white lights rather than continuous light, red light, or rotating beams.
- Install shields onto light sources not necessary for air traffic to direct light towards the ground.
- Extinguish all exterior lighting (i.e., rooftop floods, perimeter spots) not required for public safety.
- When interior or exterior lights must be left on at night, the operator of the buildings shall examine and adopt alternatives to bright, all-night, floor-wide lighting, which may include installing motion-sensitive lighting, using desk lamps and task lighting, reprogramming timers, or using lower-intensity lighting.
- Windows or window treatments that reduce transmission of light out of the building shall be implemented to the extent feasible.

Mitigation Measure MM-BI-1c: Building Design Measures to Minimize Bird Strike Risk

During design, a qualified biologist experienced with bird strikes and building/lighting design issues shall identify measures related to the external appearance of the building to minimize the risk of bird strikes. Such measures, which may include the following and/or other measures, shall be incorporated into the building's design.

- Minimize the extent of glazing.
- Use low-reflective glass and/or patterned or fritted glass.
- Use window films, mullions, blinds, or other internal or external features to "break up" reflective surfaces rather than having large, uninterrupted areas of surfaces that reflect, and thus to a bird may not appear noticeably different from, vegetation or the sky.

Implementation of the building design and lighting measures presented in MM-BI-1b and MM-BI-1c would avoid and minimize impacts on migrating and foraging birds as a result of increased bird strikes, and the impacts would be reduced to a less-than-significant level.

Special-Status and Roosting Bats

Phase 1 Development

Impacts associated with special-status and roosting bats are most likely to occur during tree removal and building demolition of the construction phase. Loss of individual bats, bat colonies, or their habitat could occur if active bat roosts are present within trees to be removed and buildings scheduled for demolition, particularly if these activities take place during the maternal roosting period season when young bats cannot yet fly or, for building-roosting bats, during hibernation when bats may be hard to rouse.

For the Phase 1 area of the project site, a roosting bat survey was conducted on the 201 Haskins Way parcel of the project site. No signs of historical or current bat usage were found on the 201 Haskins Way building or trees on the 201 Haskins Way parcel.[23] As such, there is no expectation that bats would move into the building and trees. In addition, the building addition on the 400-450 East Jamie Court parcel would not involve demolition of any buildings or removal of mature trees that would support roosting bats. To the extent any special-status and roosting bats inhabit buildings or trees located within the Phase 2 area, these buildings and trees in the Phase 2 area would be left in place during Phase 1 development. City-dwelling bats are generally accustomed to their surroundings of typical human activities, and no impacts to potential roosting bats in the Phase 2 area would occur as a result of Phase 1 construction activities. Therefore, no impacts on special-status and roosting bats would occur during Phase 1 development.

Phase 2 Development (Project Buildout)

A roosting bat survey of the Phase 2 area has not been conducted. Although building and tree conditions in the Phase 2 area are likely to be similar to the 201 Haskins Way parcel, construction of this phase

[23] H.T. Harvey & Associates, 2018. *Haskins Way Biotech Project – Roosting Bat Survey Report*, August 27, 2018.

would not be expected to begin until the year 2021. The trees and structures in the Phase 2 area may provide roosting habitat for bat species that roost in buildings or structures, and roosting conditions may change in the years before Phase 2 implementation. If special-status and roosting bats were to inhabit the Phase 2 buildings or trees, the project could result in the loss of individual bats, bat colonies, or their habitat if active bat roosts are present within trees to be removed and buildings scheduled for demolition, particularly during the maternal roosting period season or during hibernation.

Implementation of Mitigation Measure MM-BI-1d: Pre-construction Bat Survey and Roosting Habitat Abatement during project buildout in the Phase 2 area would reduce this potentially significant impact on special-status and roosting bat species to a less-than-significant level by ensuring tree removal and building demolition activities are seasonally timed where active bat roosts occur, and mitigation is provided for the loss of identified bat roosts.

Mitigation Measure MM-BI-1d: Pre-construction Bat Survey for Roosting Bats and Roosting Habitat Abatement (Phase 2)

Prior to Phase 2 building demolition or tree removal activities, no more than 2 weeks prior to the start of any such demolition or removal activities, a qualified bat biologist shall conduct a pre-construction survey to identify if bats are roosting within vacant buildings and trees located on the Phase 2 project site. If no roosting sites or bats are observed during the survey, no further mitigation is necessary.

If roosting bats or indications of bat roosts are observed within Phase 2 buildings or structures to be demolished, the qualified bat biologist shall be consulted to determine if bat roost replacement is required. If required, roost replacement shall be implemented before bat exclusion devices are installed on structures. Roost replacement, if required, will be implemented using suggested strategies such as those described in the Caltrans' report *California Bat Mitigation Techniques, Solutions, and Effectiveness*[24] and will be based on species-specific roosting requirements.

If bat exclusion is required, a wildlife removal specialist under the guidance of the qualified bat biologist shall conduct humane bat exclusion using methods such as one-way doors and installing physical barriers to entry. To reduce potential effects on roosting bats, exclusion shall be conducted between September 1 and March 31, but will not occur during long periods of inclement or cold weather (as determined by the qualified bat biologist) when prey are not available or bats are in torpor. For Phase 2 building demolition, eviction shall be initiated by either opening the roosting area to allow air flow through the roost cavity or installing a one-way exclusion device (e.g., one-way door) to evict the bats. Following bat exclusion device installation, the qualified bat biologist shall conduct biweekly inspections of each excluded structure until the structure(s) is demolished to ensure that physical exclusion devices are maintained.

If roosting bats or indications of bat roosts are observed within Phase 2 project trees to be removed, tree removal shall be conducted between September 1 and March 31, but will not occur during long periods of inclement or cold weather (as determined by the qualified bat biologist) when prey are not available or bats are in torpor, to avoid impacts on maternal bat roosts. During Phase 2 tree removal and where potential bat roosts were identified, the qualified bat biologist

[24] Johnston, D., G. Tatarian, E.D. Pierson, and G.R. Trapp. 2004. *California Bat Mitigation Techniques, Solutions, and Effectiveness*. Caltrans Project Number 2394-01.

shall be present and tree removal shall begin with portions of the tree that do not provide suitable roost habitat (e.g., low limbs lacking forage). Trees shall be removed at a speed in coordination with the on-site qualified bat biologist that allows any roosting bats to vacate the tree.

Implementation of the pre-construction survey and roosting habitat abatement measure presented in MM-BI-1d would avoid and minimize impacts on special-status and roosting bat species and the impacts would be reduced to a less-than-significant level.

Impact BI-2: The proposed project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (*Less than Significant*)

The proposed project (including the conceptual Phase 2 development plan) would involve the removal of existing landscaping and a total of approximately 121 existing trees on the project site. During Phase 1 development, approximately 30 trees on the 201 Haskins Way parcel and 16 trees on 400-450 East Jamie Court would be removed; during conceptual Phase 2 development, approximately 75 existing trees on the six remaining parcels in the Phase 2 area would be removed. All of the trees to be removed are ornamental landscape trees. To the extent that the proposed project would result in removal of a protected tree as defined under the City's Tree Preservation Ordinance, removal would require a Protected Tree Removal Permit and would be done in accordance and compliance with the Tree Preservation Ordinance. The proposed project (including the conceptual Phase 2 development plan) would replace the existing street trees with approximately 263 new trees. No other local policies or ordinances protecting biological resources apply to the proposed project. Therefore, both the proposed Phase 1 project and project buildout (assuming the conceptual Phase 2 development plan) would have a less-than-significant impact regarding conflicts with local policies or ordinances protecting biological resources. No mitigation is required.

Impact C-BI-1: The proposed project would result in a cumulatively considerable contribution to significant cumulative impacts on biological resources. (*Less than Significant with Mitigation*)

The proposed project's potential contribution to cumulative impacts on biological resources is evaluated in the context of past, present, and reasonably foreseeable probable future development expected in the City and includes the additional baseline and cumulative projects and plans listed in Section 4.1, Approach to Environmental Analysis, pp. 4.1.4-4.1.9.

Biological resources are location- and habitat-dependent. The majority of each of the cumulative project sites contains development with ornamental landscaping and ruderal vegetation, similar to the project site. One project, the *Oyster Point Specific Plan*, would involve disturbance of wetlands and aquatic habitats. The *Oyster Point Specific Plan* would implement mitigation measures appropriate for the species and habitats present. However, the proposed project site does not contain sensitive habitat, wetlands, or marine areas and would not involve construction in any wetland or aquatic habitat. Although there could be cumulative impacts related to wetlands, aquatic habitat, or other sensitive habitat, the proposed project would not contribute to any such impacts.

The cumulative projects would primarily involve redevelopment of existing light industrial uses. These projects, similar to the proposed project, would be required to protect active nests in ornamental trees on each project site. The proposed project would not contribute to impacts on the movement of any native

resident or migratory wildlife species or with established native resident or migratory wildlife corridors through implementation of Mitigation Measure MM-BI-1a: Preconstruction Nesting Bird Surveys and Buffer Areas. Similar to the proposed project, mitigation for preconstruction nesting bird surveys and buffer areas would be applicable for reasonably foreseeable probably future projects. Therefore, with implementation of Mitigation Measure MM-BI-1a, the proposed project would not result in a cumulatively considerable contribution to a significant cumulative impact with the movement of any native resident or migratory bird or wildlife species or with established native resident or migratory bird or wildlife corridors.

In addition, each of the new buildings proposed to be constructed under these reasonably foreseeable probable future projects would be designed in adherence to bird-safe lighting and design measures to prevent collisions and bird fatalities through implementation of Mitigation Measures MM-BI-1b: Lighting Measures to Reduce Impacts on Birds and MM-BI-1c: Building Design Measures to Minimize Bird Strike Risk. As such, the proposed project would not result in a cumulatively considerable contribution to a significant cumulative impact relative to bird collisions with new buildings.

The proposed project includes removal of buildings and trees that could adversely affect roosting bats. With probable future development in the City, there may be loss of existing bat roosting habitat due to tree or building removal. However, the proposed project would not result in a cumulatively considerable contribution to the displacement of roosting bats or the loss of bat roosting habitat through implementation of Mitigation Measure MM-BI-1d: Pre-construction Bat Survey and Roosting Habitat Abatement. Similar to the proposed project, the reasonably foreseeable probable future projects would be required to protect roosting bats, and this cumulative impact would be less than significant. Therefore, the proposed project would not result in a cumulatively considerable contribution to a significant cumulative impact on bat species as there would be a net gain in trees based on proposed planting, and any significant impacts on bats roosting in building or structures would be mitigated.

In conclusion, with implementation of the appropriate mitigation measures, these cumulative impacts would be less than significant. The proposed project would not result in a cumulatively considerable contribution to a significant cumulative biological resources impact.

4.4 Cultural and Paleontological Resources

4.4.1 Introduction

Section 4.4, Cultural and Paleontological Resources, addresses the impacts that land use changes related to the 201 Haskins Way Project (project) would have on historic architectural resources, archaeological resources, tribal cultural resources, and paleontological resources. All of these cultural resources subtopics are considered in the discussions of existing conditions, baseline plus project conditions, and cumulative conditions. The section describes existing cultural resources on the project site and in the study area, and presents the baseline conditions against which project impacts are measured. Project-specific impacts are presented for the proposed project and mitigation measures are identified. A cumulative impact discussion is presented for each subtopic.

4.4.2 Environmental Setting

STUDY AREA

The City of South San Francisco's climate is characterized by mild, dry summers and cool, moist winters. Because the area falls within a coastal region, winters are typically warmer, and summers tend to be milder. Being on the seaward side of the Coast Ranges, the project area gets more rain than San Leandro or Hayward to the east.[1] When California was first occupied, the climate was moister and cooler than today's Mediterranean climate.[2] Annual temperatures average 57.4 degrees Fahrenheit. Precipitation ranges between 10 and 50 inches.[3]

Current land uses in the project vicinity include aviation, commercial, and industrial development, and protected natural areas. Plant communities within and adjacent to the area include coastal and valley freshwater marsh, eucalyptus woodland, northern coastal scrub, nonnative grassland/ruderal, and willow riparian scrub. Ruderal vegetation is usually found in disturbed areas that have been significantly altered by construction, landscaping, or other types of land-clearing activities. Plant species found within this habitat are typically introduced Mediterranean species that exhibit clinging seeds, adhesive stems, and rough leaves that assist their invasion and colonization of disturbed lands. Prior to landscape and vegetation modifications during the historic period, the predominant potential natural plant communities would likely have included interior live oak, mixed chaparral, bluegrass, and valley needlegrass series.[4] Historically, land mammals in the area included mule deer, pronghorn, tule elk, coyotes, bobcats, ground squirrels, and kangaroo rats. A variety of birds were known to inhabit the area, including hawks, eagles, owls, quail, mourning doves, mockingbirds, scrub jays, gulls, herons, crows, finches, and sparrows. The proximity of the Pacific Ocean would have provided prehistoric peoples with access to sea lions, seals,

[1] Gilliam, Harold, 2002. *Weather of San Francisco Bay Region*. Berkeley: University of California Press. p. 65.
[2] Major, J., 1988. California Climate in Relation to Vegetation. In *Terrestrial Vegetation of California*, edited by M. Barbour and J. Major, pp. 11–74. Special Publication No. 9. Sacramento: California Native Plant Society.
[3] Bailey, Robert G., 1995. Description of the Ecoregions of the United States. 2d ed. U.S. Department of Agriculture, Forest Service, Miscellaneous Publication Number 1391. p. 50.
[4] Ibid.

mussels, abalone, and fish, etc. With this mosaic of ecological communities, the area would have provided a very productive environment for its prehistoric occupants, one well suited to a hunting-gathering economy with a variety of birds, small and large mammals, fish, reptiles, amphibians, and edible plant species.

REGIONAL CONTEXT

Prehistoric

The project site lies in what generally is described as the San Francisco Bay Region, which is one of eight arbitrary organizational divisions of the state.[5] This archaeological region includes all of today's San Mateo and Marin Counties, and western, northern, or southern portions of Alameda, Contra Costa, Napa, Santa Clara, Santa Cruz, Solano, and Sonoma Counties bordering the Bay Area.[6] The prehistory of this region is divided into six periods: Early Holocene (Lower Archaic, cal 8000–3500 B.C), Early period (Middle Archaic, 3500 to 500 cal B.C.), Lower Middle period (Initial Upper Archaic, 500 cal B.C. to cal A.D. 430), Upper Middle period (Late Upper Archaic, cal A.D. 430 to 1050), Initial Late Period (Lower Emergent, cal A.D. 1050 to 1550), and Terminal Late Period (cal A.D. 1550 to 1776).[7] The San Francisco Bay area is "the meeting ground of two different systems for organizing the archaeological record"[8]; therefore, the discussions in this section refer to a variety of period names.

Early Holocene/Lower Archaic (cal 8000–3500 B.C.)

Occupation in the San Francisco Bay area during the Prehistoric Period may have occurred as early as 8,000 years ago, when sea levels were some 15–20 meters lower than today,[9] but the earliest archaeological sites in this area date to only 6,000 years ago during the middle Holocene. It is likely that Holocene alluvial deposits buried many prehistoric sites in this area.[10] To the east in the Los Vaqueros region of Contra Costa County, closer to the Sacramento–San Joaquin Delta, for example, is one of the few early Holocene age sites in the region, CA-CCO-696. This site provides one of the earliest dates from a site with a millingstone component.[11] To the south at an inland site in Santa Cruz County (Scotts Valley site, CA-SCR-177), stone tools have been found in deposits dating to more than 6,000 years ago.[12] Data

[5] Moratto, Michael. 1984. *California Archaeology.* New York: Academic Press.
[6] Ibid.
[7] Milliken, Randall, Richard T. Fitzgerald, Mark G. Hylkema, Randy Groza, Tom Origer, David G. Bieling, Alan Leventhal, Randy S. Wiberg, Andrew Gottsfield, Donna Gillette, Viviana Bellifemine, Eric Strother, Robert Cartier, and David A. Fredrickson
2007. Punctuated Culture Change in the San Francisco Bay Area. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar. Altamira Press, Lanham, New York, Toronto. pp. 101, 114-118.
[8] Milliken, op. cit.
[9] Bickel, P. M. 1978. Changing Sea Levels along the California Coast: Anthropological Implications. *Journal of California Anthropology* 5:6–20. p. 7.
[10] Ragir, Sonia. 1972. *The Early Horizon in Central California Prehistory*. Contributions of the University of California Archaeological Research Facility, No. 15. Berkeley. Moratto, op. cit., pp. 221, 277.
[11] Milliken et al., op. cit., p. 114.
[12] Breschini, Gary S., and Trudy Haversat. 1991. Early Holocene Occupation of the Central California Coast. In *Hunter-Gatherers of Early Holocene Coastal California*, edited by J. M. Erlandson and R. H. Colten, pp. 125–132. Perspectives in California Archaeology, Vol. 1. Institute of Archaeology, University of California, Los Angeles. pp. 128–129.

from coastal sites in central and southern California during the Paleo-Coastal Tradition of the Paleoindian Period indicate the economy was a diverse mixture of hunting and gathering, with a major emphasis on aquatic resources in many coastal areas.[13] The few Bay Area sites include two in the Santa Clara Valley (CA-SCL-65 and CA-SCL-178) and one on the peninsula coast of Santa Cruz County (CA-SCR-7).[14] The artifact assemblages in these Bay Area sites have large numbers of handstones and milling slabs, as well as core and flake tools. Dates from CA-SCR-7, the Sand Hill Bluff shell mound, range from 4100–1400 B.C., and the mound includes large corner and side-notched projectile points. There is abundant evidence that marine resources such as fish, sea mammals, and shellfish were exploited at coastal sites.

Early Period/Middle Archaic (3500–500 cal B.C.)

Sites characteristic of the Early period/Middle Archaic in the San Mateo County area date to as early as 5,500 years ago and as late as 2,500 years ago (3500–500 cal B.C.). Such sites often contain manos and metates (grinding stones), as well as many mortar fragments, indicating that acorns and/or various seeds formed an important part of the diet.[15] The period is marked by the first cut bead, the grooved *Olivella biplicata* rectangle bead. Mortars and pestles appear in the Bay Area archaeological record during this time period. A wooden mortar and stone pestle were recovered from CA-CCO-637; these artifacts dated to 3800 cal B.C.[16]

The University Village site (CA-SMA-77) in San Mateo County and the lower levels of the West Berkeley site (CA-ALA-307) in Alameda County may represent an Early Bay culture contemporaneous with the Windmiller Pattern, from a little further south down the California coast[17]. The lowest level of the West Berkeley site has recently been radiocarbon dated to 3030–2890 cal B.C.[18] It has been suggested that the Early Bay culture had more in common with southern California coastal cultures rather than the Windmiller Pattern diagnostic of the Early Horizon in the Delta area.[19] Additional artifact assemblages, such as from CA-SCL-354 in the Los Altos foothills, imply that characteristics of Windmiller artifact assemblages were present on the South Bay peninsula.[20] Also on the peninsula coast, Olivella rectangular

[13] For example, Jones, Terry L., Richard T. Fitzgerald, Douglas J. Kennett, Charles Miksicek, John L. Fagan, John Sharp, and Jon M. Erlandson. 2002. The Cross Creek Site and Its Implications for New World Colonization. *American Antiquity* 67:213–230.

[14] Hylkema, Mark B. 2002. Tidal Marsh, Oak Woodlands, and Cultural Florescence in the Southern San Francisco Bay Region. In *Catalysts to Complexity: Late Holocene Societies of the California Coast*, edited by Jon M. Erlandson and Terry L. Jones, pp.233–262. Perspectives in California Archaeology, Vol. 6. Cotsen Institute of Archaeology, University of California, Los Angeles. pp. 233–235.

[15] Moratto, op. cit, p. 201.

[16] Milliken et al., op. cit., p. 115.

[17] Gerow, Bert A. (with Roland W. Force). 1968. *An Analysis of the University Village Complex, with a Reappraisal of Central California Archaeology*. Stanford University Press, Palo Alto, California.

[18] See Lightfoot, Kent G., and Edward M. Luby. 2002. Late Holocene in the San Francisco Bay Area: Temporal Trends in the Use and Abandonment of Shell Mounds in the East Bay. In *Catalysts to Complexity: Late Holocene Societies of the California Coast*, edited by Jon M. Erlandson and Terry L. Jones, pp.263-281. Perspectives in California Archaeology, Vol. 6. Cotsen Institute of Archaeology, University of California, Los Angeles. p. 270.

[19] Gerow, Bert A. 1974. Co-traditions and Convergent Trends in Prehistoric California. *San Luis Obispo County Archaeological Society Occasional Paper 8*.

[20] Hylkema, op. cit., p. 244.

beads (type L1) and Rossi square-stemmed and large side-notched projectile points are diagnostic of the Early Period.[21]

Lower Middle Period/Initial Upper Archaic (500 cal B.C.–cal A.D. 430)

People inhabiting the San Francisco Bay region during the Lower Middle period (also known as Berkeley period) practiced a maritime hunting and gathering economy. Large accumulations of shellfish remains, or "shell mounds," formed over hundreds, or even thousands, of years through accretion at village sites fronting the Bay that were reused seasonally or year-round.[22] Numerous shell mounds contain hundreds of burials as well as ceremonial items, house floors, hearths, and storage pits, indicating they were used as burial, ceremonial, and residential places.[23]

The well-known Emeryville shell mound (CA-ALA-309) and Ellis Landing site (CA-CCO-295) date to this period.[24] In 1902, the Emeryville shell mound (CA-ALA-309) was initially excavated, revealing a stratified deposit with numerous cultural sequences.[25] The Emeryville shell mound was one of the largest in the Bay Area, with an estimated size of at least 100 by 300 meters and a maximum depth of nearly 10 meters.[26] The lower levels contained flexed burials associated with artifacts such as pointed bone implements, chert bifaces (stone tool flaked on both sides), perforated charmstones, red ochre, and a predominance of bay oyster shells.[27] Upper levels appeared to have cremation burials, polished stone artifacts, flaked obsidian tools, and more clam shell than oyster shell. In 1924, approximately 700 burials were discovered, most interred in a flexed (fetal) position, when materials from the site were "rescued" as it was being leveled during construction of a paint factory.[28]

Artifacts typical of the Lower Middle period include spire-lopped Olivella, Olivella saucer beads, and circular Haliotis ornaments.[29] Assemblages generally have a relatively small frequency of flaked stone points; projectile points are commonly contracting stemmed (smaller at the base) and lanceolate (leaf-like) types, some of which are made from obsidian.[30] Burials are variable flexed and semiflexed with inconsistent orientation.

[21] Ibid., p. 250.

[22] Lightfoot, Kent G., 1997. Cultural Construction of Coastal Landscapes: A Middle Holocene Perspective from San Francisco Bay. In *Archaeology of the California Coast During the Middle Holocene*, edited by Jon M. Erlandson and Michael A. Glassow, pp. 129-141. Perspectives in California Archaeology, Vol. 4. Institute of Archaeology, University of California, Los Angeles. p. 135.

[23] Lightfoot, op. cit., 131–136. Luby and Lightfoot, op. cit., pp. 276–277.

[24] See discussion in Lightfoot and Luby, op. cit., p. 270. Nelson, N. C., 1909. *Shellmounds of the San Francisco Bay Region*. University of California Publications in American Archaeology and Ethnology Vol. 7, No. 4. Berkeley.

[25] Uhle, Max, 1907. The Emeryville Shellmound. *University of California Publications in American Archaeology and Ethnology* Vol. 7, No. 1. Berkeley.

[26] Moratto, op. cit., pp. 227–228.

[27] Ibid., p. 229.

[28] Schenck, W. Egbert., 1926. The Emeryville Shellmound: Final Report. *University of California Publications in American Archaeology and Ethnology* Vol. 23, No. 3. Berkeley.

[29] Milliken, op. cit., p. 115.

[30] Hylkema, op. cit.

Milling implements include large and small boulder or cobble mortars and various types of pestles, indicating that acorns formed an important part of the diet. In the South Bay, processing of hard seeds continued to be important throughout this period, as evidenced by the number of milling slabs and handstones in the artifact assemblages from that area.[31] Other plant resources included hazelnuts, cattail seeds, grass, and soaproot bulbs; the latter were roasted in earth ovens.

Shellfish species exploited varied depending on location within the Bay Area.[32] Along the West Bay in San Mateo County and the East Bay of Alameda County, bay mussel, oyster, and clam are more prevalent. In contrast, horn snail, oyster, and bay mussel are the principal shellfish recovered from South Bay mounds. Temporal variation in shellfish species (changes in the types exploited over time) is also present in the mound assemblages.

Upper Middle Period/Late Upper Archaic (cal A.D. 430–1050)

The Upper Middle Period/Late Upper Archaic period is marked by the collapse of the Olivella saucer bead trade network at cal A.D. 430 around the Bay Region.[33] The period is also evidenced by a number of changes in subsistence, foraging, and land use patterns that begin to reflect the use pattern known from Historic Period Native American groups in the area. A substantial increase in the intensity of subsistence exploitation, including fishing, hunting, and gathering (particularly the acorn), evidenced in the archaeological record, correlates directly with population growth.[34] Bow and arrow technology, the use of harpoons, and tubular tobacco pipes appear during this period. However, a greater emphasis is placed on the procurement and processing of vegetal foods, especially acorns, as evidenced in the increase of milling tools, especially the mortar and pestle. Both coiled and twined basketry were used as domestic and ceremonial items. Population size and the number of settlements increased during this period, although the large shell mound villages of the Lower Middle Period were apparently no longer favored residential places.[35] There is an increase in grave goods, particularly during the Upper Middle period, compared to few grave goods identified during the Lower Middle period in Bay Area sites.

During the Upper Middle period, the climate fluctuated between cooler, wetter periods and warmer, drier periods. During cooler, wetter periods, alluvial deposition increased; comparatively little deposition occurred in the drier intervals. Extended periods of relatively little rainfall, referred to as the Medieval Climatic Anomaly (MCA), produced droughts across the West between about A.D. 650–850 and again in the Late period A.D. 1150–1250.[36] The dry conditions during the MCA may be related to the abandonment of shell mound villages as primary residential locations, which began around A.D. 700.[37] Settlement strategies were apparently reorganized and focused on a dispersed pattern, with the

[31] Hylkema, op. cit., pp. 244–245, 252.
[32] Ibid., p. 252.
[33] Milliken, et al, op. cit., p. 116.
[34] Moratto, op. cit., pp. 211–214.
[35] Lightfoot and Luby, op. cit., pp. 264, 277.
[36] Jones, Terry L., G. M. Brown, L. Mark Raab, J. Vickar, W. G. Spalding, Douglas J. Kennett, Andrew York, and Phillip Walker. 1999. Environmental Imperatives Reconsidered: Demographic Crises in Western North America During the Medieval Climatic Anomaly. *Current Anthropology* 40:137–156.
[37] Lightfoot and Luby, op. cit., pp. 277, 279.

establishment of both coastal and interior habitation areas, coinciding with the exploitation of seasonally available resources.

Initial Late Period/Lower Emergent (cal A.D. 1050–1550)

The Late period ushers in a time of status differentiation and the rise of secret societies and cults and associated traits. Exchange networks, with the use of clamshell disk beads as a form of currency, expanded during this period. Exchange items included magnesite, steatite (talc), Olivella beads, and obsidian. Compared to the Middle Period, the use and occurrence of shell beads with burials blossomed.[38] Haliotis banjo pendants may represent the introduction and spread of the Kuksu cult (an indigenous religion), beginning during the transition from the Middle to Late Period in the Bay Area.[39] The magnitude of non-dietary Olivella shells in coastal sites during the Late Period, coupled with a concomitant increase of the shells in mortuary contexts throughout central California during this period, attests to the rise of both exchange networks and status differentiation, with coastal peoples supplying the shells to the interior groups. Partial cremation appears or reappears during this time and also marks the stratification with the diversity of grave goods included in the wealthiest of graves.[40]

During the Late Period in the peninsula coast, site assemblages indicate there is an increase in the diet of birds and marine species, especially sea otters. At the same time, there is a decrease in terrestrial fauna in the archaeological record.[41] Further inland at large residential, upland meadows sites in Santa Cruz County (CA-SCR-9 and CA-SCR-20), both dense shell and abundant deer and elk bone are present, suggesting these areas were continuously reoccupied on a seasonal basis.

Terminal Late Period/Protohistoric Ambiguities (cal A.D. 1550–1776)

The Terminal Late period is marked by the abrupt disappearance of the Olivella sequin and cup beads circa ca A.D. 1500–1550.[42] During this period and before the Spanish arrived in full force, a cultural shift was occurring. The North Bay began to take a more dominant role in the production of new technology and trade items, including clamshell disk beads, the toggle harpoon, hopper mortar (a mortar that has a bottomless basket attached), corner-notched projectile points, and magnesite tube beads. The precise reason for this cultural shift is unknown, but could have been driven by conflict between groups or the spread of European diseases northward from Mexico prior to 1776.[43]

[38] Milliken, Randolph T., and James A. Bennyhoff, 1993. Temporal Changes in Beads as Prehistoric California Grave Goods. In *There Grows a Green Tree: Papers in Honor of David A. Fredrickson*, edited by Gregory White, Pat Mikkelsen, William R. Hildebrandt, and Mark E. Basgall, pp. 381–395. Center for Archaeological Research at Davis, Publication 11. University of California, Davis.

[39] Hylkema, op. cit., p. 260.

[40] Milliken 1993, op. cit., p. 217.

[41] Hylkema, op. cit., pp. 254–255.

[42] Milliken 1993, op. cit., p. 117.

[43] Ibid., pp. 117-118.

Ethnographic Overview

The project is in an area historically occupied by the tribelets of the Costanoan linguistic group.[44] Descendants of Costanoan speakers prefer to be called by the name of the tribelet from which they are descended. When their heritage is mixed or the specifics have been lost over generations, they prefer the use of a native term, *Ohlone,* rather than the European-imposed term Costanoan ("coastal dwellers").[45]

Costanoan territory extended between the Carquinez Strait and San Pablo Bay on the north, southward along the coast beyond Monterey Bay to Carmel Valley, and inland to the coast range.[46] Neighboring groups included the Coast Miwok north across the Carquinez Strait, the Miwok and Northern Valley Yokuts to the east, and the Salinan and Esselen to the south.

Spanish mission records, diaries, and journals provide most of the information about the Costanoans, because little ethnographical research has been conducted in the twentieth century.[47] The most thorough study, by Milliken in 1995[48], used mission records, and Margolin in 1978[49] reconstructed Native American life in the Bay Area.

The numerous Costanoan social groups in this region were organized by tribelets, each of which could have several villages or a main village with a number of camps.[50] Tribelets were also political units that were structured by similarities in language and ethnicity, each holding claim to a designated portion of territory. Topographic features, such as rivers, watersheds, and ridgelines, defined tribelet territories, and the boundaries were strictly respected.

Linguistically, these tribelets belong to the Utian, or Miwok-Costanoan, language family, part of a hypothesized larger Penutian linguistic stock.[51] The Costanoan family is broken down into four branches: the Karkin, in the Carquinez Strait area; the Northern Costanoan, consisting of the Chocheno (with four dialects), Ramaytush, Tamyen, and Awaswas languages; the Soledad, seen only in Cholon; and the Southern Costanoan branch, consisting of Rumsen and Mutsun.[52] Speakers of these languages and dialects, in various configurations, have been treated as tribes in the past in accordance with anecdotal reports. Through detailed examination of mission records, marriage patterns, and dialect variation seen in

[44] Levy, Richard, 1978. Costanoan. In *California*, edited by R. F. Heizer, pp.485–495. Handbook of North American Indians, Vol. 8, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.
[45] Margolin, Malcolm, 1978. The Ohlone Way: Indian Life in the San Francisco-Monterey Bay Area. San Francisco: Heyday Books.
[46] Levy, op. cit., p. 485.
[47] Ibid., p. 495.
[48] Milliken, Randall, 1995. *A Time of Little Choice: The Disintegration of Tribal Culture in the San Francisco Bay Area 1769–1810*. Ballena Press Anthropological Papers, No. 43. Menlo Park, Calif.: Ballena Press.
[49] Margolin, Malcolm, 1978. *The Ohlone Way: Indian Life in the San Francisco-Monterey Bay Area*. San Francisco: Heyday Books.
[50] Levy, op. cit., p. 487.
[51] Mithun, Marianne, 2001. *The Languages of Native North America.* Reprinted 2001. New York: Cambridge University Press. p. 309.
[52] Ibid., L535.

personal names, Milliken[53] delineated 43 separate political entities (tribelets) in the San Francisco Bay, Santa Cruz, and inland area, with an additional six or so tribelets in the south Monterey Bay and Carmel Valley region.

Each tribelet's territory contained a main village and smaller satellite villages. The villages were typically situated along a river or stream for easy access to water.[54] Coastal people did not build right on the shoreline but usually on an overlooking bluff. Dwellings were domed structures consisting of a tule- or grass-covered framework of poles, with rectangular doorways and central hearths.[55] Villages often contained specific enclosures for dancing. Assembly halls in the center of the settlement were common; some halls were large enough to contain the entire village population of 200 people. Each community had a sweat lodge, placed near a stream. The Costanoans either buried or cremated the deceased, sometimes depending on firewood availability. There is no mention of cemeteries associated with villages.[56]

The rich resources of the ocean, bays, valleys, and mountains provided Ohlone-speaking peoples with food and all their material needs.[57] The primary food staple was the acorn, supplemented by a great variety of animal and plant resources. Depending on species availability and desirability, Costanoans used four oak species: coast live, valley, tanbark, and black. Collected nuts included buckeye, laurel, pine nuts, and hazelnuts. Seeds from dock, chia and other salvias, tarweed, and holly-leaf cherry were collected and ground into meal. Vegetal resources also included several berry-producing plants, wild onions, carrots, tule roots, and greens of clover and other annuals. Large and small game, including deer, elk, antelope, bears, mountain lions, raccoons, ground squirrels, woodrats, mice, moles, dogs, rabbits, and jackrabbits, plus seals and stranded whales, were part of their diet. Migrating waterfowl were an important resource, and included geese, ducks, and coots. Pigeons, quails, and hawks were also consumed but not eagles, owls, ravens, or turkey vultures. Rivers and streams provided freshwater fish, including steelhead, salmon, and sturgeon, while the ocean provided sharks, sardines, and lampreys. Costanoan diet also included a variety of insects and reptiles but not amphibians.

For hunting and gathering natural resources, Costanoans used a wide array of tools, implements, and enclosures. Among those used for hunting land mammals and birds were bows and arrows, traps and snares, deer-head disguises, bolas, nets and net sinkers, and enclosures/blinds. Communal hunting drives were used to catch rabbits, whereas nets and poisons were used to harvest fish. Tule watercraft were used for transportation and for hunting fish and waterfowl on enclosed bays and marshes. Many plants were collected using wooden tools: long poles for dislodging acorns and pinecones, fire-hardened digging sticks for obtaining roots, and beaters for dislodging seeds. Once collected, seeds, roots, and nuts were placed in burden baskets and transported for processing or storage.[58]

[53] Milliken 1995, op.cit., p. 229.
[54] Levy, op. cit., p. 487.
[55] Levy, op. cit., p. 492.
[56] Ibid., pp. 490-491.
[57] Ibid., pp. 491-492.
[58] Ibid., p. 491.

Costanoans used a variety of tools to process food resources. These tools included portable stone mortars and pestles, bedrock mortars, hopper mortars, anvils, woven strainers and winnowers, leaching and boiling baskets, woven drying trays, and knives. Various foods were baked in earthen ovens. Wooden paddles were carved for stirring food in the boiling baskets. There were shell spoons, basket dippers, and mush bowls for serving food, and woven water jugs and storage containers for storing food.

The presence of exotic items such as obsidian, steatite, and shell indicates Costanoan tribelets traded with coastal groups and mountain tribes.[59] Dietary items were also traded with the Plains Miwok, Sierra Miwok, and Yokuts. Costanoans provided mussels, abalone shells, dried abalone, and salt to the Yokuts and Olivella shells to the Miwok. They received pine nuts from the Yokuts, but other food resources received by the Costanoan tribelets are unrecorded.

The Native American population in this region came into contact with European culture at the beginning of Spain's land exploration and settlement in A.D. 1769. Traditional lifeways were altered drastically during the late 1700s to early 1800s when the Spanish placed their capital at Monterey, built forts at Monterey and San Francisco, and established seven Franciscan missions to convert native peoples to Christianity and the European way of life. Large-scale epidemics soon swept through the mission population and remaining villages.[60] Subsequent Spanish colonial towns at Santa Cruz and Yerba Buena (San Francisco), followed by large Mexican land grants, separated Costanoans from their harvesting grounds and hunting parks. Many surviving Native Americans were pulled away from their own villages to the new Euro-American settlements. It is estimated that the combined Costanoan population fell from a pre-Contact total of 10,000 down to 2,000 by the end of the mission period in 1834.[61] Also during the mission period, the dwindling Costanoan population intermarried within other interior tribes at the missions, mixing their cultural identities.

During the late 1800s, several Native American communities of mixed heritage remained in rural areas, with Pleasanton, Monterey, and San Juan Bautista the best known.[62] Even these groups continued to shrink as young people married into other groups and moved away. Estimates of the total remaining population of people with recognizable Costanoan descent were fewer than 300 in 1973.[63] According to Levy:

> In 1971 descendants of the Costanoan united in a corporate entity, the Ohlone Indian Tribe, and received title to the Ohlone Indian Cemetery where their ancestors who died at Mission San José are buried.[64]

Since that time, other descendants of Costanoan tribelets have organized political and cultural heritage organizations that are active locally and statewide. All are concerned with revitalizing aspects of their culture, learning the language through notes collected by anthropologist John Harrington, and preserving the natural resources that played a vital role in traditional culture. Some Costanoan groups also are

[59] Ibid., p. 493.
[60] Milliken 1995, op. cit.
[61] Levy, op. cit., p. 486.
[62] Ibid., p. 487.
[63] Ibid.
[64] Ibid.

seeking federal recognition of their tribe, petitioning the Bureau of Indian Affairs with reconstructed tribal histories and genealogies, records that will be a great resource for future generations of Costanoans.

Historic Context

Post-Contact history for the state of California generally is divided into three periods: the Spanish period (1769–1822), the Mexican period (1822–1848), and the American period (1848–present). Although there were brief visits by Spanish, Russian, and British explorers from 1529 to 1769, the beginning of Spanish settlement in California occurred in 1769 with a settlement at San Diego and the first (Mission San Diego de Alcalá) of 21 missions established from 1769 to 1823. Word of Mexican victory after a decade of revolt against the Spanish crown reached California in 1822, marking the beginning of the Mexican period. This period was marked by an extensive era of land grants, most of which were in the interior of the state, and by exploration by American fur trappers west of the Sierra Nevada Mountains.

With the signing of the Treaty of Guadalupe Hidalgo in 1848, ending the Mexican-American War, California became a territory of the United States. The discovery of gold in 1848 at Sutter's Mill near Sacramento and the resulting Gold Rush influenced the history of the state and the nation. The rush of tens of thousands of people to the goldfields also had a devastating impact on the lives of indigenous Californians, with the introduction and concentration of diseases, the loss of land and territory (including traditional hunting and gathering locales), violence, malnutrition, and starvation. Thousands of settlers and immigrants continued to pour into the state, particularly after the completion of the transcontinental railroad in 1869.

With continued growth, California continues to be a national leader in agriculture and poultry production, ranching (cattle and sheep), and aerospace and communications industries, as well as the film and entertainment business. The wealth of California's natural resources (e.g., lumber, petroleum deposits, minerals, and fish) also continues to contribute to its growth and development.

South San Francisco

South San Francisco, like San Francisco proper, existed under the governments of Spain, Mexico, and the United States, respectively. The area near the San Bruno Mountains was a region of valleys and slopes with good soil and grasses, known by the indigenous Costanoan as Buriburi, Urebure, or Buri Buri.[65] Due to the poor environment of the upper peninsula, with heavy fogs and sand dunes, cattle and crops quickly spread southward into the area to be known as Rancho Buri Buri.

Under the Spanish regime the area was under constant dispute between Mission Dolores and the Presidio, primarily in regard to land for cattle grazing. Originally, the Presidio and Mission shared pasture and grazing lands of Rancho del Rey in the hills around the Presidio, but due to protests from the mission padres, the Presidio herds were removed.[66] In 1797, however, Governor Diego de Borica, no longer

[65] Bancroft, Hubert Howe, 1886. *History of California*. The History Co., San Francisco.

[66] Stanger, Frank M. 1963. A California Rancho Under Three Flags: A History of Rancho Buri Buri in San Mateo County. California Historical Society Quarterly 17(3):245-259

wishing that the soldiers of the Presidio be dependent upon Mission Dolores, re-established Rancho del Rey, this time in the area of Buri Buri. The Mission protested, but after an investigation by the Comandante of the Presidio, the mission cattle that were present in the area were removed and a government herd took their place.[67] These herds stayed there for just under two decades, until a land use and herd trade between the Mission and Presidio occurred in 1915 where the Mission was allowed the use of Buri Buri in exchange for Las Pulgas and this continued until the end of Spanish control of California in 1822.

During the Mexican period (1822–1848), the Mexican government gave out large land grants to its supporters in Alta California (now California). One such supporter was Señor Don Jose Antonio Sanchez, who was granted the 14,639-acre Rancho Buri Buri in 1835. This land grant encompassed an area that was bounded on the north by the San Bruno Mountains, Canada San Andreas to the west, the San Francisco Bay on the east, and the area currently designated as Burlingame.[68] The property stayed as Rancho Buri Buri until California came under control of the United States, and in 1852 it was split between the heirs of Jose Antonio Sanchez. One of his sons, Isidro Sanchez, had his home within the boundaries of what was to become South San Francisco and sold his tenth of Rancho Buri Buri to Charles Lux and Alfred Edmondson in 1853 for $10,000.[69]

Charles Lux, an immigrant butcher, bought out Edmondson in 1856 and proceeded to use the land to fatten cattle before driving them to San Francisco before partnering with Henry Miller in 1858 to buy land and sell beef during the California Gold Rush.[70] Together they started the firm of Miller and Lux, a dominating force in the Pacific Coast and intermountain meat markets in the 19th century. After Charles Lux's death in 1890, his heirs sold his land to a representative of Gustavus Swift, who proceeded to use the land, in present day South San Francisco, as a stockyard and market place.

Along with investors from Chicago, Swift formed two corporations that would shape South San Francisco: South San Francisco Land and Improvement Company and the Western Meat Company.[71] The South San Francisco Land and Improvement Company quickly proceeded to lay out a town, designed to attract new industries and workers, a goal the company successfully met. The town grew rapidly and was incorporated as the City of South San Francisco (City) in 1908. Major industries continued to grow in the City, and at the beginning of both World Wars I and II, industry quickly shifted to shipbuilding. Following World War II, the population boomed again and continued the development of industrial and residential areas.[72]

[67] Ibid.
[68] Ibid.
[69] Stanger, op. cit. Igler, David. 2001. *Industrial Cowboys: Miller and Lux and the Transformation of the Far West, 1850-1920*. University of California Press, Berkeley, CA.
[70] Igler, op. cit.
[71] Ibid.
[72] Blum, Joseph A. 1984. South San Francisco: The Making of an Industrial City. *California History* 63(2): 114-134. Walker, Richard A. 2004. Industry Builds Out The City: The Suburbanization of Manufacturing In the San Francisco Bay Area, 1850-1940. *The Manufactured Metropolis*, edited by Robert Lewis, Temple University Press, Philadelphia, PA.

Development of the Project Area

The project area itself has undergone various changes since its original use as pasture land by the Mission, Presidio, and as Rancho Buri Buri. Until 1915 there was little development within the project area, though nearby to the west were the large slaughterhouse and shipping center of Miller and Lux, which had their own rail spur to support them.[73] By 1915, however, the rail spur had expanded to Point Saint Bruno and the area had begun its industrial growth, started by the 1895 construction of the W. P. Fuller and Company Paint Plant. This was particularly true during the World War II era when South San Francisco became an aviation and marine center, with the San Bruno Canal providing valuable access for launching vessels built in the area.[74] The project area was home to a number of industrial and manufacturing companies that provided materials and goods during this period, though over time the structures were abandoned.

EXISTING CONDITIONS WITHIN THE PROJECT AREA

Records Search

On December 14, 2017, SWCA requested a search of the records found at the California Historical Resources Information System (CHRIS) at the Northwestern Information Center (NWIC), located at Sonoma State University in Rohnert Park, California. On December 21, 2017, SWCA received the records search results electronically. The records search included any previously recorded cultural resources (both archaeological and built environment), as well as any previously conducted cultural resources investigations that occurred within a one-quarter mile radius of the project area. The CHRIS search also included a review of the National Register of Historic Places (NRHP), the California Register of Historic Places (CRHR), the California Points of Historical Interest (CPHI) list, the California Historical Landmarks (CHL) list, the Archaeological Determinations of Eligibility (ADOE) list, and the California State Historic Resources Inventory (HRI) list. The NWIC also reviewed pertinent portions of historic maps that incorporated the project area, including the U.S. Geological Survey (USGS) San Mateo Quadrangle Map (1896), USGS San Mateo Quadrangle Map (1915, reprinted 1939), USGS South San Francisco Quadrangle Map (1947), and the U.S. Army Corps of Engineers San Mateo Quadrangle Tactical Map (1939).

Prior Cultural Resources Studies within One-Quarter Mile of the Project Area

The NWIC records search results indicate that there have been four previously conducted cultural resources studies within one-quarter mile of Haskins Way. These studies are listed in **Table 4.4.1: Prior Cultural Resources Studies Conducted within 0.25 Mile of the Project Area**. Two of them, S-023551 and S-047106, occurred within a portion of the project area. A brief summary of the two studies is provided below.

[73] Blum, op. cit.
[74] Walker, op. cit.

Table 4.4.1: Prior Cultural Resources Studies Conducted within 0.25 Mile of the Project Area

NWIC Report Number	Title of Study	Author(s)	Year	Proximity to Project Area
S-023551(a-d)	Cultural Resources Assessment, Golden Gate Power Project, San Francisco International Airport, San Mateo County, California	McKale, George, and Gillies, Sara E.P.	2000	Within project area
S-037575	New Tower ("NT") Submission Packet, FCC Form 620, East Grandview Water Tank, SF-53638A	Billat, Lorna	2010	Outside of project
S-047106	Invasive Cordgrass Project, 2015-2016 Work Locations, Cultural Resources Assessment (letter report)	Koenig, Heidi	2015	Within project area
S-048426	Historic Architecture Survey Report for the South San Francisco/San Bruno Water Control Plant Improvement Project in the City of South San Francisco, California	Bloomfield, Anne B.	1998	Outside of project area

S-23551

In 2000, George McKale and Sara E.P. Gillies prepared *Cultural Resources Assessment, Golden Gate Power Project, San Francisco International Airport, San Mateo County, California.* The purpose of the study was to identify, record, and evaluate any cultural resources within the project area for a new power plant, along with transmission and gas lines extending to and from the plant, located within a portion of the current project area. The study identified three cultural resources: a historic rail line and dock located along the power plant's proposed transmission line route, and the U.S. Coast Guard Air Station San Francisco. None of these resources are within the 201 Haskins Way project area.

S-047106

In 2015, Heidi Koenig prepared a memorandum titled *Invasive Cordgrass Project, 2015-2016 Work Locations, Cultural Resources Assessment.* The proposed project involved the enhancement of 5,971 acres of tidal marshes and mudflats at eight locations within the San Francisco Bay. The study provided the results of a records search, a review of archival resources, and an archaeological field inventory. The field inventory identified a total of 27 resources, four of which were located in the City limits of South San Francisco. None of these resources are within the current project area.

Previously Recorded Cultural Resources within One-Quarter Mile of the Project Area

The NWIC records search results indicate that there is one previously recorded cultural resource, a historic district, within one-quarter mile of the project area, and one previously recorded cultural resource, a prehistoric archaeological site (CA-SMA-000038), located within the proposed project area, as shown in **Table 4.4.2: Previously Recorded Cultural Resources Within 0.25 Mile of the Project Area**. A brief description of these resources is provided below.

Table 4.4.2: Previously Recorded Cultural Resources Within 0.25 Mile of the Project Area

Primary Number	Trinomial	Resource Description	Eligibility Status (codes defined below)	Recorded By and Year	Proximity to Project Area
P-41-000042	CA-SMA-000038	Prehistoric	Unknown	Unknown	Within
P-41-000884	N/A	Historic District	4 (Eligible for NRHP and CRHR)	The Firm of Bonnie L. Bamburg, 1988	Outside (Within 0.25 mile)

P-41-000042: PREHISTORIC SITE

Prehistoric site P-41-000042 was identified by N.C. Nelson around 1906 or 1907. While the site form for this resource contains very limited data, Nelson's publication[75] included descriptions of multiple shellmounds in the San Francisco Bay region. Therefore, it is likely that site P-41-000042 is a shellmound. However, no additional information is known about the site (including its size or contents) and the site was plotted by hand on a topographic map before 1909. Therefore, the location should be considered approximate and the site may no longer exist. The site has not been relocated since its original recordation in the early 1900s.

P-41-000884: W. P. FULLER AND COMPANY PAINT PLANT

Historic district P-41-000884 is the site of the W. P. Fuller and Company Paint Plant. Built in 1895 after the previous factory, located in San Francisco, was destroyed by fire, this facility was the largest paint and varnish works on the West Coast. The factory produced not only paint and varnish, but also heavy glass mirrors, lubricating oils, and special paint supplies. As one of the pioneering industries of South San Francisco, it had an important role in the development of the City as a whole. The site no longer exists; it was demolished to build the neighboring Genentech facility. The district, which was located at 450 East Grand Avenue, is marker site #40 in the City's Historic Marker Program. Created by the City's Historic Preservation Commission, the Historic Marker Program is an effort to identify and provide information about sites with significance as part of the history of the City, though this district no longer exists.

Historical Map Review

In addition to the historic maps reviewed by the NWIC, additional research was undertaken by SWCA, including review of the following historic topographic maps:

1. USGS San Mateo Quadrangle Map (1896), USGS San Mateo Quadrangle Map (1896);
2. USGS San Mateo Quadrangle Map (1915, reprinted 1939);
3. USGS South San Francisco Quadrangle Map (1947);
4. USGS South San Francisco Quadrangle Map (1956); and
5. U.S. Army Corps of Engineers San Mateo Quadrangle Tactical Map (1939).

[75] Nelson, op. cit.

SWCA also reviewed Sanborn Fire Insurance maps, the South San Francisco Improvement Company Map, Bromfields Official Map of San Mateo County (1894), and various survey maps of Rancho Buri Buri drawn between 1848 and 1864.

The project area currently consists of a series of modern industrial buildings, including a warehouse, offices, and a truck terminal facility (all of which were built after 1975 according to historic topographic maps).

Native American Consultation

On January 3, 2018, SWCA contacted the Native American Heritage Commission (NAHC) to request a Sacred Lands File (SLF) search and list of contacts that may have knowledge of cultural resources in or near the study area. The NAHC emailed a response on January 18, 2018, and stated that the SLF search was completed with negative results, but noted that it is always possible for cultural resources to be unearthed during construction activities. The NAHC also provided a contact list of five Native American tribes that may have knowledge of cultural resources in or near the study area.

Under CEQA regulations, Assembly Bill 52 (AB 52; 2014), all Native American coordination and consultation are required to be completed from government to government. The City initiated the AB 52 consultation processes and distributed a notification letter in May 2018. No responses requesting additional consultation or comments were received.

Paleontological Resources

Geologic mapping[76] indicates the project area consists primarily of artificial fill at the surface, with small outcrops of slope debris (northeastern and northwestern portions of the project area), sheared rocks of the Franciscan Complex (northeastern and northwestern portions of the project area), and serpentine of the Franciscan Complex (northcentral portion of the project area). These rocks are discussed separately below, and assigned paleontological sensitivity rankings as defined by the Society of Vertebrate Paleontology are identified.[77]

Artificial Fill

Artificial fill makes up the majority of the surface of the project area, except for 101 and 151 Haskins Way and 410 and 430 East Grand Avenue, and consists of clay, silt, sand, and detritus deposited by human activity in recent times,[78] and has no potential to preserve fossil resources. Artificial fill therefore has **no paleontological sensitivity**. However, the depths of the fill in the project area are unknown, and the fill likely overlies slope debris deposits and rocks of the Franciscan Complex, which crop out in the northern half of the project area, including 101, 151, and the northern portion of 201 Haskins Way; 410

[76] Bonilla, M. G., 1998. Preliminary geologic map of the San Francisco South 7.5' quadrangle and part of the Hunters Point 7.5' quadrangle, San Francisco Bay area, California: a digital database. U.S. Geologic Survey Open-File Report OF-98-354. Scale 1: 24,000.
[77] Society of Vertebrate Paleontology, 2010. Standard procedures for the assessment and mitigation of adverse impacts to paleontological resources. Society of Vertebrate Paleontology. Impact Mitigation Guidelines Revision Committee. 11 p.
[78] Ibid.

and 430 East Grand Avenue; and the northern portion of 451 East Jamie Court. Therefore, at an undetermined depth, these sediments are likely present in the project area, and could be encountered during setting of deep foundations.

Slope Debris

Slope debris is found at the surface of the northwestern and northeastern portions of the project area and consists of stony silty to sandy clay and dates to the Pleistocene.[79] As such, this unit is old enough to preserve fossil resources (i.e., over 5,000 years old).[80] However, debris flows form under high-energy conditions that are not conducive to the preservation of scientifically significant fossils. Therefore, this unit is assigned **low paleontological sensitivity**. The thickness of this unit is unknown in the project area; however, given the proximity of outcrops of Franciscan Complex rocks in the northcentral portion of the project area, this unit may be relatively shallow in the project area. Ground-disturbing activities in the project area that exceed the depth of this unit may impact rocks of the underlying Franciscan Complex.

Franciscan Complex

The Franciscan Complex records deposition of volcanic and clastic sediments into a subduction zone during the Mesozoic era, followed by subsequent metamorphism.[81] The Franciscan Complex is known to contain a wide range of fossils, including radiolarians, mollusks, diatoms, foraminifers, and marine vertebrates.[82] There are two types of Franciscan Complex rocks present in the project area: sheared rocks and serpentine.

SHEARED ROCKS

Sheared rocks occur at the surface of the northcentral project area, to either side of the serpentine outcrops discussed below. This unit consists of small to large fragments of hard rock in a sheared rock matrix, derived primarily from serpentine and Franciscan shale and sandstone.[83] The project area is located on the border of the Marin Headlands Nappe and the Hunter's Point Shear Zone.[84] Shear zones are areas where fault activity has highly deformed the original rock units, and any fossils that might be preserved within those rocks. Therefore, while fossils are known from Franciscan Complex rocks, they are likely not to be

[79] Ibid.

[80] Schlocker, Julius, 1974. Geology of the San Francisco North Quadrangle, California, U.S. Geological Survey Professional Paper 782. U.S. Government Printing Office, Washington, D.C.

[81] Wakabayashi, John, 1992. Nappes, tectonics of oblique plate convergence, and metamorphic evolution related to 140 million years of continuous subduction, Franciscan Complex, California. *The Journal of Geology* 100: 19-40.

[82] Bailey, E.H., W. P. Irwin, and D. L. Jones, 1976. Franciscan and related rocks and their significance in the geology of western California. California Division of Mines and Geology Bulletin 183; 177 p. Schlocker, op. cit. Elder, William. 2015. Mesozoic molluscan fossils from the Golden Gate National Recreation Area and their significance to Franciscan Complex terrane reconstructions, San Francisco Bay Area, California. In V.L. Santucci and L. McClelland (eds), National Park Service Paleontological Research: National Park Service Technical Report NPS/NRGRD/GRDTR-98/0, pp. 90–94. Hilton, Richard P. 2003. Dinosaurs and other Mesozoic reptiles of California. Berkeley. University of California Press. 356 p.

[83] Society of Vertebrate Paleontology, op. cit.

[84] Wakabayashi, John, 2015. Anatomy of a subduction complex: architecture of the Franciscan Complex, California, at multiple length and time scales. *International Geology Review* 57: 669-746.

preserved in the sheared rocks that make up the project area. The sheared rocks of the Franciscan Complex in the project area have **low paleontological sensitivity**.

SERPENTINE

Serpentine rocks occur at the surface of the northcentral project area, and consist of greenish-gray serpentine with small bodies of gabbro and diabase.[85] Serpentine forms as a result of metamorphism, and is commonly associated with subduction zones, such as that documented in the Franciscan Complex rocks. Metamorphism is the alteration of earlier rocks or minerals under extremely high temperatures and pressures, which will usually destroy any fossils in the parent rock. Therefore, serpentine rocks of the Franciscan Complex in the project area have **low paleontological sensitivity**.

4.4.3 Regulatory Framework

This section provides a summary of the plans and policies of the City of South San Francisco, and regional, state, and federal agencies that have policy and regulatory control over the project site. These plans and policies include CEQA. CEQA requires a lead agency to analyze whether historic and/or archaeological resources may be adversely impacted by a proposed project. Under CEQA, a "project that may cause a substantial adverse change in the significance of a historic resource is a project that may have a significant effect on the environment." Answering this question is a two-part process: first, the determination must be made as to whether the proposed project involves cultural resources. Second, if cultural resources are present, the proposed project must be analyzed for a potential "substantial adverse change in the significance" of the resource.

HISTORICAL RESOURCES

According to CEQA Guidelines section 15064.5, for the purposes of CEQA, historical resources are as follows:

> A resource listed in, or formally determined eligible … for listing in the CRHR) (Public Resources Code 5024.1, Title 14 California Code of Regulations [CCR], Section 4850 et seq.).
>
> A resource included in a local register of historical resources, as defined in Section v5020.1(k), of the Public Resources Code or identified as significant in a historic resources survey meeting the requirements of Section Public Resources Code 5024.1(g).
>
> Any object, building, structure, site, area, place, record, or manuscript that the lead agency determines to be eligible for national, state, or local landmark listing; generally, a resource shall be considered by the lead agency to be historically significant (and therefore a historic resource under CEQA) if the resource meets the criteria for listing on the CRHR (as defined in Public Resources Code Section 5024.1, Title 14 CCR Section 4852).

[85] Bailey, Robert G., 1995. Description of the Ecoregions of the United States. 2d ed. U.S. Department of Agriculture, Forest Service, Miscellaneous Publication Number 1391. p. 50.

Resources nominated to the CRHR must retain enough of their historic character or appearance to convey the reasons for their significance. Resources whose historic integrity (as defined above) does not meet the NRHP criteria may still be eligible for listing in the CRHR.

According to CEQA, the fact that a resource is not listed in or determined eligible for listing in the CRHR or is not included in a local register or survey shall not preclude the lead agency from determining that the resource may be an historical resource. Pursuant to CEQA, a project with an effect that may cause a substantial adverse change in the significance of a historical resource may have a significant effect on the environment (CEQA Guidelines Section 15064.5[b]).

ARCHAEOLOGICAL RESOURCES

In terms of archaeological resources, Public Resources Code Section 21083.2(g) defines a *unique archaeological resource* as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

(1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.

(2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.

(3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If it can be demonstrated that a proposed project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (Public Resources Code Sections 21083.2[a], [b], and [c]). CEQA notes that, if an archaeological resource is neither a unique archaeological resource nor an historical resource, the effects of the project on those resources shall not be considered to be a significant effect on the environment (CEQA Guidelines Section 15064.5[c][4]).

CALIFORNIA STATE ASSEMBLY BILL 52

In 2014, AB 52 amended Public Resources Code Section 5097.94 and added Sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3.

Consultation with Native Americans

AB 52 formalizes the lead agency/tribal consultation process, requiring the lead agency to initiate consultation with California Native American groups that are traditionally and culturally affiliated with the project, including tribes that may not be federally recognized. Lead agencies are required to begin consultation prior to the release of a negative declaration, a mitigated negative declaration, or an environmental impact report.

Tribal Cultural Resources

Section 4 of AB 52 adds Sections 21074(a) and 21074(b) to the Public Resources Code, which address tribal cultural resources and cultural landscapes. Section 21074(a) defines *tribal cultural resources* as one of the following:

(1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
   (A) Included or determined to be eligible for inclusion in the CRHR.
   (B) Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

(2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

Section 1 (a)(9) of AB 52 establishes that "a substantial adverse change to a tribal cultural resource has a significant effect on the environment." Effects on tribal cultural resources should be considered under CEQA. Section 6 of AB 52 adds Section 21080.3.2 to the Public Resources Code, which states that parties may propose mitigation measures "capable of avoiding or substantially lessening potential significant impacts to a tribal cultural resource or alternatives that would avoid significant impacts to a tribal cultural resource." Further, if a California Native American tribe requests consultation regarding project alternatives, mitigation measures, or significant effects to tribal cultural resources, the consultation shall include those topics (Public Resources Code Section 21080.3.2[a]). The environmental document and the mitigation monitoring and reporting program (where applicable) shall include any mitigation measures that are adopted (Public Resources Code Section 21082.3[a]).

CALIFORNIA REGISTER OF HISTORICAL RESOURCES

Created in 1992 and implemented in 1998, the CRHR is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (Public Resources Code Sections 21083.2 and 21084.1). Certain properties, including those listed in or formally determined eligible for listing in the NRHP and California Historical Landmarks numbered 770 and higher, are automatically included in the CRHR. Other properties recognized under the California Points of Historical Interest program, identified as significant in historical resources surveys, or designated by local landmarks programs, may be nominated for inclusion in the CRHR. According to Public Resources Code Section 5024.1(c), a resource, either an individual property or a contributor to a historic district, may be listed in the CRHR if the State Historical Resources Commission determines that it meets one or more of the following criteria, which are modeled on NRHP criteria:

- **Criterion 1:** It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- **Criterion 2:** It is associated with the lives of persons important in our past.

- **Criterion 3:** It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- **Criterion 4:** It has yielded, or may be likely to yield, information important in history or prehistory.

Resources nominated to the CRHR must retain enough of their historic character or appearance to convey the reasons for their significance. Resources whose historic integrity does not meet NRHP criteria may still be eligible for listing in the CRHR.

TREATMENT OF HUMAN REMAINS

The disposition of burials falls first under the general prohibition on disturbing or removing human remains under California Health and Safety Code (CHSC) Section 7050.5. More specifically, remains suspected to be Native American are treated under CEQA at CCR Section 15064.5; Public Resources Code Section 5097.98 illustrates the process to be followed in the event that remains are discovered. If human remains are discovered during construction, no further disturbance to the site shall occur, and the County Coroner must be notified (CCR 15064.5 and Public Resources Code 5097.98).

4.4.4 Impacts and Mitigation Measures

This section describes the impact analysis related to cultural resources for the proposed project. This section also describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

Per the CEQA Guidelines, Appendix G, a cultural resources impact is considered significant if project implementation would result in one or more of the following:

a. Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines § 15064.5;

b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines § 15064.5;

c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or

d. Disturb any human remains, including those interred outside of dedicated cemeteries.

SIGNIFICANCE CRITERIA

State CEQA Guidelines specify that a "substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines Section 15064.5). Material impairment occurs when a project alters in an adverse manner or demolishes "those physical characteristics of an historical resource that convey its historical significance

and that justify its inclusion" or eligibility for inclusion in the NRHP, CRHR, or local register. In addition, pursuant to CEQA Guidelines Section 15126.2, the "direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects."

The following guides and requirements are of particular relevance to this study's analysis of indirect impacts on historic resources. Pursuant to CEQA Guidelines Section 15378, study of a project under CEQA requires consideration of "the whole of an action, which has the potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." CEQA Guidelines Section 15064(d) further defines direct and indirect impacts as follows:

a. A direct physical change in the environment is a physical change in the environment which is caused by and immediately related to the project;

b. An indirect physical change in the environment is a physical change in the environment which is not immediately related to the project, but which is caused indirectly by the project. If a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect physical change in the environment; or

c. An indirect physical change is to be considered only if that change is a reasonably foreseeable impact which may be caused by the project.

APPROACH TO ANALYSIS

The potential impacts of the proposed project on cultural and paleontological resources were evaluated based on the results of the CHRIS records search, the paleontological records search, geologic mapping, historic map review, a search of the SLF at the NAHC, and historic aerial imagery.

For historical resources, the potential for impacts on historical resources is determined first by the presence or absence of historical resources within the project area and, if an eligible resource is present, by assessing the potential of the project to cause a substantial adverse change in its significance.

For paleontological resources, the analysis is based on a review of geologic mapping and the results of the paleontological records search. These sources are used to determine whether there is a known resource or sensitive geologic formation present in the project area. If sensitive formations are present, the analysis considers whether the proposed ground disturbing activities are likely to impact unique paleontological resources.

For archaeological resources, the analysis is based on the results of the CHRIS records search, NAHC SLF search, and review of historic maps and aerial imagery. These sources are used to assess whether an archaeological resource which may be eligible for the CRHR or which may qualify as a unique archaeological resource is present within the project area. If an eligible or potentially eligible resource is present, the analysis considers whether the project would cause a substantial adverse change in the significance of the resource. The analysis also considers the potential for encountering previously unrecorded archaeological resources and/or human remains during proposed project ground disturbance.

IMPACT EVALUATION

Impact CR-1: Construction activities for the proposed project would not cause a substantial adverse change in the significance of an historic architectural resource as defined in Section 15064.5. ***(No Impact)***

Previously recorded historic district P-41-000884 is the site of the W.P. Fuller and Company Paint Plant and was previously located adjacent to the northeast corner of the project area. However, the site no longer exists and has been replaced with a Genentech research facility. The address (450 East Grand Avenue) still boasts a marker site #40 from the City's Historic Marker Program. Created by the City's Historic Preservation Commission, the Historic Marker Program is an effort to identify and provide information about sites with significance as part of the history of the City. This marker references a district that is no longer on the site and would not be considered to indicate a cultural or historic resource under CEQA.

The Phase 1 area is currently occupied by the light-industrial 201 Haskins Way Building, constructed around 1977, and the existing 400-450 East Jamie Court Building, developed in the early 2000s. The Phase 2 area is currently occupied by five one- to two-story light-industrial buildings constructed during the 1980s. These existing structures are not historic-in-age and are not eligible for designation on the CRHR. Therefore, both the proposed Phase 1 project and project buildout would have no impact on historic architectural resources. No mitigation is required.

Impact CR-2: Construction activities for the proposed project would cause a substantial adverse change in the significance of archaeological resources, if such resources are present within the project site. ***(Less than Significant with Mitigation)***

The results of the CHRIS records search indicate that one archaeological site (P-41-000042) has previously been recorded within the proposed project area. There is limited information available about the previously recorded site, which was identified in the early 1900s and has not been relocated since that time. The NAHC SLF search returned negative results. The project site is highly disturbed and consists of existing light industrial uses and business and technology park uses. The project site is located on historic Bay tidelands subject to fill and development in the post-war industrial period. Excavation activities associated with the proposed project would result in a total of approximately 19,000 cubic yards of soils off-haul generated during the construction period (approximately 11,000 cubic yards of soil during Phase 1 development, and approximately 8,000 cubic yards of soil during Phase 2 development), and construction would result in a total of approximately 25,000 cubic yards of imported soils (approximately 15,000 cubic yards during Phase 1 development, and approximately 11,000 cubic yards during Phase 2 development).

Geotechnical studies show that the project site is underlain by approximately 20 to 25 feet of fill in addition to approximately 0 to 20 feet of Bay Mud. Bedrock on the project site is estimated at depths between 20 and 78 feet. Therefore, foundations may also require pile-driving, auguring, or drilling to a maximum depth of approximately 78 feet below ground surface. Although the identified shellmound resource (P-41-00042) is poorly documented and is not likely to be accurately mapped, it is possible that excavation activities in the project site at depths below fill may encounter this resource. In addition,

previously unknown archaeological resources could be inadvertently unearthed during ground-disturbing activities. This inadvertent discovery could be a potentially significant impact; however, the impacts of the proposed project on archaeological resources would be reduced to less-than-significant levels through the implementation of Mitigation Measures MM-CR-2a: Cultural Resources Worker Environmental Awareness Program (WEAP), MM-CR-2b: Cultural Resources Monitoring During Ground-Disturbing Activities, and MM-CR-2c: Halt Construction Activity, Evaluate Find, and Implement Mitigation.

Mitigation Measure MM-CR-2a: Cultural Resources Worker Environmental Awareness Program (WEAP)

A qualified archaeologist should conduct a WEAP training for all construction personnel on the project site prior to construction and ground-disturbing activities. The training should include basic information about the types of artifacts that might be encountered during construction activities, and procedures to follow in the event of a discovery. This training should be provided for any additional personnel added to the project even after the initiation of construction and ground disturbing activities.

Mitigation Measure MM-CR-2b: Cultural Resources Monitoring During Ground-Disturbing Activities

A qualified archaeologist shall monitor all ground-disturbing activities within native sediments within the project. This monitoring will continue for the duration of the project or until culturally sterile sediments are reached (e.g., bedrock). A qualified archaeologist may determine to decrease or increase monitoring efforts based on sediments observed, findings, or number of large ground disturbing machines in operation.

Mitigation Measure MM-CR-2c: Halt Construction Activity, Evaluate Find, and Implement Mitigation

In the event that previously unidentified paleontological, archaeological, historical, or tribal resources are uncovered during site preparation, excavation, or other construction activity, all such activity within 25 feet of the discovery shall cease until the resources have been evaluated by a qualified professional, and specific measures can be implemented to protect these resources in accordance with sections 21083.2 and 21084.1 of the California Public Resources Code. If the find is significant, the archaeologist will excavate the find in compliance with state law, keeping project delays to a minimum. If the qualified archaeologist determines the find is not significant then proper recordation and identification will ensue and the project will continue without delay.

Impact CR-3: Construction activities for the proposed project would disturb human remains, including those interred outside of formal cemeteries, if such remains are present within the project site. ***(Less than Significant with Mitigation)***

The CHRIS records search, NAHC SLF search, and review of historic maps did not indicate the presence of human remains within the proposed project site. As such, there are no known human remains that would be disturbed by the proposed project. As mentioned under Impact CR-2 above, the project site is located in Bay fill lands. No formal cemeteries have been located on the project site, and human remains would be unlikely to be found. However, if inadvertent discovery of human remains occurs, implementation of Mitigation Measure MM-CR-3: Halt Construction Activity, Evaluate Remains, and Take Appropriate Action in Coordination with Native American Heritage Commission would reduce the impacts associated with inadvertent discovery of human remains to a less-than-significant level.

Therefore, both the proposed Phase 1 project and project buildout would have a less-than-significant impact with mitigation regarding human remains.

> **Mitigation Measure MM-CR-3: Halt Construction Activity, Evaluate Remains, and Take Appropriate Action in Coordination with Native American Heritage Commission**
>
> In the event that human remains are uncovered during site preparation, excavation, or other construction activity, all such activity within 25 feet of the discovery shall cease until the remains have been evaluated by the County Coroner, and appropriate action taken in coordination with the NAHC, in accordance with section 7050.5 of the CHSC or, if the remains are Native American, section 5097.98 of the California Public Resources Code.

Impact CR-4: Construction activities for the proposed project would cause a substantial adverse change in the significance of a tribal cultural resource, as defined in Public Resources Code Section 21074, if such resources are present within the project site. ***(Less than Significant with Mitigation)***

The results of the CHRIS records search indicate that one archaeological site (P-41-000042) has previously been recorded within the proposed project area. There is limited information available about the previously recorded site, which was identified in the early 1900s and it has not been relocated since that time. The NAHC SLF search returned negative results, and outreach by the City under AB 52 has not resulted in the identification of any tribal cultural resources within the project site. The project site is highly disturbed and consists of existing light industrial uses and business and technology park uses. The project site is located on historic Bay tidelands that was subject to fill and development in the post-war industrial period. Construction activities associated with the Project would include the removal of approximately 18,090 cubic yards of soil during Phase 1 and 2. Although not anticipated, previously unknown tribal cultural resources could be inadvertently unearthed during ground-disturbing activities. This inadvertent discovery would be a potentially significant impact and require mitigation. To avoid and mitigate this potentially significant impact, the project sponsor would implement Mitigation Measures MM-CR-2a: Cultural Resources Worker Environmental Awareness Program (WEAP), MM-CR-2b: Cultural Resources Monitoring During Ground-Disturbing Activities, MM-CR-2c: Halt Construction Activity, Evaluate Find, and Implement Mitigation, and MM-CR-3: Halt Construction Activity, Evaluate Remains, and Take Appropriate Action in Coordination with Native American Heritage Commission. Therefore, both the proposed Phase 1 project and project buildout would have a less-than-significant impact on tribal cultural resources with the incorporation of these mitigation measures.

Impact CR-5: Construction activities for the proposed project would not directly or indirectly destroy a unique paleontological resources or site or unique geologic feature. (No Impact)

Based on the paleontological resources desktop evaluation, all geologic units found within the project area have either no paleontological sensitivity or low paleontological sensitivity. There are no unique geologic or paleontological features associated with the project site. The proposed project would not impact unique paleontological resources or geologic features. Therefore, both the proposed Phase 1 project and project buildout would have no impact on paleontological resources.

CUMULATIVE IMPACTS ANALYSIS

As described in Impacts CR-1 and CR-5, above, the proposed project would have no impact on historic architectural resources or paleontological resources or geologic features, and these topics are not further discussed. The analysis below focuses on cumulative impacts associated with archaeological resources and tribal cultural resources.

Impact C-CR-1: The proposed project would make a cumulatively considerable contribution to a significant cumulative impact on historic or archaeological resources. ***(Less than Significant with Mitigation)***

The proposed project's potential contribution to cumulative impacts on archaeological resources is evaluated in the context of past, present, and reasonably foreseeable future development expected in the City and includes the cumulative projects and plans listed in Section 4.1, Approach to Environmental Analysis, pp. 4.1.7-4.1.9.

Although the potential prehistoric shellmound site identified by N. C. Nelson as described above is not well documented, the project site is part of the larger East of 101 Area prehistoric context. Nelson's publication included descriptions of multiple shellmounds in the San Francisco Bay region. Similar to the proposed project, ground-disturbing activities of past, present, and reasonably foreseeable future projects in the project vicinity have the potential to disturb archaeological resources, including other prehistoric shell mounds. These construction activities could cause a substantial adverse change in the significance of an archaeological resource. In addition, each of these projects also has the potential to encounter previously unrecorded resources. As with the proposed project, mitigation would be required. if archaeological resources or human remains are identified during implementation of any of these cumulative projects. Mitigation measures such as MM-CR-2a, MM-CR-2b, MM-CR-2c, and MM-CR-3, presented above, would reduce impacts to less than significant. Therefore, the proposed project, in combination with other past, present, and future reasonably foreseeable projects, would not cause significant cumulative impacts on archaeological resources or human remains. The project would not make a cumulatively considerable contribution to a significant cumulative impact on archaeological resources or human remains.

Impact C-CR-2: The proposed project would make a cumulatively considerable contribution to a significant cumulative impact on tribal cultural resources. ***(Less than Significant with Mitigation)***

As with Impact C-CR-1, above, ground-disturbing activities of past, present, and reasonably foreseeable future projects in the project vicinity have the potential to disturb tribal cultural resources within the larger East of 101 Area tribal cultural context in a manner similar to the proposed project. Construction activities from each of these projects could cause a substantial adverse change in the significance of a tribal cultural resource, or encounter previously unrecorded resources. As with the proposed project, mitigation would be required if tribal cultural resources are identified during implementation of any of these cumulative projects. Mitigation measures such as MM-CR-2a, MM-CR-2b, MM-CR-2c, and MM-CR-3, as presented above, would reduce impacts to less than significant. Therefore, the proposed project, in combination with other past, present, and future reasonably foreseeable projects, would not cause significant cumulative impacts on tribal cultural resources. The project would not make a cumulatively considerable contribution to a significant cumulative impact on tribal cultural resources.

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4.5 Greenhouse Gas Emissions

4.5.1 Introduction

Section 4.5, Greenhouse Gas Emissions, evaluates the potential significance of greenhouse gas (GHG) emissions related to construction and subsequent operation of the 201 Haskins Way Project (project). This section describes the existing conditions at the project site and the regulatory framework for this analysis. GHG emission impacts are presented and mitigation measures are identified. Appendix F discusses the methodologies used to assess the significance level of impacts related to GHG emissions in detail.

4.5.2 Environmental Setting

EXISTING CONDITIONS

The project site is made up of eight parcels, which encompass approximately 18.2 acres. The parcel at 201 Haskins Way had a trucking distribution use that recently relocated out of South San Francisco. Five of the parcels currently have warehouse and distribution uses, one parcel is used for parking, and one parcel has an existing office/research and development (R&D) use. Seven of these parcels are currently zoned as mixed industrial, and one is zoned as business commercial. There is a one-story, 24,075-gross-square-foot (gsf) former trucking terminal building at the 201 Haskins Way parcel, two three-story office/R&D buildings on the 400-450 East Jamie Court parcel, and one- to two-story light industrial buildings on each of the parcels located at 101 Haskins Way, 151 Haskins Way, 410 East Grand Avenue, 430 East Grand Avenue, and 451 East Jamie Court. Additionally, there is a parking lot on a portion of the 451 East Jamie Court parcel and the parcel Assessor's Parcel Number 015-102-240, which has no address.

GREENHOUSE GASES

Gases that trap heat in the atmosphere are referred to as GHGs and are regulated due to their contribution to anthropogenic climate change.[1] The most common GHGs and their typical emission sources are as follows:

- **Carbon dioxide (CO_2).** CO_2 is the most prevalent GHG and is produced by combustion of fossil fuels, combustion of biomass, and chemical reactions. It is also removed from the atmosphere via absorption by plants as part of the carbon cycle.
- **Methane (CH_4).** CH_4 is emitted from combustion, production of fossil fuels, livestock, agriculture, and municipal solid waste landfills.
- **Nitrous oxide (N_2O).** N_2O is emitted from combustion, agricultural activities, and industrial processes.
- **Fluorinated gases.** Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic GHGs that are emitted primarily from industrial processes. These gases

[1] U.S. Environmental Protection Agency. Overview of Greenhouse Gases. Available online: https://www.epa.gov/ghgemissions/overview-greenhouse-gases. Accessed May 29, 2018.

are sometimes referred to as High Global Warming Potential gases due to their potency to cause atmospheric warming.

Each GHG has a Global Warming Potential calculated to reflect how long it remains in the atmosphere, on average, and how strongly it absorbs energy. CO_2 is used as the reference GHG and by definition given a Global Warming Potential of 1. The Global Warming Potential for other GHGs is given in terms of CO_2 equivalent (CO_2e) and generally includes a timescale because some GHGs have shorter atmospheric lifespans. On a 100-year timescale, CH_4 is estimated to have a Global Warming Potential of 28–36 CO_2e, N_2O has a Global Warming Potential 265–298 CO_2e, and fluorinated gases range from a Global Warming Potential of over a 1,000 to near 25,000 CO_2e.

The anticipated climate change impacts caused by GHGs include increasing global temperatures; rising sea levels; melting of permafrost, glaciers, and ice caps; changing weather patterns; ocean acidification; species extinction; and desertification. The San Francisco Bay Area, in particular, is impacted by sea level rise and changing weather patterns due to climate change. Although the impacts of climate change vary widely from region-to-region, GHGs are regulated for their contribution on a global level rather than a regional or local level, unlike criteria and toxic air pollutants. GHG concentrations are measured through a global monitoring network with stations typically sited remotely to minimize interference from nearby sources. No National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards) CAAQS have been developed for GHGs.

4.5.3 Baseline Conditions

Since GHGs are regulated due to their contribution to climate change on a global level, localized baseline conditions do not factor into the analysis, except to the extent that existing GHG sources are removed. The Bay Area Air Quality Management District's (BAAQMD's) California Environmental Quality Act (CEQA) Guidelines establish quantitative GHG emission thresholds, expressed in terms of metric tons per year (MT/yr) of CO_2e or $MTCO_2e$ per Service Population (SP) per year. The SP consists of the residents and employees served by the project.

If a proposed project involves the removal of existing GHG emission sources, the BAAQMD's CEQA Guidelines allows for subtracting the existing emissions levels from the emissions levels estimated for the new proposed land use. However, this net calculation is only allowed if the existing emission sources are operational at the time that the Notice of Preparation is circulated, and will continue if the proposed redevelopment project is not approved. As discussed further in "Approach to Analysis," pp. 4.5.9-4.5.11, in order to be conservative about project impacts, it is assumed that the current operational emissions from the mixed industrial activities on the Phase 1 and Phase 2 area parcels would continue regardless of project approval status.

4.5.4 Regulatory Framework

This section provides a summary of the greenhouse gas plans and policies of the City of South San Francisco (City), and regional, state, and federal agencies that have policy and regulatory control over the project site.

FEDERAL CLEAN AIR ACT REGULATION OF GREENHOUSE GASES

The background and scope of the Federal Clean Air Act (CAA) is described in "Federal," in Section 4.2, Air Quality, pp. 4.2.4-4.2.5. Historically, GHGs were not directly regulated under the CAA[2]. However, the 2007 ruling by the U.S. Supreme Court in *Massachusetts v. EPA* found that U.S. Environmental Protection Agency (U.S. EPA) may regulate GHGs if they are determined to be a danger to human health. In response, President George W. Bush ordered U.S. EPA to use its existing authority under the CAA to regulate GHGs from mobile sources. The U.S. EPA issued its so-called Endangerment Finding in December 2009 which found that six GHGs do threaten the health and human welfare of current and future generations.

For mobile sources, the Endangerment Finding led to the development by U.S. EPA and the National Highway Traffic Safety Administration of the Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards Rule (LDV Rule) in May 2010.[3] The LDV rule first applied to model years 2012–2017, but was later extended to the 2025 model year. It requires light-duty vehicles to comply with progressively more stringent GHG emission standards for the 2012–2025 model years.

For stationary sources, the Endangerment Finding led to the so-called Tailoring Rule in May 2010 which tailored permit trigger levels to the largest sources.[4] U.S. EPA phased in GHG permitting requirements for stationary sources from 2010-2014. The U.S. Supreme Court decision on June 23, 2014, in *Utility Air Regulatory Group v. EPA*, limited the applicability of GHG requirements to large sources that are already subject to major source permitting under the CAA due to other pollutants. The U.S. EPA has also developed New Source Performance Standards that cover GHGs for power plants and certain oil and gas sources, and maintain an annual GHG reporting program that covers multiple industrial sectors. However, none of the current CAA requirements for GHGs are expected to directly impact the proposed project.

CALIFORNIA GHG REGULATION

The background and scope of air quality regulation in California is described in "State," in Section 4.2, Air Quality, pp. 4.2.5-4.2.6. For GHGs, Assembly Bill (AB) 32, the California Global Warming Solutions Act, was passed in 2006 as a landmark law requiring significant reduction in GHG emissions in California.[5] AB 32 directs the California Air Resources Board (CARB) to be the lead agency in implementing the law to achieve the goal of reducing GHG emissions to 1990 levels by 2020. An executive order set a statewide goal of 80 percent below 1990 levels by 2050 issued by former Governor Arnold Schwarzenegger in June 2005. Under AB 32, the CARB is required to prepare a Scoping Plan that

[2] U.S. EPA, Clean Air Act Permitting for Greenhouse Gases. Available on-line: https://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases. Accessed May 29, 2018.
[3] U.S. EPA, Regulations for Emissions from Vehicles and Engines. Available on-line: https://www.epa.gov/regulations-emissions-vehicles-and-engines/greenhouse-gas-ghg-emission-standards-light-duty-vehicles. Accessed May 29, 2018.
[4] U.S. EPA, Clean Air Act Permitting for Greenhouse Gases. Available on-line: https://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases. Accessed May 29, 2018.
[5] California Air Resources Board, Climate Change Programs. Available on-line: https://www.arb.ca.gov/cc/cc.htm. Accessed May 29, 2018.

outlines the strategies used to achieve the GHG emissions reduction goal by 2020. The CARB must update the Scoping Plan every five years. The Scoping Plan was approved in 2008, the first update approved in 2014, and an additional update was approved in 2017.

The initial Scoping Plan contains a range of GHG reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms including a cap-and-trade system, and an AB 32 program implementation fee regulation.[6] The first update to the Scoping Plan approved in 2014 summarized California's progress towards meeting its 2020 goals, and identified nine key focus areas: energy, transportation, agriculture, water, waste management, natural and working lands, short-lived climate pollutants, green buildings, and the cap-and-trade program.

To achieve further GHG reductions, California Senate Bill (SB) 32 was passed in 2016, requiring a reduction in GHG emissions to 40 percent below the 1990 levels by 2030. The CARB is charged with implementation of SB 32. The CARB approved its second update to the Scoping Plan in 2017 to incorporate the requirements of SB 32. The updated Scoping Plan includes policies to require direct GHG reductions through policies including lower GHG fuels, efficiency regulations, and the Cap-and-Trade Program. It also includes a summary of major climate statutes and regulations in Appendix H separated into the following sectors: low carbon energy, industry, transportation sustainability, lands and agriculture, waste management, water, and buildings. Appendix H is referenced herein as part of the regulatory framework for the proposed project.

The key activities and regulations outlined by the Scoping Plan in sectors with relevance to the proposed project are excerpted below:[7]

- **Energy** – CARB has implemented a Renewables Portfolio Standard (RPS) applicable to public utilities, as well as developed policies to further the use of combined heat and power systems, gas insulated switchgear, and distributed generation. The RPS requires retail sellers of electricity to have 33 percent of their load served by renewable sources by 2020 and 50 percent of their load served by renewable sources by 2030. In September 2018, the Legislature passed SB 100, which increased existing RPS targets and added new targets. Specifically, the total kilowatt hours of energy sold by electricity retailers to their end-use customers must consist of at least 50 percent renewable resources by December 31, 2026, 60 percent renewable resources by December 31, 2030, and 100 percent renewable resources by 2045. Additionally, beginning June 1, 2018, non-residential buildings greater than 50,000 square feet must report their energy use to the California Energy Commission (CEC). Low-carbon energy programs also include the CEC's Appliance Energy Efficiency standards.
- **Transportation, Fuels and Sustainable Communities** – CARB has developed requirements for light, medium, and heavy-duty vehicles, as well as a low carbon fuel standard. Measures are provided for certain equipment and non-road vehicles as well. Additionally, CARB has developed measures for strategic growth, land use, and infrastructure. State rules and regulations that reduce these emissions include SB 375 (Sustainable Communities Strategies Act) and SB 743 (Transit-

[6] California Air Resources Board, *AB 32 Scoping Plan*. Available on-line: https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm. Accessed May 29, 2018.
[7] *Ibid*.

Oriented Development) the California Complete Streets Act, the Low Carbon Fuel Standard Program, and clean car standards.

- **Water** – CARB has developed programs for water use efficiency, water recycling, urban runoff, and landscape irrigation. In addition, the state has water use reduction requirements, such as Water Efficient Landscape Ordinance requirements in Title 24.
- **Waste Management/Recycling** – CARB has developed programs for waste minimization, landfills, and mandatory commercial recycling. Statutory requirements include mandatory commercial organics recycling and a 75 percent statewide recycling goal.
- **Green Buildings** – CARB has provided green building research and strategy, as well as a green building standards code, contained in Title 24 Part II of the CCR. Title 24 is updated every three years, resulting in ever increasing energy reductions. The latest update will be applicable to buildings constructed after January 1, 2019.
- **Cap-and-Trade Program** – The Cap-and-Trade Regulation is a market-based program that covers electric generating utilities, electricity importers, large industrial facilities, and fuel distributors. It requires annual reporting of GHG emissions, creates a market place for trading GHG allowances, and achieves reductions through a cap on emissions that decreases over time.

CARB works closely with local, regional, and state programs to implement the GHG programs.

Most recently, Governor Brown issued Executive Order B-55-18, establishing a state goal to achieve carbon neutrality no later than 2045, and achieve and maintain net negative emissions thereafter. This executive order directs CARB to work with state agencies to develop a framework for implementation and accounting that tracks progress for this goal and to include measures in the next Scoping Plan update to achieve carbon neutrality by 2045.

PLAN BAY AREA

As required by SB 375, all metropolitan regions in California must complete a Sustainable Communities Strategy (SCS) as part of a *Regional Transportation Plan*. In the Bay Area, the Metropolitan Transportation Commission and the Association of Bay Area Governments are jointly responsible for developing and adopting a SCS that integrates transportation, land use and housing to meet greenhouse gas reduction targets set by CARB. SB 375 mandates that the SCS must address climate change by reducing per-capita CO_2 emissions from cars and light-duty trucks and must include sufficient housing for all of a region's projected population growth, regardless of income. The most recently adopted (July 2017) version of the SCS is called *Plan Bay Area 2040* (Plan Bay Area).

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

The background and scope of BAAQMD is described in "Bay Area Air Quality Management District (BAAQMD)," in Section 4.2, Air Quality, p. 4.2.6-4.2.7. The BAAQMD's *2017 Bay Area Clean Air Plan* includes several control measures designed to reduce GHGs, including the following examples with relevance to the proposed project: implement pricing measures to reduce travel demand; accelerate the widespread adoption of electric vehicles; promote the use of clean fuels; promote energy efficiency in

both new and existing buildings; and promote the switch from natural gas to electricity for space and water heating in Bay Area buildings.[8]

The BAAQMD's *CEQA Air Quality Guidelines* assists lead agencies in evaluating GHG impacts of projects and plans proposed in the Bay Area Air Basin.[9] For development projects, the Guidelines provide Thresholds of Significance and Screening Criteria to determine the level of analysis needed, and assessment methods and mitigation measures for operational and construction GHG emissions. The most recent version of the Guidelines, published in May 2017, has been used in the evaluation of GHG impacts from the proposed project. BAAQMD is undertaking another update to its GHG CEQA Guidelines to account for the passage of SB 32 and recent case law addressing the analysis of climate change in CEQA documents.

Additionally, the BAAQMD operates several programs related to climate protection, including a GHG measurement program, GHG emission inventories, rules with GHG emission requirements, and GHG emission fees for certain sources operating under a BAAQMD permit.

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

The San Francisco Bay Conservation and Development Commission (BCDC) is a regional planning and regulatory agency for the San Francisco Bay, its shoreline band, and the Suisun Marsh. The BCDC issues permits for work in the Bay or within 100 feet of the shoreline. The BCDC has maintained the *San Francisco Bay Plan* since 1969 for the maintenance and protection of San Francisco Bay.[10] The BCDC approved an amendment to the plan in October 2011 to address climate change. The amendment includes policies that address the following actions:

- Require sea level rise risk assessments for projects within BCDC's jurisdiction.
- Protect existing and planned development from flooding as well as erosion.
- Incorporate shoreline protection structures with natural features whenever feasible for the project.
- Foster ecosystem protection and restoration.
- Encourage projects with regional benefits that outweigh the risk from flooding.
- Preserve undeveloped areas.
- Develop a regional strategy to protect critical developed areas from flooding, exchange the natural resources of the Bay, and improve the ability of communities to adapt to sea level rise.

Portions of the proposed project that could be developed within the 100-foot shoreline band as part of Phase 2 would be under the BCDC jurisdiction; this is discussed in Section 4.11, Less-than-Significant

[8] BAAQMD, Current Plans. Available on-line: http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans. Accessed May 29, 2018.
[9] BAAQMD, *CEQA Air Quality Guidelines.* Updated May 2017. Available on-line: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en. Accessed May 29, 2018
[10] BCDC, *San Francisco Bay Plan*. Available on-line: http://www.bcdc.ca.gov/plans/sfbay_plan.html. Accessed May 29, 2018.

Impacts, relating to Aesthetics impacts on p. 4.11.1. If the shoreline band is impacted, the applicable policies would be followed and proper permits obtained.

CITY OF SOUTH SAN FRANCISCO GENERAL PLAN

The background and scope of the *City of South San Francisco General Plan* (General Plan), as well as its air quality policies is described in "Local," in Section 4.2, Air Quality, pp. 4.2.7-4.2.8. The General Plan includes a chapter that outlines policies relating to cultural and environmental resources including air quality and GHG emissions.[11] The key guiding policies and implementing polices that impact GHG are excerpted below:

Guiding Policies: Greenhouse Gas Emissions

7.3-G-2: Mitigate the community of South San Francisco's impact on climate change by reducing greenhouse gas emissions consistent with state guidance.

7.3-G-3: Reduce energy use in the built environment.

7.3-G-4: Encourage land use and transportation strategies that promote use of alternatives to the automobile for transportation, including bicycling, bus transit, and carpooling.

Implementing Policies: Greenhouse Gas Emissions

7.3-I-2: Use the City's development review process and the California Environmental Quality Act (CEQA) regulations to evaluate and mitigate the local and cumulative effects of new development on air quality and GHG emissions.

7.3-I-6: Periodically update the inventory of community-wide GHG emissions and evaluate appropriate GHG emissions reduction targets, consistent with current State objectives, statewide guidance, and regulations.

7.3-I-7: Adopt and implement the City of South San Francisco's Climate Action Plan (CAP), which will identify a GHG emissions reduction target and measures and actions to achieve the reduction target.

7.3-I-8: Evaluate and regularly report to City Council, or its designee, on the implementation status of the CAP and update the CAP as necessary should the City find that adopted strategies are not achieving anticipated reductions, or to otherwise incorporate new opportunities.

7.3-I-9: Promote land uses that facilitate alternative transit use, including high-density housing, mixed uses, and affordable housing served by alternative transit infrastructure.

7.3-I-10 - 7.3-I-13: [These implementing policies promote energy efficiency in buildings and clean energy use.]

7.3-I-15: Demonstrate effective operations in municipal facilities that reduce GHG emissions.

As referenced above, the City adopted a *Climate Action Plan* in February 2014 to demonstrate the City's commitment to reduce GHG emissions.[12] The *Climate Action Plan* serves as an implementation tool of

[11] City of South San Francisco, *City of South San Francisco General Plan.* Available online: http://www.ssf.net/departments/economic-community-development/planning-division/general-plan. Accessed May 29, 2018.
[12] City of South San Francisco, 2014. *Climate Action Plan.* Available online: http://www.ssf.net/departments/economic-community-development/planning-division/planning-documents/approved-policy-documents. Accessed May 29, 2018.

the General Plan and provides specific programs and measures to reduce GHG emissions. The key guiding *Climate Action Plan* GHG reduction strategies are excerpted below:

Measure 1.1: Expand active transportation alternatives by providing infrastructure and enhancing connectivity for bicycle and pedestrian access;

Measure 1.2: Support expansion of public and private transit programs to reduce employee commutes;

Measure 1.3: Integrate higher-density development and mixed-use development near transit facilities and community facilities, and reduce dependence on autos through smart parking practices;

Measure 2.1: Expand the use of alternative-fuel vehicles, in part, by requiring new large-scale nonresidential developments to provide a conduit for future electric vehicle charging installations, and encouraging the installation of conduits or electric vehicle charging stations for all new development;

Measure 2.2: Reduce emissions from off-road vehicles and equipment, in part, by working with project applicants through the CEQA review process to reduce construction equipment emissions by encouraging the use of alternatively powered or grid-connected equipment;

Measure 3.1: Maximize energy efficiency in the built environment through standards and the plan review process;

Measure 3.3: Encourage energy efficiency retrofits to the existing nonresidential building stock that reduce operating costs and increase industry competitiveness;

Measure 3.4: Address heat island issues and expand the urban forest through continued enforcement of new tree planting in accordance with Chapter 13.30 of the Zoning Code;

Measure 3.5: Promote energy information and sharing, and educate the community about energy-efficient behaviors and construction;

Measure 4.1: Promote installation of alternative energy facilities, in part, by (i) requiring the construction of new nonresidential conditioned space of 5,000 square feet or more to meet energy reduction standards, through providing a minimum of 50 perfect of building electricity needs through on-site renewable energy, participating in a power purchase agreement to offset a minimum of 50 perfect of modeled building electricity use, or through compliance with CALGreen [Title 24 Green Building Standards] Tier 2 energy efficiency requirements to exceed mandatory energy efficiency requirements by 20 percent or more and (ii) requiring all new development to install a conduit to accommodate wiring for solar;

Measure 5.1: Develop a waste reduction strategy to increase recycling and reuse of materials to achieve a 75 percent diversion of landfilled waste by 2020;

Measure 6.1: Reduce water demand through continued implementation of the Urban Water Management Plan and Water Efficiency Landscape Ordinance;

Measure 6.2: Provide alternative water resources for irrigation;

In accordance with these plans and the BAAQMD CEQA Guidelines, the City assesses the GHG impacts of new development projects and requires mitigation of significant GHG impacts.

4.5.5 Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Per the CEQA Guidelines, Appendix G, a GHG impact is considered significant if project implementation would result in one or more of the following:

a. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or

b. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

BAAQMD has established Thresholds of Significance (thresholds) to determine whether a project's operations are likely to have a significant impact on the environment with respect to GHGs. Should a project's operations be below the established threshold, then it is assumed that the project would result in a less-than-significant impact related to global climate change. The thresholds established by BAAQMD are described below and shown in Table 1-1 of Appendix F on p. F-4. The SP threshold is based on achieving the GHG emission reductions required by AB 32. The BAAQMD Guidelines also establish a qualitative threshold: compliance with an applicable, qualified GHG Reduction Strategy.

For project operation GHG emissions other than stationary sources, the project must either comply with a qualified GHG Reduction strategy or meet an emission limitation threshold based on either 1,100 $MTCO_2e$ per year or 4.6 $MTCO_2e$/SP/yr. The SP for the proposed project would be considered the number of employees working in the project. Stationary sources have a separate threshold than direct or indirect emissions from project area or mobile sources. The threshold for all stationary sources is 10,000 $MTCO_2e$ for all stationary sources located at the project. The different threshold for stationary sources is due to the fact that stationary source emissions of GHG are potentially subject to state and federal GHG reporting requirements.

Though BAAQMD has not developed thresholds to assess the impacts related to GHG emissions from construction activities, it is recommended that effects from construction be evaluated against the AB 32 and relevant local air quality plan goals to determine impacts. The methodology for determining the impact of construction emissions on global climate change and whether these emissions contribute to cumulatively considerable impacts is discussed in the subsequent section.

APPROACH TO ANALYSIS

The proposed project would rezone all eight parcels to a Business Technology Park (BTP) zoning district, which would allow construction of BTP office/R&D uses and associated parking. For the Phase 1 project, all existing light industrial operations located on 201 Haskins Way would cease, and the light industrial building and parking lot would be demolished; on the 400-450 East Jamie Court parcels, the two buildings would not be demolished and additional square footage would be constructed and current operations would continue.

It is uncertain when or if Phase 2 development would occur, or if it did, whether it would occur as a single redevelopment of all Phase 2 area parcels (such as illustrated in the conceptual development plan) or as separate redevelopment of one or more Phase 2 area parcels. If a proposed project involves the removal of existing GHG emission sources, BAAQMD's CEQA Guidelines allow for subtracting the existing emissions levels from the emissions levels estimated for the new proposed land use. In order to be conservative about project impacts and notwithstanding BAAQMD's CEQA Guidelines, existing operational emission levels are not subtracted from the projected project operational emission levels to determine impacts.

A quantitative approach to demonstrating the significance level of project emissions was taken to determine whether the project operations would have a significant and cumulatively considerable impact on global climate. The operational-related project emissions were compared against the 4.6 $MTCO_2e$/SP/yr threshold established by BAAQMD.

To quantitatively assess whether the project construction emissions would contribute to significant and cumulatively considerable impacts, total construction emissions from each construction phase were quantified and an average annual emission rate in MT/yr was determined based on an assumed BTP district building lifespan of 40 years.[13] This averaging of emissions emitted during construction over the life of the project is needed to allow construction emissions to be added to operational emissions. In addition, this approach reflects that emissions stay in the atmosphere for some years after being emitted. These construction emissions were added to the maximum annual operating emissions from Phase 1 alone and the total project MT/yr emissions as appropriate to thoroughly assess emission levels per service population during various stages of project buildout.

This method of quantifying and assessing construction emissions as part of the operational threshold is an approach designed to assess the project impacts holistically as well as evaluate construction impacts, as recommended by BAAQMD, in a quantitative manner. It is assumed that if the project operation threshold is met when accounting for both average annual construction emissions and annual operational-related emissions, the overall project GHG emissions would not contribute to significant impacts and would be compatible with state goals to prevent cumulatively considerable contributions to significant cumulative impacts on global climate. Assessing construction impacts utilizing the methodology described above is now considered standard practice among jurisdictions in the Bay Area. Carbon sequestration resulting from net new trees is also amortized over 50 years for consistency.

Project GHG emissions from construction and operation excluding stationary sources were quantified using California Emissions Estimator Model Version 2016.3.2 (CalEEMod)[14]. Emissions from emergency diesel-powered generator engines were quantified based on the engine specifications, proposed operating

[13] The BAAQMD Guidelines do not identify an approach to assessing the significance of construction-related GHG emissions. The approach of amortizing construction emissions over the anticipated life of the building and adding them to operational emissions is thus conservative. For the purposes of air quality analysis, the anticipated 40-year building lifespan is used as a conservative assumption.

[14] California Emissions Estimator Model. Developed for CAPCOA in Collaboration with California Air Districts. The model can be downloaded from: http://caleemod.com/. Accessed May 29, 2018.

schedules, and Subpart C[15] emission factors specific to diesel fuel (petroleum distillate No. 2) combustion.

In addition, the analysis considers the project's consistency with the City's CAP and *Plan Bay Area*. The CAP has a target reduction of 15 percent below baseline 2005 GHG emissions levels by 2020. The City's baseline GHG emissions are lower than the statewide average baseline. Accordingly, the CAP's 2020 threshold is 3.58 $MTCO_2e$/SP/year rather than 4.6 $MTCO_2e$/SP/year. The CAP also determined that consistency with its programs and actions would result in emissions of 3.08 $MTCO_2e$/SP/year in 2035. Notably, because the CAP was prepared in 2014, it did not account for regulations adopted since that time, including the adoption of 2019 Title 24, which results in additional emission reductions from building's operational emissions. The CAP also includes a number of reduction strategies applicable to the project, as discussed above in "Regulatory Framework," p. 4.5.8 and the consistency analysis determines if the project would comply with those strategies. *Plan Bay Area* also includes a few project-specific policies designed to meet the regions SB 375 emission reduction targets for 2020 and 2035 and the project is analyzed for consistency with those policies.

Finally, long-term GHG impacts are addressed qualitatively because no quantitative thresholds exist beyond 2020, but project operations are anticipated to occur for 50 years. This assessment examines whether the project would impede the state from meeting its 2030 and 2050 GHG emission reduction goals. A qualitative analysis is appropriate because anticipating technological and regulatory changes that will occur in the future, particularly by 2050, is too speculative for a quantitative analysis.

IMPACT EVALUATION

Greenhouse Gas Emissions

Impact GHG-1: The proposed project would result in GHG emissions; however, the emissions from the project would be below the applicable thresholds of significance. ***(Less than Significant)***

Project Construction Greenhouse Gas Emissions

BAAQMD has no established threshold for evaluating GHG emission impacts from construction. Therefore, to evaluate the project impacts for construction, construction emissions are amortized and added to the project emissions shown in Table 4.5.2 to assess impacts resulting from non-stationary sources associated with the project construction and operation. This is a conservative method for assessing both construction and non-stationary source operational-related GHG emission impacts. **Table 4.5.1: Construction GHG Emissions for Phase 1 and Phase 2** shows construction-related GHG emissions during Phase 1 and Phase 2 of project construction. Construction is anticipated to occur over an 18-month period for each phase, for a total of 3 years. These 3 years of construction emissions are amortized over a 40-year period and added to the non-stationary source operational emissions to assess project impacts. The combined non-stationary source operational and average annual construction emissions for each phase of the project were then compared against the $MTCO_2e$/SP/yr thresholds shown

[15] US EPA. 40 CFR Part 98, Subpart C Table C-1 and C-2 emission factors specific to diesel fuel (petroleum distillate No. 2) combustion.

in **Table 4.5.2: Combined Annual Operation and Average Annual Construction Emissions During Project Buildout (Excludes Stationary Sources)**. As shown in Table 4.5.2, the GHG emissions from the project would be less than the applicable operational-related thresholds when including both annual project operational-related emissions and project amortized construction emissions. Therefore, using this methodology, if non-stationary source operational-related GHG emissions including amortized construction emissions are determined to be less than the applicable operational GHG emission threshold of significance, it can also be assumed that construction-related GHG emissions would have a less-than-significant impact on global climate.

Table 4.5.1: Construction GHG Emissions for Phase 1 and Phase 2

Construction Year	Phase 1 Construction (MT/yr)	Phase 2 Construction (MT/yr)
2018	57.67	0
2019	1438.74	0
2020	801.04	235.19
2021	0	1255.03
2022	0	563.30
Total Construction Emissions (MT/yr)	**2297.44**	**2053.53**
Construction MT/yr (amortized)[1]	**45.95**	**41.07**

[1] Total construction emissions of CO_2e in metric tons is distributed over 40 years (assumed lifetime of new development in the BTP district) to calculate an average annual MT/yr emission rate so that construction emissions can be added to operational emissions of the project. In this way, all project GHG emissions can be quantitatively assessed against the BAAQMD Thresholds.

Source: CalEEMod version 2016.3.2. See **Appendix F** for emission model outputs.

Table 4.5.2: Combined Annual Operation and Average Annual Construction Emissions During Project Buildout (Excludes Stationary Sources)

Source Description	Phase 1 Operation/Construction (MT/yr)	Phase 1 Operation/ Phase 1&2 Construction (MT/yr)	Phase 1&2 Operation/Construction (MT/yr)
Area	0.02	0.02	0.04
Energy	2070.09	2070.09	3904.37
Mobile	486.46	486.46	955.07
Off-Road	27.46	27.46	54.92
Waste	157.32	157.32	316.91
Water	213.31	213.31	429.70
Vegetation (amortized)[1]	-0.88	-0.88	-2.01
Construction (amortized)[1]	45.95	87.02	87.02
Maximum Annual Emissions (MT/yr)	**2999.73**	**3040.80**	**5746.02**
Service Population (SP)	1120	1120	2260
Emissions per SP (MT/SP/yr)	2.68	2.72	2.54
BAAQMD Thresholds (MT/SP/yr)	4.6	4.6	4.6
Exceeds Thresholds?	**No**	**No**	**No**

[1] Total construction emissions of CO_2e is metric tons is distributed over 50 years (assumed lifetime of the BTP district) to calculate an average annual MT/yr emission rate so that construction emissions can be added to operational emissions of the project. In this way, all project GHG emissions can be quantitatively assessed against the BAAQMD Thresholds. Reduction in CO_2e from net new tree sequestration is also amortized over 50 years for consistency.

Source: CalEEMod version 2016.3.2. See **Appendix F** for emission model outputs.

Project Operation Greenhouse Gas Emissions

BAAQMD significance thresholds for evaluating project operational impacts are shown in Table 1-1 of Appendix F. The threshold of significance for non-stationary sources is compliance with a qualified GHG reduction strategy or emissions below either 1,100 $MTCO_2e$/yr, or 4.6 $MTCO_2e$/SP/yr. BAAQMD Guidelines state that GHG emissions from stationary sources associated with a project (such as back-up generators) should not be added to the project's total emissions when assessing impacts. There is a separate threshold (10,000 $MTCO_2e$/yr) which should be used to assess impacts with respect to stationary source operation.

Non-stationary Sources

GHG emissions from the project operation (excluding stationary sources) were determined to have a less-than-significant impact since the emissions would be less than the BAAQMD's established thresholds for operation of the project throughout all phases of project buildout. As discussed above, amortized construction emissions are included in the results shown in Table 4.5.2 to demonstrate that impacts from non-stationary sources during project construction and operation would be below the 4.6 $MTCO_2e$/SP/yr threshold established by BAAQMD for project operational emissions for sources other than stationary sources. The BAAQMD service population threshold is based on the emission reductions required for the region under the BAAQMD's jurisdiction to meet the reduction targets in AB 32. Although BAAQMD has not established a regional threshold for meeting the SB 32 target, based on the same methodology BAAQMD used to establish the 4.6 threshold, the threshold would be 2.7 $MTCO_2e$/SP/yr. Both Phase 1 and Phase 2 are anticipated to be constructed by 2030. As shown in Table 4.5.2, emissions from Phase 1 and Phase 2 non-stationary operational sources would be below 2.7 $MTCO_2e$/SP/yr. BAAQMD specifies that if operational project emissions are less than the thresholds prior to mitigation, the project would result in a less-than-significant impact on global climate. Therefore, GHG emissions from project buildout and operation are determined to have a less-than-significant impact.

Project Stationary Source Greenhouse Gas Emissions

The stationary source emissions from the completed project operation (Phase 1 and Phase 2) are based on the emissions from four diesel-fueled emergency generators. Emissions from all four units combined would be 104.5 $MTCO_2e$/yr, well below the 10,000 $MTCO_2e$/yr threshold for stationary sources. Therefore, the emission impacts from the project stationary sources would be less than significant.

Greenhouse Gas Emission Reduction Plan Consistency

Impact GHG-2: The proposed project's contribution to significant cumulative impacts related to GHGs would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. ***(Less than Significant)***

The proposed project would be generally consistent with applicable city, county, and state plans or regulations designed to limit impacts to global climate change. BAAQMD's thresholds were specifically set to ensure that new project development remains consistent with local and statewide GHG emission reduction goals. BAAQMD considered numerous statewide plans and regulations (e.g., the AB 32 Scoping Plan and the low carbon fuel standard) when developing the threshold. Therefore, since the

project emissions are below the thresholds for $MTCO_2e$/SP/yr established by BAAQMD, project impacts are considered less than significant, with no mitigation necessary.

Climate Action Plan

The CAP sets a 2020 service population threshold of 3.58 $MTCO_2e$/SP/year. As shown in Table 4.5.2, Phase 1 and Phase 1 and 2 project emissions would be less than this threshold. Phase 1 and Phase 1 and 2 project emissions also would be less than SP emissions the CAP anticipates for 2035, which are 3.08 $MTCO_2e$/SP/year. **Table 4.5.3: Analysis of Consistency with the CAP** shows that the project would be consistent with the CAP's GHG emission reduction policies. Because the project is consistent with the CAP's quantitative and qualitative thresholds, the project's contribution to significant cumulative impacts from GHG emissions is less than cumulatively considerable.

Plan Bay Area

Plan Bay Area is the Bay Area's SCS, and compliance with its policies results in the region achieving state-mandated emission reductions from cars and light-duty vehicles. Under the current targets, the Bay Area region must reduce its per capita vehicle emissions 7 percent by 2020 and 15 percent by 2035. Beginning October 1, 2018, the Bay Area region must reduce its per capita vehicle emissions 10 percent by 2020 and 19 percent by 2035.

The majority of SCS strategies do not apply to individual development projects. Nevertheless, the project would not impede the region from complying with the SCS. The SCS has two policies that apply to the project and with which the project would comply: encourage Transportation Demand Management (TDM) strategies and alternative fuel and vehicle strategies. As discussed above, the project includes a TDM plan and would provide charger ready parking spaces in its parking lots.

Table 4.5.3: Analysis of Consistency with the CAP

CAP Measures and Actions	Consistency Analysis
Measure 1.1: Expand active transportation alternatives by providing infrastructure and enhancing connectivity for bicycle and pedestrian access;	The proposed project would involve construction of new sidewalks, walkways, and bicycle amenities (bicycle parking spaces, showers, lockers, etc.). The project sponsor would also contribute to the Commute.org shuttle program and coordinate with other program participants to expand shuttle service.
Measure 1.2: Support expansion of public and private transit programs to reduce employee commutes. Work with businesses to support and expand shuttle connections to transit. Continue to enforce the City's Transportation Demand Management (TDM) program to require employers to demonstrate achieved mode share and to continually adjust their programs to meet the requisite goals. Partner with local businesses to expand private shuttle programs for employee commutes, share local lessons learned, and connect businesses to shuttle resources. Implement programs and encourage employers to provide additional voluntary subsidies or incentives	The proposed project would involve preparation and implementation of a TDM Plan, subject to review by the Chief Planner and approval by the Planning Commission. The TDM Plan would include various measures to promote alternative transportation, including contribution to the Commute.org shuttle program and coordination with other program participants to expand shuttle service.

CAP Measures and Actions	Consistency Analysis
Measure 1.3: Integrate higher-density development and mixed-use development near transit facilities and community facilities, and reduce dependence on autos through smart parking practices. Revise the existing traffic impact fee for development east of US Route 101 to fund the bicycle and pedestrian improvements for the portions of the city identified in the Bicycle and Pedestrian Master Plans.	The project site is not located near a major transit hub or community facility. However, the proposed project would involve contribution to the Commute.org shuttle program, which provides connectivity to BART, Caltrain, and ferry services. In addition to paying into the traffic impact fee, the proposed project would involve construction of new sidewalks and bicycle amenities (bicycle parking spaces, showers, lockers, etc.) to encourage pedestrian and bicycle activity.
Measure 2.1: Expand the use of alternative-fuel vehicles. • Revise parking design guidelines to include designated spaces for electric vehicles, carpool vehicles, and other low-emissions vehicles. • Require new large-scale nonresidential developments to provide a conduit for future electric vehicle charging installations, and encourage the installation of conduits or electric vehicle charging stations for all new development.	The proposed project would provide off-street parking spaces, including designated spaces for electric vehicles, carpool, vanpool, and other shared vehicle uses.
Measure 2.2: Reduce emissions from off-road vehicles and equipment. • Work with applicants through the CEQA review process to reduce construction equipment emissions by encouraging the use of alternatively powered or grid-connected equipment.	The proposed project would contribute emissions from off-road vehicles and equipment during the construction period. As a condition of approval, the City will require the construction contractor to use alternatively powered or electrically-driven construction vehicles and equipment when feasible.
Measure 3.1: Maximize energy efficiency in the built environment through standards and the plan review process. • Encourage the use of CALGreen energy efficiency measures as a preferred mitigation for CAP streamlining.	The proposed project would be designed to enhance resource efficiency and ensure good indoor environmental quality, as well as reduce energy consumption, water consumption, and waste. The project would be designed to meet the standards of the City Municipal Code and CALGreen building requirements, as well as LEED v4 “Gold” design standards. The project would be designed to meet International WELL and FITWELL Building Institute Standards and may also be certified thereto.
Measure 3.3: Encourage energy efficiency retrofits to the existing nonresidential building stock that reduce operating costs and increase industry competitiveness. • Encourage all nonresidential properties to provide buyers or tenants with the previous year's energy use by documenting use through the EPA's EnergyStar Portfolio Manager. • Require nonresidential alterations or additions of at least 5,000 square feet or greater in size to comply with minimum CALGreen requirements. • Encourage the use of smart grid, energy-efficient, or Energy Star appliances in new development.	The proposed project would not involve retrofits to existing nonresidential buildings. However, the proposed project would be designed to enhance resource efficiency and reduce energy consumption per CALGreen building requirements, LEED v4 “Gold” design standards and International WELL Building Institute Standards.
Measure 3.4: Address heat island issues and expand the urban forest. • Encourage the use of high albedo surfaces and technologies as appropriate, as identified in the voluntary CALGreen standards. • Continue to require tree planting in new development in accordance with Chapter 13.30 of the Zoning Code, and encourage tree placement to maximize building shading.	The proposed project would involve planting of approximately 263 new trees, including street trees and on-site landscaping.
Measure 4.1: Promote installation of alternative energy facilities. • Require the construction of any new nonresidential conditioned space 5,000 square feet or more, or the	The proposed project would be designed to meet the standards of the City Municipal Code and CALGreen Tier 2 energy efficiency requirements, as well as LEED v4 “Gold” design standards and International WELL Building Institute

CAP Measures and Actions	Consistency Analysis
conversion of unconditioned space 5,000 square feet or more, to comply with one of the following standards: • Meet a minimum of 50% of modeled building electricity needs with on-site renewable energy sources. To calculate 50% of building electricity needs for the new conditioned space, the applicant shall calculate building electricity use as part of the Title 24 compliance process. Total electricity use shall include total use for the new conditioned space excluding process energy. • Participate in a power purchase agreement to offset a minimum of 50% of modeled building electricity use. Building electricity use shall be calculated using the method identified above. • Comply with CALGreen Tier 2 energy efficiency requirements to exceed mandatory energy efficiency requirements by 20% or more. For additions to existing development of 5,000 square feet or more, CALGreen Tier 2 shall be calculated as part of the Title 24 compliance process. Existing building space already permitted shall not be subject to CALGreen Tier 2 requirements. • Require all new development to install conduit to accommodate wiring for solar.	Standards. The project design would include construction of rooftop solar photovoltaic panel connectivity located on the parking garage.
Measure 5.1: Develop a waste reduction strategy to increase recycling and reuse of materials to achieve a 75% diversion of landfilled waste by 2020. • Continue to enforce the existing construction and demolition recycling ordinance, requiring 100% of inert waste and 65% of noninert waste to be recycled from all eligible projects.	The proposed project would be designed to reduce waste. The project would be designed to meet the standards of the City Municipal Code and CALGreen building requirements, as well as LEED v4 “Gold” design standards and International WELL Building Institute Standards. For construction and demolition, 100 percent of all inert solids (building materials) and 65 percent of non-inert solids (all other materials) would be recycled as required by the City under Chapter 15.60 of the Municipal Code. Additionally, the project sponsor would submit a Waste Management Plan
Measure 6.1: Reduce water demand. • Revitalize implementation and enforcement of the Water Efficient Landscape Ordinance by undertaking the following: o Establishing a variable-speed pump exchange for water features. o Limiting turf area in commercial and large multi-family projects. o Restricting hours of irrigation to occur between 3:00 a.m. and two hours after sunrise. o Installing irrigation controllers with rain sensors. o Landscaping with native, water-efficient plants. o Installing drip irrigation systems. o Reducing impervious surfaces.	The proposed project would be designed to reduce water consumption. The project would not involve construction of new on-site turf areas or water features. Landscaping and irrigation would be designed to meet the standards of the City Municipal Code and CALGreen building requirements, as well as LEED v4 “Gold” design standards. The proposed project would also be designed to conserve resources and protect water quality through the management of stormwater runoff as part of green infrastructure through low-impact development (LID). This approach implements engineered controls to allow stormwater filtering, storage, and flood control.
Measure 6.2: Provide alternative water resources for irrigation. • Create water policies for the stormwater management strategy that seek to capture storm runoff (e.g., bioswale, rainwater collection, and irrigation programs). • Continue to implement the City’s Water Efficient Landscape Guidelines.	The proposed project would be designed to conserve water resources including controlled stormwater flows through paved areas into designated bioretention areas or storm drains. Portions of roof areas would also be designed as green roofs that would provide filtration. Stormwater received through all proposed roof areas would be routed to the ground level through downspouts and conveyed to bioretention areas. The proposed new office/R&D uses would adhere to LEED, City, and NPDES conservation measures applicable to water conservation, LID, and landscaping requirements.

Consistency with State's 2030 Target and Long-Term Emission Reduction Goal

With the passage of SB 32 (2016), the state adopted a 2030 target to reduce GHG emissions 40 percent below 1990 levels. In addition, the state has a long-term emission reduction goal to reduce emissions 80 percent below 1990 levels by 2050.

Based on CARB's 2017 Scoping Plan, many of the reductions needed to meet the 2030 target will come from state regulations, including cap-and-trade, the requirement for increased renewable energy sources in California's energy supply, updates to Title 24, and increased emission reduction requirements for mobile sources. The project would not impede the implementation of any of these regulations.

Executive Order S-03-05 established the state's long-term goal to reduce GHG emissions 80 percent from 1990 levels by 2050. Executive Order B-55-18 sets a more ambitious state goal of net zero GHG emissions by 2045. Executive orders are not binding on local jurisdictions that lack specific strategies or implementation measures to achieve their goals. Nevertheless, the Executive Orders' goals are based on a report from the Intergovernmental Panel on Climate Change regarding the global emission reductions needed to stabilize the climate and provides the best available lens for examining a project's long-range climate change impacts. Although the project's emissions level in 2045 cannot be reliably quantified, state-wide efforts are underway to facilitate the state's achievement of its 2045 goal. According to a report commissioned by the CEC, four key elements are critical for the state to achieve the 2050 GHG reduction goal in Executive Order S-03-05: (1) aggressive energy efficiency; (2) clean electricity; (3) widespread electrification of passenger vehicles, building heating and industry heating; and (4) large-scale production of low-carbon footprint biofuels to largely replace petroleum-based liquid fuels.[16] The majority of reductions required to meet the 2045 and 2050 goals will come from decarbonizing the state's energy and fuel supplies, which can only be accomplished by state-wide programs outside any individual jurisdiction's control. The project would not impede the state's ability to decarbonize its energy and fuel supplies. Should the state continue to make progress on reducing emissions from the energy sector until it meets the requirement for 100 percent renewable sources by 2045 and as technological advances occur, particularly in vehicles (whose fuel is regulated through the state's cap-and-trade program), it is reasonable to expect the project's emissions profile to decline. In addition, over the project's life, it is reasonable to anticipate certain building systems and fixtures will be upgraded in ways that will reduce its GHG emissions. For these reasons, the project would not impede the state's ability to reach the 2045 or 2050 GHG emission reduction goals.

Cumulative Impact on Climate Change

The analysis of climate change is inherently cumulative. Thus, BAAQMD's CEQA guidelines clearly state that if annual emissions of operational-related GHGs do not exceed established thresholds, then the proposed project would not result in a cumulatively considerable contribution to GHG emissions or a cumulatively significant impact on global climate change. Therefore, as elucidated when addressing other potential impacts, the project emissions would be below the thresholds and would not result in impacts on GHG emissions, nor contribute considerably to significant cumulative impacts on global climate.

[16] University of California, Berkeley and Lawrence Berkeley National Laboratory, Scenarios for Meeting California's 2050 Climate Goals (September 2013).

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4.6 Hydrology and Water Quality

4.6.1 Introduction

Section 4.6, Hydrology and Water Quality, addresses the impacts that the 201 Haskins Way Project (project) would have on water quality, groundwater supplies, stormwater, erosion, and flooding. This section describes the existing hydrology on the project site and in the study area, and presents the baseline conditions against which project impacts are measured. Project-specific impacts are presented for the proposed project and mitigation measures, if any, are identified when feasible. A cumulative impact discussion is identified for each subtopic.

4.6.2 Environmental Setting

EXISTING CONDITIONS

Climate and Topography

The project area is located in a relatively flat area east of U.S. 101, immediately adjacent to the San Francisco Bay (Bay) shoreline, in the City of South San Francisco. The regional climate is typical of the Bay Area and is characterized by dry, mild summers and moist, cool winters. Approximately 80 percent of the total annual precipitation occurs during the months of November through March, and the average annual precipitation is 20.25 inches. Average daily temperatures range from a high of 73.4 degrees Fahrenheit in September to a low of 42.6 degrees Fahrenheit in January.[1]

The project area consists of eight parcels totaling approximately 18.2 acres of land, consisting of six parcels with trucking, warehouse, and distribution uses, one parcel used for parking, and one parcel with existing office/research and development (R&D) use. The surrounding area is largely developed with light industrial manufacturing and distribution, biotechnology, waste collection and recycling service, and open space uses. The majority of the site is hardscaped with a mix of asphalt parking and building structures. The unpaved portions of the site are landscaped or ruderal areas between parcels. The site slopes toward the southwest, with the direction of slope varying across the site. The site elevation ranges from approximately 11 to 25 feet above mean sea level (MSL).

Regional Hydrology

The majority of the project area consists of fill material located east of the historic shoreline along the Bay. As such, the site lacks natural surface drainages. A series of man-made structures provides drainage of surface waters. The largest watershed in the immediate vicinity is the Colma Creek watershed, which includes portions of San Bruno Mountain, as well as urbanized areas of South San Francisco, Daly City, and the City of Colma. Most of this urbanized creek is channelized and/or conveyed underground to allow

[1] Western Regional Climate Center, 2016. Weather Station: San Francisco Intl AP, California (047769). Available online at: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7769. Accessed April 16, 2018.

for urban development. The percent of impervious surface area within the Colma Creek watershed was estimated to be 63 percent, the highest in the County of San Mateo.[2] Colma Creek is a flood control channel maintained by the San Mateo County Department of Public Works that discharges into the Bay just north of the San Francisco International Airport. In addition to the Colma Creek watershed, a series of small watersheds runs along the shoreline in the vicinity of the site.

Groundwater

The California Department of Water Resources (DWR) defines state groundwater basins based on geologic and hydrogeologic conditions. According to the DWR, the site is located within the Westside Groundwater Basin.[3] The Westside Groundwater Basin consists of bedrock and unconsolidated sediments.[4] Aquifer storage coefficients indicate unconfined conditions[5] at depths less than 100 feet and confined conditions[6] at depths in excess of 100 feet.[7] Unconsolidated materials overlying the bedrock comprise the water-bearing formations.[8]

The project site was originally bayward of the historic shoreline and is on reclaimed land.[9] In general, the site is expected to be underlain by approximately 20 to 25 feet of fill.[10] The fill is likely underlain by up to 20 feet of marine clay, known as Bay Mud.[11] Literature indicates there is no Bay Mud in the northern portion of the site; therefore, the Bay Mud thickness likely varies from approximately 0 to 20 feet, becoming thicker generally to the south and southwest.[12] Bay Mud is underlain by silty sand and sand with silt and by sandy clay and clay.[13] Geologic maps indicate that the depth to bedrock varies from approximately 20 to 70 feet below the ground surface (bgs); the depth to bedrock likely increases generally to the south and the southwest.[14] Bedrock was identified in borings drilled south of the site at approximately 64 to 78 feet bgs, although what was identified as bedrock may be very dense sand of the

[2] City of Daly City, 2018. Source Control. Available online at: http://www.dalycity.org/City_Hall/Departments/wwr/Divisions/waste_source.htm#4. Accessed April 16, 2018.

[3] California Department of Water Resources, 2018. Groundwater Information Center Interactive Map Application. Available online at: https://gis.water.ca.gov/app/gicima/. Accessed May 7, 2018.

[4] Phillips, Steven P., Scott N. Hamlin, and Eugene B. Yates, 1993. Geohydrology, Water Quality, and Estimation of Ground-Water Recharge in San Francisco, California, 1987-92, p. 5. US Geological Survey Water-Resources Investigations Report 93-4019.

[5] Unconfined aquifers are those into which water seeps from the ground surface directly above the aquifer.

[6] Confined aquifers are those in which an impermeable dirt/rock layer exists that prevents water from seeping into the aquifer from the ground surface located directly above.

[7] Phillips, Steven P., Scott N. Hamlin, and Eugene B. Yates. 1993. Geohydrology, Water Quality, and Estimation of Ground-Water Recharge in San Francisco, California, 1987-92, p. 11. US Geological Survey Water-Resources Investigations Report 93-4019.

[8] California Department of Water Resources, 2006. California's Groundwater Bulletin 118, San Francisco Bay Hydrologic Region, Westside Groundwater Basin, p. 1. Available online at: http://www.smcsustainability.org/download/energy-water/groundwater/2-35.pdf. Accessed May 7, 2018.

[9] Langan, 2017. Preliminary Geotechnical Evaluation: 201 Haskins Way, South San Francisco, California, Langan Project No.: 750645101, pp. 2 to 3.

[10] Ibid.

[11] Ibid.

[12] Ibid.

[13] Ibid.

[14] Ibid.

Colma formation, which can be cemented.[15] Groundwater was measured at nearby sites at depths varying from approximately 8 to 15 feet bgs.[16]

Site Hydrology

The majority of the project area is currently covered by low permeability surfaces. The existing 201 Haskins site includes an area of compacted gravel that was used for truck storage. Due to the compacted nature of this gravel, significant infiltration likely does not occur. However, as a conservative approach, this area is considered partially pervious for the purpose of stormwater analysis.

Stormwater runoff from the project site is generally directed to the west and south, then flows to the existing 24-inch-diameter storm drain line on East Jamie Court and the existing 48-inch-diameter storm drain line on Haskins Way. Runoff flows south along Haskins Way and into a catch basin, then through an existing approximately 48-inch-diameter outfall pipe before being discharged into the Bay.[17] The outfall pipe is designed to operate throughout a range of high tide conditions in the Bay to prevent flooding near the terminus of the system.

Within the 201 Haskins Way parcel, two existing 12-inch-diameter storm drains are located along the parcel's northern and southern boundaries. These storm drains flow west from the parcel and connect to the existing 48-inch-diameter storm drain line on Haskins Way. One connection from the southern on-site storm drain to the East Jamie Court storm drain is also provided.

The National Wetlands Inventory indicates that there is an unnamed riverine wetland located approximately 100 feet to the east of the project site which runs along the north side of the existing recycling center located southeast of the project site.[18] Stormwater is not directed toward this wetland.

Flooding

The majority of the project area is located outside the 100-year flood hazard zone as delineated by the current Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs).[19] A portion of the southern border of the site, which abuts the Bay waters, is just north of the "VE" zone designation, which defines areas with wave action in the 100-year flood hazard zone.[20]

[15] Ibid.

[16] Ibid.

[17] Personal communication with Carie Jung, South San Francisco Department of Public Works Engineering Division, (650) 877-8550, May 7, 2018.

[18] U.S. Fish and Wildlife Service, National Wetlands Inventory. Available online at: https://www.fws.gov/wetlands/data/Mapper.html. Accessed May 10, 2018.

[19] Federal Emergency Management Agency Flood Insurance Rate Maps, Map Number 06081C0044E.

[20] Federal Emergency Management Agency, FEMA Flood Map Service Center: Search by Address, 2012. Available online at: https://msc.fema.gov/portal/search#searchresultsanchor. Accessed May 7, 2018.

Sea Level Rise

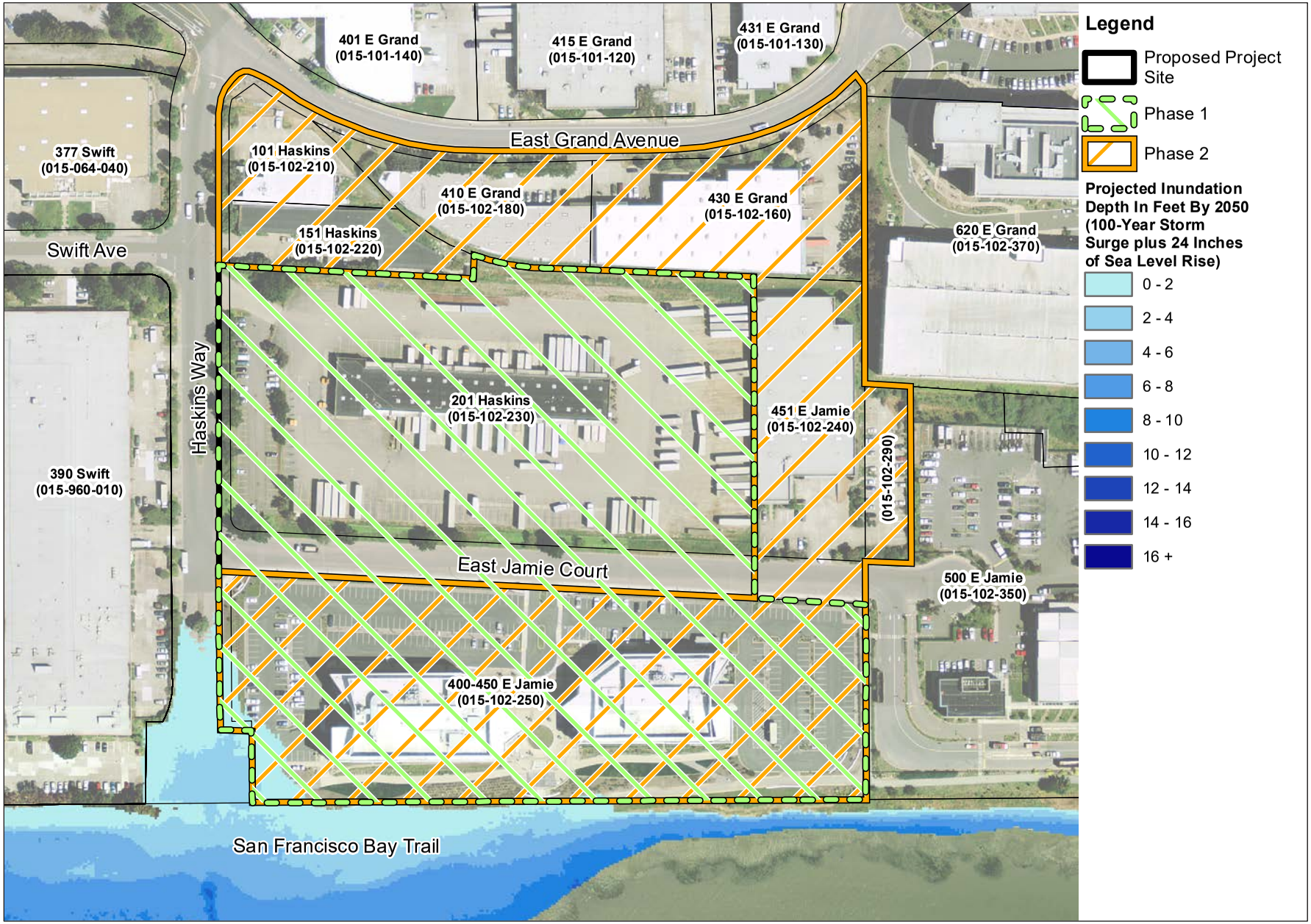
The National Research Council's (NRC) 2012 report, *Sea Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (the NRC Report) provides a scientific review of sea level rise for the West Coast and provides the most recent regional sea level rise predictions for 2030, 2050, and 2100, relative to the year 2000 sea level. In this report, the NRC projects that sea levels in the Bay Area will rise up to 24 inches by 2050 and up to 66 inches by 2100.[21] The extreme limits of the ranges (e.g., 5 to 24 inches for 2050 and 17 to 66 inches for 2100) represent unlikely but possible levels of sea level rise using both low and very high emissions scenarios and, at the high end, including significant land ice melt that was not anticipated at the time of publication but acknowledged as having potential to occur.[22] These projections include the sum of contributions from thermal expansion of seawater, wind-driven components, land ice melting, and vertical land motion.[23]

As of 2015, the California Coastal Commission (CCC) supported the use of the NRC report as the best available current science. The CCC noted that because sea level rise science is continually advancing, future research may enhance the scientific understanding of how the climate is changing, and thus there is a need to regularly update projections.[24] Therefore, for the purposes of conservative analysis, this Environmental Impact Report (EIR) uses the NRC report's highest projected sea level rise scenario. The following scenarios are used in this EIR analysis:

- A sea level rise of 24 inches by 2050
- A sea level rise of 66 inches by 2100

The project site would not be inundated with 24 inches of sea level rise, which is expected in 2050, but the southwestern corner of the project site would be inundated with 66 inches of sea level rise, which is expected in 2100. When the effects of a 100-year storm surge are combined with sea level rises of 24 or 66 inches, the southwestern corner of the project site would be partially inundated by 0 to 2 feet and 0 to 6 feet, respectively, as shown in **Figure 4.6.1: Project Inundation Depth in Feet by 2050** and **Figure 4.6.2: Project Inundation Depth in Feet by 2100**.[25] The areas that would be inundated under the 24-inch projection include landscaping and parking areas, where no structures are proposed.[26] The areas that

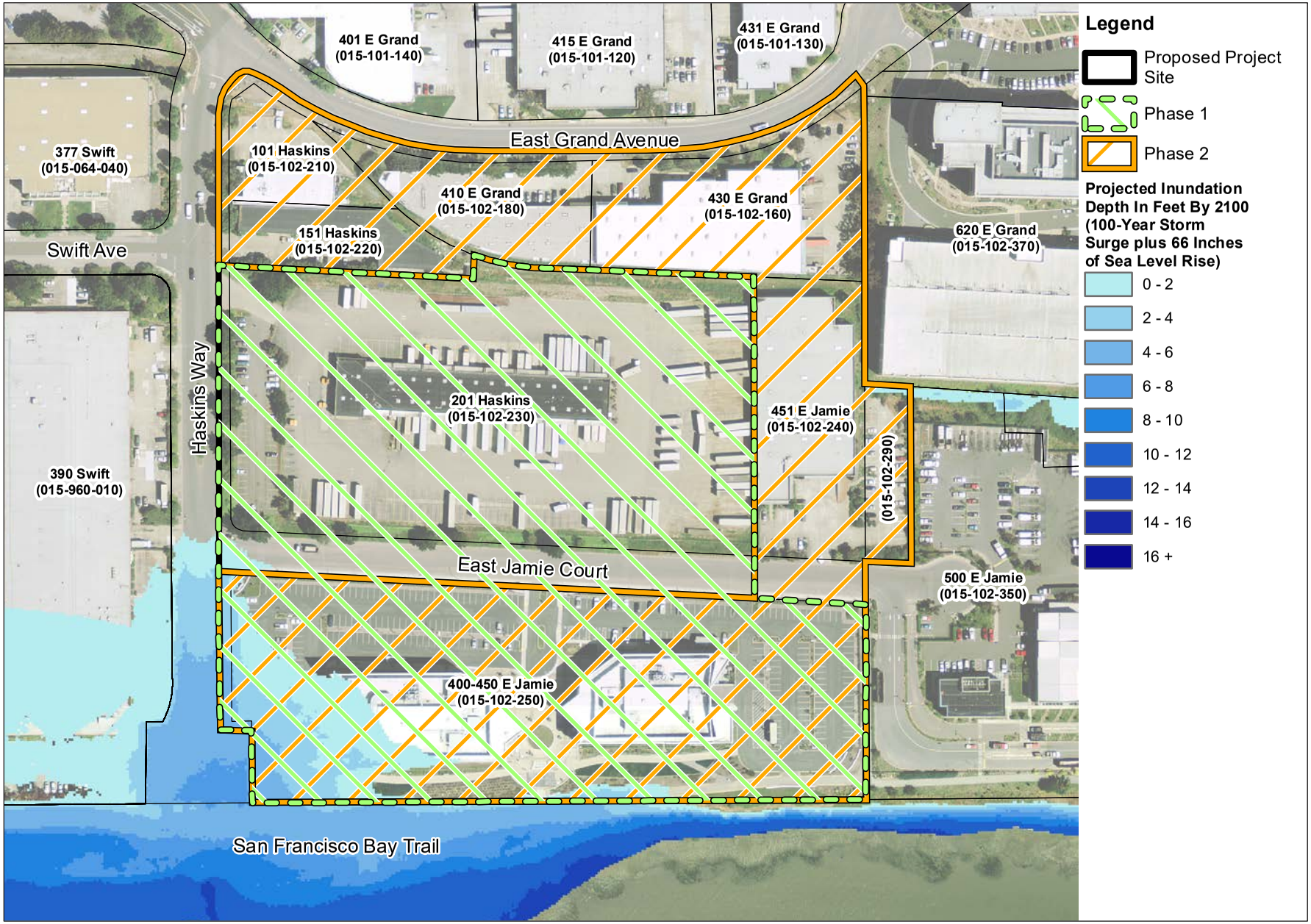
[21] National Research Council, 2012. *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*.
Available online at: http://www.nap.edu/catalog.php?record_id=13389. Accessed April 17, 2018.
[22] Adapting to Rising Tides, Bay Area Sea Level Rise Analysis and Mapping Project, 2017, p. 9. Available online at: http://www.adaptingtorisingtides.org/wp-content/uploads/2016/05/BATA-ART-SLR-Analysis-and-Mapping-Report-Final-20170908.pdf. Accessed May 7, 2018.
[23] Ibid.
[24] California Coastal Commission, 2015. Sea Level Rise Policy Guidance: Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits. Adopted August 12, 2015. Available online at: https://documents.coastal.ca.gov/assets/slr/guidance/August2015/0_Full_Adopted_Sea_Level_Rise_Policy_Guidance.pdf. Accessed May 9, 2018
[25] Adapting to Rising Tides, San Mateo County Sea Level Rise Inundation Scenarios, 2018. Available online at: http://smcmaps.maps.arcgis.com/apps/MapSeries/index.html?appid=51676b57ab5f4446a03ad13a9432986d. Accessed April 17, 2018.
[26] Ibid.



Source: BCDC, Adapting to Rising Tides Bay Area Sea Level Rise Analysis and Mapping Project (2017)

201 HASKINS WAY PROJECT

FIGURE 4.6.1: PROJECTED INUNDATION BY 2050, WITH 24 INCHES OF SEA LEVEL RISE PLUS 100-YEAR STORM SURGE



Source: BCDC, Adapting to Rising Tides Bay Area Sea Level Rise Analysis and Mapping Project (2017)

201 HASKINS WAY PROJECT

FIGURE 4.6.2: PROJECTED INUNDATION BY 2100, WITH 66 INCHES OF SEA LEVEL RISE PLUS 100-YEAR STORM SURGE

would be inundated under the 66-inch projection include landscaping, parking areas, and the southwestern portion of the existing building at 400 East Jamie Court.[27]

4.6.3 Regulatory Framework

This section provides a summary of the plans and policies of the City of South San Francisco (City), and regional, state, and federal agencies that have policy and regulatory control over the project site. These plans and policies include the Clean Water Act (CWA), Executive Order 11988, Porter-Cologne Water Quality Control Act, National Pollutant Discharge Elimination System (NPDES) permit requirements, sea level rise and Executive Order S-13-08, San Mateo Countywide Water Pollution Prevention Program, *San Francisco Bay Water Quality Control Plan*, beneficial uses of surface waters and groundwater, *East of 101 Area Plan*, and City of South San Francisco Water Quality Control Plant NPDES requirements.

FEDERAL

Clean Water Act

The CWA was enacted by Congress in 1972 and amended several times since inception. It is the primary federal law regulating water quality in the United States and forms the basis for several state and local laws throughout the country. Its objective is to reduce or eliminate water pollution in the nation's rivers, streams, lakes, and coastal waters. The CWA prescribed the basic federal laws for regulating discharges of pollutants and set minimum water quality standards for all waters of the U.S. Several mechanisms are used to control domestic, industrial, and agricultural pollution under the CWA.

At the federal level, the CWA is administered by the U.S. Environmental Protection Agency (U.S. EPA). At the state and regional level, the U.S. EPA has delegated administration and enforcement of the CWA in California to the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs). The State of California has developed a number of water quality laws, rules, and regulations, in part to assist in the implementation of the CWA and related federally mandated water quality requirements. In many cases, the federal requirements set minimum standards and policies and the laws, rules, and regulations adopted by the SWRCB and RWQCBs exceed the federal requirements.

Executive Order 11988

Under Executive Order 11988, FEMA is responsible for managing floodplain areas defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a 1 percent or greater chance of flooding in any given year (the 100-year floodplain). FEMA's overall mission is to support citizens and first responders to ensure that the United States builds, sustains, and improves capabilities to prepare for, protect against, respond to, recover from, and mitigate all hazards. With regard to flooding, FEMA provides information, guidance, and regulation associated with flood prevention, mitigation, and response. Under Executive Order 11988, FEMA requires that local governments covered by the federal flood insurance program pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year floodplain. Through its Flood Insurance and

[27] Ibid.

Mitigation Administration, FEMA manages the National Flood Insurance Program, which includes flood insurance, floodplain management, and flood hazard mapping functions. FEMA maps 100-year floodplains within its jurisdiction and provides flood insurance rate information via flood insurance rate maps.

STATE

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act establishes the SWRCB and the RWQCBs as the principal state agencies having primary responsibility for coordinating and controlling water quality in California. The Porter-Cologne Act establishes the responsibility of the RWQCBs for adopting, implementing, and enforcing water quality control plans (Basin Plans), which set forth the state's water quality standards (i.e., beneficial uses of surface waters and groundwater) and the objectives or criteria necessary to protect those beneficial uses. The NPDES permit, described below, must be consistent with the Basin Plan for the site region.

National Pollutant Discharge Elimination System Permit Requirements

Since its enactment in 1972, the CWA has regulated the discharge of pollutants to the waters of the United States from any point source. In 1987, amendments to the CWA added Section 402(p), which established a framework for regulating non-point source stormwater discharges under the NPDES. The Phase I NPDES stormwater program regulates stormwater discharge from industrial facilities, large- and medium-sized municipal separate storm sewer systems (those serving more than 100,000 persons), and construction sites that disturb 5 or more acres of land. Under the program, the Legally Responsible Person (LRP), typically the project applicant, is required to comply with the NPDES permit requirements.

City and town agencies, the San Mateo County Flood Control District, and San Mateo County formed the San Mateo Countywide Water Pollution Prevention Program. These agencies were previously subject to NPDES Permit No. CAS612008 as amended by Order No. R2-2011-0083 to discharge stormwater runoff from storm drains and water courses within their jurisdictions.[28] On November 19, 2015, the RWQCB reissued countywide municipal stormwater permits as one Municipal Regional Stormwater NPDES Permit to regulate stormwater discharges from municipalities and local agencies in Alameda, Contra Costa, San Mateo, and Santa Clara Counties, and the cities of Fairfield, Suisun City, and Vallejo. Provisions of the permit prescribe requirements and schedules for permittees identified therein to manage their discharges that may cause or contribute to violations of water quality standards for pesticides, trash, mercury, polychlorinated biphenyls, and bacteria. In addition, one of the provision goals is for the permittees to use their planning authorities to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address stormwater runoff pollutant discharges and prevent increases in runoff flows from new development and redevelopment projects. This goal is to be accomplished primarily through the implementation of low impact development techniques.

[28] California Regional Water Quality Control Board, San Francisco Bay Region, 2015. Municipal Regional Stormwater NPDES Permit – Order No. R2-2015-0049 (NPDES Permit No. CAS612008).

The NPDES Construction General Permit requirements apply to clearing, grading, and disturbance to the ground such as excavation for construction sites that disturb more than 1 acre of land. The applicant is required to submit a Notice of Intent (NOI) and other documents to the RWQCB using the Storm Water Application Report Tracking System. The NOI includes general information on the types of construction activities that will occur on the site. The applicant is also required to submit a site-specific Stormwater Pollution Prevention Plan (SWPPP) for construction activities. The SWPPP must include a description of Best Management Practices (BMPs) to minimize the discharge of pollutants from the site during construction. It is the responsibility of the LRP to obtain coverage under the permit prior to site construction. An annual report must be submitted to the SWRCB each September 1 until a Notice of Termination is filed.

Sea Level Rise and Executive Order S-13-08

In November 2008, Governor Arnold Schwarzenegger issued Executive Order S-13-08. The order indicates that future potential sea level rise associated with climate change may have a substantial effect on coastal development, and provided for the formation of an independent panel to complete a California Sea Level Rise Assessment Report by December 1, 2010. This panel, the California Adaptation Advisory Panel to the State of California, published the required report in November 2010 titled *Preparing for the Effects of Climate Change – A Strategy for California*.[29] This study noted that the state requested an assessment of defensible sea level projections for the West Coast from the NRC, which was published in 2012. The NRC projections are described above in "Sea Level Rise" on pp. 4.6.4–4.6.7.

REGIONAL

San Mateo Countywide Water Pollution Prevention Program

To comply with the CWA, San Mateo County and the 20 cities and towns in the County formed the San Mateo Countywide Water Pollution Prevention Program, which holds a joint municipal NPDES permit from the San Francisco RWQCB. The permit includes a comprehensive plan to reduce the discharge of pollutants to creeks, the Bay, and the ocean to the extent possible.

San Francisco Bay Water Quality Control Plan (Basin Plan)

The San Francisco RWQCB is responsible for the development, adoption, and implementation of the *Water Quality Control Plan* for the San Francisco Bay region. The Basin Plan is the master policy document that contains descriptions of the legal, technical, and programmatic bases of water quality regulation in the San Francisco Bay region. The Basin Plan identifies beneficial uses of surface waters and groundwater within its region and specifies water quality objectives to maintain the continued beneficial uses of these waters. As identified in the plan, the beneficial uses of groundwater in the Westside Groundwater Basin include municipal and domestic supply, industrial process supply, industrial

[29] California Adaptation Advisory Panel to the State of California, prepared by Pacific Council, 2010. *Preparing for the Effects of Climate Change – A Strategy for California*.

supply, and agricultural supply.[30] Projects are required to adhere to all water quality objectives identified in the Basin Plan.

LOCAL

City of South San Francisco General Plan

The *City of South San Francisco General Plan* (General Plan) contains policies designed to protect people and development from damage associated with flooding. Policies applicable to the project are as follows.

Open Space and Conservation Element: Water Quality

Policy 7.2-G-1: Comply with the San Francisco Bay Regional Water Quality Control Board regulations and standards to maintain and improve the quality of both surface water and groundwater resources.[31]

Policy 7.2-G-2: Enhance the quality of surface water resources and prevent their contamination.[32]

Policy 7.2-G-3: Discourage the use of insecticides, herbicides, or toxic chemical substances within the city.[33]

Policy 7.2-I-1: Continue working with the San Francisco Bay RWQCB in the implementation of the NPDES, and continue participation in STOPPP for the protection of surface water and groundwater quality.

Health and Safety Element: Flooding

Policy 8.2-G-1: Minimize the risk to life and property from flooding in South San Francisco.[34]

Policy 8.2-I-1: Continue working with the Regional Water Quality Control Board (RWQCB) in the implementation of the San Mateo Countywide Stormwater Pollution Prevention Program (STOPP).

Policy 8.2-I-2: Use the City's development review process to ensure that proposed development subject to the 100-year flood provides adequate protection from flood hazards, in areas identified in Figure 8-3.[35]

City of South San Francisco East of 101 Area Plan

The *East of 101 Area Plan* provides design-level planning policies that complement the development standards established under policies of the adopted General Plan. In particular, Policy CON-7, with

[30] San Francisco Regional Water Quality Control Board, Basin Plan, Chapter 2: Beneficial Uses, Table 2-2: Existing and Potential Beneficial Uses in Groundwater in Identified Basins. Available online at: https://www.waterboards.ca.gov/rwqcb2/water_issues/programs/basin_plan/docs/BP_CH2+tables.pdf. Accessed May 8, 2018.
[31] General Plan, Chapter 7, Open Space and Conservation Element, p. 7-12. Available online at: http://www.ssf.net/home/showdocument?id=480. Accessed May 8, 2018.
[32] Ibid.
[33] Ibid.
[34] General Plan, Chapter 8, Health and Safety Element, p. 8-11. Available online at: http://www.ssf.net/home/showdocument?id=472. Accessed May 8, 2018.
[35] General Plan, Chapter 8, Health and Safety Element, p. 8-12. Available online at: http://www.ssf.net/home/showdocument?id=472. Accessed May 8, 2018.

respect to hydrology and water quality, aims to ensure that runoff from development does not adversely affect the biotic values of adjacent wetlands or other habitat areas.[36]

City of South San Francisco Water Quality Control Plant National Pollutant Discharge Elimination System Permit Requirements

The City of South San Francisco Water Quality Control Plant requires source control measures of stormwater pollutants to comply with their NPDES permit, including methods for managing pollutant sources. Applicable control measures include utilization of stormwater pollution prevention devices, management of refuse areas, management of pesticide/fertilizer application for landscaping, use of treatment devices for interior-level parking garage flood drains, and marking of on-site storm drains.[37]

4.6.4 Impacts and Mitigation Measures

This section describes the impact analysis related to hydrology and water quality for the proposed project. This section also describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of any identified significant impacts.

SIGNIFICANCE CRITERIA

Per the CEQA Guidelines, Appendix G, a hydrology and water quality impact is considered significant if project implementation would result in one or more of the following:

a. Violate any water quality standards or waste discharge requirements;

b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);

c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;

d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantially additional sources of polluted runoff;

f. Otherwise substantially degrade water quality;

[36] City of South San Francisco, 1994. *East of 101 Area Plan*, pp. 45-46. Available online at: http://www.ssf.net/home/showdocument?id=508. Accessed April 17, 2018.

[37] San Francisco Regional Water Quality Control Board, 2014. Order No. R2-2014-0012, NPDES No. CA0038130. Available online at: https://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2014/R2-2014-0012.pdf. Accessed April 17, 2018.

g. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

h. Place within 100-year flood hazard area structures which would impeded or redirect flood flows;

i. Expose people or structures to a significant risk or loss, injury, or death involving flooding, including flooding as a result of failure of a levee or dam; or

j. Inundation by seiche, tsunami, or mudflow.

APPROACH TO ANALYSIS

Construction of the proposed project does not include housing and therefore would not place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. Therefore, criterion (f) does not apply to the proposed project and is not discussed further under "Impact Evaluation."

This analysis evaluates the project's potential effects related to hydrology and water quality. Water quality impacts are assessed with respect to the potential for the project to result in an exceedance of water quality criteria or an exceedance of waste discharge requirements, including NPDES permit effluent limitations. In addition, the impact analysis assesses potential impacts related to groundwater depletion and recharge as well as changes in stormwater flows and flooding (including flooding as a result of 100-year flooding under existing conditions, future flooding as a result of sea level rise, and flooding as a result of a tsunami). The impact analysis assumes that all construction and operations would be completed in compliance with applicable NPDES regulations and City permit requirements, including sewer and storm drain systems or a discharge to surface waters (i.e., the Bay). If compliance with these standards would ensure that impacts related to water quality would be less than significant, then no mitigation is necessary.

Sea level rise is analyzed in relation to other natural phenomena that contribute to the risk of flooding. Several factors must be considered in evaluating flooding risk at the project site. These include stormwater, tides, waves, seiche, and tsunami. In the analysis of impacts, the impact of the proposed project is first discussed in relation to these events without assuming future sea level rise. In combination with these tsunami, seiche, and storm surge events, future potential climate-induced sea level rise could pose risks of inundation to existing and proposed development located in low-lying areas close to the Bay such as the project site.

The science of estimating sea level rise continues through a process of refinement. The rate of potential future sea level rise is difficult to project, and estimates vary substantially among numerous scientific studies available on climate change and sea level rise. The analysis considers whether people or structures on the project site could be exposed to a significant risk of loss, injury, or death involving flooding as a result of sea level rise in combination with storm surge and extreme tides. The impact is considered less than significant if the project would not be inundated during a 100-year coastal flood within the life of the project, or if the project would conform to flood-resistant building standards and be capable of adapting to future flood hazard conditions. The analysis presented here is based on the best available science-based projections for sea level rise, which are described above in "Sea Level Rise" on pp. 4.6.4–4.6.7.

IMPACT EVALUATION

Water Quality Standards or Waste Discharge Requirements

Potential sources of pollutants include groundwater that is in contact with landfill waste material (leachate) and traditional non-point source pollutants. Non-point source pollutants are washed by rainwater from roofs, landscape areas, and streets and parking areas into the drainage network. Anticipated and potential non-point source pollutants for development and redevelopment activities are listed in **Table 4.6.1: Anticipated and Potential Pollutants Generated by Land Use Type**. Parking lots/structures and commercial/industrial development at the site may generate some of these classes of pollutants.

Impact HY-1: Construction activities and operation of the proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality. ***(Less than Significant)***

Phase 1 and Project Buildout

WATER QUALITY EFFECTS OF CONSTRUCTION ACTIVITIES

Grading and earthmoving for the installation of utilities and infrastructure, demolition of existing buildings, and construction of new buildings and structures would expose soil during construction.

Without proper controls, these activities could result in erosion, with potential chemicals and sediments carried in stormwater runoff. Stormwater runoff from temporary on-site use and storage of vehicles, fuels, wastes, and building materials could also carry pollutants if these materials were improperly handled. These sediments and pollutants, if discharged to the Bay, would degrade water quality.

However, the CWA effectively prohibits discharges of stormwater from construction projects unless the discharge is in compliance with an NPDES permit. During construction, stormwater from the project site would drain to the existing storm drains on East Jamie Court and Haskins Way and into an existing catch basin to an outfall pipe that discharges into the Bay. Stormwater would not be directed to the unnamed riverine wetland to the east of the project site. Construction-related stormwater discharges to the stormwater conveyance system would occur in accordance with the NPDES Construction General Stormwater Permit.

Under the Construction General Stormwater Permit, construction activities that would drain to the storm drain system would be characterized by the level of risk to water quality, as determined by using a combination of the sediment risk of the project and the receiving water quality risk. Projects can be characterized as Risk Level 1, Level 2, or Level 3, and the minimum BMPs and monitoring that must be implemented during construction are based on the risk level. The BMPs are designed to prevent pollutants from coming into contact with stormwater and to keep all products of erosion and stormwater pollutants from moving off site into receiving waters. The BMPs are specified in a SWPPP that must be prepared by a Qualified SWPPP Developer (QSD) and submitted to the San Francisco RWQCB before construction begins. Construction activities under the project would not be characterized as Risk Level 3, because the

Table 4.6.1. Anticipated and Potential Pollutants Generated by Land Use Type

Priority Project Categories	Pathogens	Heavy Metals	Nutrients	Pesticides	Organic Compounds	Sediments	Trash and Debris	Oxygen Demanding Substances	Oil and Grease
Commercial/Industrial Development >100,000 square feet	P(1)		P(2)	P(3)	P(4)	P(2)	X	P(3)	X
Parking Lots		X	P(2)	P(4)		P(2)	X	P(3)	X

Notes:

X = anticipated

P = potential

(1) A potential pollutant if land use involves food or animal waste products.

(2) A potential pollutant if landscaping exists on site.

(3) Including solvents.

(4) A potential pollutant if the project includes uncovered parking areas.

Source: California Stormwater Quality Association; Stormwater Best Management Practice Handbook, New Development and Redevelopment; 2003; p. 2-7. Available online at: https://www.casqa.org/sites/default/files/BMPHandbooks/BMP_NewDevRedev_Complete.pdf.

Lower San Francisco Bay is not considered a sediment-sensitive water body under the Construction General Stormwater Permit.[38]

For construction activities characterized as Risk Level 1, the Construction General Stormwater Permit specifies minimum BMPs to be implemented that address good housekeeping practices (including those for managing hazardous materials used during construction), non-stormwater management, erosion and sediment control, and run-on and runoff control. A qualified professional must inspect the required BMPs weekly when there is no rain and daily during a qualifying rainstorm. For construction activities characterized as Risk Level 2, the minimum requirements identified for Risk Level 1 apply in addition to more stringent requirements. For instance, erosion controls must be implemented in conjunction with sediment controls in active construction areas, and linear sediment controls such as silt fences, gravel bag berms, or fiber rolls must be used along slopes. In addition, a QSD must prepare a rain event action plan for Risk Level 2 construction activities. This plan would identify the designated site stormwater manager, the provider of erosion and sediment controls, and the stormwater sampling agent, as well as the types of construction workers active at the site during all construction phases. The plan would include suggested actions for each construction phase.

Compliance with the Construction General Stormwater Permit would ensure that water quality impacts related to violation of water quality standards or degradation of water quality due to discharge of construction-related stormwater runoff to the Bay, either directly or via the storm drain system, would be less than significant. No mitigation is necessary.

WATER QUALITY EFFECTS OF GROUNDWATER DEWATERING

Groundwater was measured at nearby sites at depths varying from approximately 8 to 15 feet bgs.[39] The project site is underlain by approximately 20 to 25 feet of fill in addition to approximately 0 to 20 feet of Bay Mud. Bedrock on the project site is estimated at depths between 20 and 78 feet. Therefore, foundations may also require auguring or drilling to a maximum depth of approximately 78 feet bgs. In addition, excavation on the site up to 13 feet would be required for the potential removal of the former underground storage tank hot spot area. Based on the depth of these ground-disturbing activities, construction-related groundwater dewatering may be required.

In the event that groundwater is encountered during construction, the discharge of groundwater produced during dewatering would be either directly discharged to the sewer system or treated on site and discharged to the storm drain system that leads to the Bay. If discharged to the sewer system, groundwater discharges would be subject to Title 14 Water and Sewage, Chapter 14.08.210 Water Quality Control, which regulates the quantity and quality of discharges to the sewer system. In accordance with Section 14.08.100, the discharger would be required to obtain a permit for the discharges and the permit would contain appropriate discharge standards. The permit may also require installation of meters to measure the

[38] California Department of Transportation, 2018. Water Quality Planning Tool. Available online at: http://svctenvims.dot.ca.gov/wqpt/wqpt.aspx. Accessed April 17, 2018.

[39] Langan, 2017. *Preliminary Geotechnical Evaluation: 201 Haskins Way, South San Francisco, California*, Langan Project No.: 750645101, p. 3.

volume of the discharge. The groundwater could contain contaminants related to past site activities, as well as sediment and suspended solids, but would be required to be treated as necessary to meet the discharge limitations. Treatment could include methods such as using settling tanks to remove sediments, filters to remove suspended solids, and other methods to meet chemical-specific discharge limitations. The chemical-specific treatment method used would depend on the chemicals that exceed the specified discharge limitation, but could include methods such as filtration or activated carbon treatment to reduce chemical concentrations as necessary to meet permit requirements prior to discharge.

If discharged directly to the storm drain system, the groundwater discharges could be subject to permitting requirements of the RWQCB under the Volatile Organic Compound (VOC) and Fuel General Permit if the groundwater is polluted by VOC, fuel, or fuel additives.[40] These permits specify water quality criteria and monitoring requirements for discharges of extracted groundwater. Accordingly, under this option, the project sponsors would be required to submit an NOI to the RWQCB describing the proposed discharge and treatment system. The RWQCB must issue an Authorization to Discharge once it is determined that the discharger is eligible to discharge under the permit. The contractors would install an on-site treatment system, as needed, to comply with the effluent limitations of the applicable discharge permit. The treated water would likely be discharged through a temporary discharge structure, and regular influent and effluent water quality monitoring would be conducted to demonstrate permit compliance. Alternatively, an individual NPDES permit from the RWQCB would be required and would impose similar requirements.

With discharge to the sewer system or the Bay in accordance with the regulatory requirements, water quality impacts related to a violation of water quality standards or degradation of water quality due to discharge of groundwater produced during construction-related dewatering would be less than significant, and no mitigation is necessary.

Operation

During operation of the proposed project, no ground-disturbing activities would occur and no activities would cause polluted discharges to surface waters. Under both phases of development (including the conceptual Phase 2 development plan), the proposed project would be designed to protect water quality through the management of stormwater runoff as part of green infrastructure through low-impact development (LID). This approach implements engineered controls to allow stormwater, filtering, and storage and flood control. Controlled stormwater would flow through paved areas into designated bioretention areas or storm drains. Portions of roof areas would also be designed as green roofs that would provide filtration. Stormwater received through all proposed roof areas would be routed to the ground level through downspouts and conveyed to bioretention areas. The bioretention areas would be designed to allow water to evaporate, and provide pre-treatment of pollutants such as trash, debris, and larger sediments, as well as filtration of other pollutants. After collection, filtered stormwater would be allowed to infiltrate into groundwater or to storm drainage conveyances. Because of the presence of shallow

[40] San Francisco Bay Regional Water Quality Control Board, 2018. VOC and Fuel General Permits. Available online at: https://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2012/R2-2012-0012.pdf. Accessed May 8, 2018.

bedrock and the influence of Bay waters and subsurface Bay Mud, it is unlikely that the existing project site provides substantial groundwater infiltration from stormwater. Nonetheless, the BMPs specified in a SWPPP would balance the rate of stormwater flows and impervious surfaces against the existing site conditions.

For these reasons, operation of the proposed project would have a less-than-significant impact related to water quality, and no mitigation is necessary.

Groundwater Depletion and Recharge

Impact HY-2: The proposed project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. ***(Less than Significant)***

The project site is located within the Westside Groundwater Basin. Implementation of the project would not result in depletion of groundwater resources in the Westside Groundwater Basin because, other than possible pumping of groundwater during construction dewatering, the project would not involve the use or extraction of groundwater. Rather, potable water for the project would be provided via pipe by the California Water Service Company, which purchases most of its water from the San Francisco Water Department. In addition, non-potable supplies from on-site sources (e.g., captured rainwater) would supplement the municipal water used for on-site landscaping. The effects of construction dewatering on the groundwater basin supplies would be minimal.

As stated in Impact HY-1, above, it is unlikely that the existing project site provides substantial groundwater infiltration from surface stormwater due to the presence of shallow bedrock and the influence of Bay waters and subsurface Bay Mud. Furthermore, the existing site consists of primarily impervious surfaces. The existing 201 Haskins site includes an area of compacted gravel that was used for truck storage. Due to the compacted nature of this gravel, significant infiltration likely does not occur. However, as a conservative approach, this area is considered partially pervious for the purpose of stormwater analysis. When this existing area is considered pervious, there may be a net increase in impervious area with the proposed project.

Under NPDES permitting requirements, both Phase 1 and buildout of the proposed project would be required to replicate the pre-project stormwater water balance for the smallest storms up to the 85th percentile storm event, or the smallest storm event that generates runoff, whichever is larger.[41] As discussed in Impact HY-1, above, Phase 1 and project buildout would direct stormwater flows to designated bioretention areas or storm drains. After collection, filtered stormwater would be allowed to infiltrate into groundwater or to storm drainage conveyances. Because infiltration of stormwater may not be feasible due the presence of shallow bedrock and Bay Mud, the BMPs specified in a SWPPP would balance the rate of stormwater flows and impervious surfaces against the existing site conditions.

[41] California State Water Resources Control Board, 2012. Order 2009-0009-DWQ Construction General Stormwater Permit as amended by 2010-0014-DWQ and 2012-0006-DWQ, Fact Sheet p. 41. Available online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml. Accessed August 27, 2018.

For these reasons, the project would not interfere substantially with groundwater recharge as a result of increased impervious surfaces and would not decrease the amount of rainwater recharged to the groundwater at the project site.

For the reasons stated above, impacts related to depletion of groundwater resources and interference with groundwater recharge would be less than significant, and no mitigation is necessary.

Alteration of Drainage

Impact HY-3: Construction of the proposed project would not substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on or off site, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site. ***(Less than Significant)***

The project site does not include any existing streams or watercourses that could be altered or diverted. Therefore, the proposed project would have no impact related to alteration of drainage patterns by altering the course of a stream in a manner that would cause erosion or flooding on- or off-site.

The proposed project would not involve construction of new unprotected drainage areas that could produce erosion or siltation during a storm. As discussed in Impact HY-1, above, Phase 1 and project buildout would be designed to control stormwater flows to designated engineered bioretention areas or storm drains. The proposed bioretention areas would also provide pre-treatment and filtration of sediments. Therefore, the proposed project would not alter the site drainage in a manner which would result in substantial erosion or siltation off site.

Under the project, stormwater would continue to be routed to groundwater or the existing storm drains on East Jamie Street and Haskins Way. As stated in Impact HY-2, above, both Phase 1 and buildout of the proposed project would be required to replicate the pre-project stormwater water balance under NPDES permitting requirements. The project would comply with all applicable BMPs and Conditions of Approval regarding stormwater drainage and surface runoff detention measures, and therefore the amount of surface runoff would not increase.

Therefore, neither alteration of existing drainage patterns at the project site nor changes in stormwater runoff rates or volumes would result in substantial erosion, siltation, or flooding on- or off-site, and this impact would be less than significant. No mitigation is necessary.

Changes in Stormwater Runoff

Impact HY-4: The proposed project would not create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. ***(Less than Significant)***

As stated in Impact HY-1, above, both Phase 1 and buildout of the proposed project would be required to replicate the pre-project stormwater water balance for the smallest storms up to the 85th percentile storm event, or the smallest storm event that generates runoff, whichever is larger. Therefore, the project would not create or contribute new runoff water that would exceed the capacity of the existing stormwater

drainage systems because neither Phase 1 nor buildout of the proposed project (including the conceptual Phase 2 development plan) would substantially increase stormwater runoff discharged from the site. Therefore, water quality effects related to exceeding the capacity of the storm drain system would be less than significant, and no mitigation is necessary.

Discharges of stormwater to the stormwater system during construction would not provide an additional source of polluted runoff because all discharges would be in accordance with the NPDES Construction General Stormwater Permit. Implementation of source control BMPs would reduce potential pollutant loads in the stormwater runoff and would improve the quality of the runoff to the sewer system or separate stormwater system. Source control measures would include covering and hydraulically isolating pollutant-generating activities, implementing maintenance activities such as regular sweeping of exposed areas, and using non-polluting building and maintenance materials. Treatment BMPs would further reduce pollutant loads in stormwater via infiltration (e.g., permeable pavement or infiltration basins or trenches), bioretention (e.g., flow through planter or rain garden), or biofiltration (e.g., vegetated areas; media, sand, or vegetated rock filters; use of swirl separators, water quality inlets, or drain inserts). One or more treatment BMPs may be required to address each of the potential stormwater pollutants of concern.

As stated in Impact HY-1, above, both Phase 1 and buildout of the proposed project would be required to protect water quality through the LID stormwater management with engineered controls to allow stormwater filtering. The proposed bioretention areas are designed to provide pre-treatment of pollutants prior to infiltration into groundwater or to conveyance to storm drainages. The proposed new office/R&D uses constructed under Phase 1 and project buildout would also adhere to Leadership in Energy and Environmental Design, City, and NPDES conservation measures applicable to LID and landscaping requirements.[42] Although infiltration of stormwater is also an allowable method of stormwater management, it is unlikely that infiltration is a feasible approach for the project site because of the presence of shallow bedrock and Bay Mud. However, selection of the appropriate BMPs would be guided by existing site conditions, design and development goals, and the pollutants of concern at the site.

With implementation of the source control and treatment BMPs in accordance with the Construction General Stormwater Permit, both Phase 1 and project buildout of the proposed project would not provide an additional source of stormwater pollutants, and this impact would be less than significant. No mitigation is necessary.

Flooding

Impact HY-5: Operation of the proposed project would not place structures within a future 100-year flood zone that would impede or redirect flood flows, nor would it expose of people or structures to a significant risk or loss, injury, or death involving flooding. ***(Less than Significant)***

The project site is located in a low-lying area adjacent to the Bay shoreline. There are no dammed surface waters (rivers or lakes) or levees in the East of 101 Area. The project site is not located downstream of a

[42] Phase 2 development is conceptual at this time and is subject to future site-specific site plan review. Phase 2 office/R&D uses are assumed to be developed according to the same LID standards as Phase 1 design, if not better, as future technologies improve and regulations are developed.

dammed surface water, nor is it located in a potential floodway of any levee or dam. Therefore, there would be no impact associated with the exposure of people or structures to a significant risk or loss, injury, or death involving flooding as a result of failure of a levee or dam.

The project site is located outside of the 100-year flood hazard zone as determined by FEMA, and the proposed project would not expose people or structures to a significant risk or loss, injury, or death involving coastal flooding due to the existing 100-year flood hazard zone. However, the City recognizes that sea level rise is a local issue of concern. The effects of sea level rise on the proposed project are not subject to CEQA review.[43] However, for informational purposes, the EIR provides information on sea level rise that may be used for planning purposes. As described above in "Existing Conditions" on pp. 4.6.4 to 4.6.7, when the effects of a 100-year storm surge are combined with sea level rises of 24 inches (anticipated by 2050) or 66 inches (anticipated by 2100), the southwestern corner of the project site would be partially inundated by 0 to 2 feet and 0 to 6 feet, respectively, as shown in Figure 4.6.1 and Figure 4.6.2.[44]

The areas that would be inundated under the 24-inch projection in 2050 include landscaping and parking areas on the 400-450 East Jamie Court parcel.[45] No Phase 1 development is planned in this area. Further, it is unlikely that project buildout associated with Phase 2 would occur in the inundation areas, since the majority of that anticipated flooded area either lies within the 10-foot street-facing setback or is located within the access way into the existing building garage. The areas that would be inundated under the 66-inch projection in 2100 include landscaping, parking areas, and the southwestern portion of the existing building at 400 East Jamie Court.[46] The proposed Phase 1 office/R&D uses at the 25,000-square-foot building addition at 400 East Jamie Court would be outside the effects of a 100-year storm surge in combination with projected sea level rise. Similarly, it is unlikely that project buildout associated with Phase 2 would occur in the inundation areas, since the majority of that anticipated flooded area either lies within the 10-foot street-facing setback or is located within the access way into the existing building garage. Since no new buildings are anticipated to be placed in areas subject to flooding, construction of the project would not impede or redirect flood flows.

Inundation

Impact HY-6: The proposed project would not expose people or structures to substantial risk of loss, injury, or death due to inundation by seiche, tsunami, or mudflow. ***(Less than Significant)***

A seiche is a tide-like rise and drop of the surface of a landlocked body of water (e.g., a lake); its period can vary from a few minutes to several hours. The site is not located in close proximity to a landlocked body of water that could cause inundation by seiche. The site is also nearly level and not bordered by hills

[43] California Building Industry Association v. Bay Area Air Quality Management District (December 17, 2015, Case No. S213478) and Ballona Wetlands Land Trust v. City of Los Angeles (2011) 201 Cal.App.4th 455.
[44] Adapting to Rising Tides, San Mateo County Sea Level Rise Inundation Scenarios, 2018. Available online at: http://smcmaps.maps.arcgis.com/apps/MapSeries/index.html?appid=51676b57ab5f4446a03ad13a9432986d. Accessed April 17, 2018.
[45] Ibid.
[46] Ibid.

that could result in mudflow across the site. Consequently, there would be no impact related to seiche or mudflow.

Tsunamis, or tidal waves, are huge sea waves that are caused by seismic activity or other disturbance of the ocean floor. Portions of South San Francisco that are near the Bay and low-lying areas are considered to be at risk for inundation by tsunami wave run-up. Wave run-up is estimated at 4.3 feet MSL for tsunami with a 100-year recurrence and 6.0 feet MSL for a 500-year tsunami.[47] The southern portion of the project site immediately borders the Bay waters; however, the project site elevation ranges from 10 to 25 feet MSL, which is higher than tsunami wave run-up inundation areas. In addition, the shoreline of the project area is protected by rip-rap to prevent damage to the shoreline by wave run-up. Consequently, this impact would be less than significant with no mitigation required.

Cumulative

Impact C-HY-1: The proposed project would not make a cumulatively considerable contribution to significant cumulative impacts related to hydrology and water quality. ***(Less than Significant)***

Assuming concurrent implementation of the project with other reasonably foreseeable probable future projects in the vicinity, adverse cumulative effects on hydrology and water quality could include construction impacts related to increases in stormwater runoff and pollutant loading to the Bay. Each of the cumulative projects listed in Section 4.1.5, Approach to Cumulative Analysis, pp. 4.1.7–4.1.9, would occur on similar paved, in-fill sites. The nearest cumulative project is greater than 0.25 mile away and would not directly impact localized flood conditions. The project and other future projects in the City would be required to comply with the Construction General Permit to control runoff and regulate water quality at each development site. New projects would be required to demonstrate that stormwater volumes could be managed by downstream conveyance features and would not induce flooding. Therefore, no significant cumulative impact on hydrology and water quality would occur and the proposed project would not contribute considerably to any significant cumulative impacts in combination with other foreseeable projects. The impact would be less than significant. No mitigation is necessary.

[47] General Plan: Health and Safety Element, p. 8-6 to 78-7. Available online at: http://www.ssf.net/home/showdocument?id=472. Accessed April 17, 2018.

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4.7 Land Use and Planning

4.7.1 Introduction

Section 4.7, Land Use and Planning, addresses the impacts that land use changes related to the 201 Haskins Way Project (project) would have on the existing land uses in the project vicinity and applicable local and state plans and policies. Project-specific impacts are presented below. A discussion of cumulative impacts is also provided.

4.7.2 Environmental Setting

PROJECT VICINITY

The City of South San Francisco is generally composed of industrial uses in its eastern and southeastern portions and single-family homes to the north and west. The City encompasses 4,298 acres.[1] The project site is located in a light industrial and research and development (R&D) area of the City's East of 101 Area.

There are several existing light industrial manufacturing and distribution uses, generally containing one- to two-story buildings, west of Haskins Way and west of the project site. To the north and northwest, the land use shifts from industrial uses to biotechnology uses, most dominantly the Genentech campus north of East Grand Avenue. The Genentech campus creates a shift in land use to three- to- six-story office and R&D buildings, plus additional amenities such as a five-story parking garage, retail uses, and child care. To the east of the project site are the South San Francisco Scavenger Company and Blue Line Transfer buildings, which provide waste collection and recycling service uses. To the south, the existing industrial development meets the San Francisco Bay Trail (Bay Trail) and the San Francisco Bay (Bay) shoreline.

PROJECT SITE

The project site is generally bounded by East Grand Avenue to the north, Haskins Way to the west, the Bay Trail and shoreline to the south, and adjacent parcels containing a recycling center and portions of the Genentech campus to the east. The project site is served by East Grand Avenue as the primary arterial, fed by Haskins Way running north to south and East Jamie Court running east to west.

Phase 1 Area

The Phase 1 area includes two parcels: the 6.45-acre 201 Haskins Way parcel (Assessor's Parcel Number [APN] 015-102-230) located on the north side of East Jamie Court, which contains a one-story terminal building previously occupied by a light industrial trucking terminal use, and the 6.13-acre 400-450 East Jamie Court parcel (APN 015-102-250), which is currently occupied by two three-story office/R&D buildings.

[1] City of South San Francisco, 1999. *City of South San Francisco General Plan* (General Plan), as amended in 2011, Chapter 2, p. 2-3. Available online at: http://www.ssf.net/departments/economic-community-development/planning-division/general-plan. Accessed May 10, 2018.

Phase 2 Area

The Phase 2 area includes the 400-450 East Jamie Court parcel (APN 015-102-250, also part of the Phase 1 area), plus six additional parcels: 101 and 151 Haskins Way, 410 and 430 East Grand Avenue (APNs 015-102-210, 015-102-220, 015-102-180, 105-102-160), and 451 East Jamie Court (APNs 015-102-240 and 015-102-290). Five of the six parcels each contain one- to two-story light industrial buildings, and the sixth contains a parking lot.

EXISTING LAND USE DESIGNATIONS

The project site is identified in the *City of South San Francisco General Plan* (General Plan) as a mixed Coastal Commercial/Mixed Industrial (CC/MI) district, with the exception of one parcel in the Phase 2 area (APN 015-102-290), which is designated as Coastal Commercial (CC) only.[2,3] The existing General Plan land use and zoning designations of the project site and surrounding parcels are illustrated in Figure 2.3: Existing General Plan Land Use and Zoning Designations, in Chapter 3, Project Description, p. 3.9. The *East of 101 Area Plan* designates the entire project site as mixed Light Industrial. The General Plan land use designations supersede the land use designations of the *East of 101 Area Plan*.

The existing zoning designations of the project site and surrounding parcels are illustrated in Figure 3.3: Existing General Plan and Zoning Designations, in Chapter 3, Project Description, p. 3.9. The 101, 151, and 201 Haskins Way parcels; the 410 and 430 East Grand Avenue parcels; the 451 East Jamie Court parcel; and the adjacent parcel (APN 015-102-290) are zoned Mixed Industrial (MI).[4,5] The 400-450 East Jamie Court parcel is zoned Business Commercial (BC).

4.7.3 Regulatory Framework

This discussion provides a summary of the plans and policies of the City of South San Francisco (City), as well as those of the regional agencies that have policy and regulatory control over the project site. There are no state or federal agencies with land use plans or policies applicable to the proposed project.

REGIONAL

Comprehensive Airport Land Use Compatibility Plan

State law requires Airport Land Use Commissions (ALUCs) to prepare and adopt an Airport Land Use Compatibility Plan (ALUCP) for each public use and military airport within their jurisdiction. Further, ALUCs are required to review the plans, regulations, and other actions of local agencies and airport operators within each Commission's jurisdiction. The San Francisco International Airport (SFO) is

[2] General Plan, pp. 2-22 and 2-25.

[3] City of South San Francisco, 2018. Plans and Policy Documents - General Plan Map (website). Available online at: http://www.ssf.net/departments/economic-community-development/planning-division/planning-documents/approved-policy-documents. Accessed May 10, 2018.

[4] City of South San Francisco Zoning Ordinance §20.110.003.

[5] City of South San Francisco, 2018. Interactive Zoning Ordinance Map (website). Available online at: http://zoning.ssf.net/. Accessed May 10, 2018.

located 1 mile south of the project site. Based on state law and guidance provided in the *California Airport Land Use Planning Handbook*, the *2012 Comprehensive Airport Land Use Compatibility Plan* prepared for the San Francisco Airport (2012 SFO ALUCP) has four primary areas of concern[6]:

- **Aircraft Noise Impact Reduction** – To reduce the potential number of future airport area residents who could be exposed to noise impacts from airport and aircraft operations.
- **Safety of Persons on the Ground and in Aircraft in Flight** – To minimize the potential number of future residents and land use occupants exposed to hazards related to aircraft operations and accidents.
- **Height Restrictions/Airspace Protection** – To protect the navigable airspace around the Airport for the safe and efficient operation of aircraft in flight.
- **Overflight Notification** – To establish an area within which aircraft flights to and from the Airport occur frequently enough and at a low enough altitude to be noticeable by sensitive residents. Within this area, real estate disclosure notices shall be required, pursuant to state law.

The 2012 SFO ALUCP contains airport/land use compatibility policies and criteria that apply to all land uses except those considered as existing land uses. Airport land use commissions were given authority to:
(1) specify how land near airports is to be used, based on safety and noise compatibility considerations;
(2) develop height restrictions for new development to protect airspace in the vicinity of the airport; and
(3) establish construction standards for new buildings near airports, including sound insulation requirements.

After an ALUC has adopted its ALUCP, affected local governments must update their general plans, specific plans, and land use regulations to be consistent with the ALUCP. Even if the local government has amended its plans to be consistent with the ALUCP, it must still submit proposed new and amended general plans, specific plans, land use ordinances (including rezoning), regulations, and facility master plans to the ALUC for review. The City/County Association of Governments of San Mateo County (C/CAG) ALUC reviews local land use policy actions and administrates consistency review and submits recommendations to the C/CAG Commission.

Code of Federal Regulations Part 77

The 2012 SFO ALUCP incorporates the provisions in Title 14 of the Code of Federal Regulations (CFR) Part 77, "Objects Affecting Navigable Airspace," as amended, to establish height restrictions and federal notification requirements related to proposed development within the 14 CFR Part 77 airspace boundaries.[7] The regulations contain three key elements: (1) standards for determining obstructions in the navigable airspace and designation of imaginary surfaces for airspace protection; (2) requirements for project sponsors to provide notice to the Federal Aviation Administration (FAA) of certain proposed construction or alteration of structures that may affect the navigable airspace; and (3) the initiation of aeronautical studies, by the FAA, to determine the potential effect(s), if any, of proposed construction or alterations of structures on the subject airspace.

[6] City/County Association of Governments of San Mateo County, 2012. *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport* (2012 SFO ALUCP). Available online at: http://ccag.ca.gov/plansreportslibrary/airport-land-use/. Accessed May 10, 2018.
[7] Code of Federal Regulations, Title 14, Chapter I, Subchapter E, Part 77.

As identified in the 2012 SFO ALUCP, the project site is located within the Federal Aviation Regulation Part 77 sphere of influence, which is the boundary established to regulate obstructions to airspace navigation, including building heights.[8] The City is located inside the 14 CFR Part 77 horizontal, conical, primary, approach, and transitional imaginary surface contour areas. The parcels for the proposed project are located within the horizontal surface contour area.

San Francisco Bay Plan

The San Francisco Bay Conservation and Development Commission (BCDC), created by the McAteer-Petris Act, functions as the state's coastal management agency for the Bay.[9] The *San Francisco Bay Plan* (Bay Plan) was prepared by BCDC from 1965 through 1969 and amended through 2007 in accordance with the McAteer-Petris Act. The Bay Plan guides the protection and use of the Bay and its shoreline. BCDC has permit jurisdiction for the nine Bay Area counties with Bay frontage over areas subject to tidal action up to the mean high tide line and including all sloughs, tidelands, submerged lands, and marshlands lying between the mean high tide and 5 feet above mean sea level (MSL), and the land lying between the Bay shoreline and a line drawn parallel to, and 100 feet from, the Bay shoreline, known as the 100-foot shoreline band. [10] Under the McAteer-Petris Act, BCDC has permit authority for the placement of fill, extraction of materials, or substantial changes in use of land, water, or structures within its jurisdiction, and to enforce policies aimed at protecting the Bay and its shoreline, as well as maximizing public access to the Bay. One parcel within the project site, the 400-450 East Jamie Court parcel, is adjacent to the Bay Trail and a portion of that parcel lies within 100 feet of the Bay shoreline.

LOCAL

City of South San Francisco General Plan

The General Plan, originally adopted in 1999, as amended in 2011, provides a vision for the long-range physical and economic development for the City, provides strategies and specific implementing actions, and establishes a basis for judging whether specific development proposals and public projects are consistent with the City's plans and policy standards. The General Plan contains the following chapters:

- Land Use
- Planning Sub-Areas Element
- Transportation
- Parks, Public Facilities, and Services
- Economic Development
- Open Space and Conservation
- Health and Safety
- Noise

[8] 2012 SFO ALUCP, Exhibit IV-2, p. IV-5.

[9] San Francisco Bay Conservation and Development Commission, 2010. The McAteer-Petris Act (website). Available online at: http://www.bcdc.ca.gov/plans/mcateer_petris.html. Accessed May 10, 2018.

[10] San Francisco Bay Conservation and Development Commission, 2012. *San Francisco Bay Plan*, p. 5. Available online at: http://www.bcdc.ca.gov/pdf/bayplan/bayplan.pdf. Accessed May 10, 2018.

The General Plan chapters above cover six of the seven elements required by state law (land use, open space, conservation, housing, circulation, noise, and safety) and optional elements (Planning Sub-Areas and Economic Development) that address local concerns and regional requirements. The seventh required element is the Housing Element, which is updated on a more regular basis than the General Plan and published under a separate volume.

The General Plan contains a Planning Sub-Area Element. Policies in this element complement citywide policies included in the Land Use and other elements. Some of these sub-areas have detailed area plans, specific plans, or redevelopment plans. Where appropriate, the General Plan provides guidance as to how these plans may need to be changed in order to conform to the policy direction provided by the General Plan. The sub-areas, 14 in all, were collectively derived from analysis of land use and urban design patterns and existing and needed planning efforts and activities. The project site is located within the East of 101 Sub-Area of the Planning Sub-Areas Element.[11]

The General Plan governs the amount and intensity of development within the East of 101 Sub-Area and establishes specific policies and goals for the area, including the project site. The proposed project site is designated as CC/MI and CC districts in the General Plan. As shown in Figure 3.3: Existing General Plan Land Use and Zoning Designations, in Chapter 3, Project Description, on p. 3.9, General Plan land use designations surrounding the project site are MI, Business Technology Park (BTP), CC, and Park and Recreation on the shore of San Francisco Bay.[12] Table 3.2: Existing Land Use and Development Standards by Zoning Designation, on p. 3.12, presents the existing General Plan land use and development standards by corresponding zoning designation on the proposed project parcels.

Policies provided in Chapter 2, Land Use,[13] and Chapter 3, East of 101 Sub-Area,[14] of the General Plan are detailed below.

> **Policy 2-G-2:** Maintain a balanced land use program that provides opportunities for continued economic growth, and building intensities that reflect South San Francisco's prominent inner bay location and excellent regional access.
>
> **Policy 2-G-4:** Provide for continued operation of older industrial and service commercial businesses at specific locations.
>
> **Policy 2-I-4:** Require all new developments seeking an (Floor Area Ratio [FAR]) bonus set forth in Table 2.2-2 to achieve a progressively higher alternative mode usage. The requirements of the (Transportation Demand Management [TDM]) Program are detailed in the Zoning Ordinance.
>
> **Policy 2-I-22:** Require that all future development conforms with the relevant height, aircraft noise, and safety policies and compatibility criteria contained in the most recently adopted version of the San Mateo County Comprehensive Airport Land Use Plan for the environs of San Francisco International Airport.

[11] General Plan, Chapter 3, pp. 3-40 and 3-41.

[12] City of South San Francisco, 2018. Plans and Policy Documents - General Plan Map (website). Available online at: http://www.ssf.net/departments/economic-community-development/planning-division/planning-documents/approved-policy-documents. Accessed May 10, 2018.

[13] General Plan, Chapter 2, pp. 2-39, 2-41, and 2-46.

[14] General Plan, Chapter 3, pp. 3-44 through 3-49.

Policy 3.5-G-3: Promote campus-style biotechnology, high-technology, and research and development uses.

Policy 3.5-I-4: Unless otherwise stipulated in a specific plan, allow building heights in the East of 101 area to the maximum limits permissible under Federal Aviation Regulations Part 77.

Policy 3.5-I-5: Do not vary permitted maximum development intensities based on lot-size

Policy 3.5-I-7: Prepare signage and streetscape plan for the areas designated as Business Commercial and Business and Technology Park on the General Plan Diagram, treating the entire area as one large campus, with unified signage and orchestrated streetscapes that make wayfinding easy and pleasant.

Policy 3.5-I-8: Encourage the development of employee-serving amenities with restaurants, cafes, support commercial establishments such as dry-cleaners, to meet the needs of the employees in the East of 101 area. Such uses could be located in independent centers or integrated into office parks [o]r technology campuses.

Policy 3.5-I-11: Do not permit any new warehousing and distribution north of East Grand Avenue or in areas designated Business Commercial.

Policy 3.5-I-13: Facilitate waterfront enhancement and accessibility by:

- Establishment of uses that would bring people to the waterfront (see policies 3.5-I-8 and 3.5-I-9);
- Establishment of a bayshore design review area as part of the Zoning Ordinance; and
- Ensuring that the Park Recreation and Open Space Master Plan include specific improvements for shoreline enhancement and accessibility, as spelled out in the East of 101 Area Plan. See policy RE-3 in the plan.

Applicable policies provided in Chapter 4, Transportation; Chapter 5, Parks, Public Facilities, and Services; Chapter 7, Open Space and Conservation; Chapter 8, Health and Safety, and Chapter 9, Noise are discussed in their respective sections of this Environmental Impact Report (EIR). A comprehensive consistency analysis of all applicable policies is provided in Appendix C, Land Use Compatibility Analysis, of this EIR.

East of 101 Area Plan

The *East 101 Area Plan*, which amended the General Plan, originally was adopted as the policy document to guide development in the area. The *East of 101 Area Plan* was adopted by the City Council in 1994 and most recently amended in 2016.[15] The East of 101 Area consists of roughly 1,700 acres of land in the City east of U.S. 101, from the City's northern border with Brisbane and to the southern border adjacent to SFO. The overall goal of the plan is to recognize the unique character of the East of 101 Area and to guide and regulate development in a manner that protects and enhances the area's physical, economic, and natural resources, while also encouraging appropriate development in the area.

[15] The 2016 amendments to the *East of 101 Area Plan* primarily relate to ensuring consistency between the General Plan, the zoning ordinance, and the 2015 *Downtown Station Area Specific Plan*. The project site is not within the Downtown Station Area.

The City interprets the *East of 101 Area Plan* as a design-level document. Development standards and density determinations, specifically floor area ratio (FAR), are established in the subsequently updated General Plan, which guides implementation of the prior adopted *East of 101 Area Plan* and takes precedence over the Area Plan.

Accordingly, where the General Plan and *East of 101 Area Plan* conflict, land use policies and designations of the General Plan supersede those outlined in the *East of 101 Area Plan*. The City has, however, retained the *East of 101 Area Plan* Design Element policies to be the design guidelines for development in the East of 101 Area.

The proposed project site is designated Light Industrial in the *East of 101 Area Plan*.[16] The 400-450 East Jamie Court parcel is also designated with a CC district overlay. While the General Plan Land Use designations supersede these designations, the designations remain relevant for determining applicable design and related guidelines.

Applicable policies from the *East of 101 Area Plan* Land Use Element are as follows[17]:

> **Policy LU-6c:** Parking structures serving off-site uses may exceed the Floor Area Ratio allowed in the Light Industrial category, provided they meet the following requirements:
>
> - The number of peak hour trips generated by the parking structure must be less than or equal to the minimum number of peak hour trips that would be expected from any other use allowed in the light industrial category.
> - The parking structure shall meet all other applicable City regulations, including all other policies of this plan.
> - The parking structure and its design shall not create traffic safety problems or circulation conflicts on public streets.
>
> **Policy LU-24:** Retail and personal services shall be encouraged throughout the area to serve the employees of the East of 101 Area. In the Light Industrial and Planned Industrial categories, dedicated retail space may be included in a development without being applied to the allowed FAR, provided that such development includes adequate parking and does not exceed 10 percent of the building square footage of a project.
>
> **Policy LU-26:** Child care facilities may be built as part of a commercial or industrial development and shall not be counted as part of the Floor Area Ratio of the project.
>
> **Policy LU-31:** No new above-ground bulk fuel tanks are permitted after July 25 1994. Above-ground fuel tanks which are lawfully existing prior to July 1994 may be maintained but may not be replaced or expanded.

The Design Element of the General Plan is applicable to the proposed project; however, individual policies are not listed here and are generally confirmed during the design review process. Policy CON-7, which discusses conservation of biological resources, is discussed in Section 4.3, Biological Resources,

[16] City of South San Francisco, 1994. *East of 101 Area Plan*, adopted July 1994, pp. 56-61. Available online at: http://www.ssf.net/departments/economic-community-development/planning-division/planning-documents/approved-policy-documents. Accessed September 1, 2017.

[17] E-mail correspondence from Naree Chan, City Legal Council, on June 22, 2018.

on p. 4.3.10. A comprehensive consistency analysis of all applicable policies is provided in Appendix C, Land Use Compatibility Analysis, of this EIR.

Downtown/Central Redevelopment Plan

The *Downtown/Central Redevelopment Plan* (Redevelopment Plan), originally adopted in 1989, was prepared by the former South San Francisco Redevelopment Agency (Redevelopment Agency) pursuant to the State Community Redevelopment Law (former Health and Safety Code, Section 33000 et seq.).[18] The plan provided the former Redevelopment Agency with the duty to redevelop, rehabilitate, and revitalize the plan area. The plan did not present a specific plan or establish priorities for specific projects. Instead, the plan presents a process and a basic framework within which specific development plans would be presented, priorities for specific projects would be established, and specific solutions would be proposed. In general, the goals and objectives of the plan are as follows: (1) to expand retail downtown; (2) to support various cultural and civic uses; (3) to promote downtown as a financial hub; (4) to eliminate blight; (5) to improve public parking and other public facilities, services, and utilities; (6) to create a pedestrian environment; (7) to emphasize historic architectural styles; (8) to expand and upgrade housing; (9) to promote new and continuing private sector investment; (10) to achieve an environment reflecting a high level of concern for architectural, landscape, and urban design and land use principles; (11) to retain and expand existing businesses; (12) to provide for increased revenues for the City; (13) to encourage public participation; (14) to create local job opportunities; (15) to redesign and develop stagnant or improperly used sites; and (16) to reduce the City's annual costs of providing local services.

The 400-450 East Jamie Court parcel is located in the Redevelopment Plan area.[19] As amended, the term of the Redevelopment Plan extends until July 12, 2030, for purposes of land use controls, and until July 12, 2040, for receipt of property taxes and repayment of indebtedness. The Redevelopment Plan provides that permitted land uses in the plan area include commercial and industrial uses, and may include any use permitted by the General Plan and City ordinances for that area.[20] Under the Redevelopment Plan, the type, size, and height of buildings in the plan area are limited by applicable local, state, and federal statutes and ordinances.[21] The Redevelopment Plan provides that the Redevelopment Agency was authorized to establish limits on height, land coverage, setbacks, design criteria, traffic, and parking through adoption of subsequent resolutions, but the Redevelopment Plan does not impose additional development standards for the plan area.[22]

City of South San Francisco Zoning Ordinance, 2017

The existing zoning designations of the project site and surrounding parcels are illustrated in Figure 3.3: Existing General Plan Land Use and Zoning Designations, in Chapter 3, Project Description, on p. 3.9.

[18] City of South San Francisco, 1989. *Redevelopment Plan for the Downtown Central Redevelopment Project* (Downtown/Central Redevelopment Plan), adopted July 12, 1989.
[19] General Plan, Figure 2-7, p. 2-37.
[20] Downtown/Central Redevelopment Plan, Section 402, p. 18.
[21] Downtown/Central Redevelopment Plan, Section 413, p. 21.
[22] Downtown/Central Redevelopment Plan, Section 420, p. 22.

Existing zoning on the project site is MI with the exception of the 400-450 East Jamie Court parcel, which is zoned BC.[23] The MI and BC districts are two of the City's base employment districts. Table 3.2: Existing Land Use and Development Standards by Zoning Designation, in Chapter 3, Project Description, on p. 3.12, outlines the development standards for the MI and BC districts for lot size, building height, minimum setbacks, lot coverage, FAR, and landscaping coverage.

The MI zoning district is intended to provide areas for a wide range of manufacturing, industrial processing, general service, warehousing, storage and distribution, and service commercial uses and to protect areas where such uses currently exist.[24] Industries that use or produce substantial amounts of hazardous materials or generate noise, odor, or other pollutants are not permitted. Conventional residential and/or group residential development are also prohibited, but live-work uses such as artists' studios are allowed in designated areas. Small-scale retail and service uses serving local employees, residents, and visitors may be permitted as secondary uses. This district is consistent with the General Plan's MI designation. The maximum FAR is 0.4 in the MI zoning district, but increases may be permitted up to a total FAR of 0.6 for development providing specified design and green building measures, subject to approval of a Conditional Use Permit (CUP).[25]

The BC zoning district is intended for business and professional offices, visitor service establishments, and retail uses with an emphasis on larger and regional-serving uses, largely in commercial areas west of U.S. 101. [26] A wide range of nonresidential uses is appropriate, including administrative, financial, business, professional, medical, and public offices, and visitor-oriented and regional commercial activities such as warehouse clubs and other large-format retail uses. The maximum base FAR is 0.5, but increases may be permitted up to a total FAR of 1.0 for R&D establishments or development that meets specific TDM, and specified design and green building standards, subject to approval of a CUP.[27] The maximum FAR for hotels is 1.2 with increases to a total of 2.0 for development that meets specified criteria consistent with General Plan policies. Section 20.110.004 of the zoning ordinance also provides requirements for BC districts regarding the orientation of the primary building entrance; building transparency and required openings; and building design features including architectural articulation, entries, and materials.

Climate Action Plan

The purpose of the *South San Francisco Climate Action Plan* (CAP), adopted in 2014, is to demonstrate the City's continued commitment to reduce greenhouse gas (GHG) emissions while protecting unique

[23] City of South San Francisco, 2018. Interactive Zoning Ordinance Map (website). Available online at: http://zoning.ssf.net/. Accessed May 10, 2018.

[24] City of South San Francisco Zoning Ordinance Section 20.110.001.

[25] City of South San Francisco Zoning Ordinance, 2017. Table 20.110.003(C). Applies to MI projects that include high quality, innovative design and product type, and maximum provisions for pedestrian and bicycle use or provision of green building measures over and above the applicable green building compliance threshold requirements pursuant to Municipal Code Title 15.

[26] City of South San Francisco Zoning Ordinance Section 20.110.001.

[27] City of South San Francisco Zoning Ordinance, 2017. Table 20.110.003(C).

resources in the City.[28] The CAP provides goals, policies, and programs to reduce GHG emissions, adapt to climate change, and support the goals of Assembly Bill 32 and Senate Bill 743. Measures and standards identified in the CAP allow the City to simplify the development review process and determine whether projects are eligible for streamlining incentives. The CAP meets the requirements of a Qualified GHG Reduction Strategy and, consistent with the Global Warming Solutions Act of 2006, presents a target reduction of 15 percent below baseline 2005 GHG emissions levels by 2020.

The CAP provides guidance for a scientific and regulatory framework, a GHG emissions inventory, a GHG reduction strategy, adaptation and resiliency, and implementation. In particular, the CAP includes a Development Checklist for City staff to use to identify applicable CAP measures for discretionary projects and required mitigation standards. The Development Checklist serves as the summary of project-level standards from the CAP. For discretionary projects seeking to use California Environmental Quality Act (CEQA) streamlining provisions, the City may require CAP measures as mandatory conditions of approval or as mitigation for identified GHG emission impacts.[29] Relevant criteria include, but are not limited to, the following questions:

- Does the project include bicycle facilities (e.g., bicycle lanes, parking, lockers)?
- Will the project support bike sharing/rental programs?
- Will there be a commute shuttle or public transit stop on site or within 500 feet?
- Will the project provide traffic-calming treatments?
- Is the project paying a traffic impact fee to fund bicycle and pedestrian improvements?
- Will the project provide designated parking spaces for electric vehicles, carpool vehicles, or other low-emissions vehicles?
- Will certification of the building be sought under Leadership in Energy and Environmental Design (LEED) or other green building criteria?
- Will any renewable energy system be installed as part of this project?
- Will any water features exceed CALGreen [Title 24 Green Building Standards] standards?
- Will the project incorporate low-impact development practices?
- Will any xeriscaping be installed?
- Will captured rainwater or graywater be used for irrigation?

4.7.4 Impacts and Mitigation Measures

This section describes the impact analysis related to land use and planning for the proposed project. This section also describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant.

[28] City of South San Francisco, 2015. *Climate Action Plan*, adopted February 13, 2014, p. ES-1. Available online at: http://www.ssf.net/departments/economic-community-development/planning-division/planning-documents/approved-policy-documents. Accessed September 1, 2017.
[29] Ibid, pp. 75, 169, 170, and 171.

SIGNIFICANCE CRITERIA

Per the CEQA Guidelines, Appendix G, a land use and planning impact is considered significant if project implementation would:

a. physically divide an established community;

b. conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or

c. conflict with any applicable habitat conservation plan or natural community conservation plan.

APPROACH TO ANALYSIS

To facilitate a review of the proposed new land uses and rezoning under the proposed project, SWCA Environmental Consultants (SWCA) prepared a Land Use Compatibility Analysis describing the applicable local and regional land use policies (see Appendix C of this EIR). The results of this analysis in relation to potential land use conflicts are described below.

There are no habitat conservation plans or natural community conservation plans applicable to the project site. Therefore, CEQA Appendix G Land Use and Planning criterion (c) is not applicable to the proposed project. This criterion is not discussed further in this section.

A project that involves a change or intensification in land use would not be considered to have a significant impact related to the topic of Land Use and Planning unless the project would physically divide an established community.

Conflicts with existing plans and policies do not, in themselves, indicate a significant environmental effect related to the topic of Land Use and Planning within the meaning of CEQA, unless the project substantially conflicts with a land use plan/policy that was adopted for the purpose of avoiding or mitigating an environmental effect. The focus of the analysis under Impact LU-2 is on the proposed project's potential conflicts with applicable land use plans and policies. Discussion of policy compatibility, while not required under CEQA, is provided for informational purposes. It does not present a comprehensive analysis of project conformity with applicable local, regional, and state plans and policies. Such analyses would be undertaken independent of the CEQA process, as part of the decision-makers' action to approve, modify, or disapprove the project or aspects thereof.

To the extent that physical environmental impacts may result from such conflicts, the EIR discloses and analyzes these physical impacts under the specific environmental topic sections in Chapter 4, Environmental Setting, Impacts, and Mitigation. Impacts resulting from a change or intensification of employment on the project site are embodied in environmental impacts related to the capacity of existing facilities and services to adequately serve the area, such as those described in Transportation and Circulation, Population and Housing, Public Services, Recreation, and Utilities and Service Systems. Physical impacts of construction and/or operation of the proposed project on the environment are embodied in physical impacts related to environmental topics such as Cultural Resources, Noise, Air

Quality, Greenhouse Gas Emissions, Hydrology and Water Quality, and Hazards and Hazardous Materials.

Project-level and cumulative land use impacts of the proposed project are addressed in relation to the significance criteria.

IMPACT EVALUATION

Impact LU-1: The proposed project would not physically divide an established community. ***(Less than Significant)***

The proposed project would not physically divide an established residential or neighborhood-serving commercial community. The existing site vicinity is characterized by the confluence of existing light industrial uses to the west and northwest and existing office/R&D uses to the east and northeast. The proposed project, during Phase 1 and project buildout, would construct new office/R&D uses on the project site under the proposed rezoning. The proposed project would not introduce new uses to the project vicinity in a manner that would physically divide the existing uses.

The project site is characterized by clusters of one- to three-story buildings, open surface parking lots and landscaping. The project site is generally located along the edge of the East of 101 Area where existing development abuts the Bay and the Bay Trail. Vehicular access is available throughout the project site. Haskins Way and East Jamie Court do not provide thru access. The southern terminus of Haskins Way abuts the Bay Trail. The eastern terminus of East Jamie Court is a dead-end transition into the South San Francisco Scavenger and Blue Line Recycling Center entrances. The proposed office/R&D buildings would not create a physical barrier between existing uses.

There are no existing sidewalks fronting the project site on East Grand Avenue. On Haskins Way, there are existing sidewalks fronting the 201 Haskins Way and 400-450 East Jamie Court parcels, but not the 101 and 151 Haskins Way parcels. On East Jamie Court, there are no sidewalks fronting the 201 Haskins Way parcel, but there are sidewalks fronting the 400-450 East Jamie Court parcel. There is existing public access to the waterfront from a nearby public access point and through walkways provided on the 400-450 East Jamie Court parcel. The proposed project, during Phase 1 and project buildout, would create a network of public pedestrian sidewalks and interconnected open spaces throughout the site, and create a pedestrian link to the Bay Trail from the northern portion of the project site. The proposed network of pedestrian paths and open spaces is intended to encourage pedestrian use through the project site and to promote accessibility of the waterfront. The proposed sidewalks would improve accessibility between the project site and surrounding uses, and would not create a physical barrier between existing uses.

For these reasons, the proposed project would have a less-than-significant land use effect related to physical division of a community. No mitigation measures are necessary.

Impact LU-2: The proposed project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. ***(Less than Significant)***

Comprehensive Airport Land Use Compatibility Plan

Because the proposed project would involve a rezoning, the project would be required to refer to the ALUC for a determination of consistency with the relevant policies of the 2012 SFO ALUCP. Based on the existing and ongoing development of office/R&D uses in the East of 101 Area, no substantial inconsistencies with safety policies are anticipated. There are three airport/land use compatibility issues addressed in the 2012 SFO ALUCP that relate to the proposed project: (a) consistency with noise compatibility policies; (b) safety criteria; and (c) airspace compatibility criteria.

Noise Policy

The 2012 SFO ALUCP uses the Community Noise Equivalent Level 65 decibel (dB) noise contour for determining land use compatibility. The proposed project site is located outside of the Community Noise Equivalent Level 65 dB noise contour.[30] Therefore, the noise policy is not applicable to the proposed project.

Safety Policy

The *California Airport Land Use Planning Handbook* requires ALUCPs to include safety zones for each runway end. The 2012 SFO ALUCP includes five safety zones and related land use compatibility criteria. The proposed project site is located outside of all safety zones established for the 2012 SFO ALUCP.[31] Therefore, the safety policy is not applicable to the proposed project.

Height of Structures, Use of Airspace, and Airspace Compatibility

The City is located inside the 14 CFR Part 77 horizontal, conical, primary, approach, and transitional imaginary surface contours. The parcels for the proposed project are located within the horizontal surface contour. The height for the imaginary surface established for the horizontal surface at the site location is 163.2 feet above MSL. The proposed project parcels are located at between 12 and 23 feet above MSL. The proposed buildings under the proposed project are designed to be constructed at a maximum building height of 99 feet above ground level. Maximum structure heights would be approximately 110 to 122 feet above MSL. A structure built at a maximum of 122 feet above MSL would be well below the imaginary surface height established.

Under federal law, the project sponsor is required to comply with all notifications and other requirements described in 14 CFR Part 77. The project sponsor would be required to file Form 7460-1, Notice of Proposed Construction or Alteration, with the FAA to determine whether the project would constitute a hazard to air navigation, and if any airspace safety design features (such as lighting) would be necessary. Based on the proposed project's maximum height of 122 feet above MSL, no additional safety

[30] 2012 SFO ALUCP, Exhibit IV-2, p. IV-5.
[31] Ibid.

requirements are anticipated. Therefore, the proposed project would be consistent with the airspace policies as established in the adopted 2012 SFO ALUCP.

San Francisco Bay Plan

For the proposed project, BCDC's jurisdiction includes the Bay and areas within 100 feet inland of the mean high tide line. A portion of the existing 400-450 East Jamie Court parcel is under BCDC's jurisdiction. The portion of the parcel inside the shoreline band contains a segment of parking lot, asphalt walking paths, a viewing and seating area, a concrete plaza, landscaping, and assorted public access amenities (e.g., benches, tables).[32] Outside the shoreline band, the parcel contains two existing office/R&D buildings and access to the Bay Trail.

Phase 1 Development

The proposed Phase 1 development of the parcel would be outside the 100-foot BCDC shoreline band. The proposed site plan and building addition at the 400-450 East Jamie Court parcel would be north of the existing 400 East Jamie Court building. Other development in the Phase 1 area would occur at 201 Haskins Way, which is located north of the 400-450 East Jamie Court parcel and would also be outside of the 100-foot BCDC shoreline band.

Views of the Bay from local roads or from the project site would change with additional development of office/R&D uses at 400-450 East Jamie Court or 201 Haskins Way. However, the Bay trail segment adjacent to 400-450 East Jamie Court parcel is not a designated vista point, wildlife refuge, or waterfront park under Bay Plan Map 5. The existing site and surrounding land uses include light industrial uses, office/R&D uses, and a recycling center use. Additional office/R&D use on the 400-450 East Jamie Court parcel from development of the 25,000-square-foot (sq. ft.) building addition would be consistent with the character of these existing uses.

The proposed 400-450 East Jamie Court building addition and development on 201 Haskins Way would maintain compatibility with appearance, design, and scenic view policies established by the Bay Plan, and site development would not require issuance of a new permit from BCDC. Impacts particular to visual character are further discussed in Section 4.11.3, Aesthetics, on pp. 4.11.1-4.11.8.

Project Buildout

The majority of development proposed under the conceptual Phase 2 site plan (including the conceptual East Grand Building and expanded parking garage), which would be constructed under project buildout, is located north of the 400-450 East Jamie Court parcel and would be located well outside the 100-foot BCDC shoreline band. However, views or access to the Bay from local roads or from the project site

[32] In 2003, BCDC issued a permit (BCDC Permit No. M02-70, originally issued on July 17, 2003, and currently consisting of Corrected Permit No. M02-70, dated October 30, 2003, and Amendment No. Two, dated June 26, 2006; as corrected and amended, the "BCDC Permit") regarding the use of certain portions of the 400-450 East Jamie Court parcel for public Bayshore access. Development of Phase 1 of the proposed project would not impact the portion of the 400-450 East Jamie Court parcel affected by the BCDC Permit. Phase 2 of the proposed project would be reviewed for consistency with the BCDC Permit.

could change with additional development of office/R&D uses at 400-450 East Jamie Court at project buildout. The majority of the parcel is not within the 100-foot shoreline band.

In addition, up to 85,000 sq. ft. of floor area of additional BTP use on 400-450 East Jamie Court would be permitted under project buildout. Additional office/R&D use on the 400-450 East Jamie Court parcel would be consistent with the character of the existing industrial and office/R&D uses in the project vicinity. However, site-specific, project-level design of Phase 2 is not currently proposed and would be subject to a separate plan review and discretionary approval process. If Phase 2 development were proposed within the 100-foot shoreline band, that development would be subject to BCDC review and approval.

Nonetheless, any new development or changes to the existing site plan at the 400-450 East Jamie Court parcel under project buildout would involve BCDC consultation to determine consistency with Bay Plan policies and BCDC Permit No. M02-70 for any portions of the project site that are within its jurisdiction.

City of South San Francisco General Plan

The Land Use Compatibility Analysis, available as Appendix C to this EIR, presents a list of relevant General Plan guiding and implementing policies applicable to the proposed project in the Land Use; East of 101 Sub-Area; Transportation; Parks, Public Facilities, and Services; Economic Development, Open Space and Conservation; Health and Safety; and Noise chapters. Appendix C discusses whether the proposed project would be consistent with the policy, or inconsistent with the policy. As shown, the proposed project would not be inconsistent with most General Plan policies.

The proposed project would involve removal of an existing trucking terminal use at 201 Haskins Way, and existing light industrial uses on 101 and 151 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court. The project site is not designated for permanent operation of older industrial and service commercial uses. The existing light industrial uses on the proposed project site include a trucking terminal, a kiteboarding equipment distribution warehouse, a packaging manufacturer, a van rental service, audio and visual equipment rental services, and a janitorial equipment supplier. These existing uses are relatively small-scale, modern industrial uses that do not represent a historic industrial use.

The proposed project would not construct new warehousing or distribution uses. The proposed project would involve new office/R&D uses under the existing CC/MI and CC land use designations for allowable development of up to 1.0 FAR through a rezoning, CUP, and implementation of a TDM Plan and incorporation of design and green building standards per the South San Francisco Municipal Code (Municipal Code) FAR-Bonus Incentives Program. The proposed project is consistent with previous and ongoing expansion of R&D uses in the East of 101 Area, including the *Genentech Master Plan* area as well as other biotechnology campus sites.

During Phase 1 and project buildout, the proposed project would include employee-serving amenities. In particular, amenities within the proposed 25,000-sq.-ft. building addition at 400-450 East Jamie Court are conceptual at this time but the building would include an employee-serving café space. Additional

opportunities for employee-serving amenities to be included in the development program of Phase 2 during project buildout would be determined in coordination with the City.

As described in Section 4.9, Transportation and Circulation, Policy 4.2-G-13 directs the City to strive to maintain Level of Service (LOS) D or better on arterial and collector streets, at all intersections, and on principal arterials in the Congestion Management Program (CMP) during peak hours. Nonetheless, Policy 4.2-G-14 permits the City to accept LOS E or F after finding that: (1) there is no practical and feasible way to mitigate the lower LOS; and (2) the uses resulting in the lower LOS are of clear, overall public benefit.

This EIR identifies all feasible mitigation measures to maintain LOS D or better at all intersections and freeway segments in the CMP during peak hours that currently are operating at LOS D or better. With feasible mitigation incorporated, LOS D would be maintained at two intersections in the CMP under existing plus project conditions: Littlefield Avenue/East Grand Avenue during the AM peak hour and Gateway Boulevard/South Airport Boulevard/Mitchell Avenue during the PM peak hour (see Impact TR-1 and Impact TR-3 for further information).

However, the existing plus project conditions would cause one intersection in the CMP (Allerton Avenue/East Grand Avenue in the PM peak hour) that is currently operating at LOS D to operate at LOS E or F (see Impact TR-2). Under year 2040 conditions, the project would cause four intersections in the CMP that would be operating at LOS D to operate at LOS E or F: Forbes Boulevard/Harbor Way/East Grand Avenue and Littlefield Avenue/East Grand Avenue in the AM peak hour (see Impact C-TR-7 and Impact C-TR-8) and Dubuque Avenue/Grand Avenue Overcrossing and East Grand Avenue/Grand Avenue Overcrossing in the PM peak hour (see Impact C-TR-4 and Impact C-TR-5).

For two intersections, Allerton Avenue/East Grand Avenue in the PM peak hour under existing plus project conditions (Impact TR-2) and Littlefield Avenue/East Grand Avenue in the AM peak hour under year 2040 conditions (Impact C-TR-8), there is no practical and feasible way to mitigate to LOS D at these locations due to right-of-way constraints and impacts to pedestrian and bicycle facilities (see Impact TR-2 and Impact C-TR-8 for further information). For three intersections under year 2040 conditions (Forbes Boulevard/Harbor Way/East Grand Avenue in the AM peak hour, and Dubuque Avenue/Grand Avenue Overcrossing and East Grand Avenue/Grand Avenue Overcrossing in the PM peak hour), the proposed mitigation measures could reduce the proposed project's contribution to the cumulative traffic impact but these measures are not in the current Traffic Impact Fee and Capital Improvement Program. Because the City has not yet completed the Transportation Impact Fee and Capital Improvement Program updates to include or fund these measures, these impacts would remain significant.

A TDM program would also be required to be prepared and implemented pursuant to Municipal Code Chapter 20.400. However, it cannot be guaranteed that the TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level and these impacts would be significant and unavoidable. As part of its consideration of the project, the City will consider a statement of overriding considerations that will explain the overriding public benefits of the project. Therefore, the proposed project would generally

be consistent with Policies 4.2-G-13 and 4.2-G-14 if the City makes the requisite findings set forth in Policy 4.2-G-14.

The proposed office/R&D uses under the proposed project are generally consistent with current land use plans and policies under the General Plan, and the CC and CC/MI districts. No conflicts with land use policies under General Plan or development standards of the CC and CC/MI district would occur under the proposed project.

East of 101 Area Plan

The proposed project would involve new office/R&D office uses. The proposed project is consistent with previous and ongoing expansion of biotechnology and R&D uses in the East of 101 Area.

Under the *East of 101 Area Plan*, the proposed project site is designated as Light Industrial, with the 400-450 East Jamie Court site designated as mixed Light Industrial/Coastal Commercial.[33] However, development standards and density determinations, including FAR, are established in the General Plan, which was updated after the adoption of the *East of 101 Area Plan* and takes precedence over the Area Plan. Accordingly, where the General Plan and *East of 101 Area Plan* conflict, land use policies and designations of the General Plan supersede those outlined in the *East of 101 Area Plan*. Applicable policies from the *East of 101 Area Plan* Land Use Element are discussed above in Section 4.7.3.

The proposed project would construct a parking structure on the 201 Haskins Way parcel during Phase 1 development, which would be expanded east during development of the conceptual Phase 2 site plan at project buildout. This parking structure would serve as a campus-wide parking resource for the project site (totaling eight parcels), but would not serve off-site uses. The parking structure would be provided to serve office/R&D uses which are typical of other similar developments. At project buildout, the parking structure would be accessed from driveways on Haskins Way, East Grand Avenue, and East Jamie Court and would not create traffic safety problems or circulation conflicts. A detailed discussion of traffic safety and circulation impacts is provided in Section 4.8, Transportation and Circulation. Therefore, the proposed project would not conflict with Policy LU-6c.

The proposed project would provide employee-serving amenities, such as retail. These uses would not exceed 10 percent of the building square footage of the project, and would not be applied to the allowable FAR. Therefore, the proposed project would not conflict with LU-24.

The proposed uses would not require installation of new underground fuel tanks, which are prohibited under Policy LU-31.

The proposed project site plan as it is presented in Chapter 2, Project Description, has been developed in accordance with Chapter 8 of the *East of 101 Area Plan*, which contains design guidelines for commercial development and streetscapes. These guidelines are interpreted during the design review process, which

[33] City of South San Francisco, 1994. *East of 101 Area Plan*, adopted July 1994, Figure 4. Available online at: http://www.ssf.net/departments/economic-community-development/planning-division/planning-documents/approved-policy-documents. Accessed September 1, 2017.

would involve iterative revisions up until project approval. City staff are responsible for determining final consistency under that process. No substantive conflicts have been identified for the proposed project.

In summary, the proposed project would be consistent with the applicable provisions of the *East of 101 Plan*.

Downtown/Central Redevelopment Plan

The Redevelopment Plan provides that permitted land uses in the plan area include commercial and industrial uses, and may include any use permitted by the General Plan and City ordinances for that area. The proposed project would construct new office/R&D uses permitted by the General Plan and would therefore be consistent with the Redevelopment Plan.

South San Francisco Zoning Ordinance, 2017

The proposed project would involve a rezoning of the project site from the MI and BC districts to the BTP district. The proposed zoning text amendment would amend Table 20.110.002, "Land Use Regulations – Employment Districts," of the Municipal Code to clarify that for parcels with a dual General Plan designation of CC and MI, the new BTP development would be considered consistent with and would be subject to the development standards applicable to the CC designation. In contrast, the continuation of pre-existing freight forwarding, customs brokering, wholesale, warehousing, and distribution uses would be considered consistent with and would be subject to the development standards applicable to the MI designation.

The proposed rezoning would increase the maximum allowable FAR at project parcels under the existing MI district from 0.6 to 1.0, and would maintain the maximum allowable FAR of the 400-450 East Jamie Court parcel under the BC district (1.0).

Climate Action Plan

The proposed project would include alternative transportation-related amenities (bicycle facilities, bike sharing, commute shuttle, electric vehicle and carpool vehicle parking spaces); payment of the City traffic impact fee; adherence to LEED Gold standards, City and National Pollutant Discharge Elimination System conservation measures (water conservation, low-impact development, and landscaping); and infrastructure to support photovoltaic solar panels on the new office/R&D parking structure. A detailed description of the proposed project's design features in relation to the CAP criteria is shown in Table 4.5.4: Analysis of Consistency with the CAP, in Section 4.5, Greenhouse Gas Emissions, on pp. 4.5.15–4.5.17. The project sponsor, in coordination with City staff, would perform ongoing review and identification of applicable CAP Measures for New Development, or for Additions, Alterations, and Tenant Improvements, to be incorporated into the proposed project as project features, mitigation of environmental effects, or mandatory conditions of approval commensurate with the project's intensity of use and site-specific conditions. Therefore, the proposed project would be consistent with the CAP.

Conclusion

Conflicts with existing plans and policies do not, in themselves, indicate a significant environmental effect related to the topic of Land Use and Land Use Planning within the meaning of CEQA, unless the project substantially conflicts with a land use plan/policy that was adopted for the purpose of avoiding or mitigating an environmental effect, such that a substantial adverse physical change in the environment related to Land Use would result. To the extent that physical environmental impacts may result from such conflicts, the EIR discloses and analyzes these physical impacts under the specific environmental topic sections in the corresponding sections of Chapter 4, Environmental Setting, Impacts, and Mitigation.

The proposed project, during Phase 1 and project buildout, would not conflict with land uses plans and policies such that a substantial adverse physical change in the environment related to land use would result. For this reason, the proposed project would have a less-than-significant land use effect related to conflict with a land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. No mitigation measures are required.

Potential conflicts with applicable policies will continue to be analyzed and considered as part of the review of entitlements applications required for the proposed project independent of environmental review under CEQA. They also will be considered by the decision-makers during their deliberations on the merits of the proposed project and as part of their actions to approve, modify, or disapprove the proposed project.

Impact C-LU-1: The proposed project would not make a cumulatively considerable contribution to a significant cumulative impact on land use and planning. ***(Less than Significant)***

Section 4.1, Approach to Environmental Analysis, on pp. 4.1.7–4.1.9, identifies foreseeable future projects that are located within an approximately 0.5-mile radius of the project site as well as projects that are located within the East of 101 Area. The majority of the proposed projects listed consist of office/R&D and commercial uses. The proposed project would contribute to these changes in land use and expand these changes further into the remaining light industrial portion of the East of 101 Area. Office/R&D development under the proposed project in combination with foreseeable future projects would increase the density of the existing neighborhood but would be consistent existing office/R&D uses and planned development in the East of 101 Area.

As discussed above under Impact LU-1, the proposed project, during both Phase 1 and project buildout, would extend a network of pedestrian paths and open spaces to facilitate public access through the project site and to the waterfront. Each of the projects listed in Section 4.1 would also be designed to accommodate pedestrian access and connectivity. Therefore, the proposed project, in combination with reasonably foreseeable future projects, would not contribute to the physical division of an established community.

Similar to the proposed projects, the office/R&D uses proposed under the foreseeable future projects would be consistent with existing land use plans and policies. The City has encouraged the redevelopment of underutilized sites with high-quality campus-style biotechnology, high-technology, and research and development uses. Furthermore, each of the foreseeable future projects would be required to conform to

the same land use policies, such as encouraging the development of employee-serving amenities (e.g., open space, café space, child care, etc.).

For these reasons, the proposed project, under both Phase 1 and project buildout, in combination with past, present, and reasonably foreseeable future projects, would have less-than-significant cumulative land use impacts. The proposed project would not make a cumulatively considerable contribution to a significant cumulative land use impact, and no mitigation measures are necessary.

4.8 Noise and Vibration

4.8.1 Introduction

Section 4.8, Noise and Vibration, addresses the potential noise and vibration impacts related to the 201 Haskins Way Project (project). This section discusses the noise and land use compatibility of proposed uses, as well as the potential for temporary, periodic, or permanent noise level increases at nearby sensitive receptors attributable to the proposed project. The analysis of construction and operation noise impacts includes the results of a noise impact analysis prepared by RGD Acoustics for the proposed project.[1] Project-specific impacts are presented for the proposed project and mitigation measures, if any, are identified when feasible. A cumulative impact discussion is identified for each subtopic.

4.8.2 Environmental Setting

FUNDAMENTALS OF ENVIRONMENTAL NOISE

Noise is defined as unwanted sound. Sound is a rapid oscillation of air pressure above and below atmospheric pressure. Sound is described by the rate of oscillation of sound waves (or "frequency"), the distance between peaks or valleys in the wave, the speed that wave travels, and the pressure level or energy content of a given sound. Most sounds in the environment do not consist of a single frequency, but rather a broad band of frequencies, with each frequency differing in sound level. The intensities of each frequency add together to generate a sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound, and the decibel (dB) scale is used to quantify sound intensity, with 0 dB corresponding roughly to the threshold of hearing.

Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency mid-range. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called "A-weighting," expressed as "dBA." The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA.

Except in carefully controlled laboratory experiments, a change of only 1 dBA in sound level cannot be perceived. Outside of the laboratory, a 3-dBA change is considered a perceptible difference. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness.[2] In practice, the

[1] RGD Acoustics, 2018. *Noise Impact Analysis for 201 Haskins Way, South San Francisco, CA*. Prepared August 20, 2018. Available as Appendix E of this EIR.

[2] California Department of Transportation, 2013. Technical Noise Supplement (TeNS) to the Traffic Noise Analysis Protocol pp. 2-44–2-45, September 2013. Available online at: http://www.dot.ca.gov/env/noise/docs/tens-sep2013.pdf. Accessed May 30, 2018.

level of a sound source is measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve.

Noise Descriptors

Although A-weighted noise levels indicate environmental noise at an instant in time, community noise levels vary continuously. Most environmental noise is composed of an accumulation of noise from several sources, which create a relatively steady background noise in which no particular source is identifiable. Variations in noise exposure over time are typically expressed in terms of a steady state energy level (called L_{eq}) that represents the acoustical energy of a given measurement, or alternatively as a statistical description of what sound level is exceeded over some fraction (10, 50, or 90 percent) of a given observation period (i.e., L_{10}, L_{50}, L_{90}). L_{max} is the maximum, instantaneous noise level registered during a measurement period. **Table 4.8.1: Representative Environmental Noise Levels** presents representative noise sources and their corresponding noise levels in dBA at varying distances from the noise sources.

To quantify the noise level over a 24-hour period, the Day/Night Average Sound Level (L_{dn}) or Community Noise Equivalent Level (CNEL) is used. These descriptors are averages like the L_{eq} except they include, by definition, a 10 dBA "penalty" for noises that occur during nighttime hours (10 p.m. to 7 a.m.) to account for people's sensitivity to intrusive noise during these hours. The CNEL also includes a 5 dBA "penalty" during evening hours (7 p.m. to 10 p.m. to account for people's increased sensitivity during these hours).[3]

Noise from Multiple Sources

Since sound pressure levels in decibels are based on a logarithmic scale, they cannot be added or subtracted in the usual arithmetical way. Adding a new noise source to an existing noise source, both producing noise at the same level, will not double the noise level. **Table 4.8.2: Rules for Combining Sound Levels by "Decibel Addition"** demonstrates the result of adding noise from multiple sources.

If the difference between two noise sources is 10 dBA or more, the higher noise source will dominate and the resultant noise level will be equal to the noise level of the higher noise source. In general, if the difference between two noise sources is 0 to 1 dBA, the resultant noise level will be 3 dBA higher than the higher noise source, or both sources if they are equal. If the difference between two noise sources is 2 to 3 dBA, the resultant noise level will be 2 dBA above the higher noise source. If the difference between two noise sources is 4 to 10 dBA, the resultant noise level will be 1 dBA higher than the higher noise source.

[3] American National Standards Institute, 1994. ANSI S1.1-1994, Acoustical Terminology.

Table 4.8.1: Representative Environmental Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet fly-over at 100 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck going 50 mph at 50 feet		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area during daytime		
Gas lawnmower at 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban area during daytime	50	Dishwasher in next room
Quiet urban area during nighttime	40	Theater, large conference room (background)
Quiet suburban area during nighttime		
	30	Library
Quiet rural area during nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Source: California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, p. 2-20, September 2013

Table 4.8.2: Rules for Combining Sound Levels by "Decibel Addition"

When two decibel values differ by	Add the following amount to the higher decibel value	Example
0 to 1 dB	3 dB	60 dB + 61 dB = 64 dB
2 to 3 dB	2 dB	60 dB + 63 dB = 65 dB
4 to 9 dB	1 dB	60 dB + 69 dB = 70 dB
10 dB or more	0 dB	60 dB + 75 dB = 75 dB

Note: This methodology provides an estimate of the resulting sound level and is accurate to ±1 decibel.

Source: SWCA Environmental Consultants (2018)

Attenuation of Noise

A receptor's distance from a noise source affects how noise levels attenuate (decrease). Transportation noise sources tend to be arranged linearly such that roadway traffic attenuates at a rate of 3.0 dBA to 4.5 dBA per doubling of distance from the source, depending on the intervening surface (paved or vegetated, respectively). Point sources of noise, such as stationary equipment or construction equipment, typically attenuate at a rate of 6.0 dBA to 7.5 dBA per doubling of distance from the source.[4] For example, a sound level of 80 dBA at 50 feet from the noise source will be reduced to 74 dBA at 100 feet, 68 dBA at 200 feet, and so on. Noise levels can also be attenuated by "shielding" or providing a barrier between the source and the receptor. With respect to interior noise levels, noise attenuation effectiveness depends on whether windows are closed or open. Based on the U.S. Environmental Protection Agency's (U.S. EPA's) national average, closed windows reduce noise levels by approximately 25 dBA, while open windows reduce noise levels by about 15 dBA.[5]

Health Effects of Environmental Noise

The World Health Organization (WHO) is perhaps the best source of current knowledge regarding health impacts of noise. According to WHO, sleep disturbance can occur when continuous indoor noise levels exceed 30 dBA (L_{eq}) or when intermittent interior noise levels reach or exceed 45 dBA (L_{max}), particularly if background noise is low. With a bedroom window slightly open (a reduction from outside to inside of 15 dB), the WHO criteria would suggest exterior continuous (ambient) nighttime noise levels should be 45 dBA (L_{eq}) or below, and short-term events should not generate noise in excess of 60 dBA (L_{max}). WHO also notes that maintaining noise levels within the recommended levels during the first part of the night is believed to be effective for the ability to fall asleep.[6]

Other potential health effects of noise identified by WHO include decreased performance on complex cognitive tasks, such as reading, attention, problem solving, and memorization; physiological effects, such as hypertension and heart disease (after many years of constant exposure, often by workers, to high noise levels); and hearing impairment (again, generally after long-term occupational exposure, or shorter-term exposure to very high noise levels, for example, exposure several times a year to a concert with noise levels at 100 dBA). Noise can also disrupt speech intelligibility at relatively low levels; for example, in a classroom setting, a noise level as low as 35 dBA can disrupt clear understanding. Finally, noise can cause annoyance and can trigger emotional reactions like anger, depression, and anxiety. WHO reports that during daytime hours, few people are seriously annoyed by activities with noise levels below 55 dBA, or moderately annoyed by activities with noise levels below 50 dBA.

[4] The 1.5-dBA variation in attenuation rate (6 dBA vs. 7.5 dBA) can result from ground-absorption effects, which occur as sound travels over soft surfaces such as soft earth or vegetation (7.5 dBA attenuation rate) versus hard ground such as pavement or very hard-packed earth (6 dBA rate) (U.S. Housing and Urban Development, The Noise Guidebook, 1985, p. 24. Available online at: https://www.hudexchange.info/onecpd/assets/File/Noise-Guidebook-Chapter-4.pdf. Accessed May 30, 2018.

[5] U.S. Environmental Protection Agency, 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, Appendix B, Table B-4, p. B-6, March 1974.

[6] World Health Organization, 1999. Guidelines for Community Noise, Chapter 3, p. 46, April 1999. Available online at: http://www.who.int/docstore/peh/noise/guidelines2.html. Accessed May 30, 2018.

Vehicle traffic and continuous sources of machinery and mechanical noise contribute to ambient noise levels. Short-term noise sources, such as large vehicle audible warnings, the crashing of material being loaded or unloaded, car doors slamming, and engines revving, contribute very little to 24-hour noise levels but are capable of causing sleep disturbance and severe annoyance. The importance of noise to receptors depends on both time and context. For example, long-term high noise levels from large traffic volumes can make conversation at a normal voice level difficult or impossible, while short-term peak noise levels at night can disturb sleep.

FUNDAMENTALS OF GROUNDBORNE VIBRATION

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Several different methods are typically used to quantify vibration amplitude. One is the Peak Particle Velocity (PPV) and another is the Root Mean Square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. Vibration is typically measured in inches per second (in/sec) or millimeters per second (mm/sec).

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile-driving and vibratory compaction equipment typically generates the highest construction-related groundborne vibration levels. Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. In general, such vibration is only an issue when sensitive receptors are located in close proximity. Since rubber tires provide vibration isolation, rubber-tire vehicles rarely create substantial groundborne vibration effects unless there is a discontinuity or bump in the road that causes the vibration.[7] Because of the sudden and impulsive nature of such activities, the use of the PPV descriptor is the most common measure of construction vibration.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with activities or cause annoyance, are evaluated against different vibration limits. The California Department of Transportation (Caltrans) has provided guidance on the evaluation and impact criteria related to groundborne vibration, as documented in the "Transportation and Construction Vibration Guidance Manual".[8] **Table 4.8.3: Vibration Guidelines for Human Annoyance** summarizes the Caltrans manual guidelines to assess the potential for annoyance, which can range from barely perceptible to severe, based on vibration PPV levels, with the potential for annoyance based on whether the vibration is transient (i.e., single, isolated vibration events, such as blasting or a dropped ball) or continuous or frequent (i.e., sources such as impact pile drivers, pogo-stick compactors, vibratory pile drivers, and vibratory compaction equipment). **Table 4.8.4: Vibration Guidelines for Potential Damage to Structures** summarizes the Caltrans manual guidelines to assess the potential for damage to structures,

[7] Federal Transit Administration, 2006. *Transit Noise and Vibration Impact Assessment*, DTA-VA-90-1003-06, p. 10-6, May 2006, U.S. Department of Transportation. Available online at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed May 30, 2018.

[8] California Department of Transportation, 2013. Transportation and Construction Vibration Guidance Manual, p. 38, September 2013. Available online at: http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. Accessed May 30, 2018.

based on vibration PPV levels, with the potential for damage based on building types (i.e., the fragility or strength of a building structure) and whether the vibration is transient or continuous or frequent.

Table 4.8.3: Vibration Guidelines for Human Annoyance

Human Response	Maximum Peak Particle Velocity (in/sec, PPV)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.90	0.10
Severe	2.00	0.40

Note: in/sec = inches per second; PPV = peak particle velocity

[1] Transient sources create a single, isolated vibration event, such as blasting or drop balls.

[2] Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: Caltrans, Transportation and Construction Vibration Guidance Manual, September 2013, Table 20, p. 38.

Table 4.8.4: Vibration Guidelines for Potential Damage to Structures

Structure Type and Condition	Maximum Peak Particle Velocity (in/sec, PPV)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.02	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Caltrans, Transportation and Construction Vibration Guidance Manual, September 2013, Table 19, p. 38.

With the exception of long-term occupational exposure, vibration levels rarely affect human health. Instead, most people consider vibration to be an annoyance that can affect concentration or disturb sleep or interfere with activities. Studies have shown that the threshold of perception for average persons is in the range of 0.008 to 0.012 in/sec PPV. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Vibration may be found to be annoying at much lower levels than those shown in Table 4.8.3, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. On the other hand, persons exposed to elevated ambient vibration levels such as people in an urban environment may tolerate a higher vibration level. People may tolerate infrequent, short-duration vibration levels, but human annoyance to vibration becomes more pronounced if the vibration is continuous or occurs frequently.

Low-level vibrations frequently also cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

High levels of vibration can damage fragile buildings or interfere with sensitive equipment. Depending on the age of the structure and type of vibration (transient, continuous, or frequent intermittent sources), vibration levels as low as 0.5 to 2.0 in/sec PPV can damage a structure.[9] Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building.

EXISTING NOISE ENVIRONMENT

Existing Noise-Generating Uses

The major noise sources affecting the East of 101 Area are vehicular traffic, railroad, aircraft, BART, and commercial/industrial activities. Land uses in the area are mostly limited to offices, commercial and light industrial. The project site is generally bounded by East Grand Avenue to the north, Haskins Way to the west, the Bay Trail and shoreline to the south, and adjacent parcels containing a recycling center and portions of the Genentech campus to the east. The project site is served by East Grand Avenue as the primary arterial road, fed by Haskins Way and East Jamie Court. To the south, the existing industrial development meets the Bay shoreline. Haskins Way and East Jamie Court are not thru-roads; therefore, the majority of ambient traffic noise comes from thru traffic on East Grand Avenue.

There are several industrial uses in the project vicinity, including light industrial manufacturing and distribution uses to the west, and the South San Francisco Scavenger Company and Blue Line Transfer waste collection and recycling facility to the east. The majority of the noise generated by these uses comes from trucking and distribution activities. To the north and northwest, the land use shifts from industrial uses to office/R&D uses, specifically the Genentech campus north of East Grand Avenue. The majority of noise generated by these uses comes from thru traffic along East Grand Avenue.

Existing Noise-Sensitive Uses

Some land uses (and associated users) are considered more sensitive to ambient noise levels than others due to the types of activities typically involved with the land use and the amount of noise exposure (in terms of both exposure duration and insulation from noise). In general, occupants of residences, schools, daycare centers, hospitals, places of worship, and nursing homes are considered to be sensitive receptors (e.g., persons who are sensitive to noise based on their specific activities, age, health). The project site is largely surrounded by light industrial and office/R&D uses. There are no residences, nursing homes, hospitals, churches, libraries, or schools within 1 mile of the project site. There are also hotels along

[9] California Department of Transportation, 2013. Transportation and Construction Vibration Guidance Manual, September 2013, Table 9, p. 23. Available online at: http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. Accessed on May 30, 2018.

Gateway Boulevard, Forbes Boulevard, Grand Avenue, Mitchell Avenue, Airport Boulevard, and South Airport Boulevard. These hotels are located more than 0.75 mile from the project site.

There are childcare centers and a preschool along Gateway Boulevard and Allerton Avenue. The project site is located approximately 0.25 mile southeast from one existing daycare center, the existing Early Years preschool at 371 Allerton Avenue, and approximately 0.20 mile southeast from one daycare center currently under construction, the Genentech Childcare Facility at 342 Allerton Avenue, as described in Section 4.A, Approach to Environmental Analysis, under "Baseline Setting".

Ambient Noise Measurements

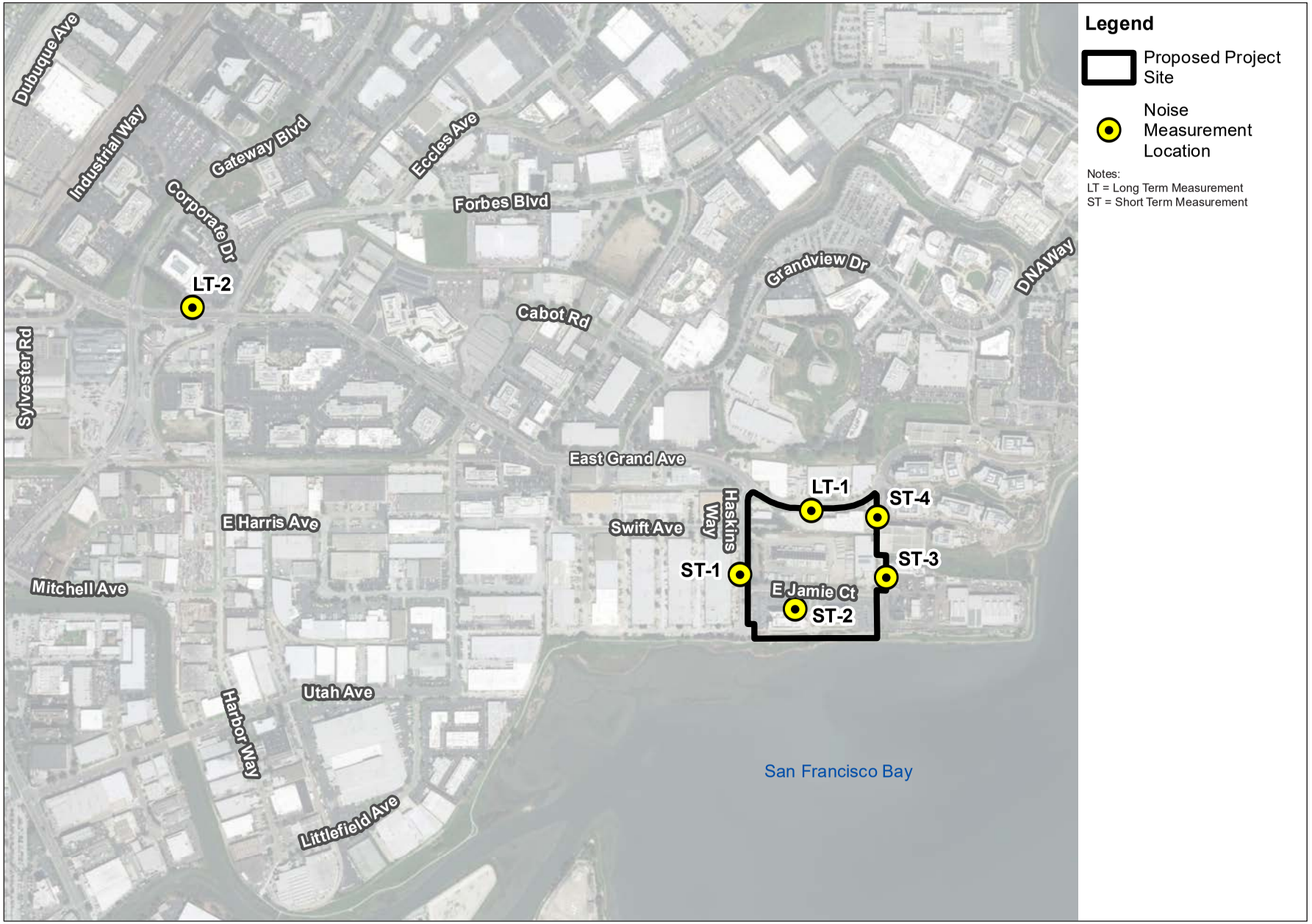
To characterize the background noise environment in the project vicinity, a total of six noise measurements were collected.[10] Two long-term (48 hour) measurements and six short-term (15 minute) measurements (at four short-term measurement locations) were collected in May 2018 in order to determine noise characteristics of the existing ambient environment near the project site and along East Grand Avenue, the nearest and primary arterial road. Measurement locations are indicated on **Figure 4.8.1: Noise Measurement Locations**. Generally, the major noise source at each long-term measurement location was traffic on East Grand Avenue. Aircraft flyovers were also clearly noticeable and contributed to the overall noise level. Noise measurement data are included in Appendix E. A summary of noise measurement data is presented in **Table 4.8.5: Summary of Long-Term (LT) Noise Monitoring on the Project Site and Vicinity (dBA)** and **Table 4.8.6: Summary of Short-Term (ST) Noise Monitoring on the Project Site and Vicinity (dBA)**.

The long-term measurement at Location LT-1 was made on a utility pole near the north edge of the project site at 410 East Grand Avenue. At Location LT-1, in addition to noise associated with local traffic and aircraft flyovers, noise from construction at the nearby Genentech building as well as occasional idling trucks around the site also contributed to the noise levels. At Location ST-4, there is a steel plate covering on the road which generated maximum noise levels up to 85 dBA when vehicles traveled over it.

The long-term measurement at Location LT-2 was made on a light pole on East Grand Avenue between Gateway Boulevard and Forbes Boulevard. The purpose of the measurement at Location LT-2 was to give additional information on noise from traffic on East Grand Avenue and be located farther from construction activities at the Genentech facility near the project site.

The trucking terminal use at 201 Haskins Way was also operating in 2017 but has since closed. Since the trucking use no longer operates on-site, the noise levels measured in May 2018 (when the use was not operating) are considered to reflect the existing ambient noise environment in the project vicinity.

[10] RGD Acoustics, 2018. *Noise Impact Analysis for 201 Haskins Way, South San Francisco, CA*. Prepared June 8, 2018. Available as Appendix E of this EIR.



Source: RGD Acoustics (2018)

201 HASKINS WAY PROJECT

FIGURE 4.8.1: NOISE MEASUREMENT LOCATIONS

Table 4.8.5: Summary of Long-Term (LT) Noise Monitoring on the Project Site and Vicinity (dBA)

Site	Location	Weekday CNEL	Average Noisiest Weekday Hour	
			Time	L_{eq}
LT-1	Northern boundary of the project site on East Grand Avenue between Haskins Way and the Genentech campus	70	8:00 a.m. – 9:00 a.m.	68
LT-2	Northern side of East Grand Avenue between Gateway Boulevard and Forbes Boulevard	75	3:00 p.m. – 4:00 p.m.	73

Source: RGD Acoustics (2018)

Table 4.8.6: Summary of Short-Term (ST) Noise Monitoring on the Project Site and Vicinity (dBA)

Site	Location	Date and Time	L_{eq}	L_{50}	L_{max}
ST-1	Haskins Way at setback of sidewalk between Swift Avenue and East Jamie Court	May 16, 2018 11:20 a.m. – 11:35 a.m.	67	61	Cars: 62 – 72, (64 – 67 typ.) Med Trucks: 70 – 77 Heavy Trucks: 69 – 79 Truck Brakes: 88 Jets: 61 – 62 typ. Backup Beeper at Haskins Way/E. Jamie Ct Intersection: < 57
ST-2	Within the 400-450 East Jamie Court parcel north of the existing 400 East Jamie Court building	May 16, 2018 11:47 a.m. – 12:08 p.m. May 18, 2018 2:47 p.m. – 3:02 p.m.	61 66	59 55	<u>May 16, 2018:</u> Cars: <54, 55 – 57 Med Trucks: 60, 64 Heavy Trucks: 60 Jets: 55 – 70 Construction (steady): 62 Construction (cutting): 64 - 68 Street Sweeper on Haskins: 60 – 62 <u>May 18, 2018:</u> Med Trucks: 54, 57 – 60 typ. Heavy Trucks: 61 - 64 Helicopter: 64, 76, 87 Parking Lot Car: 61
ST-3	451 East Jamie Court near the east property line, adjacent to the South San Francisco Scavenger and Blue Line Transfer facility	May 16, 2018 12:17 p.m. – 12:33 p.m.	63	59	Cars: < 58 Medium Trucks: 62, 65 Heavy Trucks, 76 – 77 Loading activity: 62 – 65 Nearby Truck Idle: 57, 63, 70 Backup Beeper: 75 Jets: 62 – 64
ST-4	Northeastern side of the project site on East Grand Avenue between the 430 East Grand Avenue parcel and the Genentech campus parking structure	May 16, 2018 12:17 p.m. – 12:33 p.m. May 18, 2018 2:39 p.m. – 2:53 p.m.	65 67	57 57	Cars (w/o metal sheet cover): 58 – 62 Steel Plate Cover: 69 – 71 typ., 85 Construction: 55 – 63 Street sweeper: 83

Source: RGD Acoustics (2018)

4.8.3 Baseline Conditions

The analyses in California Environmental Quality Act (CEQA) documents typically present the existing environmental setting as the baseline conditions against which the project conditions are compared to determine whether an impact is significant. However, in the study area, some land development projects are either recently occupied or under construction. Because these projects will be complete by the time the proposed project is operational, the analyses provide baseline conditions that take these conditions into account. Using an existing plus project analysis would not accurately reflect the conditions that will exist at the time the proposed project's impacts would actually occur; therefore, a baseline plus project conditions analysis was used.

Section 4.1, Approach to Environmental Analysis, under "Approach to Baseline Setting," describes the projects that are under construction or will be operational prior to construction of the proposed project. Two projects, the 249 East Grand Avenue project and the Genentech Building B-40 project, involve new office/R&D buildings that are under construction within a 0.5-mile radius of the project site. The project site is also located approximately 0.20 mile southeast from the Genentech Childcare Facility project under construction at 342 Allerton Avenue.

4.8.4 Regulatory Framework

This section provides a summary of the plans and policies of the City of South San Francisco (City), and regional, state, and federal agencies that have policy and regulatory control over the project site.

FEDERAL

U.S. Environmental Protection Agency

In 1972, the Noise Control Act (42 United States Code [USC] section 4901 et seq.) was passed by Congress to promote noise environments in support of public health and welfare. It also established the U.S. EPA Office of Noise Abatement and Control to coordinate federal noise control activities. The agency established guidelines for noise levels that would be considered safe for community exposure without the risk of adverse health or welfare effects. The agency found that to prevent hearing loss over the lifetime of a receptor, the 24-hour average L_{eq} should not exceed 70 dBA, and the L_{dn} should not exceed 55 dBA in outdoor activity areas or 45 dBA indoors to prevent interference and annoyance.[11] In 1982, the agency phased out the office's funding as part of a shift in federal noise control policy to transfer the primary responsibility of regulating noise to state and local governments.

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under Title 40 of the Code of Federal Regulations, Part 205, Subpart B. The federal truck passby noise standard is 80 dBA at 50 feet from the vehicle pathway centerline, under specified test procedures. These requirements are implemented through regulatory controls on truck manufacturers.

[11] U.S. Environmental Protection Agency, 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, p. 3, March 1974.

U.S. Federal Transit Administration

The U.S. Federal Transit Administration (FTA) has established general methodology guidelines and impact criteria for assessment of noise from construction activities in its document, *Transit Noise and Vibration Impact Assessment*. Guidelines are provided for both general assessment and detailed assessments of construction noise.[12]

The general assessment of construction noise impact includes the following major elements:

- Predictions of construction noise are based on the two noisiest pieces of equipment expected to be used during each phase of the four-phase construction program.
- Equipment is assumed to operate at full power for an hour or more.
- Construction equipment is assumed to operate in the center of the construction site.
- Construction noise levels are to be calculated as hourly L_{eq}s.

When using the above method to estimate construction sound levels, the FTA provides guidelines for assessing the potential for adverse community reaction. In general, no substantial adverse reaction would be expected if the calculated hourly L_{eq} were to remain at or below 90 dBA at residential receptors during daytime hours and 80 dBA at night.

STATE

California Government Code Section 65302 requires each local government entity to implement a noise element as part of its general plan.[13] In addition, the California Governor's Office of Planning and Research has developed guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The City has developed guidelines that are described below.

California Department of Transportation

Caltrans has published several documents characterizing assessment procedures and impact criteria related to traffic noise and groundborne vibration. Caltrans published the "Technical Noise Supplement" in September 2013, which describes the measurement, modelling, and noise impact assessment procedures for evaluating noise from traffic. The document states that changes in noise levels are perceived as follows: 3 dBA as barely perceptible, 5 dBA as readily perceptible, and 10 dBA as a doubling or halving of noise."[14]

[12] U.S. Federal Transit Administration, 2006. *Transit Noise and Vibration Impact Assessment*, pp. 12-1–12-9, May 2006. Available online at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed May 30, 2018.

[13] California Government Code, Title 7, Division 1, Chapter 3, Section 65302(f)(1), June 27, 2017. Available online at: https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=GOV&division=1.&title=7.&part=&chapter=3.&article=5. Accessed May 30, 2018.

[14] California Department of Transportation, 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol, Table 2-10, p. 2-45, September 2013. Available online at: http://www.dot.ca.gov/env/noise/docs/tens-sep2013.pdf. Accessed May 30, 2018.

Caltrans has also provided guidance on the evaluation and impact criteria related to groundborne vibration, as documented in the "Transportation and Construction Vibration Guidance Manual".[15] Tables 4.8.3 and 4.8.4, p. 4.8.6, summarize the Caltrans manual guidelines to assess the potential for human annoyance and damage to structures.

REGIONAL

Comprehensive Airport Land Use Compatibility Plan

State law requires Airport Land Use Commissions (ALUCs) to prepare and adopt an Airport Land Use Compatibility Plan (ALUCP) for each public use and military airport within their jurisdiction. Further, ALUCs are required to review the plans, regulations, and other actions of local agencies and airport operators within each Commission's jurisdiction. San Francisco International Airport is located 1 mile south of the project site. Based on state law and guidance provided in the *California Airport Land Use Planning Handbook*, the *2012 Comprehensive Airport Land Use Compatibility Plan* prepared for the San Francisco Airport (2012 SFO ALUCP)[16] has one area of concern related to aircraft noise impact reduction, specifically to reduce the potential number of future airport area residents who could be exposed to noise impacts from airport and aircraft operations.

The 2012 SFO ALUCP contains airport/land use compatibility policies and criteria that apply to all land uses except those considered as existing land uses. Airport land use commissions assist local agencies in ensuring compatible land uses in the vicinity of airports, based on safety and noise compatibility considerations; and establish construction standards for new buildings near airports, including sound insulation requirements.

After an ALUC has adopted its ALUCP, affected local governments must update their general plans, specific plans, and land use regulations to be consistent with the ALUCP. Even if the local government has amended its plans to be consistent with the ALUCP, it must still submit proposed new and amended general plans, specific plans, land use ordinances (including rezonings), regulations, and facility master plans to the ALUC for review. The City/County Association of Governments of San Mateo County (C/CAG) ALUC reviews local land use policy actions and administrates consistency review and submits recommendations to the C/CAG Commission.

As identified in the 2012 SFO ALUCP, the project site is not located within an ALUCP noise safety zone.[17]

[15] California Department of Transportation, 2013. Transportation and Construction Vibration Manual, p. 38, September 2013. Available online at: http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. Accessed May 30, 2018

[16] City/County Association of Governments of San Mateo County, 2012. *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport* (20120 SFO ALUCP). Available online at: http://ccag.ca.gov/plansreportslibrary/airport-land-use/. Accessed May 10, 2018.

[17] 2012 SFO ALUCP, Exhibit IV-2, p. IV-5.

LOCAL

City of South San Francisco General Plan

The Noise Element of the *City of South San Francisco General Plan* (General Plan) addresses noise sources in the community and identifies ways to reduce the impacts of these noise sources. The Noise Element contains policies and programs to achieve and maintain noise levels compatible with various types of land uses. Land uses that are sensitive to noise are identified and future noise-generating land uses are located so that they do not impact those sensitive areas. The following are the guiding and implementation policies contained in the Noise Element of the General Plan.

Policy 9-G-1: Protect public health and welfare by eliminating or minimizing the effects of existing noise problems, and by preventing increased noise levels in the future.

Policy 9-G-2: Continue efforts to incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.

Policy 9-I-6: Require that applicants for new noise-sensitive developments in areas subject to noise generators producing noise levels greater than 65 dBA CNEL obtain the services of a professional acoustical engineer to provide a technical analysis and design of mitigation measures.

Policy 9-I-7: Where site conditions permit, require noise buffering for all noise sensitive development subject to noise generators producing noise levels greater than 65 dBA CNEL. This noise attenuation method should avoid the use of visible sound walls, where practical.

Policy 9-I-8: Require the control of noise at source through site design, building design, landscaping, hours of operation, and other techniques for new developments deemed to be noise generators.

Policy 9.I.10: Do not allow new residential or noise sensitive development in 70 dB+ CNEL areas impacted by SFO operations, as required by Airport Land Use Commission infill criteria.

Because aircraft overflight noise is a particularly important issue in the City, the General Plan provides noise and land use compatibility standards in compliance with the San Mateo County ALUC. The standards provide land use development requirements based on the existing and projected noise environment in CNEL, as shown in **Table 4.8.7: General Plan Land Use Criteria for Noise-Impacted Areas**.

East of 101 Area Plan

The *East of 101 Area Plan*, which was adopted prior to the City's General Plan, is primarily used as a design level document for new projects located in the East of 101 Area, with the exception of some land use and conservation element policies still in effect. Therefore, the General Plan policies listed under the Noise Element are the guiding policies and supersede all Noise Element policies set forth in Chapter 9 of the *East of 101 Area Plan*.

Table 4.8.7: General Plan Land Use Criteria for Noise-Impacted Areas

Land Use	CNEL Range	General Land Use Criteria
Residential	Less than 65	Satisfactory; no special insulation requirements
	65 to 70	Development requires analysis of noise reduction requirements and insulation as needed
	Over 70	Development should not be undertaken
Commercial	Less than 70	Satisfactory; no special insulation requirements
	70 to 80	Development requires analysis of noise reduction requirements and insulation as needed
	Over 80	Airport-related development only; special noise insulation should be provided
Industrial	Less than 75	Satisfactory; no special insulation requirements
	75 to 85	Development requires analysis of noise reduction requirements and insulation as needed
	Over 85	Airport-related development only; special noise insulation should be provided
Open	Less than 75	Satisfactory; no special insulation requirements
	Over 75	Avoid uses involving concentrations of people or animals

Source: City of South San Francisco General Plan Noise Element

City of South San Francisco Noise Ordinance

The noise regulations of the City of South San Francisco Municipal Code (Municipal Code) are contained in Chapter 8.32 "Noise Regulations." The quantitative noise limits and construction noise regulations are described below.

Section 8.32.030 of the City's Noise Ordinance specifies maximum permissible sound levels to be generated by any property within the City. The maximum allowable level is determined by the land use category of the receiving property and is measured on any receiving property. These levels are summarized in **Table 4.8.8: City Noise Level Standards**. The levels shown in this table are applicable for noises that occur up to 30 minutes per hour, which is equivalent to an L_{50} noise measurement.[18] Noise levels above the standard are allowed, but for shorter periods of time: plus 5 dB for up to 15 minutes per hour, plus 10 dB for up to 5 minutes per hour, plus 15 dB for up to 1 minute per hour, or the noise level standard or the maximum measured ambient level plus 20 dB for any period of time.

Table 4.8.8: City Noise Level Standards

Land Use Category	Time Period	Noise Level (dB)
R-E, R-1 and R-2 zones or any single-family or duplex residential in a specific plan district	10 p.m.—7 a.m.	50
	7 a.m.—10 p.m.	60
R-3 and D-C zones or any multiple-family residential or mixed residential/commercial in any specific plan district	10 p.m.—7 a.m.	55
	7 a.m.—10 p.m.	60
C-1, P-C, Gateway and Oyster Point Marina specific plan districts or any commercial use in any specific plan district	10 p.m.—7 a.m.	60
	7 a.m.—10 p.m.	65
M-1, P-1	Anytime	70

Source: Table 8.32.030 of the City of South San Francisco Municipal Code

[18] Variations in noise exposure over time are can be expressed in terms of a statistical description of what sound level is exceeded over some fraction (10, 50 or 90 percent) of a given observation period (i.e., L10, L50, L90). A 30-minute duration in an hour would be 50 percent of the observation period, and is called an L50 measurement.

If the measured ambient level for any area is higher than the standard set in Table 4.8.8, then the ambient would be the base noise level standard. In such cases, the noise levels standards shall be increased in 5-dB increments above the ambient. If the measurement location is on a boundary between two different zones, the noise level standard would be that applicable to the lower noise zone plus 5 dB.

Section 20.300.010(F) of the Municipal Code states that no vibration shall be produced that is transmitted through the ground and is discernible without the aid of instruments by a reasonable person at the lot lines of the site. Vibrations from temporary construction, demolition, and vehicles that enter and leave the subject parcel (e.g., construction equipment, trains, trucks) are exempt from this standard.

Section 8.32.040 of the Municipal Code also prohibits any source of sound, on multi-family residential property or multi-tenant commercial or industrial property, which contributes a noise level more than 10 dB above the level allowed by Section 8.32.030 3 feet from any wall, floor, or ceiling inside any unit on the same property when the windows and doors of the unit are closed, except within the unit in which the noise source or sources is located.

Section 8.32.050 (d) of the Municipal Code identifies a special provision which allows construction activities with a City permit between the hours of 8 a.m. to 8 p.m. on weekdays, 9 a.m. to 8 p.m. on Saturdays, and 10 a.m. to 6 p.m. on Sundays and holidays. Other hours may be authorized by obtaining a permit, provided the construction meets at least one of the following requirements:

1. No individual piece of equipment shall produce a noise level exceeding 90 dB at a distance of 25 feet. If the device is housed within a structure or trailer on the property, the measurement shall be made outside the structure at a distance as close to 25 feet from the equipment as possible.

2. The noise level at any point outside of the property plane of the project shall not exceed 90 dB.

4.8.5 Impacts and Mitigation Measures

This section describes the impact analysis related to noise and vibration for the proposed project. This section also describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

SIGNIFICANCE CRITERIA

Per the CEQA Guidelines, Appendix G, a noise impact is considered significant if project implementation would result in one or more of the following:

a. Exposure of persons to, or generation of, noise levels in excess of standards established in the General Plan or noise ordinance, or applicable standards of other agencies;

b. Exposure of persons to, or generation of, excessive levels of groundborne vibration or noise;

c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels; or

f. For a project within the vicinity of a private airstrip, exposure of people residing or working in the project area to excessive noise levels.

APPROACH TO ANALYSIS

RGD Acoustics performed on-site surveys in May 2018 to document existing noise levels on and around the project site and to identify noise sensitive land uses within the vicinity of the project site. The surveys included two continuous 48-hour noise measurements and six short-term (15-minute) measurements (at four short-term measurement locations). The noise study evaluated the potential for the project to impact adjacent noise-sensitive uses as a result of increased traffic, operational noise, and construction. The study evaluated whether noise generated by construction and operational activities would increase ambient noise levels above those existing without the project. The study also evaluated operational traffic noise generated by the project in relation to future traffic noise levels in the year 2040.

In order to calculate the increase in traffic noise due to the project, the existing and future traffic noise levels were calculated using the Federal Highway Administration's (FHWA's) Traffic Noise Model (TNM 2.5) using traffic volumes from Kittelson & Associates, Inc. (see Appendix B). The model takes into account the vehicle class, speed, road surface, and distance. The TNM model calculates an L_{eq} based on peak-hour traffic data at a distance of 50 feet from the roadway centerline. The CNEL was determined based on the difference between the peak-hour L_{eq} and CNEL measured at the long-term monitoring locations.

Construction noise and vibration modeling was based on construction schedule and equipment information provided by the project sponsor to the extent available, along with published information on typical noise levels. On-site operational noise sources such as mechanical equipment were also provided by the project sponsor to the extent available, along with published information on typical noise levels. Future noise levels were calculated using available traffic projections and operational data for other identifiable sources.

Mitigation measures are identified to address impacts involving noise levels as a result of the proposed project that would exceed applicable City or state standards or increase noise levels significantly at adjacent uses.

The analysis of project impacts is divided into three parts: Phase 1, project buildout, and cumulative noise increases due to traffic from growth in the project vicinity and the East of 101 Area. Based on applicable regulations, ordinances, and policies, the following quantifiable thresholds were used to evaluate the significance of impacts.

Construction

Substantial Temporary Noise from Construction

Construction activities generate temporary noise level increases in the vicinity of project sites. Since noise generated by construction would be short-term and vary considerably day-to-day, construction noise is evaluated differently than operational noise. Prolonged construction activities could cause interference with normal activities at nearby land uses. Prolonged interference is defined as a substantial noise level increase that occurs for more than 1 year.

Chapter 8.32 of the Municipal Code establishes criteria for construction noise based on hours of operation. Therefore, for the purposes of this assessment, construction noise is considered significant if it:

- occurs outside the allowable hours of operation and exceeds the provisions of Municipal Code Section 8.32.050(d) (individual equipment exceeds 90 dB at 25 feet or 90 dB at any point outside the property plane); or
- causes ambient noise levels to increase significantly at nearby noise sensitive receptors.

Substantial Temporary Vibration during Construction

The following criteria are applied in this analysis for identifying potentially significant vibration impacts:

- Generation of construction-related groundborne vibration levels exceeding the "strongly perceptible" level of 0.1 in/sec PPV at off-site sensitive receptors (i.e., annoyance).
- Generation of construction-related groundborne vibration levels exceeding the modern industrial/commercial buildings damage standard of 0.5 in/sec PPV at on-site or off-site structures (i.e., structural damage).

Operation

Land Use Compatibility

AMBIENT NOISE

In the *California Building Industry Association v. Bay Area Air Quality Management District* case decided in 2015,[19] the California Supreme Court held that CEQA does not generally require lead agencies to consider how existing environmental conditions might impact a project's occupants, except where the project would significantly exacerbate an existing environmental condition. Accordingly, the significance criteria above are relevant only to the extent that the proposed project significantly exacerbates the existing noise and vibration environment where noise or vibration already exceeds standards. Thus, the analysis below evaluates whether the proposed project could exacerbate the existing or future noise environment. As such, the existing ambient noise environment's effect on future project occupants is not further discussed below.

[19] *California Building Industry Association v. Bay Area Air Quality Management District*, 62 Cal.4th 369. Opinion Filed December 17, 2015.

AIRCRAFT NOISE

Intermittent aircraft noise resulting from operations of San Francisco International Airport would be audible at the project site, but aircraft noise levels would not be considered incompatible with the proposed uses. The General Plan noise contour map shows where the projected 2020 65 dBA CNEL contours are located. According to the data on the contour map, the project site would be located well outside the airport's 65 dBA CNEL noise contour. The exterior noise environment at the project site resulting from aircraft would be considered compatible with proposed uses, which are indoor office/R&D uses. The proposed project is not within the vicinity of any private airstrip. There would be no impacts associated with aircraft noise. This topic is not further discussed below.

Substantial Permanent Increase to Noise Levels

A significant noise impact would be identified where a substantial permanent increase to noise would occur through project-generated traffic or on-site project-related noise-generating sources (i.e., mechanical equipment).

TRAFFIC NOISE

In October 2009, an EIR for the *Gateway Business Park Master Plan* promulgated traffic noise impact thresholds based on the general noticeability of noise increases: an increase 3 dBA is just noticeable, and a change of 5 dBA is clearly noticeable. Therefore, for the purposes of this impact assessment, the following increases in traffic noise, based on the *Gateway Business Park Master Plan EIR*, are considered to be significant:

Project Impact:

- 5 dBA or greater if the future noise level is within the normally acceptable range (CNEL 65 dBA or less for residences and child care; CNEL 70 dBA or less for offices and retail).
- 3 dBA or greater if future noise level is above the normally acceptable range.

Cumulative Impact:

- 5 dBA or greater if the future noise level is within the normally acceptable range (CNEL 65 dBA or less for residences and child care; CNEL 70 dBA or less for offices and retail; CNEL 75 dBA or less for industrial land uses) AND the project's contribution is cumulatively considerable (greater than 1 dBA).
- 3 dBA or greater if future noise level is above the normally acceptable range AND the project's contribution is cumulatively considerable (greater than 1 dBA).

MECHANICAL EQUIPMENT

Mechanical equipment noise that generates an L_{50} at receiving properties that exceeds the limits set forth in Table 8.32.030 of the Municipal Code (see Table 4.8.8, above) is considered a significant impact. As shown in Table 4.8.8, above, Mixed Industrial districts (including those west of the project site) have a standard of 70 dBA. Because Business Technology Park districts are not specified in Table 8.32.030 of the Municipal Code, it is assumed for the purposes of this analysis that the standards for C-1, P-C,

Gateway, and Oyster Point Marina specific plan districts or any commercial use in any specific plan district (60 dB between 10 p.m. and 7 a.m. and 65 dB between 7 a.m. and 10 p.m.) would be applied to the proposed project, as they are the most similar to an office/R&D designation. As a conservative approach, the City considers the C-1, P-C, Gateway, and Oyster Point Marina specific plan districts standards as the basis for operational mechanical equipment noise analysis for the project site and surrounding land uses. In addition, Section 8.32.040, "Interior Noise Limits," makes it unlawful for any person to operate or cause to be operated any source of sound on multitenant commercial or industrial property, a noise level more than 10 dB above the allowed level specified in Table 8.32.030, when measured 3 feet from any wall, floor, or ceiling inside any unit when the windows and doors of the units are closed. As shown in Table 4.8.6, none of the short-term noise measurements exceed the noise limit L_{50} of 65 dB. The highest existing short-term noise measurement taken in the project vicinity was a daytime L_{50} of 61 dB at Location ST-1.

OPERATIONAL VIBRATION

Operation of the proposed project is not anticipated to generate perceptible levels of vibration. Groundborne vibrations from operation generally occur from the operation of heavy machinery, particularly in an industrial setting, or heavy transit such as rail and aircraft. The proposed project would involve the operation of new office/R&D uses that do not involve the ongoing use of heavy machinery. The proposed uses would involve daily worker commuter trips and occasional use of trucks for deliveries, maintenance, and materials transport. As described in "Fundamentals of Groundborne Vibration," above, such vibration is only an issue when sensitive receptors are located in close proximity. Since rubber tires provide vibration isolation, rubber-tire vehicles rarely create substantial groundborne vibration effects unless there is a discontinuity or bump in the road that causes the vibration.[20] Most traffic anticipated during operation of the project would be rubber-tired and operating on pavement that is in good condition. No major sources of vibration are anticipated within any of the proposed new structures. Garbage collection would occur at off-street locations, or would be completed along existing streets, but would be comparable to existing garbage collection activities, and therefore not a significant vibration source. Furthermore, under Section 20.300.010(F) of the Municipal Code, vibrations from temporary construction, demolition, and vehicles that enter and leave the subject parcel (e.g., trucks) are exempt from the City's noise-related performance standards.[21] For these reasons, vibration associated with operation of the proposed project is not further discussed below.

[20] U.S. Federal Transit Administration, 2006. *Transit Noise and Vibration Impact Assessment*, DTA-VA-90-1003-06, p. 10-6, May 2006, U.S. Department of Transportation. Available online at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed May 30, 2018.

[21] City of South San Francisco, 2018. Municipal Code Section 20.300.010(F).) provides that no vibration shall be produced that is transmitted through the ground and is discernible without the aid of instruments by a reasonable person at the lot lines of the site. Vibrations from temporary construction, demolition, and vehicles that enter and leave the subject parcel (e.g., construction equipment, trains, trucks) are exempt from this standard. Available online at: http://qcode.us/codes/southsanfrancisco/. Accessed August 28, 2018.

IMPACT EVALUATION

Construction

Impact NO-1: Construction activities for the proposed project would not generate noise that would substantially increase temporary noise levels at uses in the vicinity of the site. ***(Less than Significant)***

Project implementation would result in operation of heavy equipment on the project site for demolition of existing structures and construction of new structures. Construction activities would occur intermittently on the project site over the construction duration and would generate a temporary increase in noise levels on the project site and in the project vicinity. To assess potential construction noise impacts, sensitive receptors and their relative exposure were identified and described below.

Phase 1 Development

Phase 1 construction activities would commence in 2019 and last about 18 months. These activities would include the demolition of the existing building at 201 Haskins Way and the construction of a new office building, a surface parking lot, a parking garage, and a new building addition at 400 East Jamie Court.

During Phase 1 development, the extent of work activities, including demolition and construction, would be approximately 164 feet from the industrial buildings to the west across Haskins Way, 290 feet from the office/warehouse buildings to the north across East Grand Avenue, 340 feet from the Genentech office building to the northeast, and 290 feet from the South San Francisco Scavenger office building to the east. The nearest noise sensitive land use is the outdoor area of the Genentech Childcare Facility, which is currently under construction as described in Section 4.A, Approach to Environmental Analysis, and would be more than 1,200 feet northwest of project demolition and construction activities.

Table 4.8.9: Construction Noise Levels at Adjacent Land Uses – Phase 1, shows the calculated maximum instantaneous exterior noise levels from project-related construction equipment at the neighboring office/industrial land uses under Phase 1. **Table 4.8.10: Construction Noise Levels at Future Genentech Childcare Facility – Phase 1**, shows the calculated maximum instantaneous exterior noise levels from project-related construction equipment under Phase 1 at the outdoor area of the future Genentech Childcare Facility.

The calculated exterior noise levels are based on the methodology of the FHWA's 2006 Roadway Construction Noise Model and include a factor for acoustical shielding provided by the existing buildings, where appropriate.[22] Standard construction with the windows closed provides a noise reduction of approximately 25 dBA, therefore, the noise levels in Tables 4.8.9 and 4.8.10 would also be attenuated by 25 dBA for persons inside the neighboring buildings.

Construction-related activities would typically occur Monday through Friday, between 8 a.m. and 8 p.m., although some work is anticipated to occur on Saturdays between 9 a.m. and 8 p.m. or on Sundays between 10 a.m. and 6 p.m. According to Municipal Code Section 8.32.050, the City does not place

[22] Federal Highway Administration, 2006. Roadway Construction Noise Model – RCNM. Available online at: https://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/. Accessed June 5, 2018

specific restrictions on noise emission during these hours. However, noise from construction activities would be noticeable at times at the neighboring buildings. For example, the measured outdoor ambient L_{eq} along Haskins Way (noise measurement location ST-1, as shown in Figure 4.8.1, above) is 67 dBA while the calculated maximum noise levels from construction activities for industrial buildings west of the project site are generally 3 to 13 dBA higher. The increase in average noise levels will depend on the duration of use of the construction equipment and the number of simultaneous activities.

Table 4.8.9: Construction Noise Levels at Adjacent Land Uses – Phase 1

Construction Equipment	Maximum Noise Levels (L_{max}) for Typical Construction Activities (dBA)			
	Industrial Buildings to the West across Haskins Way	Office/Warehouse Buildings to the North across East Grand Avenue	Genentech Office Building to the Northeast	South San Francisco Scavenger Office Building
Backhoe	68	58	56	56
Compressor	68	58	56	56
Concrete Saw	80	70	68	68
Dozer	72	62	60	60
Dump Truck	66	56	54	54
Gradall	73	63	61	61
Flat Bed Trucks	64	54	52	52
Excavator	71	61	59	59
Vacuum Street Sweeper	72	62	60	60
Tractor	74	64	62	62
Front End Loader	69	59	57	57
Compactor (ground)	73	63	61	61
Scraper	74	64	62	62
Auger Drill Rig	74	64	62	62
Slurry Trenching Machine	70	60	58	58
Gradall	73	63	61	61
Generator	71	61	59	59
Pneumatic Tools	75	65	63	63
Welder	64	54	52	52
Pump	71	61	59	59
Crane	71	61	59	59
Concrete Mixer Truck	69	59	57	57
Man-lift	65	55	53	53
Roller	70	60	58	58
Paver	67	57	55	55

Source: RGD Acoustics (2018)

Table 4.8.10: Construction Noise Levels at Future Genentech Childcare Facility – Phase 1

Construction Equipment	Maximum Noise Levels (L_{max}) for Typical Construction Activities during Phase 1 (dBA)
Backhoe	45
Compressor	45
Concrete Saw	57
Dozer	49
Dump Truck	43
Gradall	50
Flat Bed Trucks	41
Excavator	48
Vacuum Street Sweeper	49
Tractor	51
Front End Loader	46
Compactor (ground)	50
Scraper	51
Auger Drill Rig	51
Slurry Trenching Machine	47
Gradall	50
Generator	48
Pneumatic Tools	52
Welder	41
Pump	48
Crane	48
Concrete Mixer Truck	46
Man-lift	42
Roller	47
Paver	44

Source: RGD Acoustics (2018)

The nearest noise sensitive land use is the outdoor area of the future Genentech Childcare Facility at 342 Allerton Avenue. Based on the existing traffic volumes on East Grand Avenue and the distance between the facility and East Grand Avenue, the exterior noise levels due to traffic at the facility closest to the project site was calculated to be an L_{eq} of 63 dBA. Table 4.8.10 shows that given the distance of at least 1,200 feet from the project site, the noise from project-related construction would generally be less than 55 dBA outdoors. This may be noticeable at times but is less than the noise levels generated by other intermittent ambient noise sources, such as traffic and aircraft.

Since construction activities are allowed by the City's code during regular business hours and construction noise would be less than the noise levels of intermittent ambient noise sources at the nearest noise sensitive land use (future Genentech Childcare Facility), the proposed project would not generate a

substantial temporary or periodic increase in ambient noise levels surrounding noise sensitive land uses above levels existing without the project. This is considered a less-than-significant impact.

There is a potential for noise from construction of Phase 1 to adversely affect existing uses on the project site and neighboring office/warehouse buildings. There is also a potential for noise from construction during Phase 1 to affect existing Phase 2 area buildings (101 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court). Construction activities are allowed by the City's code during regular business hours. As shown in Table 4.8.9, the calculated maximum instantaneous exterior noise levels from project-related construction equipment at the neighboring office/industrial land uses under Phase 1 would not exceed 75 dBA. Furthermore, these nearest land uses are industrial and office/R&D, and are not considered sensitive land uses. The proposed project would not generate a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. This impact would be less than significant. Improvement Measure IM-NO-1: Construction Noise Minimization and Notification is suggested to further reduce noise emitted by construction equipment and to schedule high noise-producing activities appropriately, and to provide notification of the construction schedule to neighboring land uses through a construction complaint liaison.

Improvement Measure IM-NO-1: Construction Noise Minimization and Notification

In order to minimize disruption and potential annoyance during project construction, the project sponsor shall implement the following construction minimization and notifications measures:

- All construction equipment shall be equipped with mufflers and sound control devices (e.g., intake silencers and noise shrouds) that are in good condition and appropriate for the equipment.
- Maintain all construction equipment to minimize noise emissions.
- Stationary equipment shall be located on the site to maintain the greatest possible distance to the existing office buildings, where feasible.
- Unnecessary idling of internal combustion engines should be strictly prohibited.
- Provide advance notification to surrounding land uses disclosing the construction schedule, including the various types of activities that would be occurring throughout the duration of the construction period.
- The construction contractor shall provide the name and telephone number an on-site construction liaison. If construction noise is found to be intrusive to the community (complaints are received), the construction liaison shall investigate the source of the noise and require that reasonable measures be implemented to correct the problem.
- Schedule high noise-producing activities during times when they would be least likely to interfere with the noise sensitive activities of the neighboring land uses, when possible.

City decision makers may choose to impose Improvement Measure IM-NO-1 on the proposed project as a condition of project approval.

Phase 2 Development

Project buildout would involve construction over a total of approximately 4 years (18 months during Phase 1 development and 18 months during Phase 2 development). Phase 2 construction would not begin until existing uses are vacated. Construction activities that would occur during Phase 2 development would include the expansion of the Phase 1 parking structure, the demolition of the existing buildings along East Grand Avenue, and the construction of a new office/R&D building and additional, new square footage on the 400-450 East Jamie Court parcel.

During Phase 2 development, the extent of work activities, including demolition and construction, would be approximately 120 feet from the industrial buildings to the west across Haskins Way, 105 feet from the office/warehouse buildings to the north across East Grand Avenue, 200 feet from the Genentech office building to the northeast, and 100 feet from the South San Francisco Scavenger office building to the east. The nearest noise sensitive land use is the outdoor area of the Genentech Childcare Facility, which is currently under construction as described in Section 4.1, Approach to Environmental Analysis, and would be more than 1,000 feet northwest of project demolition and construction activities.

Table 4.8.11: Construction Noise Levels at Adjacent Land Uses – Phase 2, shows the calculated maximum instantaneous exterior noise levels from project-related construction equipment at the neighboring office/industrial land uses under Phase 2. **Table 4.8.12: Construction Noise Levels at Future Genentech Childcare Facility – Phase 2** shows the calculated maximum instantaneous exterior noise levels from project-related construction equipment under Phase 2 of the proposed project at the outdoor area of the future Genentech Childcare Facility. A description of the model used to calculate maximum noise levels for typical construction activities is described under "Phase 1 Development," above.

There is a potential for noise from construction of Phase 2 to adversely affect neighboring office/warehouse buildings. Noise from construction during Phase 2 development could also be disruptive to occupants of Phase 1 area buildings. As with Phase 1 development, construction activities would not occur outside the allowable hours of operation under Municipal Code Section 8.32.050(d).[23] Noise from construction activities would be noticeable at times at the neighboring buildings, as these activities would exceed the measured outdoor ambient L_{eq} by 3 to 15 dBA. The increase in average noise levels will depend on the duration of the construction equipment and the number of simultaneous activities. As shown in Table 4.8.11, individual equipment would not exceed 90 dBA at 25 feet or 90 dB at any point outside the project site as required by Section 8.32.050(d)(1) and 8.32.050(d)(2) of the Municipal Code.[24]Table 4.8.12 shows that given the distance of at least 1,000 feet from the project site, the noise from project-related construction at the future Genentech Childcare Facility would generally be less than

[23] Municipal Code Section 8.32.050(d) states that construction activities which are authorized by a valid city permit shall be allowed on weekdays between the hours of 8 a.m. and 8 p.m., on Saturdays between the hours of 9 a.m. and 8 p.m., and on Sundays and holidays between the hours of 10 a.m. and 6 p.m.

[24] Municipal Code Section 8.32.050(d) states that construction activities outside the standard work hours may be authorized by the permit if they meet at least one of the following limitations: (1) No individual piece of equipment shall produce a noise level exceeding 90 dB at a distance of 25 feet. If the device is housed within a structure or trailer on the property, the measurement shall be made outside the structure at a distance as close to 25 feet from the equipment as possible. (2) The noise level at any point outside of the property plane of the project shall not exceed 90 dB.

60 dBA outdoors. Based on an existing outdoor L_{eq} of 63 dBA (as described under Phase 1 Development above), construction noise from Phase 2 of the proposed project may be noticeable at times but is less than the noise levels generated by other intermittent ambient noise sources, such as traffic and aircraft. Phase 2 construction activities would not cause ambient noise levels to increase significantly at nearby noise sensitive receptors.

Table 4.8.11: Construction Noise Levels at Adjacent Land Uses – Phase 2

Construction Equipment	Maximum Noise Levels (L_{max}) for Typical Construction Activities (dBA)			
	Industrial Buildings to the West across Haskins Way	Office/Warehouse Buildings to the North across East Grand Avenue	Genentech Office Building to the Northeast	South San Francisco Scavenger Office Building
Backhoe	70	67	66	59
Compressor	70	67	66	59
Concrete Saw	82	79	78	71
Dozer	74	71	70	63
Dump Truck	68	65	64	57
Gradall	75	72	71	64
Flat Bed Trucks	66	63	62	55
Excavator	73	70	69	62
Vacuum Street Sweeper	74	71	70	63
Tractor	76	73	72	65
Front End Loader	71	68	67	60
Compactor (ground)	75	72	71	64
Scraper	76	73	72	65
Auger Drill Rig	72	73	72	65
Slurry Trenching Machine	75	69	68	61
Gradall	75	72	71	64
Generator	73	70	69	62
Pneumatic Tools	77	74	73	66
Welder	66	63	62	55
Pump	73	70	69	62
Crane	73	70	69	62
Concrete Mixer Truck	71	68	67	60
Man-lift	67	64	63	56
Roller	72	69	68	61
Paver	69	66	65	58

Note: These calculations represent outdoor noise levels. For persons inside buildings with closed windows, the noise levels provided in this table would be attenuated by 25 dBA, based on FHWA guidance.

Source: RGD Acoustics (2018), FHWA (2006)

Table 4.8.12: Construction Noise Levels at Future Genentech Childcare Facility – Phase 2

Construction Equipment	Maximum Noise Levels (L_{max}) for Typical Construction Activities during Phase 1 (dBA)
Backhoe	47
Compressor	47
Concrete Saw	59
Dozer	51
Dump Truck	45
Gradall	52
Flat Bed Trucks	43
Excavator	50
Vacuum Street Sweeper	51
Tractor	53
Front End Loader	48
Compactor (ground)	52
Scraper	53
Auger Drill Rig	53
Slurry Trenching Machine	49
Gradall	52
Generator	50
Pneumatic Tools	54
Welder	43
Pump	50
Crane	50
Concrete Mixer Truck	48
Man-lift	44
Roller	49
Paver	46

Note: These calculations represent outdoor noise levels. For persons inside buildings with closed windows, the noise levels provided in this table would be attenuated by 25 dBA, based on FHWA guidance.

Source: RGD Acoustics (2018), FHWA (2006)

Phase 2 of the proposed project would not involve construction outside the allowable hours of operation or exceed the provisions of Municipal Code Section 8.32, nor would it cause ambient noise to increase significantly at nearby noise sensitive receptors. Therefore, this impact would be less than significant. As with Phase 1, implementation of Improvement Measure IM-NO-1, above, would further reduce less-than-significant impacts associated with the potential for annoyance to business operations at the neighboring office/warehouse buildings as well as Phase 1 occupants.

Impact NO-2: Construction of the proposed project would create a substantial temporary increase in groundborne vibration levels in the project vicinity above existing conditions. ***(Less than Significant with Mitigation)***

Groundborne vibrations from construction have the potential to affect the existing offsite receptors nearest to the project site such as the existing industrial and office/R&D uses adjacent to and within the project site. The project would involve construction activities in two development phases. Receptors would include the existing 400-450 East Jamie Court buildings, the existing buildings in the Phase 2 area, as well as the nearest offsite buildings.

Phase 1 Development

The proposed Phase 1 construction duration and the distance to nearby buildings are described in Impact NO-1 under "Phase 1 Development," above. Project-related construction vibration is evaluated using methods identified by Caltrans and the FTA.[25,26] Groundborne vibration generated by construction equipment often is evaluated by the maximum rate or velocity of particle movement, commonly referred to as PPV, typically measured in inches per second (in/sec). Most construction activities typically range from between approximately 0.003 in/sec PPV and 0.21 in/sec PPV, when measured at 25 feet. The site-specific construction equipment necessary at any particular location within the project site is not known at this time. **Table 4.8.13: Typical Construction Equipment Vibration Levels**, provides the distance at which various project construction equipment would exceed to the two relevant thresholds of significance, 0.5 in/sec PPV for building damage and 0.1 in/sec PPV for human annoyance.

As shown in Table 4.8.13, the distance at which typical construction equipment would cause substantial vibration in regard to annoyance would occur would be between approximately 0 to 41 feet. The distance at which typical construction equipment would cause substantial vibration in regard to building damage would occur would be between approximately 0 and 14 feet. In general, light equipment such as a small bulldozer would create the least vibration (0.003 PPV at 25 feet), and heavy equipment such as a clam shovel drop would create the most vibration (0.202 PPV at 25 feet). The proposed project may include deep foundations consisting of augured-cast-in-place piles, or drilled shafts. For the purposes of noise analysis, these activities are considered to be similar to caisson drilling, which would create mid-range vibration levels (0.089 PPV at 25 feet).[27]

[25] California Department of Transportation, 2013. *Transportation and Construction Vibration Manual*, Tables 18, 19, and 20, pp. 37–38, September 2013. Available online at: http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. Accessed May 30, 2018

[26] Federal Transit Authority, 2006. *Transit Noise and Vibration Impact Assessment*, pp. 12-10–12-14, May 2006. Available online at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed June 5, 2018.

[27] Caisson drilling is a method used to drill a hole and then insert either a temporary or permanent steel casing in the hole to the desired depth. Then a steel rebar cage is set in place and the hole is filled with concrete. Caisson foundations are mostly used when soil conditions are inadequate to support the load of the structure being built. Generally, caisson holes are created by auger drilling to bedrock or to soil suitable to carry the load.

Table 4.8.13: Typical Construction Equipment Vibration Levels

Construction Equipment or Activity	PPV at 25 feet (in/sec)	Distance at which construction equipment or activity exceeds vibration criteria (ft)	
		Annoyance Threshold (0.1 in/sec PPV)	Building Damage Threshold (0.5 in/sec)
Clam shovel drop	0.202	40	14
Vibratory roller	0.210	41	14
Hoe ram	0.089	23	8
Large bulldozer	0.089	23	8
Caisson drilling[1]	0.089	23	8
Loaded trucks	0.076	21	7
Jackhammer	0.035	12	4
Small bulldozer	0.003	2	1

Note: [1] The proposed project may include deep foundations consisting of augured-cast-in-place piles, or drilled shafts. For the purposes of noise analysis, these activities are considered to be similar to caisson drilling.

Source: RGD Acoustics (2018)

There are no sensitive receptors on the project site or within 41 feet of the project site. Vibration levels from construction equipment would not exceed the human annoyance thresholds beyond 41 feet and would not impact off-site land uses. Therefore, no impacts from construction-related groundborne vibration with respect to human annoyance at off-site sensitive land uses would occur under the proposed project during Phase 1 development.

The nearest off-site structures are located between 160 and 340 feet from the Phase 1 area. There are no off-site structures within 14 feet of the project site. Vibration levels from construction equipment would not exceed the building thresholds beyond 14 feet and would not impact off-site land uses. Therefore, no impacts would occur under the proposed project during Phase 1 development from construction-related groundborne vibration with respect to building damage at off-site sensitive land uses.

However, construction would occur adjacent to on-site buildings and occupants, including the existing office/R&D buildings to remain at 400-450 East Jamie Court, and the existing light industrial buildings in the Phase 2 area to remain during Phase 1 (151 and 151 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court). Some activities on the outer extent of the 201 Haskins Way parcel may also be within 14 feet of these existing light industrial buildings, which are narrowly set back from the 201 Haskins Way parcel line. Construction activities on the 201 Haskins Way parcel during Phase 1 could expose these existing onsite buildings to levels in excess of the building damage thresholds. Therefore, the impact of construction-related groundborne vibration is considered potentially significant.

Mitigation Measure MM-NO-2: Groundborne Vibration Minimization and Avoidance would involve the study of potential vibration-sensitive buildings and the preparation of a mitigation plan, which would apply to activities exceeding damage threshold at applicable distances.

Mitigation Measure MM-NO-2: Groundborne Vibration Minimization and Avoidance

Prior to issuance of a site permit, the project sponsor shall identify areas of potential building damage from construction vibration and determine the distance at which construction equipment would be used during implementation of the proposed project. For any equipment use that would be located near enough to a building to exceed the Caltrans/FTA building damage threshold of 0.5 in/sec, the project sponsor shall prepare a mitigation plan that provides a procedure for limiting vibration on potentially affected structures based on an assessment of each structure's ability to withstand the loads and displacements due to construction vibrations. The project sponsor shall also prepare and implement a compliance monitoring program to ensure construction vibrations near buildings do not exceed the threshold of 0.5 in/sec, and identify site-specific control measures in consideration of equipment location and processes including, but not limited to, the following examples.

- Operate earth-moving equipment on the work site as far away from existing buildings and human-occupied sites as possible.
- Avoid simultaneous operation of vibration-causing construction equipment for demolition, earth-moving, or ground-impacting activities within approximately 50 feet existing buildings, where possible.
- Avoid operation of vibratory rollers and packers within approximately 50 feet of existing buildings, where possible.

Implementation of Mitigation Measure MM-NO-2 will involve preparation of a mitigation plan that will be developed and implemented during the final design phases of the project. Potential impacts associated with groundborne vibration would be identified, avoided and minimized. Therefore, with implementation of Mitigation Measure MM-NO-2, this impact would be reduced to a less-than-significant level.

Phase 2 Development

As shown in Table 4.8.4, typical construction equipment would cause substantial vibration in regard to human annoyance at a distance between approximately 0 to 41 feet. The proposed Phase 2 construction duration and the distance to nearby buildings are described in Impact NO-1 under "Phase 2 Development," above. There are no sensitive receptors on the project site or within 41 feet of the project site. Vibration levels from construction equipment would not exceed the human annoyance thresholds beyond 41 feet and would not impact off-site land uses. Therefore, no impacts from construction-related groundborne vibration with respect to human annoyance at off-site sensitive land uses would occur under the proposed project during Phase 2 development.

Typical construction equipment would cause substantial vibration in regard to building damage at a distance between approximately 0 and 14 feet. Offsite structures would generally be located farther from the project site construction activities (between 100 and 250 feet). The nearest off-site structures are located between 160 and 340 feet from the Phase 2 area. There are no off-site structures within 14 feet of the project site. Vibration levels from construction equipment would not exceed the building thresholds beyond 14 feet and would not impact off-site land uses. Therefore, no impacts from construction-related groundborne vibration with respect to building damage at off-site land uses would occur under the proposed project during Phase 2 development.

The closest structure that could be affected by Phase 2 construction-related groundborne vibration would be the existing on-site 400 and 450 East Jamie Court buildings. Potential Phase 2 development on this parcel is not certain at this time, but could include new building additions or new buildings adjacent to these existing structures. Although these office/R&D buildings are newly constructed and modern, the scope of Phase 2 development and the type of project construction activities necessary on this site have not been determined. Therefore, the impact of construction-related groundborne vibration is considered potentially significant.

There are no off-site buildings within 14 feet of the project site. However, the nearest off-site building, the Genentech parking structure at 620 East Grand Avenue, is located approximately 15 feet east of the project site boundary. To be conservative, it is assumed that this structure is within margin of error of the structural damage threshold. Although this parking structure newly constructed and modern, the type of project construction activities necessary adjacent to the project site boundary has not been determined. Therefore, the impact of construction-related groundborne vibration is considered potentially significant.

Mitigation Measure MM-NO-2 would involve the study of potential vibration-sensitive buildings and the preparation of a mitigation plan. Similar to Phase 1, with implementation of Mitigation Measure MM-NO-2, the impact of groundborne vibration during construction would be reduced to a less-than-significant level.

Operation

Mechanical Equipment Noise

Impact NO-3: Operation of the proposed project mechanical equipment would create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions. ***(Less than Significant with Mitigation)***

The proposed project buildings under both Phase 1 and Phase 2 (at project buildout) are expected to have mechanical equipment generally associated with building ventilation/air-conditioning units and ventilation fans, but may also include other process-specific equipment and possibly emergency diesel generators. Much of the equipment would likely be located on the rooftops of the proposed buildings, or at-grade next to the buildings. However, at this time, the details and locations of the mechanical equipment are not known and therefore, calculations of specific noise levels at surrounding uses cannot be made.

According to the City's Municipal Code, maximum permissible sound levels from the project are determined by the land use category of the receiving property and the L_{50} noise standards are shown in Table 8.32.030 of the Municipal Code (see Table 4.8.8, above.). As discussed in the "Approach to Analysis" section for mechanical equipment noise, above, it is assumed for the purposes of this analysis that the C-1, P-C, Gateway and Oyster Point Marina specific plan districts' L_{50} standards (60 dB between 10 p.m. and 7 a.m. and 65 dB between 7 a.m. and 10 p.m.) would be applied to the project site and surrounding land uses when analyzing the proposed project. In addition, Section 8.32.040 "Interior Noise Limits" makes it unlawful for any person to operate or cause to be operated any source of sound on multitenant commercial or industrial property, a noise level more than 10 dB above the allowed level

specified in Table 8.32.030, when measured 3 feet from any wall, floor or ceiling inside any unit when the windows and doors of the units are closed.

As shown in Table 4.8.6, none of the short-term noise measurements exceed a daytime L_{50} of 65 dB. The highest existing short-term noise measurement taken in the project vicinity was a daytime L_{50} of 61 dB at Location ST-1.

The large commercial systems that are often used in this type of building can generate high noise levels and they would have the potential to generate noise levels in excess of the assumed maximum permissible L_{50} sound level of 65 dB. Therefore, noise from mechanical equipment is considered a potentially significant impact at Phase 1 and project buildout. Mitigation Measure MM-NO-3: Mechanical Equipment Noise Requirements would require analysis of mechanical equipment noise, implementation of noise control measures, and submission of a mechanical equipment noise report prior to issuance of a building permit.

> **Mitigation Measure MM-NO-3: Mechanical Equipment Noise Requirements**
>
> Analysis of noise from the project's mechanical equipment shall be conducted to determine if the equipment will exceed the maximum permissible L_{50} sound levels 60 dB between 10 p.m. and 7 a.m. and 65 dB between 7 a.m. and 10 p.m. when measured at any receiving property as determined by Table 8.32.030 of the Municipal Code forC-1, P-C, Gateway, and Oyster Point Marina specific plan districts and what, if any, noise control measures must be included in the design to meet the City's requirements. Typical noise control measures include barriers, enclosures, silencers and acoustical louvers at vent openings. Prior to issuance of any building permits, the project applicant shall submit a report showing that noise levels calculated for project mechanical equipment will be no greater than maximum permissible sound levels provided in Municipal Code Chapter 8.32 and Table 8.32.030 on receiving properties.

With the implementation of Mitigation Measure MM-NO-3, impacts associated with mechanical equipment noise from the proposed project at Phase 1 or project buildout would be reduced to a less-than-significant level.

Traffic Noise

Impact NO-4: Traffic volumes generated by operation of the proposed project would not create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions. ***(Less than Significant)***

PHASE 1 DEVELOPMENT

Traffic noise levels with and without implementation of Phase 1 of the proposed project are shown in **Table 4.8.14: Traffic Noise Levels under the Proposed Project – Phase 1**, along with the increase in noise due to the project.

Table 4.8.14 shows that the increase in traffic noise would be less than 3 dBA for all roadways in the study area under Phase 1 development. There are childcare centers and a preschool along Gateway Boulevard and Allerton Avenue. The nearest child care center to the project site is the Genentech Childcare Facility currently under construction at 342 Allerton Avenue.

Table 4.8.14: Traffic Noise Levels under the Proposed Project – Phase 1

Roadway		Existing	Existing Plus Phase 1	Increase over Existing
Oyster Point Blvd				
	West of Gateway Blvd	75.2	75.2	0.0
	East of Gateway Blvd	74.1	74.1	0.0
Gateway Blvd				
	Oyster Point Blvd to East Grand Ave	70.4	70.5	0.1
	East Grand Ave to Mitchell Ave	70.2	70.5	0.3
Grand Ave				
	West of Airport Blvd	68.1	68.1	0.0
	Poletti Way to East Grand Ave	69.7	69.9	0.2
East Grand Ave				
	Dubuque Ave to Grand Ave	72.8	73.1	0.3
	Grand Ave to Gateway Blvd	73.6	73.8	0.2
	Gateway Blvd to Forbes Blvd	74.8	75.1	0.3
	Forbes Blvd to Littlefield Ave	73.5	74.0	0.5
	Littlefield Ave to Allerton Ave	74.4	74.9	0.5
	Allerton Ave to Haskins Way	73.3	74.1	0.8
	East of Haskins Way	68.0	68.0	0.0
Haskins Way				
	South of East Grand Ave	68.9	70.8	1.9
Allerton Ave				
	North of East Grand Ave	66.5	66.5	0.0
Littlefield Ave				
	South of East Grand Ave	68.8	69.0	0.2
Forbes Blvd				
	North of East Grand Ave	70.3	70.6	0.3
Harbor Way				
	South of East Grand Ave	70.3	70.3	0.0
Airport Blvd				
	North of Grand Ave	72.5	72.6	0.1
	Grand Ave to San Mateo Ave	73.3	73.3	0.0
South Airport Blvd				
	Michell Ave to U.S. NB Ramp	73.5	73.6	0.1
	U.S. 101 NB Ramp to Utah Ave	71.1	71.1	0.0
	South of Utah Ave	73.4	73.4	0.0
San Mateo Ave				
	West of Airport Blvd	71.4	71.4	0.0
Produce Ave				
	South of San Mateo Ave	73.5	73.6	0.1
Utah Ave				
	East of South Airport Blvd	72.9	73.0	0.1
Mitchell Ave				
	East of Gateway Blvd	71.7	71.7	0.0
U.S. 101 NB Ramps				
	Off-Ramp to East Grand Ave	71.1	71.2	0.1
	Intersecting South Airport Blvd	73.4	73.5	0.1

Note: NB = northbound

Source: RGD Acoustics (2018)

To evaluate impacts on this facility, the nearest applicable noise segments would be East Grand Avenue (between Haskins Way and Allerton Avenue) or Allerton Avenue (north of East Grand Avenue). As shown in Table 4.8.14, these road segments would be exposed to increases which are less than the 3 dBA threshold for a significant increase. Therefore, increase in traffic noise due to the project at Phase 1 development is considered a less-than-significant impact.

PROJECT BUILDOUT

Traffic noise levels with and without implementation of project buildout are shown in **Table 4.8.15: Traffic Noise Levels under the Proposed Project at Project Buildout**, along with the increase in noise due to the project.

Table 4.8.15 shows that the increase in traffic noise would be less than 3 dBA for all roadways in the study area under the project buildout scenario. The nearest child care center to the project site, the future Genentech Childcare Facility located at 342 Allerton Avenue, would be exposed to increases in traffic noise levels less than the 3 dBA threshold for a significant increase in noise levels to sensitive receptors.[28]

Therefore, the increase in traffic noise due to the project at project buildout would be considered a less-than-significant impact.

[28] To evaluate impacts to this facility, the nearest applicable noise segments would be East Grand Avenue (between Haskins Way and Allerton Avenue) or Allerton Avenue (north of East Grand Avenue).

Table 4.8.15: Traffic Noise Levels under the Proposed Project at Project Buildout

Roadway		Existing	Existing Plus Project Buildout	Increase over Existing
Oyster Point Blvd				
	West of Gateway Blvd	75.2	75.3	0.1
	East of Gateway Blvd	74.1	74.1	0.0
Gateway Blvd				
	Oyster Point Blvd to East Grand Ave	70.4	70.5	0.1
	East Grand Ave to Mitchell Ave	70.2	70.6	0.4
Grand Ave				
	West of Airport Blvd	68.1	68.2	0.1
	Poletti Way to East Grand Ave	69.7	70.0	0.3
East Grand Ave				
	Dubuque Ave to Grand Ave	72.8	73.3	0.5
	Grand Ave to Gateway Blvd	73.6	74.0	0.4
	Gateway Blvd to Forbes Blvd	74.8	75.3	0.5
	Forbes Blvd to Littlefield Ave	73.5	74.3	0.8
	Littlefield Ave to Allerton Ave	74.4	75.2	0.8
	Allerton Ave to Haskins Way	73.3	74.6	1.3
	East of Haskins Way	68.0	68.0	0.0
Haskins Way				
	South of East Grand Ave	68.9	71.8	2.9
Allerton Ave				
	North of East Grand Ave	66.5	66.5	0.0
Littlefield Ave				
	South of East Grand Ave	68.8	69.2	0.4
Forbes Blvd				
	North of East Grand Ave	70.3	70.9	0.6
	Harbor Way			
South of East Grand Ave		70.3	70.3	0.0
Airport Blvd				
	North of Grand Ave	72.5	72.7	0.2
	Grand Ave to San Mateo Ave	73.3	73.3	0.0
South Airport Blvd				
	Michell Ave to U.S. NB Ramp	73.5	73.7	0.2
	U.S. 101 NB Ramp to Utah Ave	71.1	71.1	0.0
	South of Utah Ave	73.4	73.5	0.1
San Mateo Ave				
	West of Airport Blvd	71.4	71.4	0.0
Produce Ave				
	South of San Mateo Ave	73.5	73.7	0.2
Utah Ave				
	East of South Airport Blvd	72.9	73.1	0.2
Mitchell Ave				
	East of Gateway Blvd	71.7	71.7	0.0
U.S. 101 NB Ramps				
	Off-Ramp to East Grand Ave	71.1	71.3	0.2
	Intersecting South Airport Blvd	73.4	73.5	0.1

Notes: NB = northbound

Bold means the proposed project at project buildout would generate over 3 dBA of traffic noise at that particular roadway.

Source: RGD Acoustics (2018)

CUMULATIVE IMPACTS

Construction

Impact C-NO-1: Construction of the proposed project would not make a cumulatively considerable contribution to significant cumulative construction noise impacts (i.e. that would substantially increase temporary noise levels at uses in the vicinity of the site). ***(Less than Significant)***

Multiple sources of construction equipment may create a combined noise effect. However, noise is generally limited by the distance noise can travel. Most construction equipment noise sources would attenuate to reasonable background levels at a distance of approximately 1,500 feet. A list of reasonably foreseeable future projects is listed under "Approach to Cumulative Impact Analysis" under Section 4.1, Approach to Environmental Analysis, and a map showing the location of these projects is provided in Figure 4.1.1, Location of Baseline and Cumulative Projects, on p. 4.1.5. Each of these projects would create construction equipment noise to surrounding industrial and office/R&D land uses. The nearest sensitive receptor to the project site, the future Genentech Childcare Facility, is within 1,500 feet of two cumulative projects: the 494 Forbes Boulevard project and the *Genentech Master Plan Update* project.

Similar to the proposed project, both of these projects would involve the demolition of existing structures (paved hardscapes and/or buildings) and the construction of new buildings. These projects would involve a similar array of typical construction equipment. Similar to the proposed project, these reasonably foreseeable future projects would generally involve construction activities during allowable daytime construction hours as defined by the Municipal Code. Noise from construction activities would be noticeable at times at neighboring buildings. The increase in average noise levels will depend on the duration of the construction equipment use and the number of simultaneous activities.

The nearest noise-sensitive land use is the outdoor area of the future Genentech Childcare Facility. In combination with other reasonably foreseeable future projects, including the 494 Forbes Boulevard project and the *Genentech Master Plan Update* project, the exact nature of the overlap in construction durations or equipment types is unknown. The cumulative construction noise among these projects would likely vary from month to month, and from year to year. As with the proposed project, each of these reasonably foreseeable future projects would be required to mitigate potentially significant noise impacts on sensitive receptors such as the future Genentech Childcare Facility to the greatest extent feasible, including the use of mufflers, sound walls, or scheduling. Therefore, the cumulative impact of construction-generated noise would be less than significant.

As stated in Impact NO-1, given the distance of the Genentech Childcare Facility of at least 1,200 feet from the project site, the noise from project-related construction would be less than 50 dBA and, therefore, barely noticeable above the ambient noise. Therefore, the proposed project, would not considerably contribute to a significant cumulative construction noise impact. Implementation of Mitigation Measure MM-NO-1, above, would further reduce cumulatively considerable contributions. No additional mitigation is necessary.

Impact C-NO-2: Construction of the proposed project would make a cumulatively considerable contribution to significant cumulative groundborne vibration impacts (i.e., that would substantially increase temporary vibration at uses in the vicinity of the site). ***(Less than Significant with Mitigation)***

Multiple sources of construction equipment may create a combined vibration effect. However, groundborne vibration is generally limited by the distance vibration can travel. Most sources of groundborne vibration would attenuate to reasonable background levels at a distance of approximately 250 feet. A list of reasonably foreseeable future projects is listed under "Approach to Cumulative Impact Analysis" under Section 4.A, Approach to Environmental Analysis, and a map showing the location of these projects is provided in Figure 4.1.1, Location of Baseline and Cumulative Projects, on p. 4.1.5. Each of these projects would create construction vibration to surrounding industrial and office/R&D land uses. The only cumulative project within 500 feet of the project site is the *Genentech Master Plan Update* project. Given that the proposed project would not generate vibration within 41 feet of the future Genentech Childcare Facility, the proposed project would not generate groundborne vibration to that facility in a manner that would exceed human annoyance thresholds, and no cumulative vibration impact with respect to the human annoyance threshold would occur.

Typical construction equipment would cause substantial vibration in regard to building damage at a distance between approximately 0 and 14 feet. Similar to the proposed project, the *Genentech Master Plan Update* project would involve the demolition of existing structures (paved hardscapes and/or buildings) and the construction of new buildings. These projects would involve a similar array of typical construction equipment. The *Genentech Master Plan Update* project shares a boundary with the eastern boundary of the project site. Given the close proximity of these two project boundaries, any construction activities within this vicinity could generate vibration in excess of the building damage threshold. The increase in vibration levels will depend on the duration of the construction equipment use and the number of simultaneous activities. The exact nature of the overlap in construction durations or equipment types is unknown. The cumulative construction vibration between the proposed project and the *Genentech Master Plan Update* project would likely vary from month to month, and from year to year. Based on the location of each project site, the buildings most likely to be affected would be the existing buildings in the Phase 2 area (particularly 451 East Jamie Court and 430 East Grand Avenue), or adjacent buildings on the Genentech Campus (one parking structure and one office building). However, due to the built-out nature of the Genentech campus at this location, it is unlikely that future development intensification would occur under the *Genentech Master Plan Update* project in this vicinity.

As with the proposed project, the *Genentech Master Plan Update* project would be required to mitigate potentially significant groundborne vibration impacts to the greatest extent feasible. Due to the wide area of sites within the *Genentech Master Plan Update* boundary that may involve new construction, and the site-specific nature of vibration, it is unlikely that construction activities would produce substantial, combined, vibration at any given point. Therefore, with implementation of Mitigation Measure MM-NO-2, above, the cumulative impact of groundborne construction-generated vibration would be less than significant. The proposed project would not considerably contribute to a significant cumulative construction vibration impact.

Operation

Mechanical Equipment Noise

Impact C-NO-3: Operation of the proposed project's mechanical equipment would not make a cumulatively considerable contribution to significant cumulative noise impacts (i.e., noise that would create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions). ***(Less than Significant)***

Multiple operational mechanical equipment sources may create a combined noise effect. However, noise is generally limited by the distance noise can travel. Most mechanical equipment noise sources would attenuate to reasonable background levels at a distance of approximately 1,500 feet. A list of reasonably foreseeable future projects is listed under "Approach to Cumulative Impact Analysis" under Section 4.1, Approach to Environmental Analysis, and a map showing the location of these projects is provided in Figure 4.1.1, Location of Baseline and Cumulative Projects, on p. 4.1.5. Each of these projects would create mechanical equipment noise to surrounding industrial and office/R&D land uses. The nearest sensitive receptor to the project site, the future Genentech Childcare Facility, is within 1,500 feet of two cumulative projects: the 494 Forbes Boulevard project and the *Genentech Master Plan Update* project.

Similar to the proposed project, both of these projects involve construction of new buildings and are expected to have mechanical equipment generally associated with building ventilation/air-conditioning units, ventilation fans, other process specific equipment, and emergency diesel generators. Much of the equipment would likely be located on the rooftops of the proposed buildings, or at-grade next to the buildings.

As with the proposed project, these reasonably foreseeable future projects are required to comply with the Municipal Code pertaining to maximum permissible sound levels at receiving properties for C-1, P-C, Gateway, and Oyster Point Marina specific plan districts (see Table 4.8.8, above.). Most of these projects would involve large commercial mechanical systems that can generate high noise levels, and therefore they would have the potential to generate noise levels in excess of the Municipal Code requirement. However, as with the proposed project, these projects would be required to comply with the Municipal Code's noise requirements, and would be required to mitigate any noise impacts resulting from project-specific mechanical systems. Therefore, there would be no significant cumulative impact related to mechanical system equipment noise. As such, the proposed project at Phase 1 or project buildout would not contribute considerably to a significant mechanical equipment noise impact. No mitigation is necessary.

Traffic Noise

Impact C-NO-4: Traffic volumes generated by operation of the proposed project would not make a cumulatively considerable contribution to significant cumulative traffic noise impacts (i.e., traffic noise that would create a substantial permanent increase in ambient noise levels in the project vicinity above existing conditions). ***(Less than Significant)***

In the future, traffic will increase due to general growth in the East of 101 Area. The future traffic volumes in this area are based on City predictions for traffic in the year 2040. **Table 4.8.16: Traffic**

Noise Levels under the Proposed Project at Phase 1 in Future Year 2040 and **Table 4.8.17: Traffic Noise Levels under the Proposed Project at Project Buildout in Future Year 2040** show the future traffic noise levels for the Future Year 2040 without the proposed project, future with Phase 1 development of the proposed project, and future with project buildout.

The nearest applicable noise segments to the future Genentech Childcare Facility, located at 342 Allerton Avenue, would be East Grand Avenue (between Allerton Avenue and Haskins Way) or Allerton Avenue (north of East Grand Avenue). As shown in Table 4.8.16 and 4.8.17, the increase in traffic noise at these road segments would be less than 3 dBA, and no significant impacts related to cumulative noise levels at this childcare facility would occur.

Tables 4.8.16 and 4.8.17 show that the increase in traffic noise would be greater than 3 dBA but less than 5 dBA for five roadways in the study area: (1) Gateway Boulevard from Oyster Point Boulevard to East Grand Avenue; (2) East Grand Avenue to Mitchell Avenue; (3) East Grand Avenue from Dubuque Avenue to Grand Avenue; (4) Grand Avenue to Gateway Boulevard; and (5) east of Haskins Way. This increase in future noise level would be greater than 3 dBA at these road segments and this would be a significant cumulative impact. However, as shown in Tables 4.8.16 and 4.8.17, the proposed project's contribution to this impact is less than 1 dBA for all road segments. Therefore, the proposed project's future traffic noise contribution would not be cumulatively considerable.

The proposed project, under Phase 1 or project buildout, would not contribute considerably to a significant cumulative operational traffic noise impact. No mitigation is necessary.

Table 4.8.16: Traffic Noise Levels under the Proposed Project at Phase 1 in Future Year 2040

Roadway	Existing	Future Year 2040	Future 2040 Plus Phase 1	Increase to Existing	Project (Phase 1) Contribution to Increase
Oyster Point Blvd					
West of Gateway Blvd	75.2	78.1	78.1	2.9	0.0
East of Gateway Blvd	74.1	76.2	76.2	2.1	0.0
Gateway Blvd					
Oyster Point Blvd to East Grand Ave	**70.4**	**73.5**	**73.6**	**3.2**	**0.1**
East Grand Ave to Mitchell Ave	**70.2**	**73.6**	**73.7**	**3.5**	**0.1**
Grand Ave					
West of Airport Blvd	68.1	70.5	70.5	2.4	0.0
Poletti Way to East Grand Ave	69.7	70.1	70.2	0.5	0.2
East Grand Ave					
Dubuque Ave to Grand Ave	**72.8**	**76.5**	**76.6**	**3.8**	**0.1**
Grand Ave to Gateway Blvd	**73.6**	**77.0**	**77.1**	**3.5**	**0.1**
Gateway Blvd to Forbes Blvd	74.8	76.0	76.2	1.4	0.2
Forbes Blvd to Littlefield Ave	73.5	74.7	75.0	1.5	0.3
Littlefield Ave to Allerton Ave	74.4	75.1	75.4	1.0	0.3
Allerton Ave to Haskins Way	73.3	74.4	74.0	0.7	-0.4
East of Haskins Way	**68.0**	**71.0**	**71.0**	**3.0**	**0.0**
Haskins Way					
South of East Grand Ave	68.9	69.1	70.8	1.9	1.7
Allerton Ave					
North of East Grand Ave	66.5	68.4	68.4	1.9	0.0
Littlefield Ave					
South of East Grand Ave	68.8	70.0	70.1	1.3	0.1
Forbes Blvd					
North of East Grand Ave	70.3	72.0	72.2	1.9	0.2
Harbor Way					
South of East Grand Ave	70.3	71.1	71.1	0.8	0.0
Airport Blvd					
North of Grand Ave	72.5	74.6	74.7	2.2	0.1
Grand Ave to San Mateo Ave	73.3	74.2	74.3	1.0	0.1
South Airport Blvd					
Michell Ave to U.S. NB Ramp	73.5	75.5	75.5	2.0	0.0
U.S. 101 NB Ramp to Utah Ave	71.1	72.2	72.2	1.1	0.0
South of Utah Ave	73.4	74.9	74.9	1.5	0.0
San Mateo Ave					
West of Airport Blvd	71.4	72.4	72.4	1.0	0.0
Produce Ave					
South of San Mateo Ave	73.5	75.5	75.6	2.1	0.1
Utah Ave					
East of South Airport Blvd	72.9	74.6	74.7	1.8	0.1
Mitchell Ave					
East of Gateway Blvd	71.7	73.7	73.7	2.0	0.0
U.S. 101 NB Ramps					
Off-Ramp to East Grand Ave	71.1	71.1	71.2	0.1	0.1
Intersecting South Airport Blvd	73.4	75.7	75.8	2.4	0.1

Note: NB = northbound

Source: RGD Acoustics (2018)

Table 4.8.17: Traffic Noise Levels under the Proposed Project at Project Buildout in Future Year 2040

Roadway	Existing	Future 2040	Future 2040 Plus Project Buildout	Increase to Existing	Project (Project Buildout) Contribution to Increase
Oyster Point Blvd					
West of Gateway Blvd	75.2	78.1	78.1	2.9	0.0
East of Gateway Blvd	74.1	76.2	76.2	2.1	0.0
Gateway Blvd					
Oyster Point Blvd to East Grand Ave	**70.4**	**73.5**	**73.6**	**3.2**	**0.1**
East Grand Ave to Mitchell Ave	**70.2**	**73.6**	**73.8**	**3.6**	**0.2**
Grand Ave					
West of Airport Blvd	68.1	70.5	70.5	2.4	0.0
Poletti Way to East Grand Ave	69.7	70.1	70.3	0.6	0.3
East Grand Ave					
Dubuque Ave to Grand Ave	**72.8**	**76.5**	**76.6**	**3.8**	**0.1**
Grand Ave to Gateway Blvd	**73.6**	**77.0**	**77.2**	**3.6**	**0.2**
Gateway Blvd to Forbes Blvd	74.8	76.0	76.4	1.6	0.4
Forbes Blvd to Littlefield Ave	73.5	74.7	75.3	1.8	0.6
Littlefield Ave to Allerton Ave	74.4	75.1	75.7	1.3	0.6
Allerton Ave to Haskins Way	73.3	74.4	74.4	1.1	0.0
East of Haskins Way	**68.0**	**71.0**	**71.0**	**3.0**	**0.0**
Haskins Way					
South of East Grand Ave	68.9	69.1	71.6	2.7	2.5
Allerton Ave					
North of East Grand Ave	66.5	68.4	68.4	1.9	0.0
Littlefield Ave					
South of East Grand Ave	68.8	70.0	70.3	1.5	0.3
Forbes Blvd					
North of East Grand Ave	70.3	72.0	72.3	2.0	0.3
Harbor Way					
South of East Grand Ave	70.3	71.1	71.1	0.8	0.0
Airport Blvd					
North of Grand Ave	72.5	74.6	74.5	2.0	-0.1
Grand Ave to San Mateo Ave	73.3	74.2	74.3	1.0	0.1
South Airport Blvd					
Michell Ave to U.S. NB Ramp	73.5	75.5	75.6	2.1	0.1
U.S. 101 NB Ramp to Utah Ave	71.1	72.2	72.2	1.1	0.0
South of Utah Ave	73.4	74.9	75.0	1.6	0.1
San Mateo Ave					
West of Airport Blvd	71.4	72.4	72.4	1.0	0.0
Produce Ave					
South of San Mateo Ave	73.5	75.5	75.6	2.1	0.1
Utah Ave					
East of South Airport Blvd	72.9	74.6	74.7	1.8	0.1
Mitchell Ave					
East of Gateway Blvd	71.7	73.7	73.7	2.0	0.0
U.S. 101 NB Ramps					
Off-Ramp to East Grand Ave	71.1	71.1	71.3	0.2	0.2
Intersecting South Airport Blvd	73.4	75.7	75.8	2.4	0.1

Note: NB = northbound

Source: RGD Acoustics (2018)

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4.9 Transportation and Circulation

4.9.1 Introduction

Section 4.9, Transportation and Circulation, addresses the impacts that transportation and land use changes related to the 201 Haskins Way Project would have on levels of service (LOS), vehicle miles traveled (VMT), traffic hazards, transit, pedestrians, bicycles, loading, and emergency vehicle access, as well as the transportation-related impacts of construction activities. All of these transportation subtopics are considered in the discussions of existing conditions and year 2040 cumulative conditions. The section describes existing transportation conditions on the project site and in the transportation study area and presents the baseline transportation conditions against which project impacts are measured. Project-specific impacts are presented for the proposed project (separately for Phase 1 and for Phases 1 and 2 at buildout), and mitigation measures, if any, are identified when feasible.

4.9.2 Environmental Setting

TRANSPORTATION STUDY AREA

The study area for transportation impacts, shown in **Figure 4.9.1: Transportation Study Area**, includes the U.S. 101 freeway, which is the primary regional access route to the project site, and the freeway interchanges and local streets that provide access between the project site and the U.S. 101 freeway, as well as routes connecting to adjacent cities.

EXISTING CONDITIONS

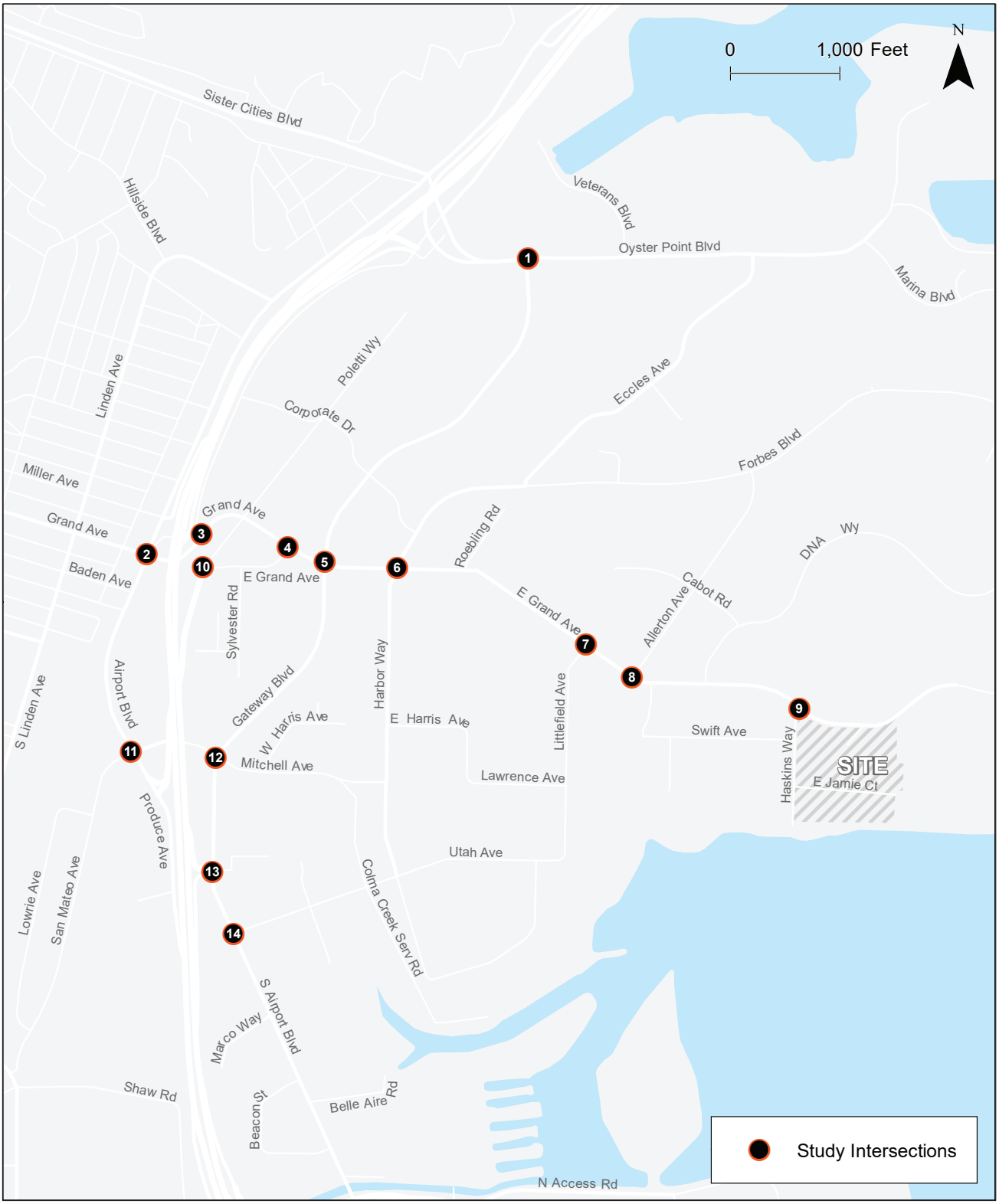
This section describes the transportation conditions in the study area in terms of existing roads and traffic operations, transit service, and pedestrian and bicycle conditions.

Existing Roads

Regional vehicle access to the project site is provided primarily by the U.S. 101 freeway. East Grand Avenue is the primary local street connection between the project site and the regional road system.

Regional Roads

The U.S. 101 is an eight-lane freeway that provides regional access to the project area. To the north, it provides connections to downtown San Francisco, northern California, and Oakland and the East Bay via the Bay Bridge. To the south, U.S. 101 serves Santa Clara County and extends to Los Angeles and southern California. Within the study area, access from the north is provided by a southbound off-ramp at Airport Boulevard/Miller Avenue (connecting to Grand Avenue) and a flyover ramp to Oyster Point Boulevard. Northbound on-ramps are at Grand Avenue, Oyster Point Boulevard and from South Airport Boulevard (between Mitchell Avenue and Utah Avenue). Access from the south is available from northbound off-ramps at East Grand Avenue/Executive Drive and at South Airport Boulevard (between



Source: Kittelson & Associates (2018)

201 HASKINS WAY PROJECT

FIGURE 4.9.1: TRANSPORTATION STUDY AREA

Mitchell Avenue and Utah Avenue), while ramps to southbound U.S. 101 are at Produce Avenue and at Dubuque Avenue just south of Oyster Point Boulevard.

Local Roads

East Grand Avenue is the central access route to the area east of U.S. 101 and is classified in the *City of South San Francisco General Plan* (General Plan) as a major arterial street. Between the intersection with the Grand Avenue Overcrossing and its intersection with Forbes Boulevard, East Grand Avenue is a six-lane arterial. It continues east of this intersection as a four-lane facility, narrowing to a 50-foot pavement width with two lanes east of Haskins Way.

Grand Avenue and the Grand Avenue Overcrossing are the continuation of East Grand Avenue west to Airport Boulevard and downtown South San Francisco. The Grand Avenue Overcrossing is a four-lane arterial street.

Airport Boulevard is a four-lane north-south major arterial street that parallels the west side of U.S. 101, ending at its intersection with San Mateo Avenue and Produce Avenue.

Gateway Boulevard is a four-lane major arterial street connecting East Grand Avenue with South Airport Boulevard and Oyster Point Boulevard.

Harbor Way is a two-lane minor arterial street serving existing and planned industrial uses south of East Grand Avenue. Harbor Way provides access to South Airport Boulevard and several U.S. 101 freeway ramps via Mitchell Avenue and Utah Avenue.

Forbes Boulevard is a four-lane major arterial street beginning at East Grand Avenue and connecting to the central Genentech campus area north of East Grand Avenue.

Littlefield Avenue is a two-lane collector street that serves the industrial area south of East Grand Avenue and provides a connection to South Airport Boulevard via Utah Avenue.

Allerton Avenue is a two-lane collector street that serves businesses north of East Grand Avenue.

DNA Way (formerly Grandview Drive) is a two-lane major arterial street that provides a second connection between East Grand Avenue and the Genentech campus area.

Haskins Way is a two-lane local street that serves the Materials Recovery Facility (MRF) and several adjacent properties south of East Grand Avenue.

EXISTING TRAFFIC OPERATIONS

This section provides information on the existing operating conditions (in terms of level of service) for selected intersections and freeway mainline segments in the transportation study area.

LEVEL OF SERVICE METHODOLOGY

Level of service (LOS) describes the operating conditions experienced by persons on a transportation system. For motorized vehicles, level of service is a qualitative measure of the effects of a number of factors, including speed and travel time, traffic interruptions, freedom to maneuver, driving comfort, and convenience. Levels of service are designated LOS A through F, from best to worst, which cover the entire range of traffic operations that might occur. Levels of service A through E generally represent traffic volumes at less than roadway capacity, while LOS F represents conditions where traffic demands exceed capacity and the flow of traffic breaks down, resulting in stop-and-go conditions and long queues of vehicles.

Methodologies outlined in the Transportation Research Board's *Highway Capacity Manual* (HCM) are used to evaluate level of service for intersections and freeway mainline segments. The intersection analysis uses the Synchro software, based on a Synchro network provided by the City of South San Francisco as used for the East of 101 and Downtown Specific Plan Year 2016 Traffic Model Update (July 2018). Consistent with the City's Synchro network, the 2010 HCM methodologies are used for most signalized and all unsignalized intersections, with 2000 HCM methodologies used for selected signalized intersections (as noted in the tables below) where the Synchro software does not fully implement the 2010 HCM methodologies.

Signalized Intersections

Signalized intersections are evaluated based on traffic volumes, traffic signal phasing and timing, and factors related to conditions such as peaking within the peak hour and the presence of trucks and pedestrians. The LOS is determined by the weighted average delay per vehicle for all vehicles entering the intersection. The LOS for signalized intersections is defined in Table 4.9.1: Level of Service Definition for Signalized and All-Way Stop Intersections.

Unsignalized All-Way Stop Intersections

At all-way stop intersections, LOS is determined by the weighted average delay for all vehicles entering the intersection and the calculated average total delay per vehicle and LOS for the intersection as a whole. The average delay criteria used to determine the LOS at all-way stop controlled intersections are the same as those shown for signalized intersections in **Table 4.9.1: Level of Service Definition for Signalized and All-Way Stop Intersections**.

Unsignalized One- or Two-Way Stop Intersections

For unsignalized intersections with stop-sign control on one street only, the methodology calculates an average total delay per vehicle for each minor street movement and for the major street left-turn movements based on the availability of adequate gaps in through traffic on the main street. A level of service designation is assigned to individual movements or to combinations of movements in the case of shared lanes, based on delay. The LOS for unsignalized one- and two-way stop intersections are defined in **Table 4.9.2: Level of Service Definition for Unsignalized One- and Two-Way Stop Intersections**.

Table 4.9.1: Level of Service Definition for Signalized and All-Way Stop Intersections

Level of Service	Description	Vehicle Delay (seconds per vehicle)
A	Very low delay	≤ 10
B	Minimal delay	> 10 – 20
C	Acceptable delay	> 20 – 35
D	Approaching unstable delay	> 35 – 55
E	Unstable operations and substantial delay	> 55 – 80
F	Excessive delay	> 80

Source: Transportation Research Board, Highway Capacity Manual, 2010

Table 4.9.2: Level of Service Definition for Unsignalized One- and Two-Way Stop Intersections

Level of Service	Description	Vehicle Delay (seconds per vehicle)
A	Little or no delay	0 – 10
B	Short traffic delays	> 10 – 15
C	Average traffic delays	> 15 – 25
D	Long traffic delays	> 25 – 35
E	Very long traffic delays	> 35 – 50
F	Extreme delays potentially affecting other traffic movements at the intersection	> 50

Source: Transportation Research Board, Highway Capacity Manual, 2010

The HCM specifies that the LOS for the worst case movement or shared approach be reported as the intersection LOS for unsignalized one- and two-way stop intersections. It is not unusual for some of the minor street movements to have LOS D, E, or F conditions while the major street movements have LOS A, B, or C conditions. In such cases, the minor street traffic experiences delays that can be substantial for individual minor street vehicles, but the majority of vehicles using the intersection have very little delay. Usually this is because the minor street traffic volumes are relatively low.

Queue Analysis

Queues in specific lane groups are evaluated based on the intersection operations analysis methods described above. The probabilities of different queue lengths for traffic movements are calculated based on volumes, amount of green signal time for the movement, and randomness of vehicle arrivals. The reported queue length represents the 95th percentile probability, meaning that the reported queue length should only be exceeded 5 percent of the time during peak hours.

Signal Warrants

The potential need for traffic signals at unsignalized intersections where the minor street movements experience substantial delay is evaluated in accordance with the *California Manual on Uniform Traffic Control Devices* (CA MUTCD). The analysis for the proposed project focuses on the peak hour volume

warrant (Warrant 3). The peak hour volume warrant is intended for application where traffic conditions are such that for at least one hour of the day, traffic on the minor street suffers long delays in entering or crossing the major street. Before a signal is installed, a more detailed signal warrant study is recommended that considers volumes during the eight highest hours of the day, pedestrian traffic, and accident histories.

It is possible that an unsignalized intersection will not meet signal warrants but will have one or more movements that experience LOS F operations. LOS F can be indicated for a very low volume of vehicles at a stop sign. Although these stopped vehicles may experience long delays of one minute or more, there would not be an overall benefit if the higher numbers of vehicles on the major street are stopped in favor of the few vehicles on the minor street. The signal warrant considers a balance between major street and minor street delays, and may indicate that there is overall system benefit if drivers on the minor street continue to experience long (LOS E or F) delays.

Freeway Mainline Segments

Caltrans' "Guide for the Preparation of Traffic Impact Studies" requires the use of HCM analysis methodology and applies the freeway mainline segment level of service criteria presented in **Table 4.9.3: Freeway Mainline Segment Level of Service Criteria**.

Table 4.9.3: Freeway Mainline Segment Level of Service Criteria

Level of Service	Maximum Density (passenger vehicles per mile per lane)
A	≤ 11
B	18
C	26
D	35
E	45
F	> 45

Source: Transportation Research Board, Highway Capacity Manual (2010)

Freeway Ramps

The methodologies for evaluation of freeway off-ramps and on-ramps are based on planning-level methodologies as applied in prior South San Francisco transportation studies.[1]

On-ramp operation has been evaluated using planning-level methodology contained in the Year 2010 *Highway Capacity Manual*. Capacity is dependent upon the free flow speed of on-ramp traffic. For single- and double-lane diamond on-ramps with higher speeds, capacity has been set at 2,200 and 3,300 vehicles per hour, respectively. For single-lane button hook or curving on-ramps, capacity has been set at 2,000 vehicles per hour. However, during peak traffic periods ramp metering will always be adjusting on-ramp flow based upon prevailing freeway operating conditions.

[1] City of South San Francisco, 2018. *East of 101 and Downtown Specific Plan Year 2016 Traffic Model Update*, July 2018.

For off-ramps, Caltrans uses a planning level volume of 1,500 vehicles per hour as the maximum acceptable limit that can be accommodated by a single lane off-ramp at its divergence from the freeway. For two-lane divergences from the freeway, an acceptable limit of 2,300 vehicles per hour has been used.

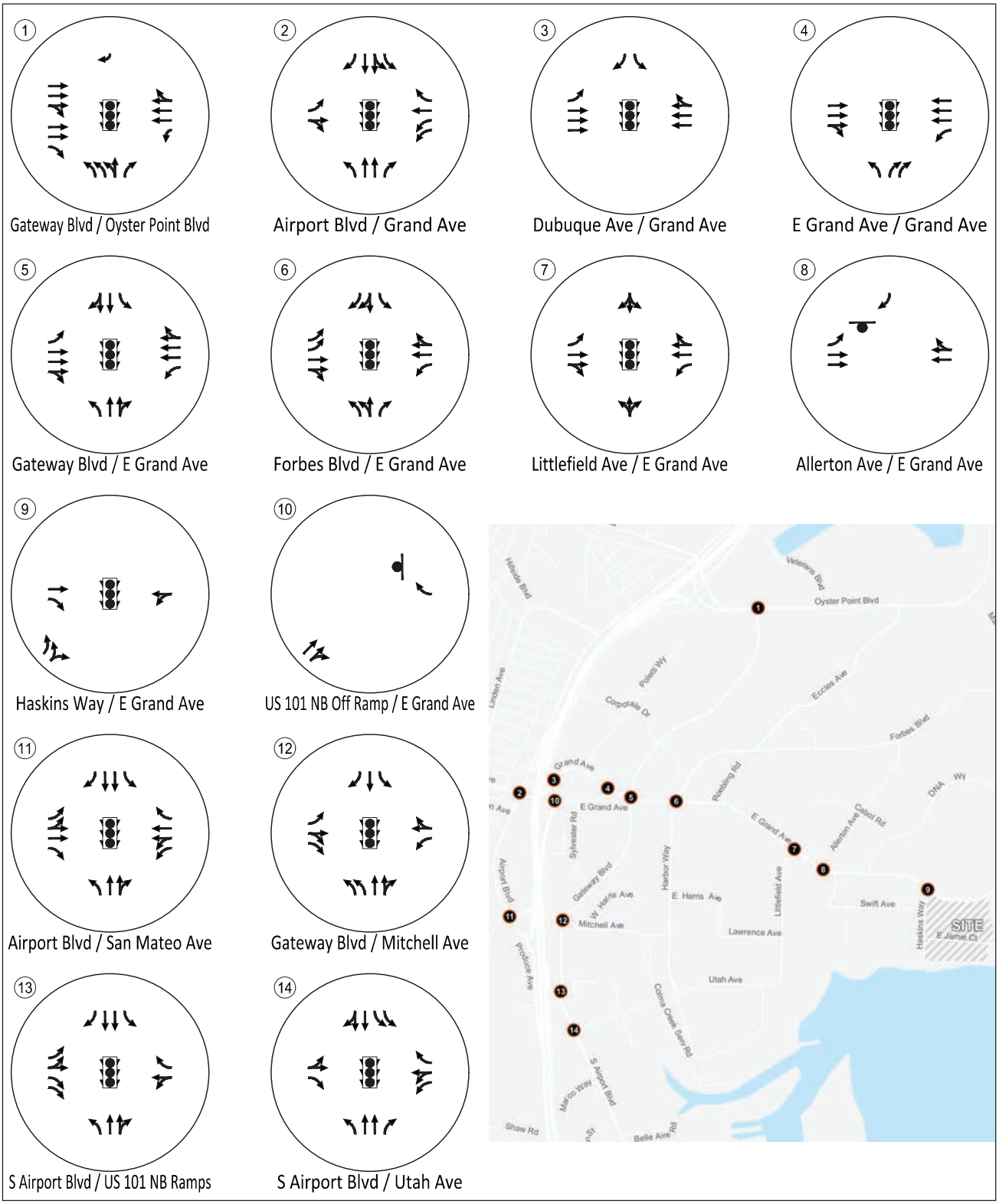
EXISTING INTERSECTION OPERATIONS

The study intersections were selected because they have the potential to be affected by traffic to and from the project site. They were identified based on prior traffic studies of development in the project area and were verified by City of South San Francisco staff. A total of 14 study intersections, listed below, were evaluated (numbers correspond to those shown on Figure 4.9.1, with north-south streets listed first):

1. Gateway Boulevard and Oyster Point Boulevard/U.S. 101 Southbound Off-Ramp
2. Airport Boulevard and Grand Avenue
3. Dubuque Avenue and Grand Avenue
4. East Grand Avenue and Grand Avenue
5. Gateway Boulevard and East Grand Avenue
6. Forbes Boulevard/Harbor Way and East Grand Avenue
7. Littlefield Avenue and East Grand Avenue
8. Allerton Avenue and East Grand Avenue
9. Haskins Way and East Grand Avenue
10. U.S. 101 Northbound Off-Ramp/Poletti Way and East Grand Avenue
11. Airport Boulevard/Produce Avenue and San Mateo Avenue/South Airport Boulevard
12. Gateway Boulevard/South Airport Boulevard and Mitchell Avenue
13. South Airport Boulevard and U.S. 101 Northbound Ramps
14. South Airport Boulevard and Utah Avenue

Existing intersection lanes and traffic controls were verified for the 14 study intersections and are shown in **Figure 4.9.2: Existing Lane Configuration and Traffic Control**. Peak hour turning movement counts were obtained from the City of South San Francisco as contained in the 2016 base year intersection analysis tool (Synchro software) provided by the City (see **Figure 4.9.3: Existing (2016) AM Peak Hour Intersection Volumes** and **Figure 4.9.4: Existing (2016) PM Peak Hour Intersection Volumes**). The AM peak hour is the highest traffic hour at each location between 7:00 and 9:00 AM and is typically 7:30 to 8:30 AM at the majority of locations. The PM peak hour is the highest traffic hour at each location between 4:00 and 6:00 PM and is typically 4:30 to 5:30 PM at the majority of locations. The intersection of Haskins Way and Grand Avenue was not included in the traffic counts provided by the City, and the peak hour turning movements were counted at this intersection on October 12, 2017.

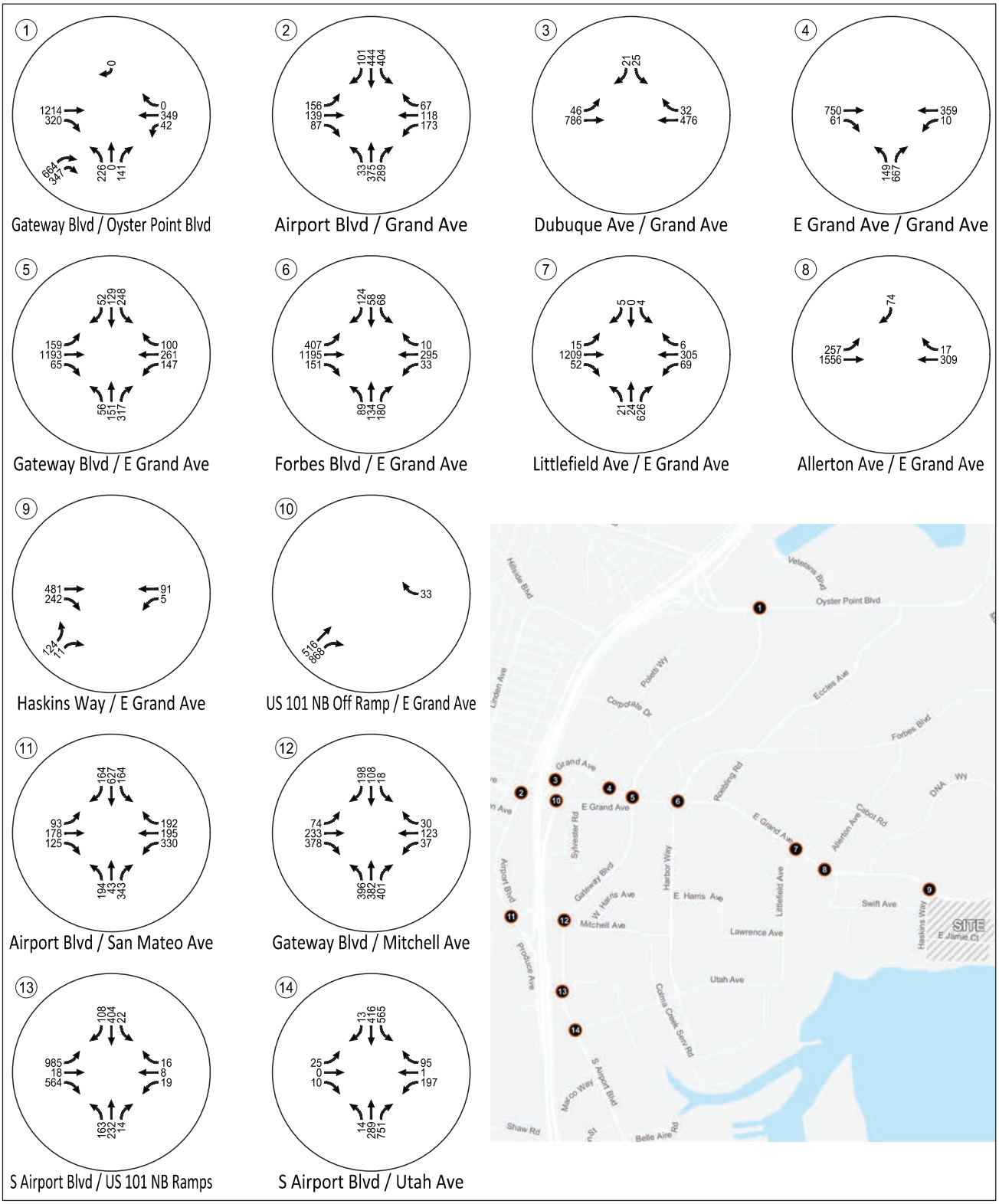
Existing traffic operations were evaluated at the 14 study intersections and the results of the analysis are summarized in **Table 4.9.4: Intersection Level of Service – Existing (2016)**. As shown in the table, all study intersections currently operate at LOS D or better during both the AM and PM peak hours, with the exception of the intersection of Gateway Boulevard/South Airport Boulevard and Mitchell Avenue (Intersection 12), which operates at LOS E during the PM peak hour.



Source: Kittelson & Associates (2018)

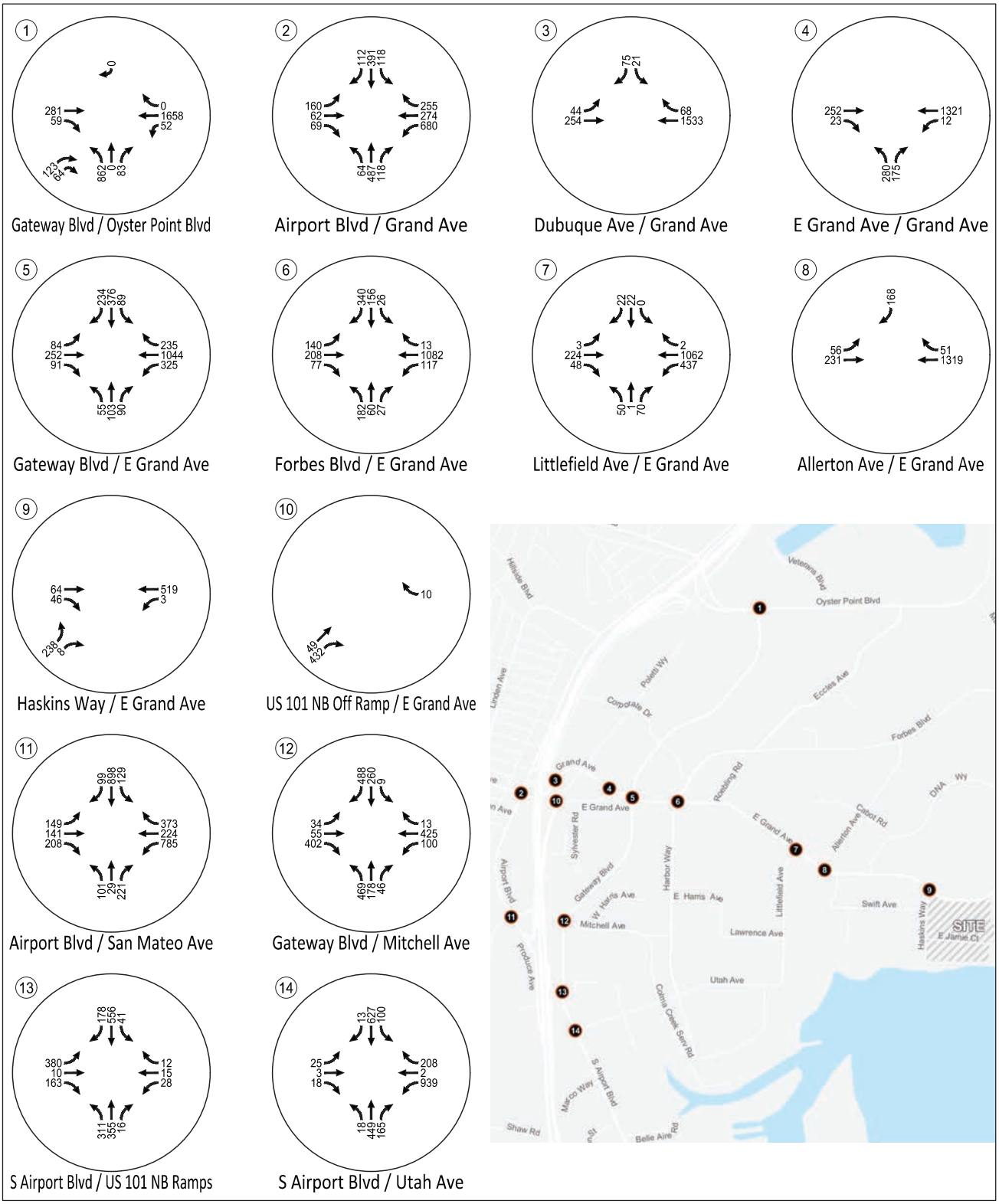
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FIGURE 4.9.2: EXISTING LANE CONFIGURATION AND TRAFFIC CONTROL



Source: Kittelson & Associates (2018)

FIGURE 4.9.3: EXISTING (2016) AM PEAK HOUR INTERSECTION VOLUMES



Source: Kittelson & Associates (2018)

FIGURE 4.9.4: EXISTING (2016) PM PEAK HOUR INTERSECTION VOLUMES

Table 4.9.4: Intersection Level of Service – Existing (2016)

No.	Intersection	Control Type	Level of Service – Average Delay per Vehicle in Seconds	
			AM Peak Hour	PM Peak Hour
1	Gateway Blvd/Oyster Point Blvd/US 101 SB Off-Ramp Flyover	Signal	C – 31.4	C – 21.0
2	Airport Blvd/Grand Ave	Signal	D – 38.2	D – 41.0
3	Dubuque Ave/Grand Ave Overcrossing	Signal	A – 5.0	A – 5.0
4	E Grand Ave/Grand Ave Overcrossing	Signal	A – 6.3	A – 7.3
5	Gateway Blvd/E Grand Ave	Signal	C – 22.7	C – 20.0
6	Forbes Blvd/Harbor Way/E Grand Ave	Signal	C – 30.5	D – 37.0
7	Littlefield Ave/E Grand Ave	Signal	D – 42.3	B – 15.6
8	Allerton Ave/E Grand Ave	TWSC	B – 10.1	D – 28.6
	Exceeds Peak Hour Signal Warrant		No	**Yes**
9	Haskins Way/E Grand Ave	Signal	A – 5.3	A – 6.2
10	US 101 NB Off-Ramp/Poletti Way/Grand Ave	TWSC	C – 16.2	A – 9.9
	Exceeds Peak Hour Signal Warrant		No	No
11	Airport Blvd/San Mateo Ave/Produce Ave	Signal	D – 36.3	D – 39.3
12	Gateway Blvd/S Airport Blvd/Mitchell Ave	Signal	D – 48.9	**E – 63.9**
13	S Airport Blvd/US 101 NB Hook Ramps/Wondercolor Ln	Signal	C – 28.0	C – 26.5
14	S Airport Blvd/Utah Ave	Signal	C – 28.4	C – 32.7

Note: TWSC = Two-Way Stop Control

Bold = exceeds City of South San Francisco's LOS D threshold for signalized intersections

Source: Kittelson & Associates, Inc. (2018)

Existing Signal Warrants

Peak hour signal warrants were evaluated at the two unsignalized study intersections, Allerton Avenue / East Grand Avenue (Intersection 8), and U.S. 101 NB Ramps/Poletti Way/East Grand Avenue (Intersection 10). Existing traffic volumes exceed the peak hour signal warrant at the intersection of Allerton Avenue and East Grand Avenue during the PM peak hour but not during the AM peak hour. The current East of 101 Traffic Impact Fee includes an improvement at this intersection which would provide a traffic signal. Existing traffic volumes at the intersection of U.S. 101 Northbound Off-Ramp/Poletti Way and East Grand Avenue do not exceed the peak hour signal warrant criteria.

Existing Intersection Queues

Queues were evaluated on selected movements which could be impacted by project traffic and the results of the analysis are summarized in **Table 4.9.5: Intersection Queues – Existing (2016)**. The analysis indicates that 95th percentile queues exceed available storage lengths on the following three movements:

- At the intersection of Gateway Boulevard with Oyster Point Boulevard and the U.S. 101 SB Off-Ramp Flyover (Intersection 1), on the right turn from the flyover ramp during the AM peak hour

- At the intersection of Gateway Boulevard with East Grand Avenue (Intersection 5), in the westbound left-turn lane during both the AM and PM peak hours
- At the intersection of South Airport Boulevard/Produce Avenue/San Mateo Avenue (Intersection 11), in the westbound through-left lanes during the PM peak hour

Table 4.9.5: Intersection Queues – Existing (2016)

Intersection	Storage Length (feet per lane)	95th Percentile Queue Lengths (feet per lane)	
		AM Peak Hour	PM Peak Hour
1. Oyster Point Blvd/Gateway Blvd/ US 101 SB Off-Ramp Flyover			
SB Off-Ramp Thru	2900	385	67
SB Off-Ramp Right	375	**512**	86
2. Airport Blvd/Grand Ave			
SB Airport Blvd Left	300	258	118
WB Grand Ave Right	75	40	58
4. Gateway Blvd/East Grand Ave			
EB E Grand Ave Thru	300	85	138
WB E Grand Ave Thru	560	13	8
WB E Grand Ave Left	200	**238**	**348**
11. Airport Blvd/ San Mateo Ave/Produce Ave			
WB Airport Thru/Left	225	208	**380**
13. S Airport Blvd/US 101 NB On/Off Hook Ramps/Wondercolor Ln			
Off-Ramp Left	750	410	165
Off-Ramp Right	150	31	18

Note: Analysis using Synchro software 2010 *Highway Capacity Manual* methodology where possible, 2000 *Highway Capacity Manual* methodology at Intersections 1, 2 and 13.

Bold = Queue exceeds storage length

Source: Kittelson & Associates, Inc. (2018)

EXISTING FREEWAY OPERATIONS

Existing freeway volumes were obtained from the East of 101 and Downtown Specific Plan Year 2016 Traffic Model Update, which derived the freeway volumes from May 2016 freeway mainline counts from the Caltrans Performance Measurement System (PeMS). The freeway volumes were evaluated relative to the level of service criteria, as shown in **Table 4.9.6: Freeway Mainline Level of Service – Existing (2016)**. All but one of the study freeway segments operate at an acceptable LOS E or better.

Table 4.9.6: Freeway Mainline Level of Service – Existing (2016)

Segment	AM Peak Hour			PM Peak Hour		
	Volume	Density	LOS	Volume	Density	LOS
North of Oyster Point Blvd						
Northbound	8023	38.9	E	7668	35.9	E
Southbound	7692	36.1	E	6852	30.2	D
North of I-380						
Northbound	10951	33.1	D	7551	21.1	C
Southbound	7936	27.3	D	8677	30.7	D

Note: Density is shown in passenger cars per lane per mile; LOS = Level of Service

Bold = exceeds San Mateo County Congestion Management Program LOS E threshold

Highway Capacity Manual (2010) Analysis Methodology

Source: Kittelson & Associates, Inc. (2018)

EXISTING FREEWAY RAMP OPERATIONS

Existing U.S. 101 freeway ramp volumes were compared to capacity thresholds, as shown in **Table 4.9.7: Freeway Ramp Capacity and Volumes – Existing (2016)**. Existing volumes on all study ramps are below ramp capacities during both the A.M. and P.M. peak hours.

Table 4.9.7: Freeway Ramp Capacity and Volumes – Existing (2016)

Freeway Ramp	AM Peak Hour			PM Peak Hour	
	Capacity	Volume	Exceeds Capacity	Volume	Exceeds Capacity
NB Off-Ramp to S. Airport/Wondercolor	2300	1567	No	553	No
SB On-Ramp from Produce Avenue	3300	1154	No	1950	No
NB Off-Ramp to E. Grand/Poletti	2300	1384	No	481	No
NB On-Ramp from Airport/Grand	2000	550	No	783	No
SB Off-Ramp to Airport	1500	610	No	586	No

EXISTING TRANSIT SERVICE

Transit service in the study area includes local bus service, shuttle service and regional rail service, as shown on **Figure 4.9.5: Existing Transit Service**.



Source: Kittelson & Associates (2018)

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FIGURE 4.9.5: EXISTING TRANSIT SERVICE

Regional Transit

CALTRAIN

Caltrain provides train service between Gilroy, San Jose, and San Francisco. The South San Francisco station is located beneath the elevated intersection of Dubuque Avenue and Grand Avenue, with vehicle access provided from Dubuque Avenue. Trains serve this station approximately twice an hour during commute periods and hourly during midday. The station is 1.5 miles from the project site. Several bus services (described in following sections) provide connections between the Caltrain station and areas surrounding the station. Caltrain is currently constructing a new center platform and pedestrian underpass at the South San Francisco station. The modifications will improve pedestrian access from Grand Avenue and will make the station fully compliant with the Americans with Disabilities Act (ADA).

BART

The Bay Area Rapid Transit (BART) system is a regional rail system that serves the northern Peninsula, San Francisco, and various cities in the East Bay. The South San Francisco BART station is located approximately 3.5 miles from the project site, along El Camino Real near McLellan Drive. This station is served by the Antioch to San Francisco International Airport/Millbrae line, which operates every 15

minutes on weekdays with several additional trains during the AM peak period. Several bus services (described in following sections) provide connections between the BART station and the East of 101 Area.

FERRIES

The South San Francisco ferry terminal is located on Marina Boulevard in the Oyster Point portion of the East of 101 Area. It is approximately 2 miles from the project site. Service is provided by the Water Emergency Transit Authority from Alameda and Oakland in the morning and to Alameda and Oakland in the evening. There are three trips during each of the peak commute periods. Several shuttle bus services (described in following sections) provide connections between the ferry terminal and the East of 101 Area.

Local Transit

SAMTRANS

The San Mateo County Transit District (SamTrans) provides bus service in South San Francisco and San Mateo County. There is no direct SamTrans service within 1.5 miles of the project site. Several SamTrans lines serve Airport Boulevard.

Route 38 connects Airport Boulevard in South San Francisco with the Safe Harbor shelter and the Colma BART station. It operates during peak periods only. Route 292 provides service parallel to U.S. 101 between Hillsdale Mall in San Mateo and downtown San Francisco. There is a stop on Airport Boulevard at Baden Avenue near Grand Avenue. Average service frequencies are 20 minutes during peak periods and 30 minutes midday.

Route 397 is a limited late-night service between Palo Alto and downtown San Francisco with a stop on Airport Boulevard at Baden Avenue near Grand Avenue.

SHUTTLES

Commute.org operates shuttles connecting the East of 101 Area with Caltrain, BART and the ferry terminal. The Commute.org shuttles currently use 20 passenger vehicles, with 28 passenger vehicles planned for the routes serving BART based on demand. There are existing shuttle stops near the project site at the corner of Haskins Way and Swift Avenue, and in the parking lot for 400/450 Jamie Court. There are also private shuttle buses operated by companies, particularly Genentech, to connect their employees with regional transit services or provide direct service from other cities.

The South San Francisco-Utah-Grand BART shuttle provides direct service to stops on Haskins Way and Jamie Court, connecting to South San Francisco BART. It operates every 30 minutes during the morning and evening commute periods, with no midday service. There are 16 daily shuttle trips with an average of 135 daily passengers, for an average of 8.4 passengers per trip.

The South San Francisco-Utah-Grand Caltrain shuttle connects the South San Francisco Caltrain station to employers along Grand Avenue and Utah Avenue, with direct service to stops on Haskins Way and Jamie Court. It operates approximately every 30 minutes during the morning and evening commute periods, with no midday service. There are 14 daily shuttle trips with an average of 104 daily passengers, for an average of 7.4 passengers per trip.

The South San Francisco-Utah-Grand Ferry shuttle connects the South San Francisco ferry terminal to employers along Grand Avenue and Utah Avenue, with direct service to stops on Haskins Way and Jamie Court. It operates four shuttle trips during the AM peak period and three during the PM peak period, timed to meet the ferry service. There are 7 daily shuttle trips with an average of 56 daily passengers, for an average of 8.11 passengers per trip.

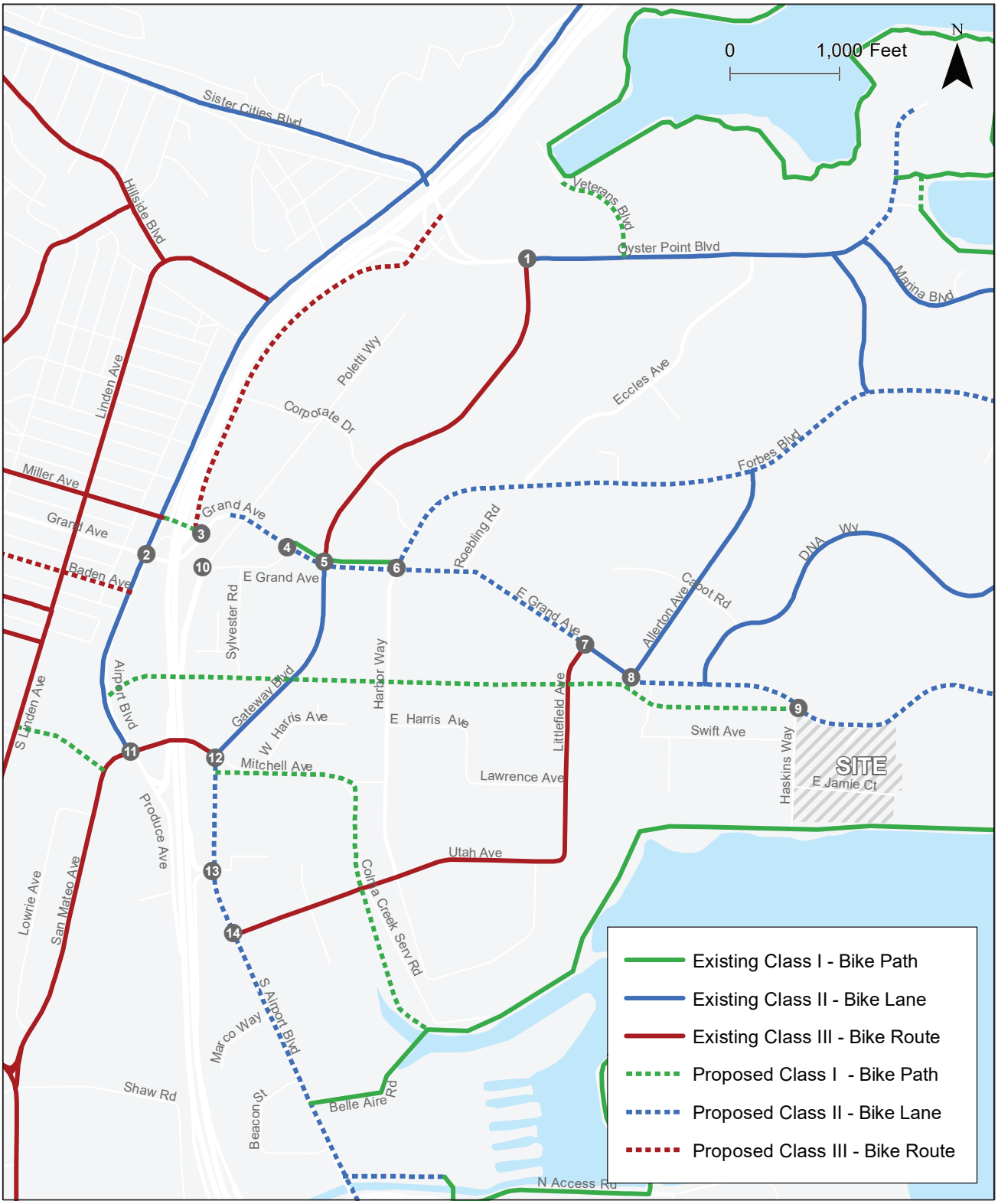
Information on whether specific shuttle runs are currently operating at or over capacity is not available.

Existing Bicycle Facilities

The San Francisco Bay Trail (Bay Trail) is a paved multi-use path that borders the shore of San Francisco Bay around the perimeter of the East of 101 Area. Access to the Bay Trail from the project site is available at the south end of Haskins Way.

The project site is not served directly by designated on-street bicycle facilities. As shown in **Figure 4.9.6: Existing and Proposed Bicycle Facilities**, there are Class II bicycle lanes[2] on a short segment of East Grand Avenue between Littlefield Avenue and Allerton Avenue. There are also bike lanes on Allerton Avenue and DNA Way. A Class III shared bike route is designated on Littlefield Avenue and Utah Avenue.

[2] A Class II bicycle lane is a striped and signed bicycle lane separated from traffic; a Class III shared bike route has signs indicating the bicycle route but the road is shared by bicycles and motor vehicles, with no separate bicycle lane.



Source: Kittelson & Associates (2018)

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FIGURE 4.9.6: EXISTING AND PROPOSED BICYCLE FACILITIES

The *South San Francisco Bike Master Plan* designates East Grand Avenue east of Dubuque Avenue as a route for future Class II bike lanes, which would directly serve the project site. A proposed separated Class I bike path west of Dubuque Avenue would connect East Grand Avenue to Airport Boulevard and the downtown area.[3]

When traffic counts were conducted at the intersection of Haskins Way and East Grand Avenue in October 2017, four bicyclists were observed during the AM peak hour and zero bicycles were observed in the PM peak hour.

Existing Pedestrian Facilities

Existing pedestrian conditions were observed in the study area. There are no sidewalks on East Grand Avenue, Haskins Way or East Jamie Court adjacent to the project site. As shown in **Figure 4.9.7: Existing and Proposed Pedestrian Facilities**, there are sidewalks on the opposite sides of each of these streets. There are sidewalks on both sides of East Grand Avenue west of Haskins Way. Pedestrians can also use the San Francisco Bay Trail.

When traffic counts were conducted at the intersection of Haskins Way and East Grand Avenue in October 2017, two pedestrians were observed during the AM peak hour and seven pedestrians were observed in the PM peak hour.

4.9.3 Regulatory Framework

This section provides a summary of the plans and policies of federal, state, and regional agencies and the City of South San Francisco that have policy and regulatory control over the project site.

FEDERAL

There are no federal regulations that pertain to the evaluation of the proposed project's transportation impacts.

STATE

California Department of Transportation

The California Department of Transportation (Caltrans) is the primary state agency responsible for transportation issues. One of its duties is the construction and maintenance of the state highway system. Caltrans has established standards for roadway traffic flow and developed procedures to determine if state-controlled facilities require improvements. Caltrans facilities within the project study area include the U.S. 101 freeway, the on- and off-ramps and the traffic signals at ramp termini.

[3] A Class I bike path is a completely separate right-of-way reserved for shared use of bicycles and pedestrians.



Source: Kittelson & Associates (2018)

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FIGURE 4.9.7: EXISTING AND PROPOSED PEDESTRIAN FACILITIES

Caltrans, as a responsible agency under the California Environmental Quality Act (CEQA), is available for early consultation on projects to provide guidance on applicable transportation analysis methodologies or other transportation-related issues, and is responsible for reviewing traffic impact studies for errors and omissions pertaining to the state highway facilities. In relation to this role, Caltrans published the "Guide for the Preparation of Traffic Impact Studies"[4] (Caltrans Guide), which establishes "measures of effectiveness" used to determine significant impacts on state facilities. Caltrans endeavors to maintain a minimum level of service at the transition between LOS C and LOS D on state facilities. Where an existing facility is operating at less than the LOS C/D threshold, the existing measure of effectiveness should be maintained. For example, a facility that operates at LOS E under existing conditions should be maintained to operate at no worse than LOS E under future conditions.

The Caltrans Guide also mandates that traffic analyses include mitigation measures to lessen potential project impacts on state facilities and to meet each project's fair share responsibility for the impacts. However, the ultimate mitigation measures and their implementations are to be determined based on consultation between Caltrans, the City of South San Francisco, and the project sponsor.

Senate Bill 743

Senate Bill 743 (SB 743; 2013) requires the Governor's Office of Planning and Research (OPR) to update the CEQA Guidelines and establish "criteria for determining the signficance of transportation impacts of projects within transit priority areas." As part of the new CEQA Guidelines, the new criteria "shall promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diveristy of land uses." The new criteria eliminate the use of level of service measures in favor of VMT for environmental review purposes.

The OPR has submitted changes to the CEQA Guidelines with an accompanying technical advisory document. The Natural Resources Agency has begun the formal administrative rulemaking process under the Administrative Procedure Act. Changes would only go into effect after the Office of Administrative Law reviews and approves the changes. OPR recommends that the new procedures remain optional for a two-year period and that the new procedures become effective statewide in January 2020.

The proposed revisions to the CEQA Guidelines submitted by OPR in November 2017 in compliance with SB 743 include criteria for analyzing transportation impacts. For land use projects, VMT exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high-quality transit corridor should be presumed to cause a less-than-significant transportation impact.[5] Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be considered to have a less-than-significant transportation impact. A lead agency has discretion to choose the most appropriate

[4] California Department of Transportation, *Guide for the Preparation of Traffic Impact Studies,* December 2002. Available on line at: http://dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf. Accessed June 4, 2018.

[5] Governor's Office of Planning and Research, "Proposed Updates to the CEQA Guidelines," November 2017, p. 78. Available online at http://opr.ca.gov/docs/20171127_Comprehensive_CEQA_Guidelines_Package_Nov_2017.pdf. Accessed June 8, 2018.

methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure.

The OPR "Technical Advisory on Evaluating Transportation Impacts in CEQA" provides a recommended threshold for office projects. Office projects that would generate vehicle travel exceeding 15 percent below existing VMT per employee for the region may indicate a significant transportation impact.[6]

REGIONAL

San Mateo County City/County Association of Governments

The San Mateo County City/County Association of Governments (C/CAG) prepares the county's Congestion Management Program (CMP), a plan mandated by California law to describe the strategies to address congestion problems on the Metropolitan Transportation System (MTS) and CMP network, which includes state highways and principal arterials. The 2017 CMP for San Mateo County was last updated in January 2018. The CMP uses level of service standards as a means to measure congestion and has established LOS standards to determine how local governments meet the objectives of the CMP. U.S. 101 is the only MTS and CMP roadway in the study area. Regional transit systems include BART, Caltrain, and SamTrans.

The LOS standards established for roads and intersections in the San Mateo County CMP street network vary based on geographic differences. For roadway segments and intersections near the county border, the LOS standard was set at E in order to be consistent with the recommendations in the neighboring counties. If the existing level of service in 1990/91 was F, the standard was set to LOS F. If the existing or future LOS was or will be E, the standard was set to E. For the remaining roadways and intersections, the standard was set to be one letter designation worse than the projected LOS in the year 2000.

If a proposed land use change would either cause a deficiency (to operate below the standard LOS) on a CMP-designated roadway system facility, or would significantly affect (by using greater than 1 percent of the facility capacity) a deficient CMP system facility that operated at LOS F in the 1991 CMP baseline LOS, mitigation measures are to be developed so that LOS standards are maintained on the CMP-designated roadway system. If mitigation measures are not feasible (due to financial, environmental, or other factors), a Deficiency Plan must be prepared for the deficient facility. The Deficiency Plan must indicate the land use and infrastructure action items to be implemented by the local agency to eliminate the deficient conditions. A Deficiency Plan may not be required if the deficiency would still occur if traffic operation outside the county were excluded from the determination of conformance.

For proposed individual development projects that would generate more than 100 net new peak hour vehicle trips on the CMP network, local jurisdictions must ensure that the developer and/or tenants analyze those impacts and apply feasible mitigation for the new peak hour trips generated by the project by selecting one or more of the options listed below. It is up to the local jurisdiction working together

[6] Governor's Office of Planning and Research, "Technical Advisory on Evaluating Transportation Impacts in CEQA," November 2017, p. 12. Available online at http://opr.ca.gov/docs/20171127_Transportation_Analysis_TA_Nov_2017.pdf. Accessed June 8, 2018.

with the project sponsor to choose the methods that will be compatible with the intended purpose of the project. This list is not all inclusive. Additional measures may be proposed for consideration by C/CAG in advance of project approval by the local decision-maker.

a. Reduce the scope of the project so that it will generate less than 100 peak hour trips.

b. Build adequate roadway and/or transit improvements so that the added peak hour trips will have no measurable impact on the Congestion Management Program roadway network.

c. Contribute an amount per peak hour trip to a special fund for improvements to the Congestion Management Program roadway network. This amount will be set annually by C/CAG based on a nexus test.

d. Require the developer and all subsequent tenants to implement Transportation Demand Management programs that mitigate the new peak hour trips. A list of acceptable programs and the equivalent number of trips that are mitigated will be provided by C/CAG annually. Programs can be mixed and matched so long as the total mitigated trips is equal to or greater than the new peak hour trips generated by the project. These programs, once implemented, must be on-going for the occupied life of the development. Programs may be substituted with prior approval of C/CAG, so long as the number of mitigated trips is not reduced. Additional measures may be proposed to C/CAG for consideration. Also, there may be special circumstances that warrant a different amount of credit for certain measures. These situations can also be submitted to C/CAG in advance for consideration.

LOCAL

City of South San Francisco General Plan

The Transportation Element of the General Plan contains the following policies that are relevant to the evaluation of project impacts and mitigation measures:

Policy 2-I-4: Require all new developments seeking an FAR bonus set forth in Table 2.2-2 to achieve a progressively higher alternative mode usage. The requirements of the TDM Program are detailed in the Zoning Ordinance. The requirements of the TDM program for projects seeking an FAR bonus are based on the percentage trip reduction that is achieved.

Policy 4.2-G-1: Undertake efforts to enhance transportation capacity, especially in growth and emerging employment areas such as in the East of 101 area.

Policy 4.2-G-10: Make efficient use of existing transportation facilities and, through the arrangement of land uses, improved alternate modes, and enhanced integration of various transportation systems serving South San Francisco, strive to reduce the total vehicle-miles traveled.

Policy 4.2-G-12: Provide fair and equitable means for paying for future street improvements including mechanisms such as development impact fees.

Policy 4.2-G-13: Strive to maintain LOS D or better on arterial and collector streets, at all intersections, and on principal arterials in the CMP during peak hours.

Policy 4.2-G-14: Accept LOS E or F after finding that:

- There is no practical and feasible way to mitigate the lower level of service; and
- The uses resulting in the lower level of service are of clear, overall public benefit.

Policy 4.2-I-5: Establish accessibility requirements for all streets designated as arterial or collector on Figure 4-1. As part of development review of all projects along these streets, ensure that access to individual sites does not impede through traffic flow.

Policy 4.2-I-7: Continue to require that new development pays a fair share of the costs of street and other traffic and transportation improvements, based on traffic generated and impacts on service levels. Explore the feasibility of establishing impact fee, especially for improvements required in the Lindenville area.

Policy 4.2-I-10: Design roadway improvements and evaluate development proposals based on LOS standards.

Policy 4.2-I-11: Implement, to the extent feasible, circulation system improvements illustrated in Figures 4-1, 4-2 and 4-3 prior to deterioration in levels of service below the stated standard.

Policy 4.3-G-1: Develop a comprehensive and integrated system of bikeways that promote bicycle riding for transportation and recreation.

Policy 4.3-G-2: Provide safe and direct pedestrian routes and bikeways between and through residential neighborhoods, and to transit centers.

Policy 4.3-G-5: In partnership with employers, continue efforts to expand shuttle operations.

Policy 4.3-G-6: In partnership with the local business community, develop a transportation systems management plan with identified trip-reduction goals, while continuing to maintain a positive and supportive business environment.

Policy 4.3-I-4: Require provision of secure covered bicycle parking at all existing and future multifamily residential, commercial, industrial, and office/institutional uses.

Policy 4.3-I-6: Expand pedestrian facilities in new development, using the PMP for pedestrian design guidelines and to identify other improvements that should be considered for projects proposed in areas that are identified in PMP concept plans.

Policy 4.3-I-11: As part of any development in Lindenville or East of 101, require project proponents to provide sidewalks and street trees as part of frontage improvements for new development and redevelopment projects.

Policy 4.3-I-16: Favor Transportation Systems Management programs that limit vehicle use over those that extend the commute hour.

Policy 4.3-I-18: Establish parking standards to support trip reduction goals by:

- Allowing parking reductions for projects that have agreed to implement trip reduction methods, such as paid parking, and for mixed use development.
- Requiring projects larger than 25 employees to provide preferential parking for carpools and vanpools.

Policy 4.4-G-1: Promote local and regional public transit serving South San Francisco.

Policy 4.4-G-2: Explore mechanisms to integrate various forms of transit.

The *East of 101 Area Plan*, which was adopted prior to the City's General Plan, is primarily used as a design-only document for new projects located east of U.S. 101. Therefore, the General Plan policies listed under the Transportation Element are the guiding policies and supersede all Circulation Element policies set forth in Chapter 5 of the *East of 101 Area Plan*.

City of South San Francisco Municipal Code

Several sections of the South San Francisco Municipal Code pertain to the transportation components of the proposed project.

Municipal Code Section 20.330.004, Required Parking Spaces, specifies that each land use shall be provided at least the number of on-site parking spaces stated in Table 20.330.004. These parking ratios should generally not be exceeded. However, the City Planner may allow parking in excess of the spaces required as long as the amount of parking provided is supportive of the recommendations and requirements of the TDM plan prepared for the project. For business and professional office uses, the minimum required parking spaces are 1 per 300 square feet (sq. ft.) of floor area up to 100,000 sq. ft. and 1 per 350 sq. ft. over 100,000 sq. ft.; for research and development uses, the minimum required parking spaces are 1 per 350 sq. ft.

Municipal Code Section 20.330.006, Parking Reductions, states that required parking for any use may be reduced through approval of a Conditional Use Permit (CUP). Support for a CUP could include a description of possible Transportation Demand Management measures, such as preferential carpool spaces, telecommuting or staggered work shifts, provision of transit passes or other transit incentives for residents or employees, incorporation of spaces for car share vehicles, bicycles, or other measures that could result in reduced parking demand.

Municipal Code Section 20.330.008, Bicycle Parking, specifies that short-term bicycle parking spaces shall be provided at a rate of 10 percent of the number of required automobile parking spaces and any establishment with 25 or more employees shall provide long-term bicycle parking at a ratio of one space per 25 vehicle spaces.

Municipal Code Section 20.330.009, On-Site Loading, specifies the number of on-site loading spaces (minimum 50 feet in length) that must be provided based on building square footage.

Municipal Code Chapter 20.400, Transportation Demand Management, contains the City's TDM requirements. The TDM requirements apply to all nonresidential development expected to generate 100 or more average daily trips. The minimum requirements are to achieve 28 percent alternative mode usage (compared to solo driving) with additional density bonuses allowed for higher use of alternative modes. In order to achieve an FAR of 1.0, as required for development of the project, the TDM plan implemented in connection with the project must achieve 35 percent alternative mode usage. The chapter also contains required trip reduction measures, TDM plan submittal, and monitoring requirements.

Bicycle Master Plan

The *South San Francisco Bicycle Master Plan* (Bicycle Plan) recommends a comprehensive and integrated system of bikeways that promote bicycle riding for transportation and recreation.[7] The Bicycle Plan follows the steps necessary to qualify for a wide range of funding sources, including the California

[7] City of South San Francisco, *South San Francisco Bicycle Master Plan*, adopted February 2011. Available online at http://www.ssf.net/home/showdocument?id=760. Accessed June 8, 2018.

Bicycle Transportation Account. The following policy is relevant to evaluation of project impacts and mitigation measures:

> **Policy 3.2:** Bicycle parking facilities should be provided at schools, parks and transit stops, and shall be required to be provided at private developments including places of work, commercial shopping establishments, parks, community facilities and other bicyclist destinations.

The Bicycle Plan recommends improvements to on-street and off-street bicycle facilities. As shown on **Figure 6.2: New General Plan Bikeways**,[8] in the project area these include recommendations for bicycle lanes on East Grand Avenue and development of an off-street multi-use path along former railroad right-of-way parallel to and south of East Grand Avenue.

Pedestrian Master Plan

The *South San Francisco Pedestrian Master Plan* describes the planning context, existing conditions, recommended improvements, and funding plan for pedestrian facilities in South San Francisco.[9] The following policies are relevant to evaluation of project impacts and mitigation measures:

> **Policy 1.1:** Integrate pedestrian facilities and planning into all of the City's planning review and construction activities, legitimizing walking as a transportation mode.
>
> > **Implementation Measure 1.1-1:** All development projects shall be required to conform to the Pedestrian Master Plan goals, policies and implementation measures.
>
> **Policy 3.2:** Pedestrian facilities and amenities should be provided at schools, parks and transit stops, and shall be required to be provided at private developments including places of work, commercial shopping establishments, parks, community facilities and other pedestrian destinations.

The Pedestrian Plan includes recommendations for priorities for sidewalk gap closures throughout the City. The completion of sidewalks adjacent to the project site is listed as third priority gap closures.[10]

4.9.4 Impacts and Mitigation Measures

This section describes the impact analysis related to transportation and circulation for the proposed project. This section also describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

[8] *South San Francisco Bicycle Master Plan*, p. 6-4.

[9] City of South San Francisco, *South San Francisco Pedestrian Master Plan*, adopted February 2014. Available online at http://www.ssf.net/home/showdocument?id=516. Accessed June 8, 2018.

[10] *South San Francisco Pedestrian Master Plan*, Chapter 5, Concept Plan, Section 5.1, Citywide Sidewalk Gap Closure Plan, p. V-3, Concept Plan One.

SIGNIFICANCE CRITERIA

Per the CEQA Guidelines, Appendix G, a transportation and circulation impact is considered significant if project implementation would:

a. conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;

b. conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways;

c. result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;

d. substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);

e. result in inadequate emergency access; or

f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

The proposed revisions to the CEQA Guidelines would replace the criteria related to LOS with criteria related to VMT.

The following significance criteria are based on the CEQA Guidelines and are consistent with criteria used for the City of South San Francisco and C/CAG:

Circulation System Performance

Intersection Impact Criteria

A project would result in a significant traffic impact at a signalized intersection if:

- the addition of project traffic at an intersection operating at an acceptable LOS (LOS D or better) without the project would cause the intersection to operate at an unacceptable LOS (LOS E or F) with the project, and the total traffic volume through the intersection would increase by at least 2 percent (1 percent for an intersection with a freeway ramp connection); or
- the project would add more than 2 percent of total traffic volume at an intersection operating at an unacceptable LOS (LOS E or F) without the project, or 1 percent for an intersection with a freeway ramp connection.

A project would result in a significant traffic impact at an unsignalized intersection if:

- the addition of project traffic at an intersection operating at an acceptable LOS (LOS E or better) without the project would cause the intersection to operate at an unacceptable LOS F with the project, and the total traffic volume through the intersection would increase by at least 2 percent; or

- the project would add more than 2 percent of total traffic volume at an intersection operating at an unacceptable LOS F without the project; or
- the addition of project traffic would cause traffic volumes to exceed the Caltrans peak hour or pedestrian/school crossing warrant criteria; or
- the project would add more than 2 percent of total traffic volume at an intersection where traffic volumes exceed the Caltrans peak hour or pedestrian/school crossing warrant criteria without the project.

Queue Impact Criteria

A project would result in a significant traffic impact at an intersection if:

- the addition of project traffic on a turn-lane or freeway off-ramp where the 95th percentile queues are within the available storage length without the project would cause 95th percentile vehicle queues to exceed the available storage length; or
- the project would add more than 1 percent to the traffic volume on a turn-lane, freeway off-ramp or through lane segment where 95th percentile queues would exceed the available storage length without the project.

Freeway Ramp Impact Criteria

A project would result in a significant traffic impact at a freeway ramp if:

- the addition of project traffic on a freeway ramp would cause volumes to exceed the ramp capacity; or
- the project would add more than 1 percent to the traffic volume on a freeway ramp where volumes would exceed the available capacity without the project.

Conflict with Congestion Management Program

Trip Generation Impact Criterion

A project sponsor must comply with the "Land Use Impact Analysis Program" guidelines in the latest 2017 CMP for San Mateo County. For proposed individual development projects that would generate more than 100 net new peak hour vehicle trips on the CMP network, local jurisdictions must ensure that the developer and/or tenants analyze those impacts and apply feasible mitigation for the new peak hour trips generated by the project by selecting one or more of the options listed below. It is up to the local jurisdiction working together with the project sponsor to choose the methods that will be compatible with the intended purpose of the project. A project would result in a significant traffic impact on the CMP road system if it will add more than 100 net new peak hour vehicle trips.

Freeway Segment Impact Criteria

A project would result in a significant traffic impact on a CMP freeway segment if:

- the addition of project traffic on a freeway segment operating at an acceptable LOS (LOS E or better) without the project would cause the segment to operate at an unacceptable LOS F with the project, and the total traffic volume on the segment increases by at least 1 percent; or

- the project would add more than 1 percent of total traffic volume on a freeway segment operating at an unacceptable LOS F without the project.

Increase Hazards

Safety Impact Criterion

A project safety impact is considered significant if the project would introduce a design feature that presents safety concerns within the project site or on the adjacent streets.

Emergency Access Impact Criterion

An emergency vehicle access impact is considered to be significant if the proposed project would provide inadequate design features to accommodate emergency vehicle access and circulation.

Conflict with Transit, Bicycle or Pedestrian Facilities

Transit Impact Criteria

A project would result in a significant impact on public transit facilities if:

- the project would conflict with adopted policies, plans or programs supporting alternative transportation; or
- the project would disrupt existing transit service; or
- the project would cause demand for public transit service to increase above that which local transit operators or agencies could accommodate; or
- the project would not provide amenities necessary to accommodate transit demand.

Bicycle and Pedestrian Impact Criteria

A project would result in a significant impact on bicycle or pedestrian facilities if:

- the project would conflict with adopted policies, plans or programs supporting bicycle and pedestrian circulation; or
- the project would disrupt existing bicycle or pedestrian facilities; or
- at a signalized intersection, the project would increase pedestrian walking distance, increase pedestrian exposure, or significantly increase pedestrian delay.

Vehicle-Miles of Travel

A project proposing "office" land uses would result in a significant impact on VMT if it would generate VMT per employee that is greater than a threshold of 15 percent below the regional average, with the region defined as employees working in San Mateo County, where VMT is measured from all residence locations including both within and outside San Mateo County.

Change in Air Traffic Patterns

The proposed project would not result in a change in air traffic patterns; therefore, no significance criteria are applicable. This criterion is not discussed further in this section.

APPROACH TO ANALYSIS

The traffic analysis for the proposed project is based on the City of South San Francisco traffic modeling system applied for the East of 101 and Downtown Specific Plan Year 2016 Traffic Model Update. The traffic modeling system includes two components:

- A traffic demand forecasting model (EMME software) which estimates traffic volumes based on assumed development. The traffic forecast model covers the East of 101 Area and the downtown area. It also includes assumptions for traffic growth at the boundaries of those areas based on traffic forecasts from the regional travel forecast model maintained by C/CAG.
- An intersection analysis network tool (Synchro software) which contains consistent assumptions for evaluation of intersection operations for a given level of traffic volumes.

The traffic for the proposed project was estimated and added to the City's traffic modeling system in order to evaluate project traffic impacts. For the base year (existing plus project scenario), the City traffic model was used to determine project trips and then those trips were added to the existing traffic counts. For cumulative conditions, the 2040 traffic forecasts from the City traffic model were used as a base (without project) scenario, and the project traffic was added to the 2040 base scenario.

Baseline Conditions

Transportation impacts of the proposed project are evaluated relative to existing conditions and cumulative conditions. The City of South San Francisco has not defined a near-term baseline conditions scenario which would include development that would be occupied at the time that the proposed project is operational. Traffic added by the project would represent a larger share of total traffic when compared to existing traffic levels as opposed to comparing project-generated traffic to traffic volumes that include other baseline development expected to be occupied when the proposed project would be occupied. The cumulative analysis ensures that the project impacts are considered along with all other foreseeable development within the year 2040 study planning horizon.

Cumulative 2040 Traffic Forecasts

The 2040 traffic forecasts in the traffic demand forecasting model were based on a projection of development in the East of 101 and downtown areas provided by the City of South San Francisco. The development assumptions include projects that are under construction but not yet occupied, approved projects, projects currently under review, and potential development not necessarily associated with a specific building project. The assumptions used for this study are consistent with those used for the East of 101 and Downtown Specific Plan Year 2016 Traffic Model Update prepared in July 2018. In particular, the proposed land uses for the *Oyster Point Specific Plan* do not include housing. In the East of 101 Area, the total land use growth assumptions from 2016 to 2040 include 1,290 hotel rooms and over 13 million sq. ft. of non-residential square footage.

The development assumptions for the 201 Haskins project site used in the 2040 forecasts were reviewed. It was confirmed that the East of 101 and Downtown Specific Plan Year 2016 Traffic Model Update assumed existing (as of the 2016 model base year) industrial uses on the 201 Haskins site. Therefore, project traffic must be added to the 2040 forecast to generate cumulative traffic forecasts with the proposed project.

The 2040 peak hour traffic forecasts without the proposed project are based directly on the traffic forecasts reported in the East of 101 and Downtown Specific Plan Year 2016 Traffic Model Update and are shown in **Figure 4.9.8: 2040 AM Peak Hour Traffic Forecasts without Project** and **Figure 4.9.9: 2040 PM Peak Hour Traffic Forecasts without Project**. The intersection of Haskins Drive with East Grand Avenue was not included in the City traffic model. Therefore, future growth at that intersection was estimated based on growth reported at adjacent intersections.

Consistent with the East of 101 and Downtown Specific Plan Year 2016 Traffic Model Update, the traffic analysis for 2040 cumulative conditions includes implementation of transportation improvements that will be funded and implemented by the East of 101 Area Traffic Impact Fee. These include improvements at the following study intersections:

2. Airport Boulevard and Grand Avenue
5. Gateway Boulevard and East Grand Avenue
6. Forbes Boulevard/Harbor Boulevard and East Grand Avenue
7. Littlefield Avenue and East Grand Avenue
8. Allerton Avenue and East Grand Avenue
11. Airport Boulevard/Produce Avenue/San Mateo Avenue
12. Gateway Boulevard/South Airport Boulevard/Mitchell Avenue

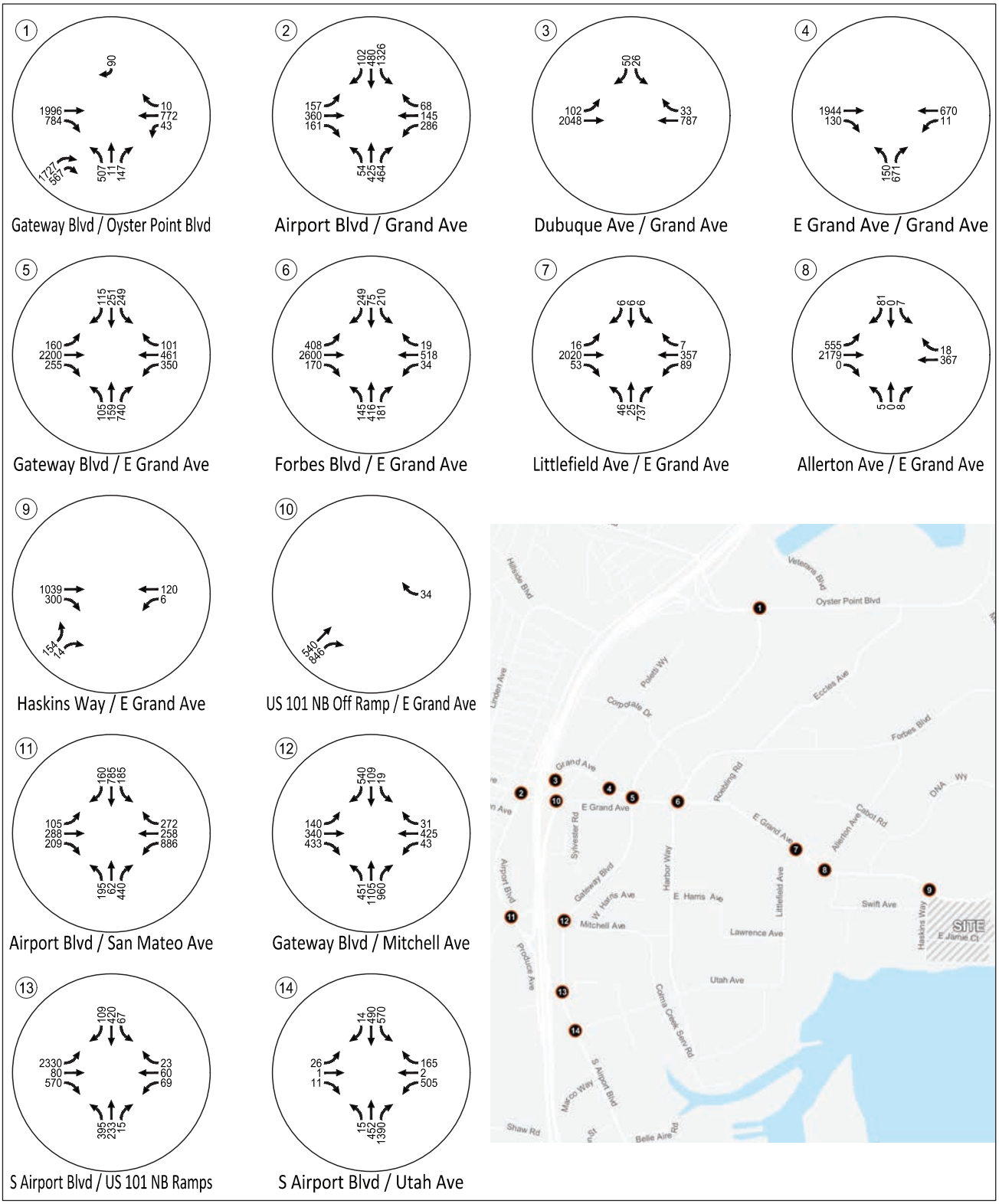
Caltrans and MTC are currently studying the implementation of high-occupancy vehicle (HOV) lanes or express lanes on the U.S. 101 freeway in San Mateo County. However, these regional freeway improvements are not assumed in this analysis as they have not secured committed full funding.

Project Trip Generation

Trip generation relates land uses to the number of persons or vehicles entering or exiting the site. The trip generation rates are typically based on traffic counts and surveys at similar existing land uses.

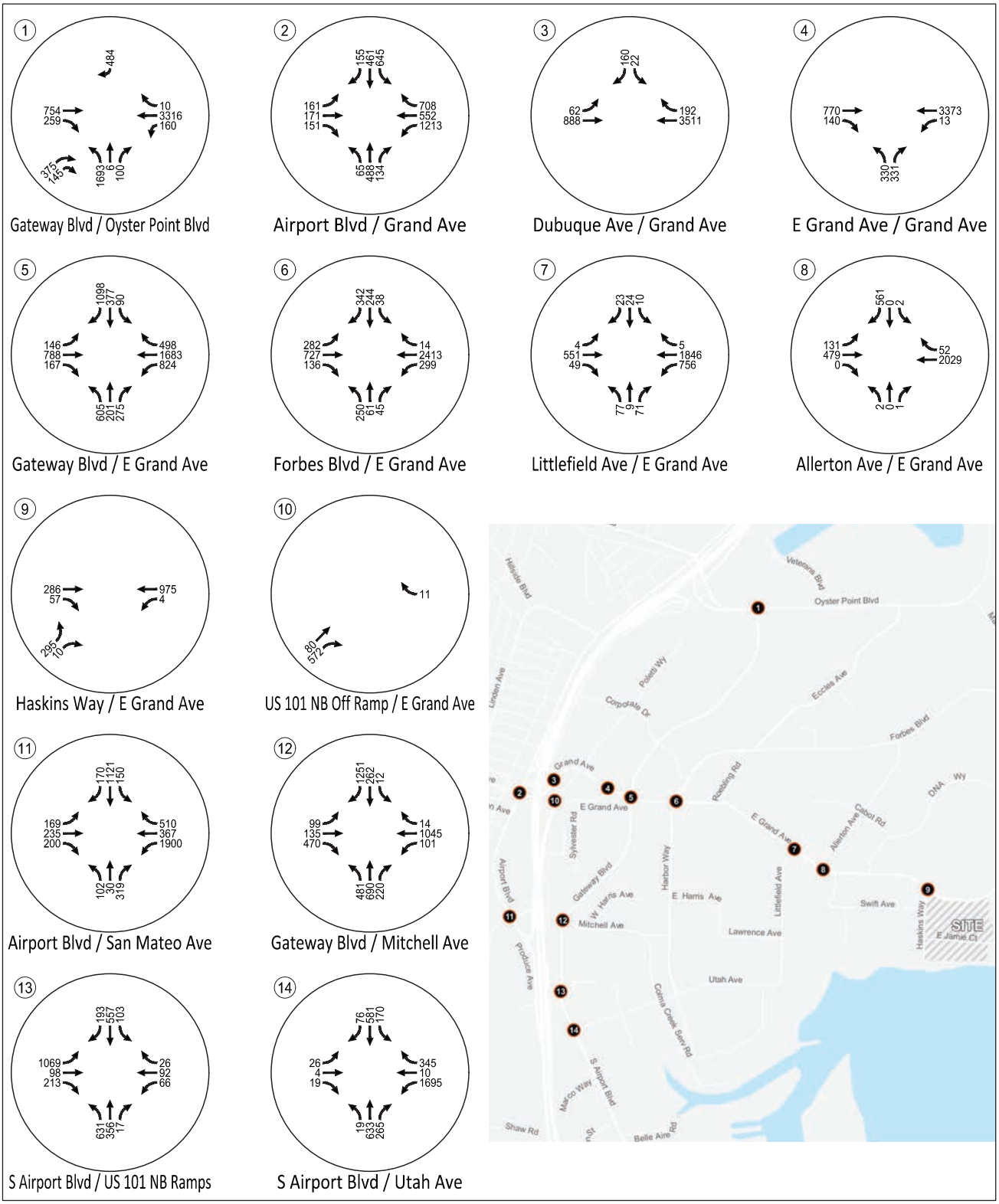
Vehicle Trip Generation Rates

The vehicle trip generation rates for the proposed project are based on the trip generation rates used in the City's traffic forecasting model. The "Office" category assumes that building space is occupied by employee work spaces and supporting facilities at densities of approximately 3 to 4 employees per 1,000 sq. ft. (KSF). The "R&D" (research and development) category assumes that a substantial amount of building area is dedicated to laboratory equipment, so that employee densities are in the range of 2 to 3 per KSF. The "Office" category of trip generation has been assumed for all project office and R&D space. This assumption provides a conservative estimate of project traffic generation and traffic impacts regardless of which type of business would occupy the space. The City traffic model uses an "average" trip generation rate for this office category as opposed to a "fitted curve" trip generation rate.



Source: Kittelson & Associates (2018)

FIGURE 4.9.8: 2040 AM PEAK HOUR TRAFFIC FORECASTS WITHOUT PROJECT



Source: Kittelson & Associates (2018)

FIGURE 4.9.9: 2040 PM PEAK HOUR TRAFFIC FORECASTS WITHOUT PROJECT

Standard vehicle trip generation rates, such as those documented in the Institute of Transportation Engineers' (ITE) *Trip Generation,* are based on averages of surveys of office buildings conducted during the past 30 years, primarily in suburban locations. They assume minimal use of transit and other TDM measures. The ITE Trip Generation rates for General Office Building (Code 710) are 9.74 daily vehicle trips per KSF, with 1.16 vehicle trips per KSF in the AM peak hour and 1.15 vehicle trips per KSF in the PM peak hour.[11] The proposed project would be required to implement a TDM program as required by the City of South San Francisco and C/CAG. In addition, peak commute travel in the Bay Area tends to be more spread out through the entire peak period than in many less congested areas of the United States. Therefore, the City model trip generation rates are somewhat lower than standard ITE trip generation rates, with the AM peak hour rate 30 percent lower than ITE and the PM peak hour rate 19 percent lower than ITE.

The City traffic model does not include trip generation rates for the daily time period. The daily trips are estimated from the peak hour trips based on the ratios of peak hour to daily trips for the ITE *Trip Generation* "Office" category.

Net Project Vehicle Trips

The project would remove existing industrial uses from the site. Since these industrial uses were active and generating traffic that is included in the base traffic counts from 2016 and 2017, their trips are subtracted from the total project trip generation to determine the net added vehicle trips for each project phase. [12] This methodology is also consistent with the application of the City's traffic model, which assumes fully occupied industrial uses for the parcels within the project site. The City traffic model rate for industrial uses is based on an "average" trip generation rate as opposed to a "fitted curve" trip generation rate.

As shown in **Table 4.9.8: Vehicle Trip Generation**, the Phase 1 project would generate 2,533 net daily vehicle trips, with 258 in the AM peak hour and 298 in the PM peak hour. Phase 2 would generate an additional 1,913 net daily vehicle trips, with 178 in the AM peak hour and 219 in the PM peak hour. Phases 1 and 2 combined at project buildout would add 4,777 daily trips, 436 AM peak hour trips, and 517 PM peak hour trips.

[11] Institute of Transportation Engineers, *Trip Generation Manual*, 10th Edition, September 2017.

[12] The trucking and distribution use on the 201 Haskins Way site relocated in 2018. As this use was still active when traffic counts were established, it is appropriate to consider the trips generated by this use in the calculation of net added vehicle trips. Other industrial uses on the project site are still in operation.

Table 4.9.8: Vehicle Trip Generation

Land Use				Vehicle Trips		
	Land Use	Size (Sq.Ft.)	Vehicle Trip Generation Rates per KSF AM (PM)	Daily	AM Peak Hour	PM Peak Hour
PHASE 1 (Est Complete 2021)						
Existing Land Use (To Be Removed)						
Existing Mixed Industrial (MI)	Industrial	-24,075	0.62 (0.62)	-118	-15	-15
Proposed Land Use						
New Business and Technology Park (BTP)	Office	336,368	0.81 (0.93)	2,651	273	313
Net New Trips (Phase 1)				*2,533*	*258*	*298*
PHASE 2 (Est Complete 2023)						
Existing Land Use (To Be Removed)						
Existing Mixed Industrial (MI)	Industrial	-157,995	0.62 (0.62)	-772	-98	-98
Proposed Land Use						
New Business and Technology Park (BTP)	Office	341,232	0.81 (0.93)	2,685	276	317
Net New Trips (Phase 2)				*1,913*	*178*	*219*
Net New Trips (Phases 1 & 2)				**4,777**	**436**	**517**

Notes: Trip generation rates from City of South San Francisco Traffic Forecast Model
KSF = thousand square feet
Daily vehicle trips estimated by using the ratio between Daily and PM peak hour trips from ITE Trip Generation Manual, 10th Edition

Source: Kittelson & Associates, Inc. (2018)

Person Trip Generation

The United States Census American Community Survey reports the following commute mode shares for workplaces in South San Francisco:[13]

- Drive Alone 71%
- Carpool/Vanpool 9%
- Public Transit 13%
- Other 7%

The "Other" category could include taxis and transportation network vehicles (such as Lyft or Uber) in addition to bicycling and walking. Assuming an average carpool occupancy of 2.5 persons per vehicle, the Phase 1 project would generate approximately 3,400 daily person trips, including 440 transit trips (45 AM peak hour, 52 PM peak hour). Phases 1 and 2 combined at buildout would generate 6,400 daily person trips, including 830 transit trips (83 AM peak hour, 97 PM peak hour).

[13] United States Census Bureau, American Community Survey, 2016 One Year Estimates, Means of Transportation to Work by Selected Characteristics for Workplace Geography South San Francisco, California.

PROJECT VEHICLE TRIP DISTRIBUTION

The estimated distribution of project traffic was based on the City's traffic forecasting model. The AM and PM peak hour trips to and from the transportation analysis zone (TAZ) containing the project site were traced through each study intersection using a "select zone" traffic assignment. Distribution percentages to and from major origins and destinations were calculated based on these forecasts and are shown in **Table 4.9.9: Project Vehicle Trip Distribution**. These trips were then scaled to match the calculated AM and PM peak hour trips for Phase 1 of the project, shown in **Figure 4.9.10: Phase 1 Project Trips, AM Peak Hour** and **Figure 4.9.11: Phase 1 Project Trips, PM Peak Hour**, and for project buildout, shown in **Figure 4.9.12: Phase 1 and 2 Project Trips, AM Peak Hour** and **Figure 4.9.13: Phase 1 and 2 Project Trips, PM Peak Hour**. The same trip distribution percentages were assumed for the proposed uses and the replaced industrial uses, as both uses generate primarily employee commute trips during peak hours.

IMPACT EVALUATION

Impacts and mitigation measures are described for the following categories:

- Intersection impacts
- Queue impacts
- Trip generation impacts
- Freeway segment impacts
- Safety impacts
- Emergency access impacts
- Transit impacts
- Bicycle and pedestrian circulation impacts
- Vehicle-miles of travel impacts

Table 4.9.9: Project Vehicle Trip Distribution

Direction	AM (%)		PM (%)	
	IN	OUT	IN	OUT
Oyster Point Blvd west of Gateway Blvd	11%	2%	5%	11%
Airport Blvd north of Grand Ave	27%	2%	37%	4%
Grand Ave west of Airport Blvd	3%	2%	2%	3%
Airport Blvd south of Grand Ave	3%	2%	2%	3%
US 101 NB Off-Ramp to Grand Avenue	15%	-	24%	-
San Mateo Ave west of Airport Blvd	1%	1%	1%	0%
South of Airport Blvd/Produce Ave/San Mateo Ave	1%	29%	1%	28%
US 101 NB Off-Ramp to South Airport Blvd/Wondercolor Ln	17%	0%	19%	0%
South of S Airport Blvd/Utah Ave	20%	5%	2%	16%
US 101 NB On-Ramp from Grand Ave	-	47%	-	30%
Internal to East of 101 Area	*2%*	*10%*	*6%*	*5%*
Total	**100%**	**100%**	**100%**	**100%**

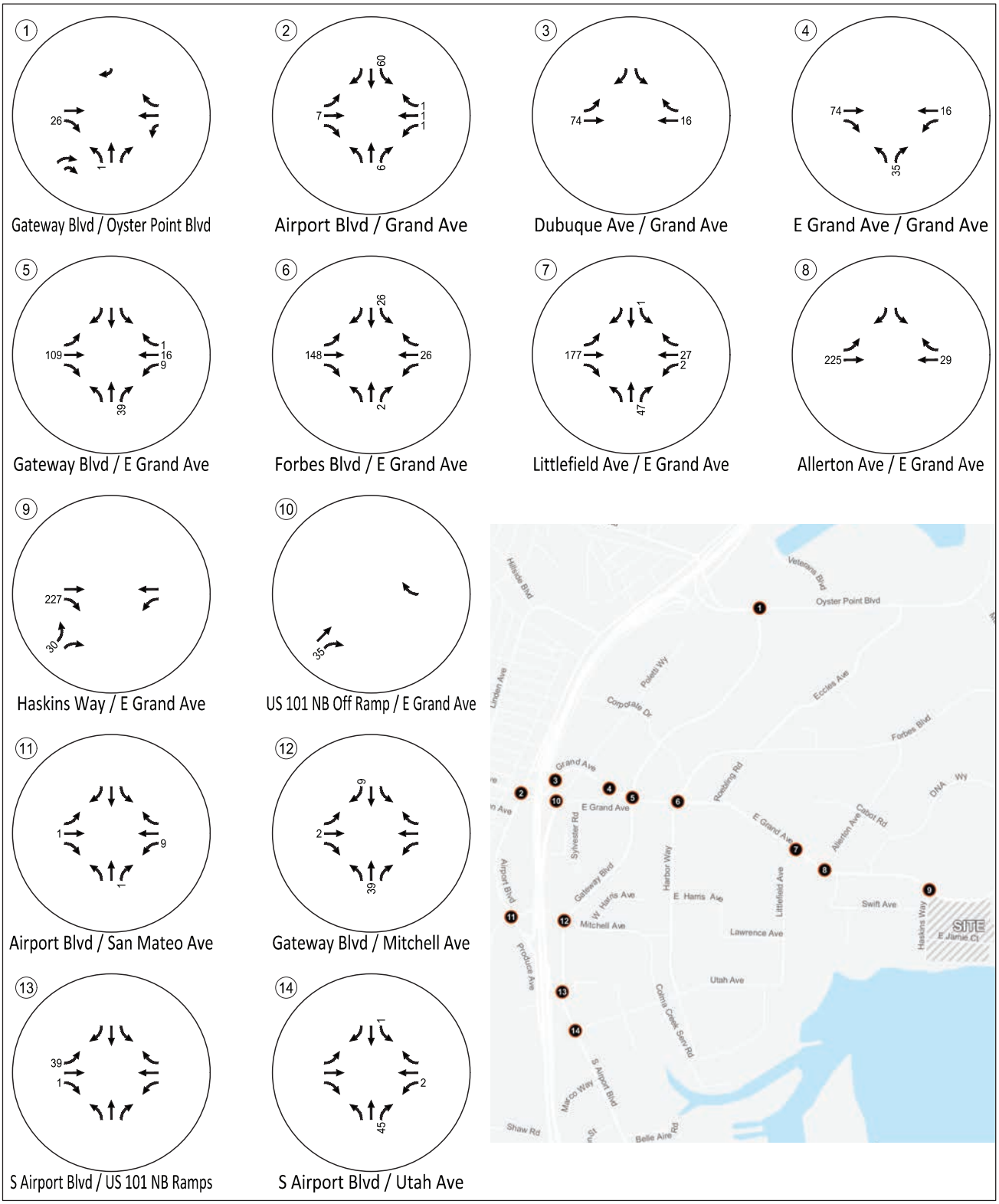
Source: Kittelson & Associates, Inc. (2018) based on City of South San Francisco Traffic Forecast Model

The project-specific impacts are presented first, in relation to existing conditions. Cumulative 2040 conditions with the proposed project are presented at the end of the section.

Existing Plus Project Conditions

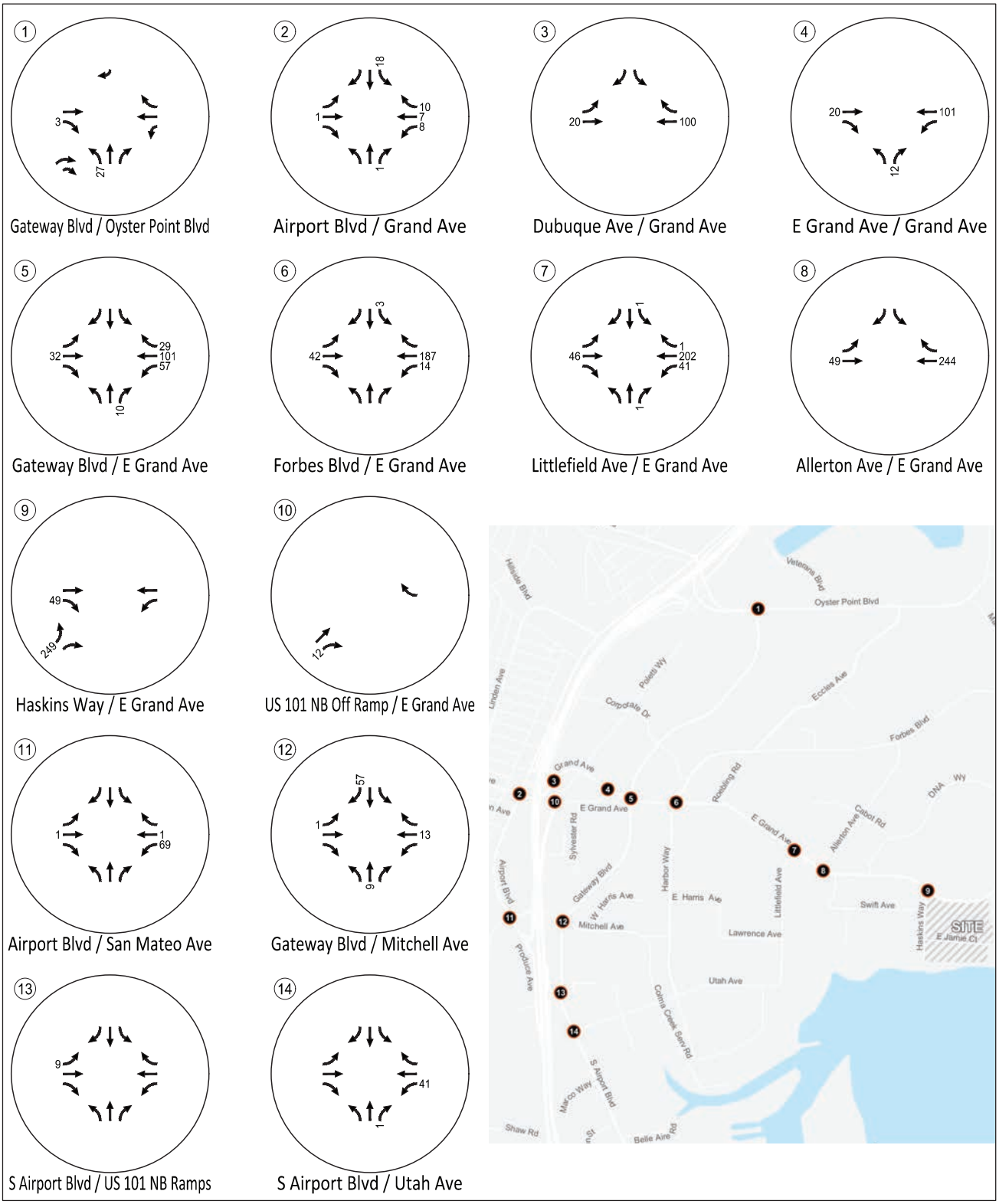
Intersection Impacts

Project traffic was added to existing traffic volumes, and operations were evaluated at the 14 study intersections. As shown in **Table 4.9.10: Intersection Level of Service – Existing (2016) AM Peak Hour Without and With Project**, and **Table 4.9.11: Intersection Level of Service – Existing (2016) PM Peak Hour Without and With Project**, 13 of the 14 study intersections in the AM peak hour and 12 of the 14 study intersections in the PM peak hour would continue to operate at an acceptable LOS D or better and would not result in significant traffic impacts with traffic generated by the proposed project. Three intersections—Intersection 7: Littlefield Avenue and East Grand Avenue, Intersection 8: Allerton Avenue and East Grand Avenue, and Intersection 12: Gateway Boulevard/South Airport Boulevard/Mitchell Avenue —would operate at LOS E or F, and therefore would exceed standards with the addition of project-generated vehicle trips in either the AM or PM peak hour. Both Phase 1 and buildout of the proposed project would contribute more than 2 percent of the total traffic. These three intersections are discussed individually below.



Source: Kittelson & Associates (2018)

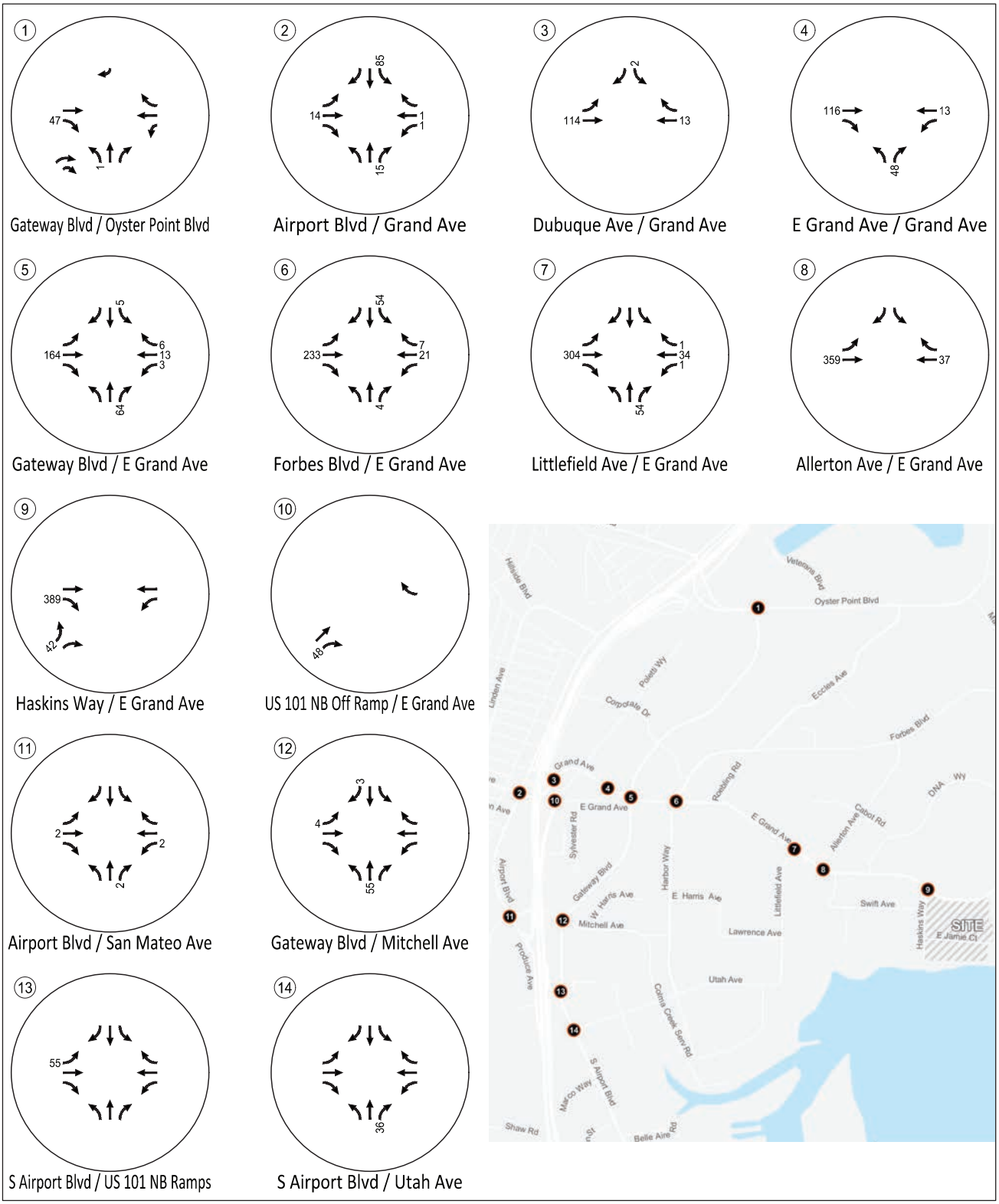
FIGURE 4.9.10: PHASE 1 PROJECT TRIPS, AM PEAK HOUR



Source: Kittelson & Associates (2018)

201 HASKINS WAY PROJECT

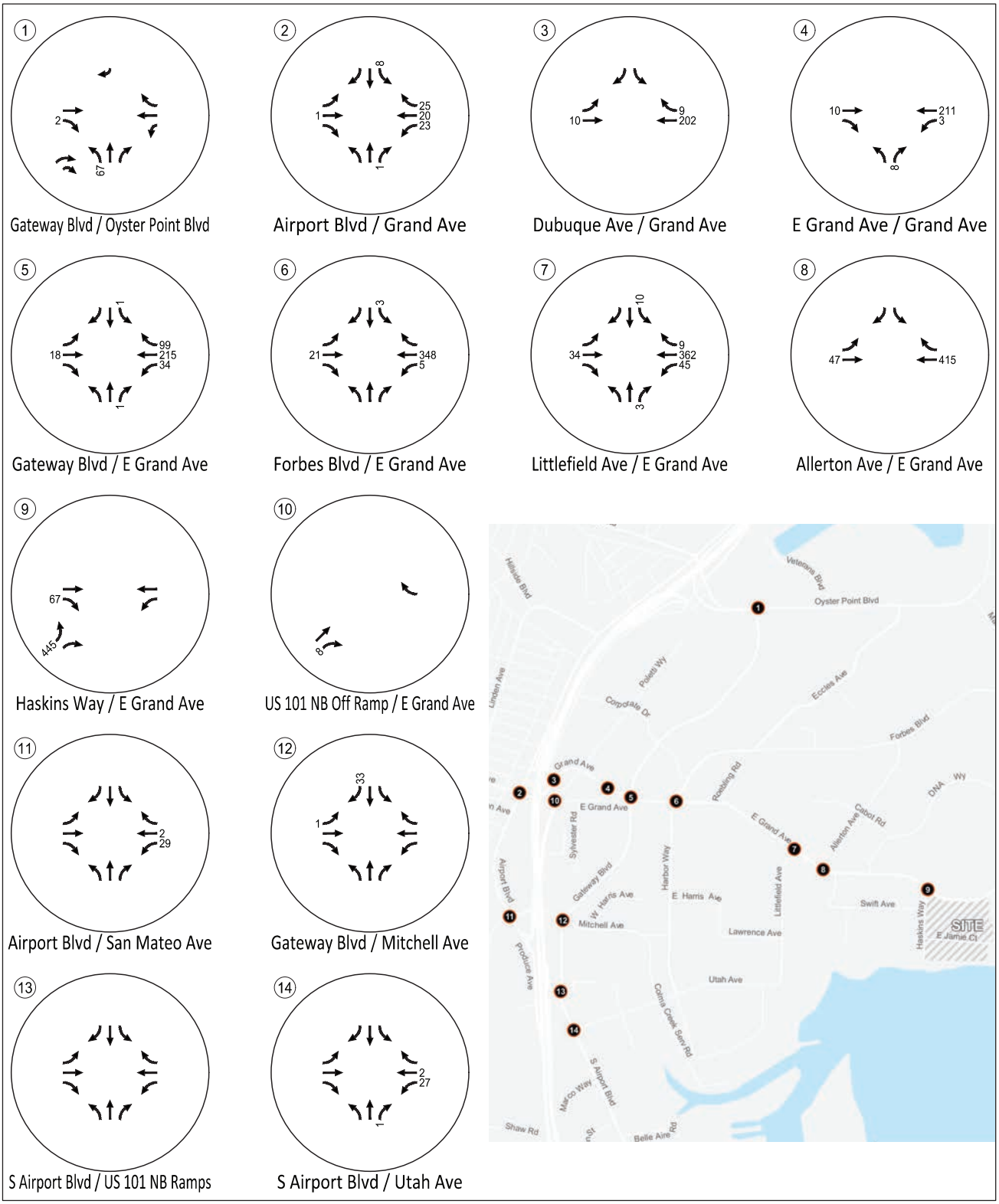
FIGURE 4.9.11: PHASE 1 PROJECT TRIPS, PM PEAK HOUR



Source: Kittelson & Associates (2018)

201 HASKINS WAY PROJECT

FIGURE 4.9.12: PHASE 1 AND 2 PROJECT TRIPS, AM PEAK HOUR



Source: Kittelson & Associates (2018)

201 HASKINS WAY PROJECT

FIGURE 4.9.13: PHASE 1 AND 2 PROJECT TRIPS, PM PEAK HOUR

Table 4.9.10: Intersection Level of Service – Existing (2016) AM Peak Hour Without and With Project

No.	Intersection	Control Type	Level of Service – Average Delay per Vehicle in Seconds [Project Traffic Percentage of Total Traffic at Intersections Exceeding LOS D]		
			Existing	With Phase 1	With Buildout
1	Gateway Blvd/Oyster Point Blvd/US 101 SB Off-Ramp Flyover	Signal	C – 31.4	C – 31.9	C – 32.3
2	Airport Blvd/Grand Ave	Signal	D – 38.2	D – 38.5	D – 39.0
3	Dubuque Ave/Grand Ave Overcrossing	Signal	A – 5.0	A – 4.4	A – 4.2
4	E Grand Ave/Grand Ave Overcrossing	Signal	A – 6.3	A – 5.9	A – 5.7
5	Gateway Blvd/E Grand Ave	Signal	C – 22.7	C – 22.8	C – 22.8
6	Forbes Blvd/Harbor Way/E Grand Ave	Signal	C – 30.5	C – 31.2	C – 33.8
7	Littlefield Ave/E Grand Ave	Signal	D – 42.3	**E – 61.0 [10.9%]***	**F – 82.5 [18.5%]***
8	Allerton Ave/E Grand Ave	TWSC	B – 10.1	B – 10.2	B – 10.3
	Exceeds Peak Hour Signal Warrant		*No*	*No*	*No*
9	Haskins Way/E Grand Ave	Signal	A – 5.3	A – 5.9	A – 7.7
10	US 101 NB Off-Ramp/Poletti Way/Grand Ave	TWSC	C – 16.2	C – 16.6	C – 16.8
	Exceeds Peak Hour Signal Warrant		*No*	*No*	*No*
11	Airport Blvd/San Mateo Ave/Produce Ave	Signal	D – 36.3	D – 36.5	D – 36.6
12	Gateway Blvd/S Airport Blvd/Mitchell Ave	Signal	D – 48.9	D – 50.0	D – 50.2
13	S Airport Blvd/US 101 NB Hook Ramps/Wondercolor Ln	Signal	C – 28.0	C – 28.5	C – 29.1
14	S Airport Blvd/Utah Ave	Signal	C – 28.4	C – 30.1	C – 32.5

Note: Signalized level of service – control delay in seconds; TWSC = Two-Way Stop Control

[xx%] – Project volume percent of total traffic entering intersection

Bold = exceeds threshold *** = Significant impact**

Source: Kittelson & Associates, Inc. (2018)

Table 4.9.11: Intersection Level of Service – Existing (2016) PM Peak Hour Without and With Project

No.	Intersection	Control Type	Level of Service – Average Delay per Vehicle in Seconds [Project Traffic Percentage of Total Traffic at Intersections Exceeding LOS D]		
			Existing	With Phase 1	With Buildout
1	Gateway Blvd/Oyster Point Blvd/US 101 SB Off-Ramp Flyover	Signal	C – 21.0	C – 21.3	C – 21.5
2	Airport Blvd/Grand Ave	Signal	D – 41.0	D – 41.2	D – 41.4
3	Dubuque Ave/Grand Ave Overcrossing	Signal	A – 5.0	A – 5.2	A – 5.6
4	E Grand Ave/Grand Ave Overcrossing	Signal	A – 7.3	A – 6.8	A – 6.5
5	Gateway Blvd/E Grand Ave	Signal	C – 20.0	B – 19.8	B – 19.3
6	Forbes Blvd/Harbor Way/E Grand Ave	Signal	D – 37.0	D – 38.2	D – 42.1
7	Littlefield Ave/E Grand Ave	Signal	B – 15.6	B – 15.9	B – 16.2
8	Allerton Ave/E Grand Ave	TWSC	D – 28.6	**E – 43.6 [16.0%]***	**F – 67.2 [27.9%]***
	Exceeds Peak Hour Signal Warrant		***Yes***	***Yes***	***Yes***
9	Haskins Way/E Grand Ave	Signal	A – 6.2	A – 7.5	A – 8.8
10	US 101 NB Off-Ramp/Poletti Way/Grand Ave	TWSC	A – 9.9	A –1090	B – 10.0
	Exceeds Peak Hour Signal Warrant		*No*	*No*	*No*
11	Airport Blvd/San Mateo Ave/Produce Ave	Signal	D – 39.3	D – 40.2	D – 40.8
12	Gateway Blvd/S Airport Blvd/Mitchell Ave	Signal	**E – 63.9**	**E – 78.3 [3.2%]***	**F – 92.1 [5.7%]***
13	S Airport Blvd/US 101 NB Hook Ramps/Wondercolor Ln	Signal	C – 26.5	C – 26.5	C – 26.5
14	S Airport Blvd/Utah Ave	Signal	C – 32.7	C – 32.9	C – 33.0

Note: Signalized level of service – control delay in seconds; TWSC = Two-Way Stop Control

[xx%] – Project volume percent of total traffic entering intersection

Bold = exceeds threshold * = Significant impact

Source: Kittelson & Associates, Inc. (2018)

Impact TR-1: The proposed project (Phase 1 or buildout) would cause the intersection of Littlefield Avenue and East Grand Avenue to exceed LOS D operations during the AM peak hour, and the project (Phase 1 or buildout) would contribute more than 2 percent of the total traffic through the intersection. ***(Less than Significant with Mitigation)***

At Intersection 7, Littlefield Avenue and East Grand Avenue, traffic from the proposed project would result in LOS E in the AM peak hour, as shown in Table 4.9.10. Development of Phase 1 would contribute 10.9 percent of the total traffic using the intersection, resulting in a significant impact. At buildout (Phases 1 & 2) the proposed project is estimated to contribute 18.5 percent of the total traffic, also a significant impact.

Mitigation Measure MM-TR-1 has been identified to reduce this significant impact:

Mitigation Measure MM-TR-1: Add a Northbound Right-Turn Lane at the Intersection of Littlefield Avenue and East Grand Avenue.

The City of South San Francisco shall restripe the northbound approach on Littlefield Avenue to provide a separate right-turn lane in addition to the existing left-through-right lane. The additional turn lane may require removal of on-street parking and/or acquisition of right-of-way along Littlefield Avenue approaching East Grand Avenue. This improvement is included in the East of 101 Area Traffic Impact Fee. Therefore, the project's payment of East of 101 Traffic Impact Fees will represent the project's required contribution towards this mitigation.

Implementation of the mitigation measure would result in LOS D or better operations at this intersection. The impact would be less than significant after mitigation.

Impact TR-2: The proposed project (Phase 1 or buildout) would cause the intersection of Allerton Avenue and East Grand Avenue to exceed LOS D operations during the PM peak hour, and the project would contribute more than 2 percent of the total traffic through the intersection. ***(Significant and Unavoidable [Mitigation found to be infeasible])***

At Intersection 8, Allerton Avenue and East Grand Avenue, traffic from the proposed project would result in unacceptable LOS E or F operations in the PM peak hour. Existing traffic volumes at the intersection exceed the Caltrans peak hour signal warrant during the PM peak hour, and Phase 1 or buildout of the project would add more than 2 percent of total traffic volume during the PM peak hour. Development of Phase 1 would contribute 16.0 percent of the total traffic using the intersection, resulting in a significant impact. At buildout (Phases 1 & 2) the proposed project is estimated to contribute 27.9 percent of the total traffic, which would also be a significant impact.

Mitigation Measure MM-TR-2 has been identified to reduce this significant impact:

Mitigation Measure MM-TR-2: Add a Traffic Signal and a Southbound Right-Turn Lane at the Intersection of Allerton Avenue and East Grand Avenue.

The City of South San Francisco shall restripe the southbound approach on Allerton Avenue to provide a separate right-turn lane in addition to the existing left-through-right lane, and install a traffic signal at the intersection. The installation of a traffic signal is included in the East of 101 Area Traffic Impact Fee, but not the additional turn lane. The project's payment of East of 101 Traffic Impact Fees will represent the project's required contribution towards the traffic signal. The project shall contribute a proportionate share to the additional cost of improvements beyond the traffic signal.

Implementation of the mitigation measure would result in LOS D or better operations. The impact after mitigation would be less than significant. However, the revisions to the lane striping would remove a portion of the Class II bicycle lanes on Allerton Avenue and thereby disrupt an existing bicycle facility. This secondary impact of the mitigation measure would be significant relative to the bicycle and pedestrian impact criteria. In order to avoid impacts on the bicycle facility, additional right-of-way would need to be acquired from the adjacent property owners and Allerton Avenue would need to be widened by approximately 12 feet. The acquisition of property would require removal of parking spaces for properties that do not have alternative locations for replacement parking, such that the associated buildings would not be able to be occupied. The City of South San Francisco has determined that causing businesses to be non-viable due to lack of parking would reduce the City's tax base, and that funding sources for

acquisition of property for additional right-of-way are unknown and may not be available for the additional turn lane; therefore, this mitigation measure is considered to be infeasible. While the mitigation measure could reduce the traffic impact to a less-than-significant level, the mitigation measure is infeasible and the overall impact at this intersection would remain significant.

Additionally, a TDM program would be required to be prepared and implemented pursuant to City ordinance. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's impact to a less-than-significant level. The impact would be significant and unavoidable.

Impact TR-3: The proposed project (Phase 1 or buildout) would contribute more than 2 percent of the total traffic through the intersection of Gateway Boulevard/South Airport Boulevard/Mitchell Avenue, which operates at LOS E during the PM peak hour without the project. ***(Less than Significant with Mitigation)***

At Intersection 12, Gateway Boulevard/South Airport Boulevard/Mitchell Avenue would operate at an unacceptable LOS E in the PM peak hour with project-generated traffic; this location would also operate at LOS E without the project, as shown in Table 4.9.11. The proposed project would contribute 3.2 percent of the total traffic through the intersection from Phase 1 development and 5.7 percent from buildout of the proposed project, which would be a significant impact.

Mitigation Measure MM-TR-3 has been identified to reduce this significant impact:

> **Mitigation Measure MM-TR-3: Widen and Restripe the Southbound, Eastbound and Westbound Approaches at the Intersection of Gateway Boulevard/South Airport Boulevard/Mitchell Avenue**.
>
> The City of South San Francisco shall widen the southbound approach on Gateway Boulevard to provide a second right-turn lane, widen the eastbound approach on South Airport Boulevard to provide a second left-turn lane and replace the existing shared through-right lane with one through lane and a second right-turn lane, and widen the westbound approach on Mitchell Avenue to replace the existing shared through-right lane with three through lanes and a right-turn lane. This improvement is included in the East of 101 Area Traffic Impact Fee. Therefore, the project's payment of East of 101 Traffic Impact Fees will represent the project's required contribution towards this mitigation.

With implementation of the mitigation measure, the impact would be less than significant.

Queue Impacts

Project traffic was added to existing traffic volumes at study intersections, and 95th percentile queues were evaluated on key movements affecting either U.S. 101 off-ramps or short street segments between adjacent intersections. The results of the evaluation are summarized in **Table 4.9.12: Queues on Key Movements – Existing (2016) and Existing plus Project AM and PM Peak Hours**. At 6 of the 10 study locations, storage would be available for the longer queues resulting from the addition of project-generated traffic, and no significant impact would result.

Table 4.9.12: Queues on Key Movements – Existing (2016) and Existing + Project AM and PM Peak Hours

Intersection	Storage Length (feet)	AM Peak Hour			PM Peak Hour		
		Existing	With Phase 1	With Buildout	Existing	With Phase 1	With Buildout
1. Oyster Point Blvd/Gateway Blvd/US 101 SB Off-Ramp Flyover							
SB Off-Ramp Thru	2900	385	385	385	67	67	67
SB Off-Ramp Right	375	**512**	**513 [<1%]**	**514 [<1%]**	86	86	86
2. Airport Blvd/Grand Ave							
SB Airport Blvd Left	300	258	**327 [15.3%]***	**351 [21.2%]***	118	123	126
WB Grand Ave Right	75	40	43	42	58	62	54
4. Gateway Blvd/E. Grand Ave							
EB E. Grand Ave Thru	300	85	105	113	138	145	148
WB E. Grand Ave Thru	560	13	13	13	8	8	8
WB E. Grand Ave Left	200	**238**	**263 [6.1%]***	**275 [8.8%]***	**348**	**395 [17.5%]***	**420 [31.7%]***
11. Airport Blvd/Produce Ave/San Mateo Ave							
WB Airport Thru/Left	225	208	213	213	**380**	**400 [8.8%]***	**413 [15.9%]***
13. S. Airport Blvd/US 101 NB On/Off Hook Ramps/Wondercolor Ln							
Off-Ramp Left	750	410	435	452	165	178	182
Off-Ramp Right	150	31	31	34	18	18	18

Note: Synchro software used for all analysis year 2010 where possible, otherwise year 2000

[xx%] – Project volume percent of turn movement

Bolded results = unacceptable operation *** = Significant impact**

Source: Kittelson & Associates, Inc. (2018)

As shown in the table, the three following locations have 95th percentile queues in either the AM or PM peak hours or both that currently exceed available storage lengths: (1) the U.S. 101 southbound off-ramp right-turn lane to Oyster Point Boulevard in the AM peak hour; (2) the westbound left turn lane from East Grand Avenue to Gateway Boulevard in both AM and PM peak hours; and (3) the westbound left-turn lane of Airport Boulevard at San Mateo Avenue/Produce Avenue in the PM peak hour. With project-generated traffic, these three locations and one new location (Airport Boulevard at Grand Avenue in the AM peak hour) would have queues that would exceed the available storage.

The proposed project would add more than 1 percent of total traffic at two of the locations where queues already exceed available storage, and therefore would result in significant traffic impacts. The proposed project also would cause one location to exceed available storage length. Each location where queues would exceed storage capacity is discussed separately in Impacts TR-4 through TR-8, below.

Impact TR-4: The proposed project (Phase 1 or buildout) would add less than 1 percent of traffic to the right-turn lane from the southbound U.S. 101 flyover off-ramp at Gateway Boulevard/Oyster Point Boulevard where the 95th percentile queue currently exceeds the ramp's storage length in the AM peak hour. (*Less than Significant*)

Existing 95th percentile queues exceed storage length by up to about 137 feet in the right-turn lane on the southbound U.S. 101 flyover off-ramp at Gateway Boulevard/Oyster Point Boulevard in the AM peak hour. The proposed project would contribute slightly to the queue at this location. However, the proposed project would add less than 1 percent of total traffic on this movement, and the impact would be less than significant. No mitigation is necessary.

Impact TR-5: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic to the westbound left-turn movement on East Grand Avenue at Gateway Boulevard where the 95th percentile queue currently exceeds the available storage length during the AM and PM peak hours without the project. *(Less than Significant with Mitigation)*

At the intersection of Gateway Boulevard and East Grand Avenue, the existing 95th percentile queue in the westbound left-turn lane exceeds the available storage length in the AM and PM peak hours. The proposed project, in both Phase 1 and at buildout, would add more than 1 percent of the total number of westbound left-turn vehicles in the AM and PM peak hours. Traffic generated by Phase 1 would contribute about 6.1 percent of total traffic in the AM peak and about 17.5 percent in the PM peak hour. Traffic generated by buildout of the proposed project would contribute about 8.8 percent in the AM peak hour and 31.7 percent in the PM peak hour. As these are each more than 1 percent of total traffic, the impact would be significant and require mitigation.

> **Mitigation Measure MM-TR-5: Adjust Signal Timing at Gateway Boulevard and East Grand Avenue.**
>
> The City of South San Francisco shall adjust signal timing at the intersection of Gateway Boulevard with East Grand Avenue to reduce the 95th percentile queue length in the westbound left-turn lane by the amount increased by the project. Improvements at this intersection are included in the East of 101 Area Traffic Impact Fee. Therefore, the project's payment of East of 101 Traffic Impact Fees will represent the project's required contribution towards this mitigation.

With implementation of this mitigation measure, the impact would be less than significant.

Impact TR-6: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic to the westbound left turn movement on Airport Boulevard at San Mateo Avenue/Produce Avenue where the 95th percentile queue currently exceeds the available storage length during the PM peak hour without the project. *(Less than Significant with Mitigation)*

At the intersection of Airport Boulevard and San Mateo Avenue, the existing 95th percentile queue on the westbound left-turn movement exceeds the storage length in the PM peak hour. Traffic generated by the proposed project, both with Phase 1 and at buildout, would contribute more than 1 percent to the total traffic in the left-turn lane. Phase 1 traffic would contribute 8.8 percent, and buildout traffic would contribute about 15.9 percent of total traffic, resulting in a significant impact and requiring mitigation.

Mitigation Measure MM-TR-6: Adjust Signal Timing at the intersection of Airport Boulevard/San Mateo Avenue/Produce Avenue.

The City of South San Francisco shall adjust signal timing at the intersection of Airport Boulevard and San Mateo Avenue/Produce Avenue to reduce the 95th percentile queue length in the westbound left-turn lane by the amount increased by the project. Improvements at this intersection are included in the East of 101 Area Traffic Impact Fee. Therefore, the project's payment of East of 101 Traffic Impact Fees will represent the project's required contribution towards this mitigation.

With implementation of the mitigation measure, the impact would be less than significant.

Impact TR-7: The proposed project (Phase 1 or buildout) would cause the existing 95th percentile queue to exceed the available storage capacity in the AM peak hour at the southbound left-turn lane on Airport Boulevard at Grand Avenue. (*Less Than Significant with Mitigation*)

The existing 95th percentile queue on the Airport Boulevard left turn movement does not exceed the storage capacity in the AM peak hour. With project traffic generated by both Phase 1 development and Phases 1 & 2 at buildout, the queue would cause the 95th percentile queue to exceed the available storage capacity at this location. Traffic generated in Phase 1 would be about 15.3 percent of total traffic, and at buildout would be about 21.2 percent of total traffic, resulting in a significant traffic impact and requiring mitigation.

Mitigation Measure MM-TR-7: Adjust Signal Timing at Airport Boulevard and Grand Avenue.

The City of South San Francisco shall adjust signal timing at the intersection of Airport Boulevard with Grand Avenue to reduce the 95th percentile queue length in the southbound left-turn lane to be within the available 300 feet of storage length. Improvements at this intersection are included in the East of 101 Area Traffic Impact Fee. Therefore, the project's payment of East of 101 Traffic Impact Fees will represent the project's required contribution towards this mitigation.

With implementation of this mitigation measure, the impact would be reduced to a less-than-significant level.

Freeway Ramps

Project traffic was added to existing traffic volumes on freeway ramps to determine whether project traffic would result in volumes that would exceed the acceptable capacity thresholds. The results are presented in **Table 4.9.13: Freeway Ramp Capacity and Volumes – Existing (2016) Without and With Project**.

Table 4.9.13: Freeway Ramp Capacity and Volumes – Existing (2016) Without and With Project

Freeway Ramp		Existing	With Phase 1	With Buildout
	Capacity	Volume	Volume	Volume
AM PEAK HOUR				
NB Off-Ramp to S. Airport/Wondercolor	2300	1567	1607	1636
SB On-Ramp from Produce Avenue	3300	1154	1163	1167
NB Off-Ramp to E. Grand/Poletti	2300	1384	1419	1444
NB On-Ramp from Airport/Grand	2000	550	564	570
SB Off-Ramp to Airport	1500	610	670	714
PM PEAK HOUR				
NB Off-Ramp to S. Airport/Wondercolor	2300	553	562	566
SB On-Ramp from Produce Avenue	3300	1950	2019	2075
NB Off-Ramp to E. Grand/Poletti	2300	481	493	498
NB On-Ramp from Airport/Grand	2000	783	858	918
SB Off-Ramp to Airport	1500	586	604	611

Source: Kittelson & Associates, Inc. (2018)

Impact TR-8: The proposed project (Phase 1 or buildout) would add traffic to freeway ramps, but not in numbers that would exceed the capacity of the freeway ramps. (*Less than Significant)*

Under existing conditions, all freeway ramps serving the project have volumes that are less than the ramp capacities during the AM and PM peak hours. The proposed project would add traffic to each ramp, but traffic volumes would remain less than the ramp capacities. The additional project-generated traffic would not result in significant impacts on freeway ramp capacities and no mitigation is required.

Trip Generation

Impact TR-9: The proposed project (Phase 1 or buildout) would generate more than 100 peak hour vehicle trips, exceeding the threshold in the San Mateo County CMP. *(Less than Significant with Mitigation)*

Phase 1 of the proposed project would generate 258 net new vehicle trips in the AM peak hour and 298 in the PM peak hour (Table 4.9.8). Buildout of the proposed project would generate 436 net new vehicle trips in the AM peak hour and 517 in the PM peak hour. Under both scenarios, the proposed project would generate more than 100 peak hour vehicle trips. The project sponsor would be required by South San Francisco Municipal Code Chapter 20.400 to prepare and implement a Transportation Demand Management program (TDM program); some features of the TDM program could produce "trip credits" as identified in Appendix I of the San Mateo County CMP. In order to comply with San Mateo County CMP requirements, the measures implemented must provide enough trip credits to mitigate the effective peak hour trip generation, including the first 100 net new peak hour trips.

Mitigation Measure MM-TR-9: Implement Transportation Demand Management measures listed in San Mateo County Congestion Management Program Appendix I.

The project shall implement a TDM program consistent with the City's TDM ordinance and using trip credits in compliance with C/CAG's CMP sufficient to account for all net new peak hour trips.

With implementation of the mitigation measure, the impact would be less than significant.

Freeway Segments

Project traffic was added to existing traffic volumes on two key freeway segments to determine whether project traffic would result in levels of service that would exceed the acceptable LOS E threshold applicable to freeways. The results are presented in **Table 4.9.14: Freeway Mainline Level of Service – Existing (2016) Without and With Project**.

Impact TR-10: The proposed project (Phase 1 or buildout) would not add more than 1 percent of total traffic to any study segment of U.S. 101 during the AM or PM peak hours, which would operate at LOS F without the project. ***(Less than Significant)***

As shown in Table 4.9.14, all freeway segments currently operate at LOS E or better. The proposed project would add traffic to these segments but would not cause any changes in LOS. Therefore there would be no significant impacts on freeway segments as a result of project-generated traffic. All segments

Table 4.9.14: Freeway Mainline Level of Service – Existing (2016) Without and With Project

Segment	Existing			With Phase 1			With Buildout		
	Volume	Density	LOS	Volume	Density	LOS	Volume	Density	LOS
AM PEAK HOUR									
North of Oyster Point Blvd									
Northbound	8023	38.9	E	8037	39.0	E	8043	39.1	E
Southbound	7692	36.1	E	7746	36.5	E	7786	36.9	E
North of I-380									
Northbound	10951	33.1	D	11026	33.5	D	11081	33.8	D
Southbound	7936	27.3	D	7945	27.3	D	7949	27.3	D
PM PEAK HOUR									
North of Oyster Point Blvd									
Northbound	7668	35.9	E	7743	36.5	E	7803	37.0	E
Southbound	6852	30.2	D	6870	30.3	D	6878	30.3	D
North of I-380									
Northbound	7551	21.1	C	7572	21.2	C	7581	21.2	C
Southbound	8677	30.7	D	8747	31.1	D	8803	31.4	D

Note: Density is shown in passenger cars per lane per mile; LOS = Level of Service
Bold = exceeds LOS threshold
[xx%] – Percent traffic added by project
Highway Capacity Manual (2010) Analysis Methodology
Source: Kittelson & Associates, Inc. (2018)

would continue to operate at acceptable LOS E or better. No mitigation would be necessary, and no Deficiency Plan would be required under the CMP.

Safety

Existing driveway access to the various parcels on the project site provides appropriate sightlines and does not present any hazardous features to either vehicle or pedestrian traffic. There are no active bicycle lanes on streets adjacent to the eight parcels that make up the project site. There are no sidewalks along some of the streets that border the project site.

Impact TR-11: The proposed project (Phase 1 or buildout) would not introduce hazardous design features within the project site or on the adjacent streets. ***(Less than Significant)***

The proposed project would remove three driveways on Haskins Way, two driveways on East Grand Avenue, and one driveway on East Jamie Court. However, the proposed project would construct four new driveways (two along Haskins Way, one on East Jamie Court and one on East Grand Avenue). The new driveways would be designed to City standards and would not present new hazardous conditions for either vehicles or pedestrians. Sidewalks would be added as part of the proposed project, reducing existing potentially hazardous conditions for pedestrians in the project vicinity. The project would also create a new north-south pedestrian path east of Haskins Way, which at buildout would connect Jamie

Court with East Grand Avenue. No significant safety impacts would result from the proposed project, and no mitigation is necessary.

Emergency Access

Existing emergency access to the project site is provided by City streets and driveways on Haskins Way, East Jamie Court, and East Grand Avenue. The proposed project would not reroute or otherwise change any City streets in its vicinity other than to add sidewalks. New driveway access would be provided to some of the parcels as part of the proposed project.

Impact TR-12: The proposed project (Phase 1 or buildout) would provide adequate emergency access. ***(Less than Significant)***

Phase 1 of the proposed project would maintain existing access points on Haskins Way and East Jamie Court for the development south of East Jamie Court, and would establish new access points on Haskins Way and East Jamie Court for the 201 Haskins site north of East Jamie Court. Existing emergency access would be maintained and there would be no design features within the site that would impede emergency vehicle access. Buildout with Phase 2 would add an additional access point on East Grand Avenue, and there would be no design features within the site that would impede emergency vehicle access. The impact would be less than significant, and no mitigation would be required.

Transit

The 201 Haskins project site would be served by existing Commute.org shuttle services to Caltrain, BART, and the South San Francisco ferry terminal. The project would not conflict with adopted transit programs and would not disrupt existing transit services.

Impact TR-13: The proposed project (Phase 1 and buildout) may exceed the capacity of the existing shuttle services serving the East of 101 Area. (*Less than Significant with Mitigation*)

The proposed project is estimated to generate up to 52 peak hour transit trips with development of Phase 1 and up to 97 peak hour transit trips at buildout. These trips would primarily use the local shuttle services that provide access to Caltrain, BART, and the South San Francisco ferry. The number of new transit trips would be distributed among the regional transit services (BART, Caltrain, ferry) and would not be expected to exceed capacities on these facilities. The transit trips generated by the proposed project could, however, cause demand for local shuttles to increase to a level that could not be accommodated with existing services and facilities provided by local operators. This would be a significant impact on transit services and require mitigation.

> **Mitigation Measure MM-TR-13: Expand local shuttle services.**
>
> The project sponsor shall participate in Commute.org's Employer/Property Manager Consortium and contribute a fair share of funding as required to ensure that shuttle buses serving the project site can accommodate peak hour transit passengers added by the proposed project. If the Commute.org shuttles do not adequately meet commuter needs or ridership exceeds capacity as a result of the proposed project, the project sponsor shall explore options to enhance the Commute.org shuttle program or augment shuttle services with other shuttle providers or mobility solutions.

Implementation of this mitigation measure would reduce the impact to a less-than-significant level.

Impact TR-14: The proposed project (Phase 1 or buildout) would add transit riders at bus stops without amenities. (*Less than Significant with Mitigation)*

The Phase 1 project site plan includes a covered entry court/atrium which could be used for transit passenger waiting, and an adjacent porte cochère which could be used by shuttle buses. The current conceptual version of the proposed project site plan for Phase 2 does not specifically identify any amenities to accommodate transit demand, such as bus shelters on East Grand Avenue, or any new bus stop signage or wayfinding to access shuttle stops. Without these amenities, transit use would be less convenient and potential transit users would be less likely to travel by transit. This is considered to be a significant impact of project buildout under the 4th transit impact criterion (p. 4.9.28).

Mitigation Measure MM-TR-14 has been identified to reduce this significant impact:

> **Mitigation Measure MM-TR-14: Provide shuttle stop amenities for Phase 2.**
>
> For Phase 2 buildout, the project sponsor shall coordinate with shuttle providers to install amenities for transit passengers including seating, shelters and signage at shuttle bus stops, as well as transit information for employees in the new and expanded structures. The project sponsor shall contribute its fair share to the cost of these amenities.

With implementation of this mitigation measure, the impact would be less than significant.

Bicycle/Pedestrian

The Phase 1 project would complete sidewalks along the site frontage on the east side of Haskins Way and the north side of East Jamie Court. Phase 2 would create a new pedestrian linkage through the site connecting East Grand Avenue with the Bay Trail.

The proposed project would not conflict with any adopted plans or programs supporting bicycle or pedestrian transportation.

Impact TR-15: The proposed project (Phase 1 or buildout) would add pedestrians and bicyclists to local street segments, but not in numbers that would exceed the capacity of sidewalks or streets. (*Less than Significant)*

While the proposed project would generate more pedestrians than currently walk in the vicinity of the project site, the proposed project includes completing the missing and inadequate sidewalks along the project frontages on the north side of East Jamie Court, the east side of Haskins Way, and the south side of East Grand Avenue as the adjacent property is developed. In addition, the new pedestrian linkages would reduce pedestrian walking distance to the Bay Trail. These project features would improve pedestrian conditions, and would not disrupt any existing pedestrian facilities once construction is completed. The proposed project would also increase the number of bicyclists using nearby streets, but not to the level that would exceed the capacity of any streets or that would affect bicycle safety. The impact would be less than significant, and no mitigation is necessary.

Vehicle Miles of Travel

Impact TR-16: The proposed project (Phase 1 or buildout) would add VMT to the regional transportation system, but the VMT per employee would be less than a threshold of 15 percent below the regional average, with the region defined as employees working in San Mateo County. *(Less than Significant)*

According to the Bay Area Air Quality Management District Vehicle Miles Traveled Data Portal,[14] the average daily VMT generated per employee in San Mateo County is 27.4. The average for South San Francisco is 25.6 VMT per employee, or 6.6 percent lower than the county average. The recommended OPR CEQA guidelines call for a VMT per employee target of 15 percent lower than the regional average, which would be 23.3 VMT per employee if San Mateo County is used as the regional average. Without further reductions in VMT below the current South San Francisco average, the proposed project would generate VMT per employee that exceeds the target of 15 percent lower than the regional average. The project would be required to implement a TDM program in compliance with City ordinances that would achieve a minimum 28 percent alternative mode usage (not equivalent to 28 percent reduction in peak hour vehicle trip generation) and provide regular monitoring of performance. In order to achieve an FAR of 1.0, as required for development of the project, the TDM plan implemented in connection with the project must achieve 35 percent alternative mode usage. Implementation of the required TDM program would reduce traffic generation and VMT per capita to 23.3 VMT per employee or less, which would be

[14] Bay Area Air Quality Management District, Vehicle Miles Traveled Data Portal, http://capvmt.us-west-2.elasticbeanstalk.com/data. Accessed June 4, 2018.

15 percent lower than the county average. The impact would be less than significant. No mitigation is necessary.

Cumulative Conditions

The approach to the cumulative transportation analysis is described above in "Approach to Analysis," p. 4.9.29. As explained there, the analysis for 2040 cumulative conditions assumes implementation of transportation improvements to be funded and implemented by the East of 101 Area Traffic Impact Fee in effect at the time of this report. The analysis determines whether there would be significant cumulative impacts in the future, in analysis year 2040, and if so, whether Phase 1 or full buildout of both Phase 1 and Phase 2 of the proposed project would contribute considerably to those significant impacts. The traffic analysis is based on the City's travel demand model.

In 2040 it is expected that the entire project site would be built out—both Phase 1 and Phase 2. The traffic analysis presents results for Phase 1 and separately for buildout of both Phase 1 and Phase 2, to be conservative, in the event that Phase 2 is not completed.

Intersection Impacts

Project traffic was added to cumulative 2040 traffic volumes (without the project) and operations were evaluated at the study intersections. The results are summarized in **Table 4.9.15: Intersection Level of Service – Year 2040 AM Peak Hour Without and With Project**, and **Table 4.9.16: Intersection Level of Service – Year 2040 PM Peak Hour Without and With Project**. Five of the study intersections would operate at acceptable LOS D or better in the AM and PM peak hours under cumulative conditions in 2040. With Phase 1 project traffic, no significant cumulative traffic impacts would result at three of those locations during those time periods, while cumulative traffic impacts with Phase 1 project traffic would result in LOS E or F operations and therefore significant impacts at two of those locations. Cumulative with buildout project traffic would cause LOS E or F operations and therefore significant impacts at three of the five locations. Nine other study intersections would operate at unacceptable LOS E or F in either the AM or PM peak hour, or both, under cumulative conditions without project traffic. Although the proposed project would contribute traffic at these locations, Phase 1 project contributions would be less than cumulatively considerable at four of the locations, while traffic increases at five locations would be cumulatively considerable requiring mitigation. Project contributions at buildout would be less than cumulatively considerable at one of the locations. Traffic increases at buildout at 11 locations would be cumulatively considerable in either the AM or PM peak hour or both, and would add more than 2 percent of the total traffic volume at an intersection or add more than 1 percent of the total traffic volume at an intersection with a freeway ramp connection already operating at LOS F. These impacts would require mitigation.

Table 4.9.15: Intersection Level of Service – Year 2040 AM Peak Hour Without and With Project

No.	Intersection	Control Type	Level of Service – Average Delay per Vehicle in Seconds [Project Traffic Percentage of Total Traffic at Intersections Exceeding LOS D]		
			No Project 2040 Conditions	With Phase 1	With Buildout
1	Gateway Blvd/Oyster Point Blvd/US 101 SB Off-Ramp Flyover	Signal	**F – 141.6**	**F – 144.4 [0.4%]**	**F – 146.4 [0.7%]**
2	Airport Blvd/Grand Ave	Signal	**F – 102.3**	**F – 110.4 [1.9%]**	**F – 116.6 [3.2%]***
3	Dubuque Ave/Grand Ave Overcrossing	Signal	C – 25.9	C – 26.1	C – 26.3
4	E Grand Ave/Grand Ave Overcrossing	Signal	C – 24.7	D – 40.0	B – 12.0
5	Gateway Blvd/E Grand Ave	Signal	D – 39.6	D – 40.4	D – 41.2
6	Forbes Blvd/Harbor Way/E Grand Ave	Signal	D – 54.9	**E – 69.8 [4.0%]***	**F – 86.3 [6.8%]***
7	Littlefield Ave/E Grand Ave	Signal	D – 46.2	**E – 67.7 [7.5%]***	**F – 87.5 [12.8%]***
8	Allerton Ave/E Grand Ave	Signal	B – 19.9	C – 22.1	D – 39.0
9	Haskins Way/E Grand Ave	Signal	A – 8.8	A – 9.0	A – 9.4
10	US 101 NB Off-Ramp/Poletti Way/Grand Ave	TWSC	B – 10.4	B – 10.4	B – 10.4
	Exceeds Peak Hour Signal Warrant		*No*	*No*	*No*
11	Airport Blvd/Produce Ave/San Mateo Ave	Signal	D – 43.3	D – 43.4	D – 43.5
12	Gateway Blvd/S Airport Blvd/Mitchell Ave	Signal	D – 46.0	D – 46.4	D – 46.7
13	S Airport Blvd/US 101 NB Hook Ramps/Wondercolor Ln	Signal	**F – 183.6**	**F – 188.8 [0.9%]**	**F – 192.5 [1.6%]***
14	S Airport Blvd/Utah Ave	Signal	**F – 161.5**	**F – 174.1 [1.3%]**	**F – 183.4 [2.3%]***

Note: Signalized level of service – control delay in seconds; TWSC = Two-Way Stop Control

[xx%] – Project volume percent of total traffic entering intersection

Bold = exceeds threshold *** = Significant impact**

Source: Kittelson & Associates, Inc. (2018)

Table 4.9.16: Intersection Level of Service – Year 2040 PM Peak Hour Without and With Project

No.	Intersection	Control Type	Level of Service – Average Delay per Vehicle in Seconds [Project Traffic Percentage of Total Traffic at Intersections Exceeding LOS D]		
			No Project 2040 Conditions	With Phase 1	With Buildout
1	Gateway Blvd/Oyster Point Blvd/US 101 SB Off-Ramp Flyover	Signal	**F - 128.4**	**F - 131.0 [0.4%]**	**F - 133.1 [0.7%]**
2	Airport Blvd/Grand Ave	Signal	**F - 112.6**	**F - 115.6 [0.9%]**	**F - 117.5 [1.5%]**
3	Dubuque Ave/Grand Ave Overcrossing	Signal	D - 43.0	D - 53.5	**E - 62.1 [4.3%]***
4	E Grand Ave/Grand Ave Overcrossing	Signal	D - 52.6	**E - 62.3 [2.7%]***	**F - 81.1 [4.6%]***
5	Gateway Blvd/E Grand Ave	Signal	**F - 119.3**	**F - 130.0 [3.4%]***	**F - 138.6 [5.9%]***
6	Forbes Blvd/Harbor Way/E Grand Ave	Signal	**F - 260.9**	**F - 259.8 [5.1%]***	**F - 270.9 [8.8%]***
7	Littlefield Ave/E Grand Ave	Signal	C - 24.6	D - 35.0	D - 50.3
8	Allerton Ave/E Grand Ave	Signal	**F - 153.9**	**F - 191.5 [9.0%]***	**F - 224.4 [15.6%]***
9	Haskins Way/E Grand Ave	Signal	A - 8.5	B - 13.8	C - 20.0
10	US 101 NB Off-Ramp/Poletti Way/Grand Ave	TWSC	A - 8.6	A - 8.6	A - 8.6
	Exceeds Peak Hour Signal Warrant		*No*	*No*	*No*
11	Airport Blvd/Produce Ave/San Mateo Ave	Signal	**F - 104.3**	**F - 110.2 [1.3%]**	**F - 115.7 [2.4%]***
12	Gateway Blvd/S Airport Blvd/Mitchell Ave	Signal	**F - 127.4**	**F - 140.2 [1.7%]**	**F - 150.3 [2.9%]***
13	S Airport Blvd/US 101 NB Hook Ramps/Wondercolor Ln	Signal	**F - 139.0**	**F - 140.2 [0.3%]**	**F - 140.7 [0.4%]**
14	S Airport Blvd/Utah Ave	Signal	**F - 106.5**	**F - 112.5 [1.1%]**	**F - 117.5 [1.9%]**

Note: Signalized level of service – control delay in seconds; TWSC = Two-Way Stop Control

[xx%] – Project volume percent of total traffic entering intersection

Bold = exceeds threshold *** = Significant impact**

Source: Kittelson & Associates, Inc. (2018)

Impact C-TR-1: The proposed project (Phase 1 or buildout) would not contribute considerably to significant cumulative traffic impacts in the AM and PM peak hours at the intersection of Gateway Boulevard/Oyster Point Boulevard/U.S. 101 southbound Off-Ramp Flyover. (*Less than Significant)*

The level of service without or with the proposed project would be LOS F and would exceed standards in 2040 in combination with traffic from cumulative development at the intersection of Gateway Boulevard/Oyster Point Boulevard/U.S. 101 southbound Off-Ramp Flyover in the AM and PM peak hours. However, as shown in Tables 4.9.15 and 4.9.16, the proposed project would add less than 1 percent of total traffic at this intersection both with traffic generated by Phase 1 development alone and at full buildout. The intersection of Gateway Boulevard/Oyster Point Boulevard/U.S. 101 Southbound Off-Ramp Flyover would continue to operate at LOS F in the AM and PM peak hours.

The proposed project would contribute 0.4 percent of total traffic with Phase 1 development and 0.7 percent at full buildout in the AM peak hour, and would contribute 0.4 percent of total traffic with Phase 1 development and 0.7 percent at full buildout in the PM peak hour. Therefore, while there would be significant cumulative traffic impacts in the future at this location, the proposed project would not contribute considerably to those impacts. No project mitigation is necessary.

Impact C-TR-2: Phase 1 of the proposed project would not contribute considerably to significant cumulative traffic impacts in the AM or PM peak hour at the intersection of Airport Boulevard/Grand Avenue. ***(Less than Significant)***

The intersection of Airport Boulevard/Grand Avenue would continue to operate at unacceptable LOS F under cumulative conditions in 2040 with traffic generated by Phase 1 of the proposed project in the AM and PM peak hours. However, as shown in Table 4.9.15: Intersection Level of Service – Year 2040 AM Peak Hour Without and With Project and Table 4.9.16: Intersection Level of Service – Year 2040 PM Peak Hour Without and With Project, in both peak hours, traffic generated by Phase 1 of the proposed project would contribute less than 2 percent of the total traffic – 1.9 percent in the AM peak hour and 0.9 percent in the PM peak hour. Therefore, while there would be significant cumulative traffic impacts at this location, development of only Phase 1 of the proposed project would not contribute considerably to this significant cumulative impact. No mitigation is necessary.

Buildout of both Phase 1 and Phase 2 of the proposed project would contribute considerably to significant cumulative impacts in the AM peak hour at this location and is discussed in Impact C-TR-3.

Impact C-TR-3: Buildout of the proposed project (Phases 1 & 2) would contribute considerably to the significant cumulative impact at the intersection of Airport Boulevard and Grand Avenue during the AM peak hour. ***(Significant and Unavoidable)***

Under 2040 cumulative conditions with forecast growth, without the project, the intersection of Airport Boulevard/Grand Avenue would operate at an unacceptable LOS F during both the AM and PM peak hours, as shown on Tables 4.9.15 and 4.9.16. With the addition of project-generated traffic from project buildout, the intersection would continue to operate at LOS F during both peak hours. Buildout of the proposed project would contribute 1.5 percent to total traffic volumes in the PM peak hour and would not contribute considerably to the significant cumulative impact. However, buildout of the proposed project would contribute 3.2 percent to total traffic volumes in the AM peak hour, as shown in Table 4.9.15. This is more than a 2 percent contribution during the AM peak hour, which would be a considerable contribution to the significant cumulative traffic impact at this location and require mitigation.

> **Mitigation Measure C-TR-3: Add a Third Eastbound Lane on Grand Avenue at Airport Boulevard.**
>
> The City of South San Francisco shall widen the eastbound approach on Grand Avenue to provide a third eastbound lane, with the approach striped as a shared left-through lane, a through lane and a right-turn lane.

The mitigation measure would improve operations from LOS F to LOS E but would not result in LOS D or better operations at this location. No additional feasible physical improvements have been identified to provide LOS D or better operations at this intersection with 2040 cumulative traffic volumes. A project's

contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measure designed to alleviate the cumulative impact (CEQA Guidelines, § 15130(a)(3)). Implementation of Mitigation Measure MM-C-TR-3 would more than compensate for the project's contribution to cumulative traffic (by improving the LOS from F without the project to LOS E with the project and mitigation) but would not eliminate the cumulative impact of LOS exceeding LOS D or better operations. The mitigation measure would remove recent sidewalk improvements on Grand Avenue. The narrowing of the sidewalk on Grand Avenue would diminish the visual character of the gateway to downtown and conflict with the City's desired streetscape, but would not significantly impact pedestrian travel through the intersection. Therefore, implementation of Mitigation Measure MM-C-TR-3 would not introduce additional significant cumulative impacts.

The City is in the process of updating its East of 101 Area Traffic Impact Fee (TIF) and Capital Improvement Program (CIP). The City is considering including Mitigation Measure MM-C-TR-3 in the updated TIF and CIP. The Phase 2 project sponsor(s) will pay the applicable TIF in effect at the time the building permit is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-3. At this time, the City therefore cannot guarantee that this mitigation measure will be implemented. Thus, while the proposed mitigation measure could reduce the proposed project's contribution to the cumulative traffic impact to a less-than-cumulatively considerable level, the measure would not eliminate the significant cumulative impact, and the City has not yet completed the TIF and CIP updates to include or fund Mitigation Measure MM-C-TR-3, so the impact would remain significant.

A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The impact would be significant and unavoidable.

Impact C-TR-4: Buildout of the proposed project (Phases 1 & 2) would contribute considerably to a significant cumulative impact the intersection of Dubuque Avenue and Grand Avenue during the PM peak hour. ***(Significant and Unavoidable)***

Under 2040 cumulative conditions with forecast growth, without the project, the intersection of Dubuque Avenue and Grand Avenue would operate at an acceptable LOS D or better during both the AM and PM peak hours, as shown on Tables 4.9.15 and 4.9.16. With the addition of project-generated traffic from project buildout, the intersection would operate at LOS E during the PM peak hour, and the project would add 4.3 percent of the total traffic through the intersection. This is more than a 2 percent contribution to total traffic, which would be a considerable contribution to the significant cumulative traffic impact at this location and require mitigation.

> **Mitigation Measure MM-C-TR-4: Adjust Signal Timing for Pedestrian Crossings at the intersection of Dubuque Avenue and Grand Avenue.**
>
> The City of South San Francisco shall adjust existing signal timings for pedestrian crossings for cumulative traffic demands to reduce vehicle delay.

The mitigation measure would reduce vehicle delay and improve operations but may not result in LOS D or better operations at this location. A project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measure designed to alleviate the cumulative impact (CEQA Guidelines, § 15130(a)(3)). Implementation of Mitigation Measure MM-C-TR-4 would partially compensate for the project's contribution to cumulative traffic (by reducing vehicle delay) but would not eliminate the cumulative impact of LOS exceeding LOS D or better operations.

The City is in the process of updating its East of 101 Area TIF and CIP. The City is considering including Mitigation Measure MM-C-TR-4 in the updated TIF and CIP. The Phase 2 project sponsor(s) will pay the applicable TIF in effect at the time the building permit is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-4. At this time, the City therefore cannot guarantee that this mitigation measure will be implemented. Thus, while the proposed mitigation measure could reduce (but not eliminate) the proposed project's contribution to the cumulative traffic impact, the City has not yet completed the TIF and CIP updates to include or fund Mitigation Measure MM-C-TR-4, so the impact would remain significant.

A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The impact would be significant and unavoidable.

Impact C-TR-5: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact the intersection of East Grand Avenue and Grand Avenue Overcrossing during the PM peak hour. ***(Significant and Unavoidable)***

Under 2040 cumulative conditions with forecast growth, without the project, the intersection of East Grand Avenue and the Grand Avenue Overcrossing would operate at an acceptable LOS D during the PM peak hour, as shown on Table 4.9.16. With the addition of project-generated traffic from Phase 1, the intersection would operate at LOS E during the PM peak hour. With the addition of project-generated traffic from buildout, the intersection would operate at LOS F during the PM peak hour. Phase 1 of the proposed project would contribute 2.7 percent to total traffic volumes in the PM peak hour, and buildout (Phases 1 & 2) would contribute 4.6 percent of total traffic volumes. This is more than a 2 percent contribution during the PM peak hour, which would be a considerable contribution to the significant cumulative traffic impact at this location and require mitigation.

> **Mitigation Measure MM-C-TR-5: Add a Second Northbound Left-Turn Lane to the northbound approach on East Grand Avenue at the Grand Avenue Overcrossing.**
>
> The City of South San Francisco shall restripe the northbound approach on East Grand Avenue to provide a second left-turn lane, and implement curb and traffic signal modifications as required.

The City is in the process of updating its East of 101 Area TIF and CIP. The City is considering including the improvement contemplated under Mitigation Measure MM-C-TR-5 in the updated TIF and CIP. The Phase 1 and Phase 2 project sponsors will pay the applicable TIF in effect at the time the building permit

is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-5. At this time, the City, therefore, cannot guarantee that this mitigation measure will be implemented. Thus, while the proposed mitigation measure could reduce the traffic impact to a less-than-significant level, the City has not yet completed the TIF and CIP updates to include or fund Mitigation Measure MM-C-TR-5, so the overall impact would remain significant.

A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the Phase 2 project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The impact would be significant and unavoidable.

Impact C-TR-6: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Gateway Boulevard and East Grand Avenue during the PM peak hour. ***(Significant and Unavoidable)***

Under 2040 cumulative conditions with forecast growth, without the project, the intersection of Gateway Boulevard and East Grand Avenue would operate at an unacceptable LOS F during the PM peak hour, as shown on Table 4.9.16. With the addition of project-generated traffic from Phase 1 or project buildout, the intersection would continue to operate at LOS F during the PM peak hour. Phase 1 of the proposed project would contribute 3.4 percent to total traffic volumes in the PM peak hour, and buildout (Phases 1 & 2) would contribute 5.9 percent of total traffic volumes. This is more than a 2 percent contribution during the PM peak hour, which would be a considerable contribution to the significant cumulative traffic impact at this location and require mitigation.

> **Mitigation Measure MM-C-TR-6: Add a Westbound Right-Turn Lane and a Northbound Left-Turn Lane at the intersection of Gateway Boulevard and East Grand Avenue.**
>
> The City of South San Francisco shall restripe or widen the westbound approach on East Grand Avenue to provide a separate right-turn lane in addition to the existing three through lanes and planned two left-turn lanes. Widen the northbound approach on Gateway Boulevard to provide a second left-turn lane.

The City is in the process of updating its East of 101 Area TIF and CIP. The City is considering including Mitigation Measure MM-C-TR-6 in the updated TIF and CIP. The Phase 1 and Phase 2 project sponsors will pay the applicable TIF in effect at the time the building permit is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-6. At this time, the City therefore cannot guarantee that this mitigation measure will be implemented. Thus, while the proposed mitigation measure could reduce the traffic impact to a less-than-significant level, the City has not yet completed the TIF and CIP updates to include or fund Mitigation Measure MM-C-TR-6, so the overall impact would remain significant.

A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant

cumulative impact to a less-than-cumulatively considerable level. The impact would be significant and unavoidable.

Impact C-TR-7: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Harbor Way/Forbes Boulevard and East Grand Avenue in both the AM and PM peak hours. ***(Significant and Unavoidable)***

Under 2040 cumulative conditions with forecast growth, the intersection of Harbor Way/Forbes Boulevard/Grand Avenue would operate at an acceptable LOS D during the AM peak hour, as shown on Table 4.9.15, and an unacceptable LOS F during the PM peak hour, as shown on Table 4.9.16. With the addition of project-generated traffic from either Phase 1 or buildout, the intersection would experience further delay. Traffic from Phase 1 of the proposed project would cause the AM peak LOS to change from LOS D to LOS E, and during the PM peak hour the intersection would continue to operate at LOS F with the project contributing 5.1 percent to total traffic volumes. Traffic from buildout of the proposed project would result in further degradation during the AM peak hour, to LOS F, and during the PM peak hour the intersection would continue to operate at LOS F with the project contributing 8.8 percent of total traffic. Both Phase 1 and buildout would contribute more than 2 percent of total traffic, which would be a considerable contribution to the significant cumulative traffic impact at this location and require mitigation.

> **Mitigation Measure MM-C-TR-7: Add a Fourth Westbound Through Lane on East Grand Avenue and Restripe Northbound and Southbound Approaches to the Intersection of Harbor Way/Forbes Boulevard/East Grand Avenue.**
>
> The City of South San Francisco shall widen the westbound approach on East Grand Avenue at Harbor Way/Forbes Boulevard to provide a fourth through lane. Restripe southbound Forbes Boulevard from the planned improvements to provide one left-turn lane, two through lanes and one right-turn lane. Restripe northbound Harbor Boulevard from the planned improvements to provide two left-turn lanes, one through lane and one right-turn lane, with signal modifications as required.

The City is in the process of updating its East of 101 Area TIF and CIP. The City is considering including Mitigation Measure MM-C-TR-7 in the updated TIF and CIP. The Phase 1 and Phase 2 project sponsors will pay the applicable TIF in effect at the time the building permit is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-7. At this time, the City therefore cannot guarantee that this mitigation measure will be implemented. Thus, while the proposed mitigation measure could reduce the traffic impact to a less-than-significant level, the City has not yet completed the TIF and CIP updates to include or fund Mitigation Measure MM-C-TR-7, so the overall impact would remain significant.

A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the Phase 1 or Phase 2 project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The impact would be significant and unavoidable.

Impact C-TR-8: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Littlefield Avenue and East Grand Avenue in the AM peak hour. ***(Significant and Unavoidable [Mitigation found infeasible])***

Under 2040 cumulative conditions with forecast growth, the intersection of Littlefield Avenue/East Grand Avenue would operate at an acceptable LOS D during the AM peak hour, as shown on Table 4.9.15. With the addition of project-generated traffic from either Phase 1 or buildout, the intersection would experience further delay. Traffic from Phase 1 of the proposed project would cause the intersection to operate at LOS E. Traffic from buildout of the proposed project would result in further degradation, causing the intersection to operate at LOS F. Both Phase 1 and buildout would contribute more than 2 percent of total traffic, which would be a considerable contribution to the significant cumulative traffic impact at this location and require mitigation.

> **Mitigation Measure MM-C-TR-8: Add an Eastbound Through Lane to the Intersection of Littlefield Avenue/East Grand Avenue**.
>
> The City of South San Francisco shall widen East Grand Avenue to provide a third eastbound through lane.

Implementation of the mitigation measure would provide LOS D or better operations. The cumulative traffic impact after mitigation would be less than significant. However, the revisions to the lane striping could impact the existing bike lanes on East Grand Avenue. This secondary impact of the mitigation measure would be significant relative to the bicycle and pedestrian impact criteria. Mitigation of the secondary impact would require the acquisition of additional right-of-way from adjacent property owners so that East Grand Avenue could provide a third eastbound through lane and maintain bicycle lanes on each side. The acquisition of property would require removal of parking spaces for properties that do not have alternative locations for replacement parking, such that the associated buildings would not be able to be occupied. Because the City of South San Francisco has determined that acquisition of property for the additional right-of-way to widen East Grand Avenue would economically affect existing businesses that need parking to remain viable, and that funding for the acquisition is not assured, this mitigation measure is considered to be infeasible. Therefore, while the mitigation measure could reduce the traffic impact to a less-than-significant level, the overall impact at this intersection would remain significant.

Impact C-TR-9: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Allerton Avenue and East Grand Avenue in the PM peak hour. ***(Significant and Unavoidable [Mitigation found infeasible])***

Under 2040 cumulative conditions with forecast growth, the intersection of Allerton Avenue/East Grand Avenue would operate at an unacceptable LOS F during the PM peak hour, as shown on Table 4.9.16. With the addition of project-generated traffic from either Phase 1 or buildout, the intersection would continue to operate at LOS F and would experience further delay. Traffic from Phase 1 of the proposed project would contribute 9.0 percent to total traffic volumes. Traffic from buildout of the proposed project would result in further degradation, and the project would contribute 15.6 percent of total traffic. Both Phase 1 and buildout would contribute more than 2 percent of total traffic, which would be a considerable contribution to the significant cumulative traffic impact at this location and require mitigation**.**

Mitigation Measure MM-C-TR-9: Add a Westbound Through Lane and a Southbound Right-Turn Lane at the intersection of Allerton Avenue/East Grand Avenue.

The City of South San Francisco shall widen East Grand Avenue to provide a third westbound through lane, and restripe the southbound approach on Allerton Avenue to provide a separate right-turn lane in addition to the existing left-through-right lane.

Implementation of the mitigation measure would result in operations at this intersection of LOS D or better. A project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measure designed to alleviate the cumulative impact (CEQA Guidelines, § 15130(a)(3)). The cumulative traffic impact after mitigation would be less than significant. However, the revisions to the lane striping would remove a portion of the Class II bicycle lanes on Allerton Avenue and could impact the existing bike lanes on East Grand Avenue. This secondary impact of the mitigation measure would be significant relative to the bicycle and pedestrian impact criteria. Mitigation of the secondary impact would require the acquisition of additional right-of-way from adjacent property owners so that East Grand Avenue could provide a third eastbound through lane and maintain bicycle lanes on each side, and so that Allerton Avenue could provide an additional southbound lane and maintain bicycle lanes. The acquisition of property would require removal of parking spaces for properties that do not have alternative locations for replacement parking, such that the associated buildings would not be able to be occupied. Because the City of South San Francisco has determined that acquisition of property for the additional right-of-way to widen East Grand Avenue could affect existing businesses that require parking to remain viable, and that funding for acquisition is not assured, this mitigation measure is considered to be infeasible. Therefore, while the mitigation measure could reduce the traffic impact to a less-than-significant level, the overall impact at this intersection would remain significant.

Impact C-TR-10: The proposed project at buildout (Phase 1 & 2) would contribute considerably to a significant cumulative impact at the intersection of Airport Boulevard/Produce Avenue/San Mateo Avenue in the PM peak hour. ***(Significant and Unavoidable)***

Under 2040 cumulative conditions with forecast growth, the intersection of Airport Boulevard/Produce Avenue/San Mateo Avenue would operate at an unacceptable LOS F during the PM peak hour, as shown on Table 4.9.16. With the addition of project-generated traffic from buildout, the intersection would continue to operate at LOS F and would experience further delay. Traffic from buildout of the proposed project would contribute 2.4 percent of total traffic. The project at buildout would contribute more than 2 percent of total traffic, which would be a considerable contribution to the significant cumulative traffic impact at this location and require mitigation**.**

Mitigation Measure MM-C-TR-10: Reconstruct the Southbound Approach on Airport Boulevard at San Mateo Avenue.

The City of South San Francisco shall reconstruct southbound Airport Boulevard at San Mateo Avenue to convert the right-turn lane to a shared through-right lane, so that the southbound approach provides one left-turn lane, two through lanes and a shared through-right lane, and implement curb and traffic signal modifications as required.

The City is in the process of updating its East of 101 Area TIF and CIP. The City is considering including Mitigation Measure MM-C-TR-10 in the updated TIF and CIP. The Phase 2 project sponsor(s) will pay the applicable TIF in effect at the time the building permit is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-10. At this time, the City therefore cannot guarantee that this mitigation measure will be implemented. Thus, while the proposed mitigation measure could reduce the traffic impact to a less-than-significant level, the City has not yet completed the TIF and CIP updates to include or fund Mitigation Measure MM-C-TR-10, so the overall impact would remain significant.

A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the Phase 2 project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The impact would be significant and unavoidable.

Impact C-TR-11: The proposed project at buildout (Phase 1 & 2) would contribute considerably to a significant cumulative impact at the intersection of Gateway Boulevard/South Airport Boulevard/Mitchell Avenue in the PM peak hour. ***(Significant and Unavoidable)***

Under 2040 cumulative conditions with forecast growth, the intersection of Gateway Boulevard/South Airport Boulevard/Mitchell Avenue would operate at an unacceptable LOS F during the PM peak hour, as shown on Table 4.9.16. With the addition of project-generated traffic from buildout, the intersection would continue to operate at LOS F and would experience further delay. Traffic from buildout of the proposed project at buildout would contribute 2.9 percent of total traffic. The project at buildout would contribute more than 2 percent of total traffic, which would be a considerable contribution to the significant cumulative traffic impact at this location and require mitigation**.**

The planned improvements at this intersection to be implemented by the East of 101 Area Traffic Impact Fee would provide the maximum number of operational lanes for all critical traffic movements for safe and effective operation of an at-grade intersection. No additional feasible physical mitigation has been identified to provide LOS D operations with the forecast traffic volumes. While a TDM program would be required to be prepared and implemented pursuant to City ordinance, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The impact would be significant and unavoidable.

Impact C-TR-12: The proposed project at buildout (Phase 1 & 2) would contribute considerably to a significant cumulative impact at the freeway ramp intersection of South Airport Boulevard and U.S. 101 Northbound Hook Ramps/Wondercolor Lane in the AM peak hour. ***(Significant and Unavoidable)***

Under 2040 cumulative conditions with forecast growth, the intersection of South Airport Boulevard and U.S. 101 Northbound Hook Ramps/Wondercolor Lane would operate at an unacceptable LOS F during the AM peak hour, as shown on Table 4.9.15. With the addition of project-generated traffic from buildout, the intersection would continue to operate at LOS F and would experience further delay. Traffic

from buildout of the proposed project would contribute 1.6 percent of total traffic. The project at buildout would contribute more than 1 percent of total traffic at a freeway ramp intersection, which would be a considerable contribution to the significant cumulative traffic impact at this location and require mitigation**.**

This intersection provides the maximum number of operational lanes for all critical traffic movements for safe and effective operation of an at-grade intersection at this location. No additional feasible physical mitigation has been identified to provide LOS D operations with the forecast traffic volumes. While a TDM program would be required to be prepared and implemented pursuant to City ordinance, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-considerable level. The impact would be significant and unavoidable.

Impact C-TR-13: The proposed project at buildout (Phase 1 & 2) would contribute considerably to a significant cumulative impact at the intersection of South Airport Boulevard and Utah Avenue in the AM peak hour. ***(Significant and Unavoidable)***

Under 2040 cumulative conditions with forecast growth, the intersection of South Airport Boulevard and Utah Avenue would operate at an unacceptable LOS F during the AM peak hour, as shown on Table 4.9.15. With the addition of project-generated traffic from buildout, the intersection would continue to operate at LOS F and would experience further delay. Traffic from buildout of the proposed project would contribute 2.3 percent of total traffic. The project at buildout would contribute more than 2 percent of total traffic, which would be a considerable contribution to the significant cumulative traffic impact at this location and require mitigation**.**

> **Mitigation Measure MM-C-TR-13: Restripe the Northbound Approach on South Airport Boulevard at Utah Avenue**.
>
> The City of South San Francisco shall restripe northbound South Airport Boulevard at Utah Avenue to convert the rightmost through lane to a shared through-right lane, so that the northbound approach provides one left-turn lane, one through lane, one shared through-right lane and one right-turn lane, and implement traffic signal modifications as required.

The City is in the process of updating its East of 101 Area TIF and CIP. The City is considering including Mitigation Measure MM-C-TR-13 in the updated TIF and CIP. The Phase 2 project sponsor(s) will pay the applicable TIF in effect at the time the building permit is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-13. At this time, the City therefore cannot guarantee that this mitigation measure will be implemented. Thus, while the proposed mitigation measure could reduce the traffic impact to a less-than-significant level, the City has not yet completed the TIF and CIP updates to include or fund Mitigation Measure MM-C-TR-13, so the overall impact would remain significant.

A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the Phase 2 project's contribution to a

significant cumulative impact to a less-than-cumulatively considerable level. The impact would be significant and unavoidable.

Queue Impacts

Project traffic was added to cumulative 2040 traffic volumes and 95th percentile queues were evaluated on key movements. As shown in **Table 4.9.17: Queues on Key Movements– Cumulative (2040) AM and PM Peak Hours**, queues would be within storage lengths on 5 of the 10 study locations in the AM peak hour and on 4 of the 10 locations in the PM peak hour with 2040 traffic volumes without the project.

At the remaining five locations in the AM peak hour and six locations in the PM peak hour, queues from increased traffic in 2040 would exceed available storage lengths with the project, resulting in significant cumulative impacts. During the AM peak hour, both Phase 1 and buildout of the proposed project would not add traffic greater than 1 percent of the movement volume on one of the five movements where queues would exceed storage length, but would add more than 1 percent of traffic on four of the five movements, resulting in considerable contributions to these significant impacts. For the PM peak hour, the proposed project (Phase 1 and buildout) would add more than 1 percent of traffic on all six

Table 4.9.17: Queues on Key Movements – Cumulative (2040) AM and PM Peak Hours

	Storage Length (feet)	AM Peak Hour			PM Peak Hour		
		No Project 2040 Conditions	With Phase 1	With Phase 1 & 2	No Project 2040 Conditions	With Phase 1	With Phase 1 & 2
1. Oyster Point Blvd/Gateway Blvd/US 101 SB Off-Ramp Flyover							
SB Off-Ramp Thru	2900	932	932	932	159	159	159
SB Off-Ramp Right	375	**657**	**658 [<1%]**	**659 [<1%]**	150	150	150
2. Airport Blvd/Grand Ave							
SB Airport Blvd Left	300	**696**	**744 [4.5%]***	**778 [7.8%]***	**396**	**411 [2.8%]***	**417 [3.9%]***
WB Grand Ave Right	75	22	23	23	**448**	**463 [1.4%]***	**477 [2.5%]***
5. Gateway Blvd/East Grand Ave							
EB E. Grand Ave Thru	300	30	40	58	**328**	**345 [4.1%]***	**360 [5.7%]***
WB E. Grand Ave Thru	560	3	5	5	**1208**	**1420 [6.0%]***	**1588 [10.8%]***
WB E. Grand Ave Left	200	**430**	**468 [2.6%]***	**478 [3.7%]***	**353**	**378 [6.9%]***	**403 [12.5%]***
11. Airport Blvd/Produce Ave/San Mateo Ave							
WB S Airport Thru/Left	225	**348**	**353 [1.0%]***	**353 [1.5%]***	**960**	**1075 [3.6%]***	**1173 [6.6%]***
13. S Airport Blvd/US 101 NB On/Off Hook Ramps/Wondercolor Ln							
Off-Ramp Left	750	**1487**	**1520 [1.7%]***	**1543 [2.8%]***	723	733	735
Off-Ramp Right	150	102	103	104	49	49	49

Note: Analysis using Synchro software 2010 Highway Capacity Manual methodology where possible, 2000 Highway Capacity Manual methodology at Intersections 1, 2 and 13.

[xx%] – Project volume percent of turn movement

Bolded results = unacceptable operation *** = Significant impact**

Source: Kittelson & Associates, Inc. (2018)

movements where queues would exceed storage length without the project, resulting in considerable contributions to these significant impacts. In total, significant cumulative queue impacts were identified at five intersections, and the proposed project would contribute considerably to four of the five. These intersections are discussed below.

Impact C-TR-14: The proposed project (Phase 1 or buildout) would add less than 1 percent of traffic to the right-turn movement from the southbound U.S. 101 off-ramp at Oyster Point Boulevard/Gateway Boulevard where cumulative queues would exceed storage length without the project in the AM peak hour, and therefore would not contribute considerably to a significant cumulative traffic impact. (*Less than Significant*).

Morning traffic at this location would substantially exceed the available storage length with growth in the area expected to occur by 2040 without traffic generated by the proposed project. This would be a significant cumulative impact. While both Phase 1 and buildout of the proposed project would add traffic to this movement, the project's contribution under either project scenario would be less than 1 percent of total traffic on this movement. Therefore, the proposed project would not contribute considerably to the significant cumulative impact. No mitigation is necessary.

Impact C-TR-15: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impacts on the southbound left turn movement in the AM and PM peak hours and the westbound right-turn movement in the PM peak hour at the intersection of Airport Boulevard and Grand Avenue where the 95th percentile queues with future cumulative growth in 2040 would exceed the available storage length without the project. *(Significant and Unavoidable)*

The 95th percentile queue for southbound left-turning traffic on Airport Boulevard at Grand Avenue in the AM and PM peak hours, with forecast cumulative growth in 2040, would substantially exceed the available storage length. This would be a significant cumulative impact. Both Phase 1 and buildout of the proposed project would add vehicles on this movement. Phase 1 traffic would contribute 4.5 percent of total AM peak hour traffic and 2.8 percent of PM peak hour traffic, and buildout of the proposed project would contribute 7.8 percent of total AM peak hour traffic and 3.9 percent of PM peak hour traffic, resulting in a considerable contribution to the significant cumulative impact.

The 95th percentile queue for westbound right-turning traffic on Grand Avenue at Airport Boulevard in the PM peak hour, with forecast growth in 2040, would also exceed the available storage length in the PM peak hour, which would be a significant cumulative impact. Traffic generated by Phase 1 of the proposed project would contribute 1.4 percent of the total traffic to this movement, and therefore would contribute considerably to this significant cumulative impact. Traffic generated by buildout of the proposed project would contribute 2.5 percent of total traffic and thus would contribute considerably to the significant cumulative impact, requiring mitigation.

> **Mitigation Measure MM-C-TR-15: At the intersection of Airport Boulevard and Grand Avenue, widen Grand Avenue to provide a third eastbound approach lane at the intersection and adjust signal timing.**
>
> The City of South San Francisco shall widen Grand Avenue to provide a third lane on the eastbound approach (Mitigation Measure MM-C-TR-3) and adjust signal timing at the

intersection of Airport Boulevard and Grand Avenue to reduce the 95th percentile queue length in the southbound left-turn lane and westbound right-turn lane.

The City is in the process of updating its East of 101 Area TIF and CIP. The City is considering including Mitigation Measure MM-C-TR-15 in the updated TIF and CIP. The Phase 1 and Phase 2 project sponsors will pay the applicable TIF in effect at the time the building permit is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-15. At this time, the City therefore cannot guarantee that this mitigation measure will be implemented. Thus, while the proposed mitigation measure could reduce the traffic impact to a less-than-significant level, the City has not yet completed the TIF and CIP updates to include or fund Mitigation Measure MM-C-TR-15, so the overall impact would remain significant.

A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The impact would be significant and unavoidable.

Impact C-TR-16: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impacts on the eastbound and westbound through movements in the PM peak hour and westbound left turn movement in the AM and PM peak hours on East Grand Avenue at Gateway Boulevard where the 95th percentile queues would exceed the available storage lengths during these peak hours without the proposed project. ***(Significant and Unavoidable)***

The 95th percentile queue in the eastbound through movement on East Grand Avenue at Gateway Boulevard would exceed the available storage length in the PM peak hour with traffic from forecast development in 2040, resulting in a significant cumulative impact. Phase 1 of the proposed project would contribute 4.1 percent of the traffic on this movement, and buildout would contribute 5.7 percent. Therefore, the proposed project would contribute considerably to the significant cumulative impact.

The 95th percentile queue in the westbound through movement on East Grand Avenue at Gateway Boulevard would exceed the available storage length in the PM peak hour with traffic from forecast development in 2040, resulting in a significant cumulative impact. Phase 1 of the proposed project would contribute 6.0 percent of the traffic on this movement, and buildout would contribute 10.8 percent. Therefore, the proposed project would contribute considerably to the significant cumulative impact.

The westbound left-turn movement on East Grand Avenue at Gateway Boulevard would exceed the available storage length in both the AM and PM peak hours with traffic from forecast growth in 2040, resulting in a significant cumulative impact. Phase 1 of the proposed project would contribute 2.6 percent to this movement in the AM peak hour and 6.9 percent in the PM peak hour and therefore would contribute considerably to the significant cumulative impact. Buildout of the proposed project would contribute 3.7 percent to this movement in the AM peak hour and 12.5 percent in the PM peak hour, also resulting in a considerable contribution to significant cumulative impacts and requiring mitigation.

Mitigation Measure MM-C-TR-16: Add a Westbound Right-Turn Lane and a Northbound Left-Turn Lane and Adjust Signal Timing at the Intersection of Gateway Boulevard and East Grand Avenue.

The City of South San Francisco shall add a westbound right-turn lane on East Grand Avenue and a northbound left-turn lane on Gateway Boulevard, and adjust signal timing at the intersection of Gateway Boulevard with East Grand Avenue to reduce the 95th percentile queue length in the eastbound through lane and westbound left-turn lane.

Implementation of the mitigation measure would result in queues that would be no longer than those that would occur without the proposed project in the westbound left-turn lane in the AM peak hour and in the westbound through lanes in the PM peak hour, but would not mitigate the other two impacted movements for westbound left turns or eastbound through travel in the PM peak hour. The impact would be significant and unavoidable.

The City is in the process of updating its East of 101 Area TIF and CIP. The City is considering including Mitigation Measure MM-C-TR-16 in the updated TIF and CIP. The Phase 1 and Phase 2 project sponsors will pay the applicable TIF in effect at the time the building permit is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-16. At this time, the City therefore cannot guarantee that this mitigation measure will be implemented. Thus, while the proposed mitigation measure could reduce the proposed project's contribution to a portion of the cumulative traffic impact to a less-than-significant level, the measure would not eliminate the significant cumulative impact, and the City has not yet completed the TIF and CIP updates to include or fund Mitigation Measure MM-C-TR-16, so the impact would remain significant.

A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The impact would be significant and unavoidable.

Impact C-TR-17: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the westbound left turn movement on Airport Boulevard at the intersection of Airport Boulevard/Produce Avenue where the 95th percentile queue would exceed the available storage length during the AM and PM peak hours in 2040 without the proposed project. ***(Significant and Unavoidable)***

The westbound through movement on Airport Boulevard at Produce Avenue/San Mateo Avenue would exceed the available storage length in the AM and PM peak hours with traffic from forecast growth in 2040, which would be a significant cumulative impact. Phase 1 of the proposed project would contribute slightly more than 1.0 percent to the total AM peak hour traffic volume on this movement and 3.6 percent of the PM peak hour traffic and therefore would contribute considerably to the significant cumulative impact. Buildout of the proposed project would contribute 1.5 percent to the total AM peak hour traffic on this movement and 6.6 percent of the PM peak hour traffic, and would also contribute considerably to the significant cumulative impact, requiring mitigation.

Mitigation Measure MM-C-TR-17: Adjust Signal Timing at the Intersection of Airport Boulevard/Produce Avenue and San Mateo Avenue/Airport Boulevard.

The City of South San Francisco shall reconstruct the southbound approach on Airport Boulevard at San Mateo Avenue to convert the right-turn lane to a shared through-right lane, so that the southbound approach provides one left-turn lane, two through lanes and a shared through-right lane, and implement curb and traffic signal modifications and adjust signal timing at the intersection of Airport Boulevard and San Mateo Avenue to reduce the 95th percentile queue length in the westbound left-turn lane.

Implementation of the mitigation measure would result in queues that are no longer than those that would occur without the project during the AM peak hour but not during the PM peak hour. The impact would remain significant and unavoidable with mitigation.

The City is in the process of updating its East of 101 Area TIF and CIP. The City is considering including Mitigation Measure MM-C-TR-17 in the updated TIF and CIP. The Phase 1 and Phase 2 project sponsors will pay the applicable TIF in effect at the time the building permit is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-17. At this time, the City therefore cannot guarantee that this mitigation measure will be implemented. Thus, while the proposed mitigation measure could reduce the proposed project's contribution to the cumulative traffic impact to a less-than-significant level, the measure would not eliminate the significant cumulative impact, and the City has not yet completed the TIF and CIP updates to include or fund Mitigation Measure MM-C-TR-18, so the impact would remain significant.

A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The impact would be significant and unavoidable.

Impact C-TR-18: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the eastbound left turn movement on the northbound U.S. 101 off-ramp at South Airport Boulevard/Wondercolor Lane where the 95th percentile queue would exceed the available storage length during the AM peak hour in 2040 without the proposed project. ***(Significant and Unavoidable)***

Traffic from future development forecast to occur by 2040 would substantially exceed the available storage length in the AM peak hour on the left-turn movement on the northbound U.S. 101 off ramp at South Airport Boulevard, which would be a significant cumulative impact. Phase 1 of the proposed project would contribute 1.7 percent of the traffic volume on this movement and buildout would contribute 2.8 percent. Therefore, both Phase 1 and buildout would contribute considerably to the significant cumulative impact and require mitigation.

Mitigation Measure MM-C-TR-18: Adjust Signal Timing at the Intersection of South Airport Boulevard and U.S. 101 Hook Ramps at Wondercolor Lane.

The City of South San Francisco shall coordinate with Caltrans to adjust signal timing at the intersection of South Airport Boulevard and the U.S. 101 hook ramps at Wondercolor Lane.

The City is in the process of updating its East of 101 Area TIF and CIP. The City is considering including Mitigation Measure MM-C-TR-18 in the updated TIF and CIP, in coordination with Caltrans. The Phase 1 and Phase 2 project sponsors will pay the applicable TIF in effect at the time the building permit is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-18. At this time, the City therefore cannot guarantee that this mitigation measure will be implemented. In addition, while queues would be reduced, it cannot be demonstrated that queues could be reduced sufficiently to remove the proposed project's considerable contribution by this mitigation. Thus, the measure would not eliminate the significant cumulative impact, and the City has not yet completed the TIF and CIP updates to include or fund Mitigation Measure MM-C-TR-18, so the impact would remain significant.

A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The impact would remain significant and unavoidable.

Freeway Segments

Project traffic was added to cumulative 2040 traffic volumes on key freeway segments, and freeway volumes were evaluated. The results are shown in **Table 4.9.18: Freeway Mainline Level of Service – Year 2040 Without and With Project**. Level of service F operations were identified on both of the study freeway segments in one or both directions during both the AM and PM peak hours with forecast development in 2040, exceeding the LOS E threshold identified in the San Mateo County Congestion Management Program and resulting in significant cumulative impacts. Phase 1 of the proposed project would add less than 1 percent of total traffic on all segments in either direction during both the AM and PM peak hours. Buildout of the proposed project (Phases 1 & 2) would add less than 1 percent of total traffic in both directions on one segment during the AM peak hour, and less than 1 percent of total traffic in the southbound direction of that segment and in the northbound direction on the other segment during the PM peak hour, but would add slightly more than 1 percent of total traffic in one direction of each segment during the PM peak hour, resulting in a considerable contribution to a significant cumulative impact. These segments are discussed in Impact C-TR-19.

Impact C-TR-19: The freeway segments serving the proposed project site would operate at unacceptable LOS F in the future with forecast development in 2040, resulting in a significant cumulative impact. The proposed project at buildout (Phases 1 & 2) would add more than 1 percent of total traffic to two freeway segments during the PM peak hour which would operate at LOS F under cumulative conditions without the project. ***(Significant and Unavoidable for buildout)***

All but two directions of the two freeway segments studied would operate at an unacceptable LOS F in 2040 with traffic generated by forecast development without the project. This would be a significant cumulative traffic impact, other than the LOS D operations on the southbound segment of U.S. 101 north of I-380 in the AM peak hour, and the LOS D on the northbound segment north of I-380 in the PM peak hour.

Table 4.9.18: Freeway Mainline Level of Service – Year 2040 Without and With Project

Segment	No Project			With Phase 1			With Buildout		
	Volume	Density	LOS	Volume	Density	LOS	Volume	Density	LOS
AM PEAK HOUR									
North of Oyster Point Blvd									
Northbound	**10176**	**72.6**	**F**	**10190**	**73.0**	**F [0.1%]**	**10196**	**73.1**	**F [0.2%]**
Southbound	**9651**	**60.5**	**F**	**9705**	**61.6**	**F [0.6%]**	**9745**	**62.4**	**F [0.9%]**
North of I-380									
Northbound	**13349**	**48.4**	**F**	**13424**	**49.1**	**F [0.6%]**	**13479**	**49.6**	**F [0.89]**
Southbound	8656	30.6	D	8665	30.7	D	8669	30.7	D
PM PEAK HOUR									
North of Oyster Point Blvd									
Northbound	**12897**	**n/a**	**F**	**12972**	**n/a**	**F [0.6%]**	**13032**	**n/a**	**F [1.0%]***
Southbound	**8676**	**45.7**	**F**	**8694**	**45.9**	**F [0.2%]**	**8702**	**46.0**	**F [0.3%]**
North of I-380									
Northbound	9974	29.0	D	9995	29.0	D	10004	29.1	D
Southbound	**11351**	**48.8**	**F**	**11421**	**51.8**	**F [0.6%]**	**11477**	**52.4**	**F [1.1%]***

Note: Density is shown in passenger cars per lane per mile; LOS = Level of Service; Highway Capacity Manual (2010) Analysis Methodology

Bolded results = unacceptable operation *** significant impact**

Source: Kittelson & Associates, Inc. (2018)

As noted above, on most freeway segments both Phase 1 and full buildout of the proposed project would add traffic but would not contribute more than 1 percent to total traffic volumes on the segments exhibiting significant cumulative impacts. Therefore, the proposed project would not contribute considerably to significant cumulative impacts except on two segments of U.S. 101, both in the PM peak hour. North of Oyster Point Boulevard in the northbound direction, Phase 1 of the proposed project would contribute 0.6 percent to total traffic volumes, which would not be considered to be a considerable contribution. However, full buildout of the proposed project would contribute 1.01 percent to this freeway segment in the PM peak hour and would contribute considerably to the significant cumulative impact at this location. North of I-380 in the southbound direction, Phase 1 would contribute 0.6 percent to total traffic volumes in the PM peak hour, which would not be a considerable contribution. However, full buildout of the proposed project would contribute 1.1 percent and would contribute considerably to the significant cumulative impact at this location

While a TDM program would be required to be prepared and implemented pursuant to City ordinance, it cannot be guaranteed that the required TDM program would reduce freeway traffic by the amount

necessary to reduce the project's contribution to a significant cumulative impact to a less-than-considerable level. No other feasible mitigation measures have been identified. The impact would be significant and unavoidable.

Freeway Ramps

Project traffic was added to existing traffic volumes on freeway ramps to determine whether cumulative project traffic would result in volumes that would exceed the acceptable capacity thresholds. The results are presented in **Table 4.9.19: Freeway Ramp Capacity and Volumes – Existing (2016) Without and With Project**.

Table 4.9.19: Freeway Ramp Capacity and Volumes – Year 2040 Without and With Project

Freeway Ramp	Capacity	No Project	With Phase 1	With Phase 1 & 2
		Volume	Volume	Volume
AM PEAK HOUR				
NB Off-Ramp to S. Airport/Wondercolor	2300	**2980**	**3020 [1.3%]***	**3049 [2.3%]***
SB On-Ramp from Produce Avenue	3300	1821	1830	1834
NB Off-Ramp to E. Grand/Poletti	2300	1386	1421	1446
NB On-Ramp from Airport/Grand	2000	741	754	760
SB Off-Ramp to Airport	1500	1364	1424	1468
PM PEAK HOUR				
NB Off-Ramp to S. Airport/Wondercolor	2300	1380	1389	1393
SB On-Ramp from Produce Avenue	3300	3233	**3302 [2.1%]***	**3358 [3.9%]***
NB Off-Ramp to E. Grand/Poletti	2300	652	664	669
NB On-Ramp from Airport/Grand	2000	1633	1708	1768
SB Off-Ramp to Airport	1500	1332	1350	1357

Bolded results = exceeds capacity *** significant impact**

Source: Kittelson & Associates, Inc. (2018)

Impact C-TR-20: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the northbound U.S. 101 off-ramp at South Airport Boulevard/Wondercolor Lane where the volume would exceed the available capacity during the AM peak hour in 2040 without the proposed project. ***(Significant and Unavoidable)***

Traffic from future development forecast to occur by 2040 would substantially exceed the available capacity in the AM peak hour on the northbound U.S. 101 off-ramp to South Airport Boulevard/Wondercolor Lane, which would be a significant cumulative impact. Phase 1 of the proposed project would contribute 1.3 percent of the traffic volume on this off-ramp and buildout would contribute 2.3 percent. Therefore, both Phase 1 and buildout would contribute considerably to the significant cumulative impact. No feasible physical mitigation has been identified to increase the capacity of the off-ramp. While a TDM program would be required to be prepared and implemented pursuant to City ordinance, it cannot be guaranteed that the required TDM program would reduce freeway ramp traffic by

the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-considerable level. The impact would be significant and unavoidable.

Impact C-TR-21: The proposed project (Phase 1 or buildout) would add traffic volumes which would cause total traffic to exceed capacity and therefore would contribute considerably to the significant cumulative impact on the southbound U.S. 101 on-ramp from Produce Avenue where the volume would not exceed the available capacity during the PM peak hour in 2040 without the proposed project. ***(Significant and Unavoidable)***

Traffic from future development forecast to occur by 2040 would not exceed the available capacity on the southbound U.S. 101 on-ramp from Produce Avenue. Traffic added by the proposed project (Phase 1 or buildout) would cause traffic volumes to exceed ramp capacity during the PM peak hour, resulting in a significant cumulative impact. Phase 1 of the proposed project would contribute 2.1 percent of the traffic volume on this on-ramp and buildout would contribute 3.9 percent. Therefore, both Phase 1 and buildout would contribute considerably to the significant cumulative impact. No feasible physical mitigation has been identified to increase the capacity of the on-ramp. While a TDM program would be required to be prepared and implemented pursuant to City ordinance, it cannot be guaranteed that the required TDM program would reduce freeway ramp traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-considerable level. The impact would be significant and unavoidable.

Transit, Safety, Emergency Access, Bicycle/Pedestrian Travel, and VMT

The proposed project would add to the demand for shuttle service to regional transit facilities in the project area, as discussed in Impact TR-12. It is expected that the shuttle system in the East of 101 Area would expand as development occurs in the future and participation in the shuttle system by local employers increases. The project sponsor would contribute to the shuttle system. Therefore, the proposed project would not contribute considerably to a significant cumulative impact on the local shuttles.

The proposed project would not result in any safety or emergency access impacts and therefore would not contribute considerably to any significant cumulative impacts on hazardous travel conditions or emergency access in the project vicinity. The proposed project would not result in substantial amounts of bicycle traffic that would contribute considerably to any significant bicycle impacts under future cumulative conditions. The proposed project would include pedestrian improvements in the form of new sidewalks that would enhance the pedestrian experience; therefore, it would not contribute considerably to any significant cumulative impacts on pedestrian travel.

VMT is by its nature a cumulative impact. No individual project alone would be of sufficient size to prevent a region from meeting established VMT goals. If a proposed project's VMT per employee would be more than 15 percent below the regional average VMT per employee, it can be determined that the project would not contribute considerably to significant cumulative VMT impacts.

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4.10 Utilities and Service Systems

4.10.1 Introduction

Section 4.10, Utilities and Service Systems, addresses the impacts that land use changes related to the 201 Haskins Way Project (project) would have on water supplies, wastewater treatment, landfill capacity, and solid waste. All of these subtopics are considered in the discussions of existing conditions, baseline plus project conditions, and cumulative conditions. The section describes existing utilities and service systems on the project site and in the study area, and presents the baseline conditions against which project impacts are measured. Project-specific impacts are presented for the proposed project and mitigation measures, if any, are identified when feasible. A cumulative impact discussion is identified for each subtopic.

4.10.2 Environmental Setting

EXISTING CONDITIONS

Water System

The water system in the East of 101 Area is owned and operated by the California Water Service Company (Cal Water). The Cal Water South San Francisco District (SSF District) is located in northern San Mateo County approximately 6 miles south of the City of San Francisco. The SSF District serves the communities of South San Francisco, Colma, a small portion of Daly City, and an unincorporated area of San Mateo County known as Broadmoor, which lies between Colma and Daly City.[1] The SSF District's overall water system includes 160 miles of pipeline, 14 storage reservoirs, 25 booster pumps, and eight groundwater wells.

Potable water supply for the SSF District is a combination of groundwater from Cal Water-owned wells and purchased water from the San Francisco Public Utilities Commission (SFPUC). Cal Water's annual allocation of SFPUC supply is shared among its three peninsula districts: Bear Gulch, Mid-Peninsula, and South San Francisco.[2] Annual supply from SFPUC to utility customers varies with precipitation and related hydrologic conditions.

Purchased SFPUC potable supply is delivered through a network of pipelines, tunnels, and treatment plants. This supply is predominantly from the Hetch Hetchy Reservoir but also includes water produced from watersheds, reservoirs, and treatment facilities in Alameda and San Mateo Counties.[3] Groundwater

[1] Bay Area Water Supply & Conservation Agency, 2018. California Water Service – South San Francisco District (website). Available online at: http://bawsca.org/members/profiles/cws-san-francisco. Accessed June 7, 2018.
[2] California Water Service (CalWater), 2016. *2015 Urban Water Management Plan, South San Francisco District*, published June 2016. Available online at: https://www.calwater.com/docs/uwmp2015/bay/South_San_Francisco/2015_Urban_Water_Management_Plan_Final_(SSF).pdf. Accessed June 7, 2018.
[3] Ibid, pp. 19–20.

has historically supplied 10 to 15 percent of the SSF District's water demand.[4] It is extracted from the Merced Formation of the Colma Creek Basin, a sub-basin of the Merced Valley Groundwater Basin. Locally this basin is referred to as the Westside Basin. Cal Water intends to limit its planned production of groundwater from the Westside Bain to 1,535 acre-feet per year (AFY), which is consistent with current pumping capacity and historical pumping rates.[5] There are currently no plans for recycled water or desalinated water supplies to be available to the project area.[6]

Total system demand in 2015 was 7,064 AFY.[7] SSF District water use in 2015 was strongly affected by the Drought Emergency Regulation adopted by the State Water Resources Control Board (SWRCB) in May 2015. Between June and December 2015, water use in South San Francisco decreased by 21.7 percent compared to 2013.[8] The projected average annual growth rate in services across all customer categories is approximately 0.5 percent, with a projected total system demand of 8,901 AFY in 2040.[9]

The distribution system of the SSF District is upgraded and improved through Cal Water's main replacement program. Storage facilities and new booster pumps are added as needed to meet the average day and maximum day requirements. Future capital expenditures are planned for drilling and developing new wells to replace aging wells currently in operation, which would increase system reliability and allow Cal Water to pump its fair share of sustainable extracted groundwater from the Westside Basin.[10]

Project Site

The project site is served by the California Water Service Company, which purchases most of its water from the SFPUC. Existing water supply piping near the project site is located under Haskins Way, East Grand Avenue, and East Jamie Court. Three fire hydrants are located on the south side of East Jamie Court north of and adjacent to 400-450 East Jamie Court, one is west of Haskins Way on the east side of the 390 Swift parcel, and another is on the north side of East Grand Avenue south of 415 East Grand Avenue.

Existing water use, based on 2017 metered readings for irrigation and interior building use, is shown in **Table 4.10.1: Existing Water Use**, in terms of hundred cubic feet per year (CCF), gallons per day, and AFY.

[4] Ibid, pp. 54–55.
[5] Ibid, pp. 76.
[6] Ibid, pp. 69–70.
[7] Ibid, Table 2-1, p. 16
[8] Ibid, p. 27.
[9] Ibid, Table 4-2, p. 31.
[10] Ibid, p. 55.

Table 4.10.1: Existing Water Use

Parcel	CCF/year	Gallons per day	AFY
Phase 1 Area			
201 Haskins Way	278		
400-450 East Jamie Court			
400-450 East Jamie Court (Interior)	*3,734*		
400-450 East Jamie Court (Irrigation)	*1,515*		
Subtotal Phase 1 Area	**5,527**	**11,327**	**12.7**
Phase 2 Area			
400-450 East Jamie Court[1]	-	**-**	**-**
101 Haskins Way	56		
151 Haskins Way	298		
410 Haskins Way	80		
430 Haskins Way	112		
451 East Jamie Court	**69**		
Subtotal Phase 2 Area	**615**	**1,260**	**1.4**
Total	**6,142**	**12,587**	**14.1**

Notes: CCF = hundred cubic feet. One CCF is equivalent to 748 gallons.

[1] Development activity would occur on 400-450 E. Jamie Court (015-102-250) during both Phase 1 development and Phase 2 development.

Source: CalWater, Water Supply Assessment for the 201 Haskins Way Project, September 6, 2018.

Wastewater System

Regional

The City of South San Francisco (City) maintains all of its sewer system facilities and infrastructure in accordance with the *Sewer System Management Plan* (SSMP) per Waste Discharge Requirements (WDRs) adopted by the SWRCB.[11] The current SSMP is dated June 2014 and is regularly updated in accordance with regulatory requirements.[12] City staff are currently preparing an update to the plan (herein referred to as the Draft SSMP) and have provided a 2017 draft for the purposes of analysis of the proposed project.[13]

All wastewater from the City is conveyed to the Water Quality Control Plant (WQCP), which is located at 195 Belle Air Road in South San Francisco. The WQCP is operated and maintained by the City and provides secondary wastewater treatment for the cities of South San Francisco, San Bruno, and Colma. It also provides the dechlorination treatment of chlorinated effluent for the cities of Burlingame, Millbrae,

[11] State Water Resources Control Board, Waste Discharge Requirements Order No. 2006-003 DWQ and Order No. WQ 2003-0058-EXEC

[12] City of South San Francisco, 2014. *Sewer System Management Plan*. Revised June 2014. Available online at: http://www.ssf.net/home/showdocument?id=824. Accessed June 6, 2018.

[13] City of South San Francisco, 2017. *Draft Sewer System Master Plan*. Prepared November 2017. Available as part of the Administrative Record of this EIR.

and the San Francisco International Airport prior to discharging the treated wastewater into San Francisco Bay (Bay).[14] The combined treated, dechlorinated wastewater is discharged to the Bay through a single pipe to the deep water outfall approximately 1 mile northeast of San Bruno Point.

The WQCP design capacity for average dry weather flow is 13 million gallons per day (mgd).[15] The City is entitled to approximately 74 percent of the available treatment capacity of the WQCP. In 2016, average daily flows were 8.27 mgd for South San Francisco and San Bruno combined. Average dry weather flows for 2040 are projected to be 10.3 mgd.

The City's wastewater collection system in the East of 101 Area consists of 6-inch- through 30-inch-diameter sewers and a series of gravity sewers and pump stations that convey flow to the main pump station (Pump Station No 4); Pump Station No. 7 conveys a small portion of the East of 101 Area to the WQCP as well. Pump Station 3, located on Kimball Way, serves the project site and directs flows west along Grand Avenue, and south on Harbor Way to Pump Station 4.

Project Site

The project site is served by the existing sanitary sewer system. There are 8-inch-wide sanitary sewer lines on Haskins Way and East Jamie Court along the project site frontage and 8-inch-wide sanitary sewer lines on East Grand Avenue. On Haskins Way, near Swift Avenue, the 8-inch line on Haskins Way expands to a 15-inch line running northwest.

Within the 201 Haskins Way parcel, a 10-foot-wide sewer easement with a 15-inch-wide sanitary sewer line runs along the parcel's northern boundary. Where the Haskins Way line meets the northern 15-inch-diameter line, the lines merge into the 15-inch-wide sanitary sewer line near Swift Avenue, which continues to the northwest.

A sanitary sewer capacity analysis prepared for the proposed project investigated the existing 8-inch sanitary sewer main fronting the site on Haskins Way, the existing 15-inch sanitary sewer main running east-west through the project within an easement, and the 15-inch sanitary sewer main downstream of the site within Swift Avenue to Pump Station 3 at the intersection of Swift Avenue and Kimball Way.[16] The capacity of Pump Station 3 was evaluated as the downstream terminus for this analysis.

In 2017, the City prepared a Draft SSMP evaluated the sewer collection system capacity during peak dry weather flows and peak wet weather flows for the existing and buildout flows. In general, the hydraulic model prepared for the Draft SSMP indicated that the sewer collection system exhibited acceptable performance during both peak dry weather flows and peak wet weather flows, with some exceptions.[17]

[14] City of South San Francisco, 2018. Water Quality Control Plant (website). Available online at: http://www.ssf.net/departments/public-works/water-quality-control-plant. Accessed: June 6, 2018.
[15] Schumacker, Brian. 2017. Plant Superintendent, South San Francisco Water Quality Control Plant. Email to Alice Tackett regarding the 2017 OPSP Update, Planner, Michael Baker International. February 14.
[16] BKF, 2018. 201 Haskins Way – Sanitary Sewer Capacity Analysis, dated July 13, 2018. Available as part of the Administrative Record for this EIR.
[17] City of South San Francisco, 2017. *Draft Sewer System Master Plan*, Figures 7.1 and 7.2.

Estimates of sanitary sewer generation for the existing uses at the project site were determined using a unit rate of 0.03 gallons per day per square foot provided in the Draft SSMP, as shown in **Table 4.10.2: Existing Sanitary Sewer Generation Rates**.[18] These unit rates multiplied by the square footage of land use determine the Average Dry Weather Flow (ADWF) for the site. Due to fluctuations in flow through the day and for the effects of rainfall and groundwater dependent inflow and infiltration, a peaking factor of 3 was applied to the ADWF to determine the Peak Wet Weather Flows (PWWF).

Existing flows are expressed as a ratio between the existing depth of flow compared to the existing pipe diameter ("depth of flow to pipe diameter", abbreviated as d/D), where 0.1 d/D would be considered a pipe with low flow and 0.9 would be considered full pipe flow.[19] The existing sanitary sewer flows within each of these pipe segments was calculated using Manning's Equation for gravity pipe flow and assuming an existing flow condition of d/D=0.50 per the Draft SSMP hydraulic model. [20] These flows correspond to the Peak Wet Weather Flow (PWWF) condition. The existing available flow capacity is the difference between flows at 0.50 d/D (existing) and 0.90 (full pipe flow). **Table 4.10.3: Available Capacity of Existing Sanitary Sewer Mains** details the full flow capacities of the existing sanitary sewer mains.

Pump Station 3 is the downstream terminus for the sewer main segments listed above. Based on the 2017 Draft SSMP, Lift Station 3 does not have any capacity issues under existing conditions, and has a minimum of 925 gallons per minute (gpm) of surplus capacity to accommodate future wet weather flows.[21]

Stormwater

The City is one of 22 members of the San Mateo Countywide Water Pollution Prevention Program and operates under the San Francisco Bay Regional Water Quality Control Board (RWQCB) Municipal Regional Stormwater National Pollution Discharge Elimination System (NPDES) Permit (MS4 Permit).[22] The City's stormwater infrastructure is comprised of underground storm drains, engineered channels, and present-day creeks and watersheds.[23] The largest watershed in the immediate vicinity is the Colma Creek watershed, which includes portions of San Bruno Mountain, as well as urbanized areas of the City, Daly City, and Colma. Most of this urbanized creek is channelized and/or conveyed underground to allow for urban development. The percent of impervious surface area within the Colma Creek watershed was estimated to be 65 percent.[24] Colma Creek is a flood control channel maintained by the San Mateo County Department of Public Works that discharges into the Bay just north of the San Francisco

[18] BKF, 2018. 201 Haskins Way – Sanitary Sewer Capacity Analysis, Attachment A, Table 1 – Existing Sanitary Sewer Generation.

[19] BKF, 2018. 201 Haskins Way – Sanitary Sewer Capacity Analysis, p. 4.

[20] City of South San Francisco, 2017. *Draft Sewer System Master Plan*, Figures 7.1 and 7.2.

[21] Ibid, Table 5 and Table 7.3.

[22] San Francisco Bay Regional Water Quality Control Board, 2015. Municipal Regional Stormwater NPDES Permit, Order No. R2-2015-0049, NPDES Permit No. CAS612008.

[23] Givler, R.W, Sowers, J.M., and Vorster, P., 2006. Creek & Watershed Map of Daly City & Vicinity, Oakland Museum of California, Oakland, CA. 1:25,800 scale. Available online at: http://explore.museumca.org/creeks/WholeMaps/11_Daly%20City%20Creek%20Map.pdf. Accessed June 6, 2018.

[24] National Land Cover Database, 2016. Imperviousness Data, Colma Creek Watershed. Available online at: https://www.mrlc.gov/. Accessed June 6, 2018.

International Airport. In addition to the Colma Creek watershed, a series of small watersheds are located along the shoreline in the vicinity of the site. The majority of the project vicinity consists of fill material located east of the historic shoreline along the Bay. As such, the site lacks natural surface drainages. A series of man-made structures provide drainage of surface waters.

Table 4.10.2: Existing Sanitary Sewer Generation Rates

Parcel	Existing Land Use	Sanitary Sewer Generation (gallons per day)[1]	Peak Wet Weather Flow Rate (cubic feet per second [cfs])[2]	Peak Wet Weather Flow Rate (gallons per minute)
Phase 1 Area				
015-102-230 201 Haskins Way	24,075	722	0.003	1.5
015-102-250 400-450 East Jamie Court[3]	157,000	7,850	0.035	15.9
Subtotal Phase 1 Area	***181,075***	***8,572***	***0.039***	***17.3***
Phase 2 Area				
015-102-250 400-450 East Jamie Court[3]	-	-	-	-
015-102-210 101 Haskins Way	7,000	210	0.001	0.4
015-102-220 151 Haskins Way	11,599	348	0.002	0.7
015-102-180 410 East Grand Avenue	27,300	819	0.004	1.7
015-102-160 430 East Grand Avenue	37,096	1113	0.005	2.2
015-102-240 451 East Jamie Court	75,000	2250	0.010	4.5
015-102-290 No Address[4]	N/A	-	-	
Subtotal Phase 2 Area	***157,995***	***4,740***	***0.021***	***9.6***
Total	**339,070**	**13,312**	**0.060**	**26.9**

Notes:

1 Based on a generation rate of 0.03 gallons per day per square foot of light industrial land use and and 0.05 gallons per day per square foot of office/research and development (R&D) land use.

[2] Based on a conversion of gallons per day to cubic feet per second, then multiplied by a peaking factor of 3.

[3] Development activity would occur on 400-450 E. Jamie Court (015-102-250) during both Phase 1 development and Phase 2 development.

[4] Assessor's Parcel Number 015-102-290 is a parking lot. No existing sewer flows are generated.

Source: BKF (2018), 2017 Draft SSMP Table 3.3 (2017)

Table 4.10.3: Available Capacity of Existing Sanitary Sewer Mains

Segment (Location)	Pipe Size	Existing Available Flow Capacity (cfs)
SA-1 (Swift Avenue)	15-inch	1.63
HW-1 (Haskins Way)	8-inch	0.38
JC-1 (East Jamie Court)	8-inch	0.72
ES-2 (Easement)	15-inch	1.16

Note: Based on Figures 7.1 and 7.2 of the 2017 Draft SSMP, each of these segments are flowing with a d/D ratio less than 0.50 in the existing PWWF conditions. The existing available flow capacity is the difference between flows at 0.50 d/D (existing) and 0.90 (full pipe flow).

Source: BKF (2018), 2017 Draft SSMP (2017)

Project Site

The majority of the project area is currently covered by low-permeability surfaces, including asphalt parking areas, compacted gravel areas, buildings, and streetscape infrastructure. Stormwater runoff from the project site is generally directed to the west and south, then flows to the existing 24-inch-diameter storm drain line on East Jamie Court and the existing 48-inch-diameter storm drain line on Haskins Way. Runoff flows south along Haskins Way and into a catch basin, then through an existing approximately 48-inch-diameter outfall pipe before being discharged into the Bay. The outfall pipe is designed to operate throughout a range of high tide conditions in the Bay to prevent flooding near the terminus of the system.

Within the 201 Haskins Way parcel, two existing 12-inch-diameter storm drains are located along the parcel's northern and southern boundaries. These storm drains flow west from the parcel and connect to the existing 48-inch-diameter storm drain line on Haskins Way. One connection from the southern on-site storm drain to the East Jamie Court storm drain is also provided.

Within the 400-450 East Jamie Court parcel, a series of underground on-site storm drains ranging from 10 to 15 inches in diameter meet at one 18-inch-diameter storm drain at the southwest corner of the parcel, which provides one connection from the site to the existing 48-inch-diameter storm drain line on Haskins Way.

Solid Waste

The South San Francisco Scavenger Company is contracted by the City as the sole hauler of solid waste and operator of recycling services for the City. The South San Francisco Scavenger Company would transport all solid waste from the project site to the Blue Line Transfer facility, located directly east of the project site. The Blue Line Transfer facility has a permitted capacity of 2,400 tons per day. Once the useable materials have been separated at the Blue Line Transfer facility, the remaining trash is then transported to the Corinda Los Trancos (Ox Mountain) Sanitary Landfill or Newby Island Sanitary Landfill.

The Ox Mountain Landfill has a permitted maximum disposal of 3,598 tons per day. As of 2015, the landfill's remaining capacity was 22.18 million cubic yards[25], or approximately 16.64 million tons of compacted-in-place solid waste.[26,27] The estimated closure date for the Ox Mountain Landfill is 2034. The Newby Island Landfill has a permitted maximum disposal of 4,000 tons per day, with an estimated remaining capacity of 21.2 million cubic yards, or approximately 15.9 million tons of compacted-in-place solid waste.[28] The estimated closure date for the Newby Island Landfill is 2041.

In 2015, the latest year for which data are available, the average per capita residential disposal rate in South San Francisco was 6.9 pounds per day, which meets South San Francisco's target identified by the California Department of Resources Recycling and Recovery (CalRecycle) of 6.9 pounds per day[29]. For the employment sector, the average disposal rate was 9.3 pounds per day per employee, which did not meet the 9.0 pounds per day per employee target. Thus, the estimated existing solid waste generation rates are calculated in **Table 4.10.4: Existing Estimated Employee-Generated Solid Waste** based on a factor of 9.3 pounds per day per employee.

4.10.3 Baseline Conditions

The analyses in California Environmental Quality Act (CEQA) documents typically present the existing environmental setting as the baseline conditions against which the project conditions are compared to determine whether an impact is significant. However, in the study area, some land development projects are either recently occupied or under construction. Because these projects would be complete by the time the proposed project is operational, the analyses provide baseline conditions that take these conditions into account. The projects that are taken into account in the baseline conditions, in addition to existing projects, are listed in Section 4.1, Approach to Environmental Analysis, under "Approach to Baseline Setting," on pp. 4.1.4-4.1.7.

4.10.4 Regulatory Framework

This section provides a summary of the plans and policies of the City, and the state agencies that have policy and regulatory control over the project site.

[25] CalRecycle, 2018. Facility/Site Summary Details: Corinda Los Trancos Landfill (Ox Mtn) (41-AA-0002) (website). Available online at: http://www.calrecycle.ca.gov/SWFacilities/Directory/41-AA-0002/Detail/. Accessed June 6, 2018.

[26] CalRecycle. 2015. PacITConversion Table 1 – Material Type Equivalency Factors. Available online at: http://www.calrecycle.ca.gov/FacIT/Conversion1.pdf. Accessed June 6, 2018.

[27] A cubic yard of uncompacted municipal solid waste is equivalent to approximately 0.22 tons (440 pounds); a cubic yard of compacted-in-place in a landfill is equivalent to approximately 0.75 tons (1,500 pounds) (CalRecycle 2015).

[28] CalRecycle, 2018. Facility/Site Summary Details: Newby Island Sanitary Landfill (43-AN-0003). Available online at: http://www.calrecycle.ca.gov/SWFacilities/Directory/43-AN-0003/Detail/. Accessed June 6, 2018.

[29] CalRecycle, 2015. South San Francisco Diversion/Disposal Rate Detail, 2015. Available online at: http://www.calrecycle.ca.gov/LGCentral/reports/diversionprogram/JurisdictionDiversionDetail.aspx?JurisdictionID=511&Year=2015. Accessed August 27, 2018.

Table 4.10.4: Existing Estimated Employee-Generated Solid Waste

Existing Land Use	Land Use (sq. ft.)	Estimated Employment[1]	Estimated Solid Waste Disposal (pounds per day)	Estimated Solid Waste Disposal (tons per year)
Phase 1 Area				
015-102-230 201 Haskins Way	24,075	25	234	43
015-102-250 400-450 East Jamie Court[2]	157,000	349	3,245	592
Subtotal Phase 1 Area	***181,075***	***374***	***3,479***	***635***
Phase 2 Area				
015-102-250 400-450 East Jamie Court[2]	-	-	-	-
015-102-210 101 Haskins Way	7,000	7	68	12
015-102-220 151 Haskins Way	11,599	12	113	21
015-102-180 410 East Grand Avenue	27,300	29	266	49
015-102-160 430 East Grand Avenue	37,096	39	361	66
015-102-240 451 East Jamie Court	75,000	79	730	133
015-102-290 No Address[3]	N/A			
Subtotal Phase 2 Area	***157,995***	***165***	***1,539***	***281***
Total	**339,070**	**540**	**5,018**	**916**

Notes:

[1] Based on the *City of South San Francisco General Plan* Land Use Element employment estimates of 955 sq. ft. of industrial use per employee and 450 sq. ft. of office/ research and development (R&D) use per employee.

[2] Development activity would occur on 400-450 E. Jamie Court (015-102-250) during both Phase 1 development and Phase 2 development.

[3] Assessor's Parcel Number 015-102-290 is a parking lot. No existing sewer flows are generated.

Source: City of South San Francisco General Plan (1999), CalRecycle (2015)

STATE

Urban Water Management Planning Act

In 1983, the California Legislature enacted the Urban Water Management Planning Act.[30] The Act has been modified over the years in response to factors such as the state's water shortages and droughts. A significant amendment was made in 2009, after the drought of 2007–2009, and as a result of the governor's call for a statewide 20 percent reduction in urban water use by the year 2020 (see "Water Conservation Act of 2009," below).

The Urban Water Management Planning Act requires an urban water supplier that provides water to 3,000 or more customers, or that provides over 3,000 acre-feet of water annually, to prepare an Urban Water Management Plan (UWMP) to support long-term water resource planning and ensure the reliability of its water resources over a 20-year planning horizon. The UWMP must consider availability of water resources during normal, dry, and multiple dry years. The act describes the contents of the UWMP and specifies how urban water suppliers should adopt and implement the plans. In accordance with the Water Conservation Act of 2009, urban water suppliers must also establish water use targets for 2015 and 2020 that would help achieve a statewide savings of 20 percent by 2020. The Urban Water Management Planning Act requires that UWMPs be updated every five years, in years ending with "0" or "5."

Water Conservation Act of 2009

The Water Conservation Act of 2009, also known as Senate Bill (SB) X7-7, requires the state to set a goal of reducing urban water use by 20 percent by the year 2020.[31] In turn, each retail urban water supplier must determine baseline water use during their baseline period and must also specify water use targets for the years 2015 and 2020 in order to help the state achieve the reduction. Water agencies are required to demonstrate compliance with their established water use target for the year 2015 and 2020 in their 2015 UWMPs. Beginning in 2016, urban retail water suppliers are required to comply with the water conservation requirements in SB X7-7 in order to be eligible for state water grants or loans.

Water Supply Assessment – Senate Bill 610

SB 610 (Water Code Sections 10910 through 10915), effective January 1, 2002, requires cities and counties to confirm that sufficient water supply sources are available before specified large development projects are approved.[32] Confirmation is provided in a Water Supply Assessment (WSA) that must be prepared for projects that include: (1) the equivalent demand of 500 residential units; (2) a shopping center or business establishment that employs more than 1,000 persons or has a floor space of more than 500,000 square feet; or (3) a commercial office building that employs more than 1,000 persons or has a floor space of more than 250,000 square feet. The WSA for a proposed project must be included in that

[30] California Water Code Sections 10610 through 10656. Available online at: https://www.water.ca.gov/LegacyFiles/urbanwatermanagement/docs/UWMPAct.pdf. Accessed June 7, 2018.
[31] Senate Bill X7-7, approved November 10, 2009. Available online at: http://wdl.water.ca.gov/wateruseefficiency/sb7/docs/SB7-7-TheLaw.pdf. Accessed June 7, 2018.
[32] California Water Code Sections 10910 through 10915. Available online at: http://www.leginfo.ca.gov/pub/01-02/bill/sen/sb_0601-0650/sb_610_bill_20011009_chaptered.html. Accessed June 6, 2018.

project's CEQA document. A WSA was prepared for the 201 Haskins Way Project because the project meets the commercial office criteria. The results of this analysis are discussed under Impact UT-3, below. This assessment is available as Appendix D of this EIR.

National Pollutant Discharge Elimination System Permits

The Porter-Cologne Water Quality Control Act authorizes the SWRCB to issue and enforce NPDES permits.[33] In addition, the SWRCB develops water quality standards and performs other functions to protect California's waters. The RWQCBs carry out the SWRCB regulations and standards and also issue and enforce permits. The NPDES permit applicable to the proposed project that pertains to utilities and service systems is the NPDES Municipal Regional Stormwater Permit (see "Regulatory Framework" in Section 4.6, Hydrology and Water Quality, pp. 4.6.8-4.6.9).

The San Francisco-San Bruno WQCP operates under an NPDES permit issued by RWQCB under the authority of the state. One of the requirements of the permit is that the WQCP implement a Pretreatment Program to regulate the collection of toxic and hazardous wastes of municipal sources. Under the Pretreatment Program, dischargers of industrial wastewater are required to abide by specific wastewater discharge limits and prohibitions. Industrial dischargers are also required to submit self-monitoring reports on the total volume and pollutant concentrations of their wastewater, and to allow for inspections by the City of South San Francisco.

The NPDES Municipal Regional Stormwater Permit (Provision C3) for South San Francisco requires that best management practices (BMPs) and low-impact development (LID) practices be implemented as part of redevelopment.

California Integrated Waste Management Act – Assembly Bill 939

Among the California statutes regulating solid waste, the California Integrated Waste Management Act (CIWMA), Assembly Bill (AB) 939 (1989), was landmark legislation. The CIWMA mandated that source reduction be the highest priority waste management strategy, followed by recycling and composting, and environmentally safe transportation and land disposal.[34] The law requires that each county prepare an Integrated Waste Management Plan, replacing the earlier County Solid Waste Management Plan. The CIWMA and later revisions required that counties, cities, and regional agencies prepare a source reduction and recycling element in its plan for diversion of 25 percent of all solid waste from landfills or transformation facilities by 1995, and 50 percent by 2000, using a 1989 baseline. Subsequent policies have been enacted to further intensify solid waste diversion rates, which are incorporated on an ongoing basis into the statewide California Green Building Standards Code (CALGreen) mandatory waste reduction requirements.

[33] California State Water Resources Control Board, 2018. Porter-Cologne Water Quality Control Act, Water Code Division 7 and Related Sections (As amended, including Statutes 2017). Available online at: https://www.waterboards.ca.gov/laws_regulations/docs/portercologne.pdf. Accessed June 7, 2018.

[34] CalRecycle, 2018. History of California Solid Waste Law, 1985-1989 (website). Available online at: http://www.calrecycle.ca.gov/laws/legislation/calhist/1985to1989.htm. Accessed June 7, 2018.

Solid Waste Disposal Measurement Act – Senate Bill 1016

The Solid Waste Disposal Measurement Act, SB 1016 (2008), changed the metric for evaluating success in California's solid waste management. The act maintained the 50 percent diversion requirement set forth under the CIWMA, but addressed the problem that calculating the diversion rate was a complex, time-consuming, and difficult process. Instead, the act provided for a 50 percent Equivalent Per Capita Disposal Target.[35] This per capita disposal target is the amount of disposal a jurisdiction would have had during the base period, if it had been exactly at a 50 percent diversion rate. The 50 percent Equivalent Per Capita Disposal Target is calculated by dividing the average of 2003–2006 per capita generation in half. Each jurisdiction has a specific 50 percent Equivalent Per Capita Disposal Target that cannot be compared to other jurisdictions. In addition, for jurisdictions that have already met the 50 percent diversion rate at that time, annual waste generation studies are no longer required, allowing more resources to be focused on the development or maintenance of waste reduction strategies.

LOCAL

City of South San Francisco General Plan

The *City of South San Francisco General Plan* (General Plan), originally adopted in 1999 and as amended in 2011, provides a vision for the long-range physical and economic development for the City, provides strategies and specific implementing actions, and establishes a basis for judging whether specific development proposals and public projects are consistent with the City's plans and policy standards. The General Plan contains a Parks, Public Facilities, and Services Element, which includes policies pertaining to water supply and wastewater systems, and a Health and Safety Element, which addresses solid waste.[36]

Policy 5.3-G-1: Promote the orderly and efficient operation and expansion of the water supply system to meet projected needs.

Policy 5.3-G-2: Encourage water conservation measures for both existing and proposed development.

Policy 5.3-G-3: Promote the equitable sharing of the costs associated with providing water service to new development.

Policy 5.3-I-1: Work with California Water Service Company and Westborough County Water District to ensure coordinated capital improvements with respect to the extent and timing of growth.

Policy 5.3-I-2: Establish guidelines and standards for water conservation and actively promote the use of water-conserving devices and practices in both new construction and major alterations and additions to existing buildings.

Policy 5.3-I-3: Ensure that future residents and businesses equitably share costs associated with providing water service to new development in South San Francisco.

Policy 5.3-G-4: Promote the orderly and efficient operation and expansion of the wastewater system to meet projected needs.

[35] Senate Bill 1016, approved September 26, 2018. Available online at: http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200720080SB1016. Accessed June 7, 2018.

[36] City of South San Francisco, 1999. *City of South San Francisco General Plan*, as amended, Chapters 5 and 8. Available online at: http://www.ssf.net/departments/economic-community-development/planning-division/general-plan. Accessed June 7, 2018.

Policy 5.3-G-5: Promote the equitable sharing of the costs of associated with providing wastewater service to new development.

Policy 5.3-G-6: Maintain environmentally appropriate wastewater management practices.

Policy 5.3-I-4: Ensure coordinated capital improvements with respect to the extent and timing of growth.

Policy 5.3-I-5: Ensure that future residents and businesses equitably share costs associated with providing wastewater service to new development in South San Francisco.

Policy 5.3-I-7: Encourage new projects in East of 101 area that are likely to generate large quantities of wastewater to lower treatment needs through recycling, pretreatment, or other means as necessary.

Policy 8.3-G-1: Reduce the generation of solid waste, including hazardous waste, and recycle those materials that are used, to slow the filling of local and regional landfills, in accord with the California Integrated Waste Management Act of 1989.

Policy 8.3-I-1: Continue to work toward reducing solid waste, increasing recycling, and complying with the San Mateo County Integrated Waste Management Plan.

East of 101 Area Plan

The *East of 101 Area Plan* was adopted by the City in 1994 in order to guide and regulate development in the City's East of 101 Area, which includes the project site. The East of 101 Area Plan, which was adopted prior to the City's General Plan, is primarily used as a design-level document for new projects located in the East of 101 Area, with the exception of some land use and conservation element policies still in effect. For all other utilities and service system policies, the current General Plan policies listed under Chapter 5 of the General Plan, Public Facilities and Services, are the guiding policies and supersede all Public Facilities Element policies set forth in Chapter 6 of the *East of 101 Area Plan*.

Urban Water Management Plan

As stated above, the State Urban Water Management Plan Act requires urban water suppliers to prepare a UWMP every 5 years. The 2015 UWMP for the SSF District is a foundational document and source of information about SSF District's historical and projected water demands, water supplies, supply reliability and vulnerabilities, water shortage contingency planning, and demand management programs.[37] Among other things, it is used as a long-range planning document by Cal Water for water supply and system planning.

East of 101 Sewer System Management Plan

The City completed an SSMP for the east portion of the City (east of U.S. 101) in September 2002 with subsequent updates in 2007 and 2011. These updates identified capacity deficiencies in the existing wastewater collection system and recommended improvements intended to mitigate deficiencies and serve future redevelopments. Recognizing the importance of planning, developing, and financing system

[37] California Water Service (CalWater), 2016. *2015 Urban Water Management Plan, South San Francisco District*, published June 2016. Available online at: https://www.calwater.com/docs/uwmp2015/bay/South_San_Francisco/2015_Urban_Water_Management_Plan_Final_(SSF).pdf. Accessed June 7, 2018.

facilities to provide reliable sewer collection service to existing customers and for servicing anticipated growth, the City initiated the development of the 2017 SSMP. The plan describes characteristics of the planning area, system performance and design criteria, existing sewer system facilities, existing and projected sewer flows, the hydraulic model development, model evaluation and proposed improvements, and a summary of recommended Capital Improvement Program projects.[38]

Climate Action Plan

The purpose of the *South San Francisco Climate Action Plan* (CAP), adopted in 2014, is to demonstrate the City's continued commitment to reduce greenhouse gas (GHG) emissions while protecting unique resources in the City.[39] The CAP provides goals, policies, and programs to reduce GHG emissions, adapt to climate change, and support the goals of AB 32 (2006) and SB 743 (2013). Measures and standards identified in the CAP allow the City to simplify the development review process and determine whether projects are eligible for streamlining incentives. The CAP meets the requirements of a Qualified GHG Reduction Strategy and, consistent with the Global Warming Solutions Act of 2006, presents a target reduction of 15 percent below baseline 2005 GHG emissions levels by 2020.

The CAP provides guidance for a scientific and regulatory framework, a GHG emissions inventory, a GHG reduction strategy, adaptation and resiliency, and implementation. The CAP incorporates several policies regarding water usage and diversion of solid waste, including the policies listed below.

Measure 5.1: Develop a waste reduction strategy to increase recycling and reuse of materials to achieve a 75% diversion of landfilled waste by 2020.

- Continue to enforce the existing construction and demolition recycling ordinance, requiring 100% of inert waste and 65% of noninert waste to be recycled from all eligible projects.

Measure 6.1: Reduce water demand.

Revitalize implementation and enforcement of the Water Efficient Landscape Ordinance by undertaking the following:

- Establishing a variable-speed pump exchange for water features.
- Limiting turf area in commercial and large multi-family projects.
- Restricting hours of irrigation to occur between 3:00 a.m. and two hours after sunrise.
- Installing irrigation controllers with rain sensors.
- Landscaping with native, water-efficient plants.
- Installing drip irrigation systems.
- Reducing impervious surfaces.

Measure 6.2: Provide alternative water resources for irrigation.

[38] City of South San Francisco, 2017. *Draft Sewer System Master Plan*. Prepared November 2017. Available as part of the Administrative Record of this EIR.

[39] City of South San Francisco, 2015. *Climate Action Plan*, adopted February 13, 2014, p. ES-1. Available online at: http://www.ssf.net/departments/economic-community-development/planning-division/planning-documents/approved-policy-documents. Accessed September 1, 2017.

- Create water policies for the stormwater management strategy that seek to capture storm runoff (e.g., bioswale, rainwater collection, and irrigation programs).
- Continue to implement the City's Water Efficient Landscape Guidelines.

The CAP includes a Development Checklist for City staff to use to identify applicable CAP measures for discretionary projects and required mitigation standards. The Development Checklist serves as the summary of project-level standards from the CAP. For discretionary projects seeking to use CEQA streamlining provisions, the City may require CAP measures as mandatory conditions of approval or as mitigation for identified GHG emission impacts.[40] Criteria applicable to utilities and service systems include, but are not limited to, the following questions:

- Will certification of the building be sought under Leadership in Energy and Environmental Design (LEED) or other green building criteria?
- Will any water features exceed CALGreen standards?
- Will the project incorporate low-impact development practices?
- Will any xeriscaping be installed?
- Will captured rainwater or graywater be used for irrigation?

The CAP, as it generally relates to the reduction of GHG emissions, is also discussed in detail in Section 4.5, Greenhouse Gas Emissions, on pp. 4.5.7-4.5.8.

City of South San Francisco Municipal Code

Chapter 15.60 of the South San Francisco Municipal Code (Municipal Code) establishes regulations for recycling and diversion of debris from construction and demolition. Contractors are encouraged to make every structure planned for demolition available for deconstruction, salvage, and recovery prior to demolition; and to recover the maximum feasible amount of salvageable designated recyclable and reusable materials prior to demolition, but at least at the rate set forth in CALGreen. The diversion requirements of the Municipal Code include submittal and completion of a waste management plan that includes deconstruction and salvaging as practicable, directing 100 percent of inert solids (building materials) to reuse or recycling facilities approved by the City, and either recycling all mixed debris to recycling facilities or source separating non-inert materials or directing non-inert materials (all other materials) to recycling facilities at a diversion rate of 65 percent.

4.10.5 Impacts and Mitigation Measures

This section describes the impact analysis related to utilities and service systems for the proposed project. This section also describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant.

[40] Ibid, pp. 75 and 169–171.

SIGNIFICANCE CRITERIA

Per the CEQA Guidelines, Appendix G, a utilities and service system impact is considered significant if project implementation would:

a. exceed wastewater treatment requirements or the applicable Regional Water Quality Control Board.

b. require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

c. require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

d. have insufficient water supplies available to serve the project from existing entitlements and resources, or need new or expanded entitlements.

e. result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

f. be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs.

g. not comply with federal, state, and local statutes and regulations related to solid waste.

APPROACH TO ANALYSIS

The impact analysis is informed by the results of a WSA performed for the proposed project (provided as Appendix D to this EIR),[41] a sanitary sewer capacity analysis performed for the proposed project,[42] the draft *East of Highway 101 – City of South San Francisco Sewer System Master Plan* prepared November 2017 (Draft SSMP),[43] and solid waste and landfill information provided by CalRecycle. Based on the general area-wide scale of utility service areas and systems, project-specific water demand, wastewater production, and solid waste production, implementation of Phase 1 development and project buildout are expected to have relatively similar results. Therefore, each of the impacts discussed below considers the proposed project at full project buildout, and Phase 1 development is not discussed separately.

Prior to construction of the proposed project during Phase 1 development and project buildout, existing light industrial uses would vacate. Therefore the consumption of water and energy and the production of wastewater and solid waste under the proposed project would be a net difference between the prior utility use and the new utility use. To determine the net water consumption utilized under the proposed project, the WSA analyzes the net new water use under the proposed project based on the water demand calculation for the *Genentech 2017 Master Plan Update* because that data differentiates water use for office and laboratory facilities similar to those of the project. For purposes of calculating new water demand estimates, it is assumed that 60 percent of the project would be for laboratory/research and

[41] CalWater, 2018. *SB 610 Water Supply Assessment for the 201 Haskins Way Project*, September 6, 2018. Available as Appendix D to this EIR.

[42] BKF, 2018. 201 Haskins Way – Sanitary Sewer Capacity Analysis, July 13, 2018.

[43] City of South San Francisco, 2017. *East of Highway 101 – City of South San Francisco Sewer System Master Plan*, draft prepared November 2017. Available as part of the Administrative Record of this EIR.

development (R&D) use and 40 percent of the project would be office use. As discussed in the WSA, the net water use calculation reflects the existing water use of the buildings located on the Phase 1 area and Phase 2 area parcels that would be replaced by the project based on 2017 metered readings for those buildings.

Estimates of wastewater generation rates under existing and proposed conditions were determined using unit rates provided by the 2017 Draft SSMP. From this estimate, a calculation of net new wastewater generation rate between the existing light industrial use to be removed and proposed new office/R&D use was performed. To analyze wastewater capacity, this analysis investigates the existing 8-inch sanitary sewer main fronting the site on Haskins Way, the existing 15-inch sanitary sewer main running east-west through the project within an easement, and the 15-inch sanitary sewer main downstream of the site within Swift Avenue to Pump Station 3 at the intersection of Swift Avenue and Kimball Way. The capacity of Pump Station 3 was evaluated as the downstream terminus for this analysis.

For solid waste, existing generation rates are not known; therefore, the analysis of these impacts is based on the citywide average solid waste generation rates from CalRecycle of employment uses per capita. The analysis compares the estimated existing solid waste rates to the estimated the rates that would occur under the proposed project.

IMPACT EVALUATION

Wastewater

Impact UT-1: Implementation of the proposed project would not exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board; would not exceed the capacity of the wastewater treatment provider that would serve the project site; and would not require the construction of new, or expansion of existing, wastewater treatment facilities, the construction of which could cause significant effects. ***(Less than Significant)***

The project site is served by an existing separated sewer system. The proposed project, at both Phase 1 and project buildout, would involve construction of new connections to the existing sewer lines on East Grand Avenue, Haskins Way, and East Jamie Court to provide service to the proposed new office/R&D buildings. From there, the existing sewer lines run west of Haskins Way to Swift Avenue, west on Swift Avenue to Kimball Way, north on Kimball Way to East Grand Avenue, then west on East Grand Avenue to Harbor Way, then south to Harbor Way and terminating at the WQCP.[44]

The sanitary sewer capacity analysis prepared for the proposed project investigated the existing 8-inch sanitary sewer main fronting the site on Haskins Way, the existing 15-inch sanitary sewer main running east-west through the project within an easement, and the 15-inch sanitary sewer main downstream of the site within Swift Avenue to Pump Station 3 at the intersection of Swift Avenue and Kimball Way. The capacity of Pump Station 3 was evaluated as the downstream terminus for this analysis.

[44] City of South San Francisco, 2017. *Draft Sewer System Master Plan*, Figure 4.1, p 4-2.

Estimates of sanitary sewer generation for the proposed office/R&D uses at the project site were determined using a unit rate of 0.05 gallons per day per square foot provided in the 2017 Draft SSMP, as shown in **Table 4.10.5: Proposed Project Sanitary Sewer Generation Rates**.[45] These unit rates multiplied by the square footage of land use determine the ADWF for the site. Due to fluctuations in flow through the day and for the effects of rainfall and groundwater dependent inflow and infiltration, a peaking factor of 3 was applied to the ADWF to determine the PWWF.

The future sanitary sewer flows within each of these pipe segments was calculated using Manning's Equation for gravity pipe flow and assuming an existing flow condition of d/D=0.50 per Figures 7.1 and 7.2 of the 2017 Draft SSMP. These flows correspond to the PWWF condition. The future available flow capacity is the difference between flows at 0.50 d/D (existing) and 0.90 (full pipe flow). As shown in **Table 4.10.6: Flow Capacity of Existing Sanitary Sewer Mains with Proposed Project**, the additional flows generated by the proposed project would account for between 3.5 and 23.7 percent of existing available flow capacity, and would not exceed flow capacities of the existing sanitary sewer mains.

Lift Station 3 has a minimum of 925 gpm of surplus capacity to accommodate future wet weather flows. Based on the net new sewer generation rate of 59.2 gpm as shown in Table 4.10.2, above, Lift Station 3 would have approximately 865.8 gpm of remaining surplus capacity to accommodate future wet weather flows, and the proposed project would not exceed the capacity of the lift station.

The Draft SSMP projects future land use development in the East of 101 Area to the year 2040 divided into four generalized areas: the Oyster Point Community, Genentech's Campus, the Gateway Area, and Bay West Cove. The project site is located within the "Genentech" area of the Draft SSMP's growth map, and the parcels on the project site are identified for future growth.[46] The Draft SSMP identifies components for the system that would require improvement to support future growth. Those improvements include capacity (pipe diameter) upgrades, slope improvements, and lift station improvements. None of the segments analyzed above, which occur between the project site and Lift Station 3, were identified in the Draft SSMP as requiring improvements, However, project flows would be added to the region-wide system as it flows from Lift Station 3 to the WQCP. According to the Draft

[45] Ibid, Table 3.3, p 3-10.2
[46] Ibid, Figure 2.3, p. 2-7.

Table 4.10.5: Proposed Project Sanitary Sewer Generation Rates

	Land Use (sq.ft.)	Sanitary Sewer Generation (gallons per day)[2]	Peak Wet Weather Flow Rate (cubic feet per second [cfs])[3]	Peak Wet Weather Flow Rate (gallons per minute)
Existing Light Industrial Land Use To Be Removed[1]				
Phase 1 Area (201 Haskins Way)	24,075	722	0.003	1.5
Subtotal Phase 2 Area (101 and 151 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court	*157,995*	*4,740*	*0.021*	*9.6*
Total Existing Light Industrial Land Use To Be Removed	**182,070**	**15,288**	**0.022**	**10.3**
Proposed New Office/R&D Use				
Phase 1 Development				
015-102-230 201 Haskins Way	280,765	**14,038**	**0.063**	**28.4**
015-102-250 400-450 East Jamie Court[2]	25,000	**1,250**	**0.0026**	**2.5**
Subtotal Phase 1 Development	***305,765***	**15,288**	**0.069**	**30.9**
Phase 2 Development				
015-102-250 400-450 East Jamie Court	85,000	**4,250**	**0.019**	**8.6**
015-102-210 101 Haskins Way	24,535	**1,227**	**0.006**	**2.5**
015-102-220 151 Haskins Way	28,602	**1,430**	**0.006**	**2.9**
015-102-180 410 East Grand Avenue	40,384	**2,019**	**0.009**	**4.1**
015-102-160 430 East Grand Avenue	72,076	**3,604**	**0.016**	**7.3**
015-102-240 451 East Jamie Court	62,087	**3,104**	**0.014**	**6.3**
015-102-290 No Address[4]	16,347	**817**	**0.004**	**1.7**
Subtotal Phase 2 Development	***329,031***	**16,452**	**0.074**	**33.2**
Total Proposed New Office/R&D Use	**634,796**	**31,740**	**0.143**	**64.1**
Net New Sewer Generation				
Phase 1		**14,566**	**0.066**	**29.4**
Phase 2		**11,712**	**0.053**	**23.7**
Total Project Buildout		**26,278**	**0.118**	**53.1**

Notes:

[1] For a summary of existing sanitary sewer generation rates by parcel, see Table 4.10.2.

[2] Based on a generation rate of 0.03 gallons per day per square foot of light industrial land use and 0.05 gallons per day per square foot of office/R&D land use.

[3] Based on a conversion of gallons per day to cubic feet per second, then multiplied by a peaking factor of 3.

[3] Development activity would occur on 400-450 East Jamie Court (015-102-250) during both Phase 1 development and Phase 2 development.

[4] Assessor's Parcel Number 015-102-290 is a parking lot. No existing sewer flows are generated.

Source: BKF (2018), 2017 Draft SSMP Table 3.3 (2017)

Table 4.10.6: Flow Capacity of Existing Sanitary Sewer Mains with Proposed Project

Segment (Location)	Pipe Size	Existing Available Flow Capacity (cfs)	Additional Project Flow (cfs)	Project Flow as a Percent of Existing Capacity (%)	Remaining Capacity (cfs)
SA-1 (Swift Avenue)	15-inch	1.63	0.13	8.0%	1.5
HW-1 (Haskins Way)	8-inch	0.38	0.09	23.7%	0.28
JC-1 (East Jamie Court)	8-inch	0.72	0.03	4.2%	0.69
ES-2 (Easement)	15-inch	1.16	0.04	3.5%	1.12

Note: Based on Figures 7.1 and 7.2 of the 2017 Draft SSMP, each of these segments are flowing with a d/D ratio less than 0.50 in the existing PWWF conditions. The existing available flow capacity is the difference between flows at 0.50 d/D (existing) and 0.90 (full pipe flow).

Source: BKF (2018), 2017 Draft SSMP (2017)

SSMP, there is one pipeline capacity improvement and three slope deficiency improvements recommended between Lift Station 3 and the WQCP,[47] as follows:

- 4-P2 – Pipeline capacity improvement to a gravity main on Harbor Way (replace existing 27-inch pipeline with a 30-inch pipeline)
- 4-S1– Slope deficiency improvement on Littlefield Avenue from 50 feet northeast of East Grand Avenue to Littlefield Avenue to East Grand Avenue
- 4-S2 – Slope deficiency improvement on Littlefield Avenue from 100 feet south of East Grand Avenue to Grand Avenue
- 4-S5 – Slope deficiency improvement on East Grand Avenue from 250 feet east of Kimball Way to Kimball Way

The Draft SSMP also provides a discussion of the City's Capital Improvement Program, which was adopted by the City on June 15, 2017, to assist the City in planning and constructing the collection system improvements through the 2040 scenario, and presents the methodologies for developing equitable distribution of costs. The capital improvement costs account for project-related costs associated with engineering design, project administration, construction management, inspection, and legal costs.

The Draft SSMP indicates that capacity allocation analysis is needed to identify improvement funding sources, and to establish a nexus between development impact fees and improvements needed to service growth. In compliance with the provisions of the Mitigation Fee Act, Government Code Sections 66000, et. seq. (also known as AB 1600), the analysis differentiates between the needs of existing users and those of anticipated future developments. For example, to address pipeline capacity improvement 4-P2, the SSMP suggests a cost allocation of 54 percent of funding from existing users and 46 percent of costs from future users.[48]

The costs of capital improvements would be captured through payment of the City's Sewer System Capacity Study and Improvement Fee (the "Sewer Capacity Fee"), based on the square footage of

[47] Ibid, Figure 7.3, Table 7.1 and Table 7.2, pp 7-6, 7-8, and 7-9.
[48] Ibid, Table 8.2, p 8-6.

proposed project new uses, pursuant to the City's Master Fee Schedule and Title 14 "Water and Sewage" of the Municipal Code.

Therefore, with a fair-share contribution to the City's capital improvement program through payment of the Sewer Capacity Fee, the proposed project would not exceed the capacity of wastewater facilities, and would not require the construction of new, or expansion of existing, wastewater treatment facilities. This impact is less than significant. No mitigation is necessary.

Stormwater

Impact UT-2: Implementation of the proposed project would not require the construction of new, or expansion of existing, stormwater drainage facilities, the construction of which could cause significant environmental effects. ***(Less than Significant)***

In general, the proposed project would alter but not create substantial new impervious surface area compared to existing conditions at Phase 1 or at project buildout. The existing site is largely disturbed by buildings and paved parking areas. Many of the existing parcels (the 201 Haskins parcel in the Phase 1 area; 101 and 151 Haskins Way and 410 and 430 East Grand Avenue parcels in the Phase 2 area) include portions of compacted gravel that have previously been used for parking or truck storage. Due to the compacted nature of this existing gravel, significant infiltration providing groundwater recharge is likely not occurring in the existing condition. Existing permeable surfaces include ornamental landscaping in the site frontages and parking areas, and ruderal grass areas in undeveloped setbacks between parcels.

Both Phase 1 and buildout of the proposed project would be required to manage stormwater runoff as part of green infrastructure through LID practices. This approach implements engineered controls to allow stormwater, filtering, and storage and flood control. Phase 1 and project buildout would involve minor grading to allow controlled stormwater flows through paved areas into designated bioretention areas or storm drains. Portions of roof areas would also be designed as green roofs that would provide filtration. Stormwater received through all proposed roof areas would be routed to the ground level through downspouts and conveyed to bioretention areas. The bioretention areas would be designed to allow water to evaporate, and provide pre-treatment of pollutants such as trash, debris, and larger sediments, as well as filtration of other pollutants. After collection, filtered stormwater would be allowed to infiltrate into groundwater or to storm drainage conveyances.

In summary, the project would alter but not substantially increase impervious surfaces as compared to existing conditions. Under the project, stormwater would continue to be routed to the storm drains on East Jamie Court and Haskins Way. Post-construction peak stormwater flows would not be increased compared to existing conditions. The project would comply with all applicable BMPs and Conditions of Approval regarding stormwater drainage and surface runoff detention measures, and therefore the amount of surface runoff would not increase.

Therefore, impacts associated with stormwater drainage facilities would be less than significant. No mitigation is necessary.

Water Supply

Impact UT-3: Cal Water has sufficient water supply available to serve the project site from existing entitlements and resources and would not require new or expanded water supply resources or entitlements. ***(Less than Significant)***

Construction of the proposed project would require minor quantities of water for dust control, concrete mixing, and construction-related equipment washing. This impact is less than significant, and is not further discussed below.

The proposed project would require water supplies to serve office/R&D uses and employees on-site. The proposed project would require the most water resources at project buildout (including both Phase 1 development and the conceptual Phase 2 development). Therefore, a separate discussion of Phase 1 water supply impacts is not necessary.

The City requested Cal Water to prepare a WSA in accordance with SB 610 requirements for the proposed project, which is provided as Appendix D to this EIR. To estimate water use rates for proposed project, water usage rates for similar office space and laboratories in the Oyster Point area were obtained from the December 2008 South San Francisco Gateway Business Park WSA prepared by Cal Water. In the Gateway Business Park WSA, overall average annual day office water use was 0.04 gallon per day per square foot, and average annual day laboratory water use was 0.063 gallon per day per square foot.

More recently, the City requested a water demand study for the *Genentech Master Plan Update* project in 2017. The study indicated that existing Genentech office water use is 0.0547 gallon per day per square foot and laboratory water use is 0.082 gallon per day per square foot.[49] Since this water use data is more recent and is based on metered water use for assumed similar office and laboratory facilities to those proposed project, these use assumptions are used to calculate project water demand. This is a conservative approach as existing usage rates do not account for the improvements in water conservation technology and water conservation policies that have occurred in the past 6 years.

At project buildout, the irrigated landscaped areas likely would increase from present site conditions; however, the technology of irrigation has improved since the current project site's irrigation systems were installed. Furthermore, the project would comply with CAP Measure 6.1 and 6.2 to implement features to reduce water demand and provide alternative water resources per CAP Measure 6.1 and Measure 6.2, such as water efficient irrigation systems and alternative water resources for irrigation (such as stormwater runoff collection and bioswales). Therefore, irrigated water demand is expected to be similar to existing conditions or reduced. Current city ordinances require all new developments to install water-conserving fixtures and appliances. All of these would be incorporated into the proposed project.

[49] California Water Service, 2018. *SB 610 Water Supply Assessment for the 201 Haskins Way Project*, September 6, 2018. Available as Appendix D of this EIR.

The estimated net water demand accounts for the existing water use for the buildings that would be demolished in connection with development of the proposed project. Existing water use for those uses to be removed is based on 2017 metered readings and is approximately 1,830 gallons per day.[50]

For the basis of analysis of water demand estimates, it is assumed that the intended use of the new uses on the project site would be comprised of 60 percent laboratories space (R&D) and 40 percent office space. Based on 0.0547 gallon per day per square foot of office use and 0.082 gallon per day per square foot of laboratory use, the proposed project at project buildout would require approximately 48,164 gallons per day (14,826 gallons per day for office use and 33,338 gallons per day of laboratory use).

Therefore, the estimated net water demand for the proposed project is calculated as follows: 48,164 gallons per day of new office and laboratory use, less 1,830 gallons per day for the existing water use for a total of 46,334 gallons per day of net new water use.

The WSA utilizes 2023 as the date of overall project completion and beginning of operations at the proposed building, including conceptual Phase 2 development.

The SSF District has a sufficient supply under normal hydrological conditions. However, during 1-year or multi-year dry periods, shortfalls up to 22 percent are projected.[51] The WSA analyzed the proposed project's estimated water use based on a normal hydrological year, a single dry year, and three consecutive dry years.

Normal Hydrologic Year

For all three Cal Water peninsula districts served by SFPUC, the combination of existing local and purchased supplies would be adequate to meet forecasted demands for the proposed project, those associated with existing Cal Water customers and all other new developments for the next 20+ years.

Single Dry Year

For a single dry year, supplies may be less than normal projected demands if SFPUC supplies are reduced, which historically has not occurred. Generally, a reduced supply is not expected, but if SFPUC does reduce its supplies, Cal Water would implement additional demand reduction measures. The amount of groundwater supply of 1,535 AFY would not be affected by a single dry year. During a single dry year, treated surface water from the Bear Gulch Reservoir in the Bear Gulch District would most likely decrease. While a single dry year may trigger increased water demand reduction measures, demand has not been reduced to reflect those measures. Depending on when in the next 20+ years another single dry year occurs, additional supply sources (water transfers and desalination) may have been developed and be available to offset any reductions in existing sources. Accordingly, water supplies during a single dry year would be adequate to meet forecasted demands for the proposed project.

[50] Existing water use is based on interior building use only. For the purposes of this analysis, irrigated water demand is expected to be similar to existing conditions or reduced based on improvements to technology.

[51] California Water Service, 2018. *SB 610 Water Supply Assessment for the 201 Haskins Way Project*, September 6, 2018. Available as Appendix D of this EIR.

Three Consecutive Dry Years

During a 3-year dry period, water supplies would be less than normal demand by a range from 14 to 22 percent in 2040 depending on the specific dry year and the projected future date. Again, Cal Water would assess any supply reduction notifications from SFPUC, the availability of water from its treated surface source in Bear Gulch District, and whether it can continue to pump groundwater at its historically normal rate. Westside Basin groundwater supplies would likely continue to be pumped at current rates although that would result in a reduction in basin storage and a lowering of groundwater levels. During years of above-normal rainfall, it is expected that groundwater storage would increase, as has been the case in past decades.

Depending on the timing of possible successive dry years in the next 20+ years, additional water supply sources (water transfers and desalination) may have been developed and be available to offset any reductions in existing supply sources. If not, Cal Water would determine what additional demand reduction measures would be needed to reduce demand to match available supplies. As previously noted, Cal Water exceeded its goal of reducing demands during the most recent (2010–2015) severe drought.

If in the first dry year, demand reduction responses do not appear to be sufficient, Cal Water would implement additional conservation measures in the second and third dry years. This is expected to result in an adequate supply for all three Cal Water peninsula districts from 2020–2040. Accordingly, water supplies during 3 consecutive dry years would be adequate to meet forecasted demands for the proposed project.

Conclusion

The SSF District would be able to provide adequate water supplies to meet existing and projected demands, which includes full development of the proposed project for normal, single dry year, and multiple dry-year conditions based on the following:

1. Current Westside Basin groundwater supplies and Cal Water's current and projected groundwater production rates from its active wells.
2. Generally adequate long-term normal hydrologic supplies provided by the SFPUC, but recent significant proposed reductions in supply during multiple dry-year periods.
3. An effective demand reduction program to meet requirements of state laws.
4. Future Cal Water plans to develop additional supply sources including transfers/exchanges of supplies from outside the peninsula area and development of local desalination facilities.
5. The prospect of longer term additional local supplies being obtained from SFPUC's proposed conjunctive use program for the Westside Basin.
6. Possible recycled water projects being developed collaboratively among local wastewater and water utilities in the SSF District area.
7. Cal Water's ability to achieve additional drought-driven reductions in demand (15 to 26 percent) during single dry-year and multiple dry-year periods through its established in-place water programs.

8. Historical performance which demonstrates Cal Water's ability to both increase supply sources and effectively achieve demand reductions if required.

As part of the project entitlements process, Cal Water would review the proposed project's water facility designs to ensure that the required water facilities are consistent with the proposed development plan and would coordinate with the developer, its planners and engineers, the City, and the California Division of Drinking Water in the design, construction, and operation of the proposed water distribution system.

In summary, the proposed project would not require new or expanded water supply entitlements or the expansion of existing water facilities, the construction of which could cause significant environmental effects. Therefore, impacts associated with water demand would be less than significant. No mitigation is necessary.

Solid Waste

Impact UT-4: The proposed project would be served by a landfill with sufficient permitted capacity and would comply with all applicable statutes and regulations related to solid waste. ***(Less than Significant)***

As discussed above, the South San Francisco Scavenger Company is contracted by the City as the sole hauler of solid waste and operator of recycling services for the City. The South San Francisco Scavenger Company would transport all solid waste from the project site to the Blue Line Transfer facility, located directly east of the project site. The Blue Line Transfer facility has a permitted capacity of 2,400 tons per day. Once the useable materials have been separated at the Blue Line Transfer facility, the remaining trash is then transported to the Corinda Los Trancos (Ox Mountain) Sanitary Landfill or Newby Island Sanitary Landfill.

The Ox Mountain landfill has a permitted maximum disposal of 3,598 tons per day. As of 2015, the landfill's remaining capacity was 22.18 million cubic yards[52], or approximately 16.64 million tons of compacted-in-place solid waste.[53] The estimated closure date for the Ox Mountain Landfill is 2034. The Newby Island Landfill has a permitted maximum disposal of 4,000 tons per day, with an estimated remaining capacity of 21.2 million cubic yards, or approximately 15.9 million tons of compacted-in-place solid waste.[54] The estimated closure date for the Newby Island Landfill is 2041.

The proposed project would increase the intensity of land uses at the site, resulting in an increase of solid waste to the Blue Line Transfer facility and landfills, particularly the Ox Mountain Sanitary Landfill, from the project site. Based on the average 2015 solid waste disposal rate of 9.3 pounds per employee in the City[55], the net new solid waste generation rate in tons per year is provided in **Table 4.10.7: Estimated Employee-Generated Solid Waste under the Proposed Project**.

[52] CalRecycle, 2018. Facility/Site Summary Details: Corinda Los Trancos Landfill (Ox Mtn) (41-AA-0002) (website). Available online at: http://www.calrecycle.ca.gov/SWFacilities/Directory/41-AA-0002/Detail/. Accessed June 6, 2018.

[53] A cubic yard of uncompacted municipal solid waste is equivalent to approximately 0.22 tons (440 pounds); a cubic yard of compacted-in-place in a landfill is equivalent to approximately 0.75 tons (1,500 pounds) (CalRecycle 2015).

[54] CalRecycle, 2018. Facility/Site Summary Details: Newby Island Sanitary Landfill (43-AN-0003). Available online at: http://www.calrecycle.ca.gov/SWFacilities/Directory/43-AN-0003/Detail/. Accessed June 6, 2018.

[55] CalRecycle, 2015. South San Francisco Diversion/Disposal Rate Detail, 2015. Available online at: http://www.calrecycle.ca.gov/LGCentral/reports/diversionprogram/JurisdictionDiversionDetail.aspx?JurisdictionID=511&Year=2015. Accessed August 27, 2018.

Table 4.10. 7: Estimated Employee-Generated Solid Waste under the Proposed Project

	Land Use (sq. ft.)	Estimated Employment[2]	Estimated Solid Waste Disposal (pounds per day)	Estimated Solid Waste Disposal (tons per year)
Existing Light Industrial Land Use To Be Removed[1]				
Phase 1 Area (201 Haskins Way)	24,075	25	0.003	1.5
Subtotal Phase 2 Area (101 and 151 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court	*157,995*	*166*	*0.021*	*9.6*
Total Existing Light Industrial Land Use To Be Removed	**182,070**	**15,288**	**0.022**	**10.3**
Proposed New Office/R&D Use				
Phase 1 Development				
015-102-230 201 Haskins Way	280,765	**14,038**	**0.063**	**28.4**
015-102-250 400-450 East Jamie Court[2]	25,000	**1,250**	**0.0026**	**2.5**
Subtotal Phase 1 Development	***305,765***	**15,288**	**0.069**	**30.9**
Phase 2 Development				
015-102-250 400-450 East Jamie Court	85,000	**4,250**	**0.019**	**8.6**
015-102-210 101 Haskins Way	24,535	**1,227**	**0.006**	**2.5**
015-102-220 151 Haskins Way	28,602	**1,430**	**0.006**	**2.9**
015-102-180 410 East Grand Avenue	40,384	**2,019**	**0.009**	**4.1**
015-102-160 430 East Grand Avenue	72,076	**3,604**	**0.016**	**7.3**
015-102-240 451 East Jamie Court	62,087	**3,104**	**0.014**	**6.3**
015-102-290 No Address	16,347	**817**	**0.004**	**1.7**
Subtotal Phase 2 Development	***329,031***	**16,452**	**0.074**	**33.2**
Total Proposed New Office/R&D Use	**634,796**	**31,740**	**0.143**	**64.1**
Net New Sewer Generation				
Phase 1		**14,566**	**0.066**	**29.4**
Phase 2		**11,712**	**0.053**	**23.7**
Total Project Buildout		**26,278**	**0.118**	**53.1**

Notes:

[1] For a summary of existing sanitary sewer generation rates by parcel, see Table 4.10.24.

[2] Based on General Plan Land Use Element employment estimates of 955 sq. ft. of industrial use per employee and 450 sq. ft. of office/R&D use per employee.

[3] Development activity would occur on 400-450 East Jamie Court (015-102-250) during both Phase 1 development and Phase 2 development.

Source: General Plan (1999), CalRecycle (2015)

Development under the proposed project would result in an additional approximately 53.1 tons of solid waste per year (approximately 0.15 tons per day), representing less than 1 percent of the permitted maximum amount accepted daily at the Blue Line Transfer facility and Ox Mountain Sanitary Landfill. The remaining capacity of the Blue Line Transfer facility would be able to accommodate the additional solid waste. Thus, the increase in solid waste generated under the proposed project would be sufficiently served by the Blue Line Transfer facility and the Ox Mountain Landfill. Therefore, the impact would be less than significant and no mitigation measures are required.

Solid waste disposal and recycling in the City is regulated by the Municipal Code, particularly Chapters 8.16 and 8.28. As neither of these chapters establishes quantitative disposal or recycling rates, the project site would not be subject to diversion requirements. However, under the Municipal Code, the proposed project would be required to have its solid waste, including construction, demolition debris, and recyclable materials, collected by the South San Francisco Scavenger Company. Additional health and sanitation requirements set forth in the Municipal Code would be met by San Francisco Scavenger Company. For construction and demolition, the City requires 100 percent of all inert solids (building materials) and 65 percent of non-inert solids (all other materials) to be recycled.[56] Additionally, eligible projects (2,000 square feet or more) must submit a Waste Management Plan.

As described in "Regulatory Framework," AB 939 requires that local jurisdictions divert at least 50 percent of all solid waste by 2000. Furthermore, as described in the CAP, Measure 5.1, the project sponsor would be required to develop a waste reduction strategy to increase recycling and reuse of materials to achieve a generalized rate of 75 percent diversion of landfilled waste. As analyzed above, the project site is not a substantial contributor to the City's generation of solid waste disposal at the Ox Mountain Sanitary Landfill. Implementation of the proposed project would increase the project site's solid waste contribution by less than 1 percent to the Blue Line Transfer facility and Ox Mountain Sanitary Landfill. Consequently, because the proposed project would not impede the City's compliance with AB 939 and the CAP, the impact related to compliance with solid waste regulations would be less than significant and no mitigation measures are required.

CUMULATIVE IMPACTS

Impact C-UT-1: The proposed project would not result in a cumulatively considerable contribution to significant cumulative impacts on utilities and service systems. ***(Less than Significant)***

The geographic context for a discussion of cumulative impacts on utilities is the service area of the utility in question. For instance, the geographic context for cumulative impacts on water supply is the Cal Water and SFPUC service areas; on wastewater, it is the East of 10 l Area; and on the storm drainage system, the geographic context is the local watershed. The cumulative impacts analysis for each utility considers all cumulative growth within its respective service area, as identified by the providers' demand projections.

[56] City of South San Francisco, 2017. *City of South San Francisco Construction and Demolition Waste Management Plan* – Information for the Applicants. Available online at: http://www.ssf.net/home/showdocument?id=2416. Accessed August 27, 2018.

As discussed under Impacts UT-1, UT-2, UT-3, and UT-4, above, the existing water supply system, wastewater collection and treatment system, and landfill and solid waste systems are each projected to have adequate capacity to accommodate future growth in the East of 101 Area. The proposed project would add demand to each of these facilities, along with the reasonably foreseeable future projects listed in Section 4.1, Approach to Environmental Analysis, under "Approach to Cumulative Analysis," on pp. 4.1.7-4.1.9.

Water Supply

For water demand, similar to the proposed project, those reasonably foreseeable future projects that involve large commercial or office uses would also be required to request a WSA from Cal Water to identify project-specific impacts. However, the WSA states that existing water supplies in a normal hydrologic year, a single dry year, or 3 consecutive dry years are adequate to meet forecasted demands for the next 20+ years to the year 2040. Therefore, it is anticipated that existing water supplies are adequate to meet the demand of the proposed project, in combination with these reasonably foreseeable future projects. Therefore, the proposed project, in combination with reasonably foreseeable future projects, would have a less-than-significant cumulative impact on water supplies. As such, the proposed project would not contribute considerably to a significant cumulative water supply impact. No mitigation is necessary.

Stormwater

Similar to the proposed project, each of the reasonably foreseeable future projects identified in Section 4.1, Approach to Environmental Analysis, involves infill development on areas that are largely covered by existing paved and impervious surfaces from existing light industrial and office uses. Each of these projects would be required to manage stormwater runoff as part of green infrastructure through LID practices and these projects would likely maintain or increase the amount of landscaped or pervious surfaces in the East of 101 Area. The proposed project, in combination with reasonably foreseeable future projects, would not substantially increase impervious surfaces as compared to existing conditions. Post-construction peak stormwater flows would not be increased compared to existing conditions. Similar to the proposed project, these reasonably foreseeable future projects would be required to comply with all applicable BMPs and Conditions of Approval regarding stormwater drainage and surface runoff detention measures, and therefore, the amount of surface runoff would not increase. Therefore, the proposed project, in combination with reasonably foreseeable future projects, would have a less-than-significant cumulative impact on water supplies. As such, the proposed project would not contribute considerably to a significant cumulative water supply impact. No mitigation is necessary.

Wastewater

With regard to wastewater collection and treatment, the Draft SSMP projects future land use development in the East of 101 Area to the year 2040, and identifies components for the system that would require improvement to support future growth. Those improvements include capacity (pipe diameter) upgrades, slope improvements, and lift station improvements. Similar to the proposed projects, these reasonably foreseeable future projects would be required to contribute to the Capital Improvement Program through

the Sewer System Capacity Study and Improvement Fee. Furthermore, as a standard condition of approval, the City would require the proponents of each project to provide project-specific sewer capacity studies. Therefore, the proposed project, in combination with reasonably foreseeable future projects, would have a less-than-significant cumulative impact on wastewater generation. As such, the proposed project would not contribute considerably to a significant cumulative wastewater generation impact. No mitigation is necessary.

Solid Waste and Landfill Capacity

For solid waste and landfill capacity, the state generated about 87 million tons waste in 2013, of which approximately 30.2 million tons were disposed in landfills in the state or exported to out-of-state landfills. With a population of about 38 million residents, California had a per capita disposal rate of 4.4 pounds per resident per day, well below the statewide target of 6.3 pounds per person per day needed to meet the 50 percent diversion mandate.[57] Although the average per capita residential disposal rate in South San Francisco in 2015 was 6.9 pounds per day, which meets the statewide target, the average disposal rate was 9.3 pounds per employee, which did not meet the 9.0 pounds per day per employee target. The proposed project, in combination with reasonably foreseeable future projects, would not cause significant regional impacts on landfill capacity, because these projects would comply with the City's requirements to reduce solid waste and achieve an overall 75 percent diversion of landfilled waste per CAP Measure 5.1, as would other development projects that would also contribute waste to the City's landfills. The construction of other cumulative projects identified would generate construction waste during their construction periods. However, the compliance with construction waste diversion regulatory requirements to recycle 100 percent of all inert solids (building materials) and 65 percent of non-inert solids (all other materials) during construction and demolition, along with the cumulative projects' compliance with regulatory requirements, would reduce their contribution to overall solid waste volumes such that the cumulative impact would be less than significant. Therefore, the proposed project would not have a considerable contribution to a significant cumulative solid waste impact. No mitigation is necessary.

[57] CalRecycle, 2015. State of Disposal in California (Publication #DRRR 2015-1524), p. 6. Available online at: http://www.calrecycle.ca.gov/publications/Documents/1524/20151524.pdf. Accessed June 8, 2018.

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4.11 Less-than-Significant Impacts

In the course of evaluating certain topics included in the California Environmental Quality Act (CEQA) Guidelines Appendix G checklist, the proposed 201 Haskins Way Project (project) was found to have less-than-significant impacts or no impacts due to the project type and location. This section briefly describes these effects, pursuant to CEQA Guidelines Section 15128. Note that some of the topics in which the proposed project was determined to have no impact or a less-than-significant impact are addressed in the various Draft Environmental Impact Report (EIR) sections (Sections 4.2 through 4.9) to provide a more comprehensive discussion as to why impacts would be less than significant and to provide more detail for decision-makers and the general public.

Each topic includes a brief description of the regulatory framework, significance criteria, approach to analysis, and impacts. Information about the environmental setting of the proposed project is incorporated within the impact analysis discussions for the impact areas below, where necessary, to provide a baseline context for the impact analysis.

4.11.1 Aesthetics

REGULATORY FRAMEWORK

Regional

San Francisco Bay Plan and the Bay Conservation and Development Commission

The San Francisco Bay Plan (Bay Plan) was prepared by the Bay Conservation and Development Commission (BCDC) from 1965 through 1969 and amended through 2007 in accordance with the McAteer-Petris Act.[1,2] The Bay Plan guides the protection and use of San Francisco Bay (Bay) and its shoreline. BCDC has permit jurisdiction for the nine Bay Area counties with Bay frontage over areas subject to tidal action up to the mean high tide line and including all sloughs, tidelands, submerged lands, and marshlands lying between the mean high tide and 5 feet above mean sea level, and the land lying between the Bay shoreline and a line drawn parallel to, and 100 feet from, the Bay shoreline, known as the 100-foot shoreline band.[3] Under the McAteer-Petris Act, BCDC has permit authority for the placement of fill, extraction of materials, or substantial changes in use of land, water, or structures within its jurisdiction, and to enforce policies aimed at protecting the Bay and its shoreline, as well as maximizing public access to the Bay.

[1] San Francisco Bay Conservation and Development Commission, 2010. The McAteer-Petris Act (website). Available online at: http://www.bcdc.ca.gov/plans/mcateer_petris.html. Accessed May 10, 2018.

[2] California Government Code Sections 66600–66682. The San Francisco Bay Conservation and Development Commission (BCDC), created by the McAteer-Petris Act, functions as the state's coastal management agency for San Francisco Bay.

[3] San Francisco Bay Conservation and Development Commission, 2012. *San Francisco Bay Plan*, p. 5. Available online at: http://www.bcdc.ca.gov/pdf/bayplan/bayplan.pdf. Accessed May 10, 2018.

APPEARANCE, DESIGN, AND SCENIC VIEW POLICIES

Several policies of the Bay Plan are aimed at protecting the Bay's scenic views and the appearance and design of the Bayfront and adjacent developments.[4] The Bay Plan policies that are most relevant with respect to appearance, design, and scenic views are as follows:

> **Policy 1:** To enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines.
>
> **Policy 2:** All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay. Maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shore. To this end, planning of waterfront development should include participation by professionals who are knowledgeable of the Commission's concerns, such as landscape architects, urban designers, or architects, in conjunction with engineers and professionals in other fields.
>
> **Policy 4:** Structures and facilities that do not take advantage of or visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline. However, some small parking areas for fishing access and Bay viewing may be allowed in exposed locations.
>
> **Policy 8:** Shoreline developments should be built in clusters, leaving areas open around them to permit more frequent views of the Bay. Developments along the shores of tributary waterways should be Bay-related and should be designed to preserve and enhance views along the waterway, so as to provide maximum visual contact with the Bay.
>
> **Policy 12:** In order to achieve a high level of design quality, the Commission's Design Review Board, composed of design and planning professionals, should review, evaluate, and advise the Commission on the proposed design of developments that affect the appearance of the Bay in accordance with the Bay Plan findings and policies on Public Access; on Appearance, Design, and Scenic Views; and the Public Access Design Guidelines. City, county, regional, state, and federal agencies should be guided in their evaluation of Bayfront projects by the above guidelines.
>
> **Policy 14:** Views of the Bay from vista points and from roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water. In this regard, particular attention should be given to all waterfront locations, areas below vista points, and areas along roads that provide good views of the Bay for travelers, particularly areas below roads coming over ridges and providing a "first view" of the Bay (shown in Bay Plan Map No. 8, Natural Resources of the Bay).[5]

The BCDC Design Review Board reviews and makes recommendations to the Commission on the appearance and design of proposed projects within its jurisdiction, evaluating them in light of the policies for appearance, design, and scenic views. Its recommendations are advisory only and are not themselves grounds for denying a permit. Outside the area of the Commission's jurisdiction where permits for development from the Commission are not required, the McAteer-Petris Act specifies that the provisions of the Bay Plan pertaining to such areas are simply advisory to the applicant.[6]

[4] San Francisco Bay Conservation and Development Commission, 2012. *San Francisco Bay Plan*, pp. 70–72.

[5] Bay Plan Map No. 8 has been removed from the Bay Plan. Bay Plan Map No. 5 provides current information on scenic and sensitive resources in the Central Bay.

[6] McAteer-Petris Act, Section 66663.

Local

City of South San Francisco General Plan

The *City of South San Francisco General Plan* (General Plan), originally adopted in 1999 and as amended in 2011, provides a vision for the long-range physical and economic development for the City, provides strategies and specific implementing actions, and establishes a basis for judging whether specific development proposals and public projects are consistent with the City of South San Francisco (City) plans and policy standards. The General Plan contains a Parks, Public Facilities, and Services Element, which includes Policy 5.1-I-9, to improve the accessibility and visibility of Sign Hill Park and the bayfront.

East of 101 Area Plan

The *East 101 Area Plan*, which was adopted by the City Council in 1994 and most recently amended in 2016, sets forth specific land use policies for the East 101 Area. Development standards and density determinations, including floor area ratio (FAR), are established in the General Plan, which was updated after the adoption of the *East of 101 Area Plan* and takes precedence over the Area Plan. Accordingly, where the General Plan and *East of 101 Area Plan* conflict, land use policies and designations of the General Plan supersede those outlined in the *East of 101 Area Plan*. The City has, however, retained the East of 101 Area Plan Design Element policies to be the design guidelines for development in the East of 101 Area.

City of South San Francisco Zoning Ordinance, 2017

The City zoning ordinance prescribes development and site regulations that apply to development in all districts. The zoning ordinance contains standards for lighting and illumination that apply to all new development and additions that expand existing floor area by 10 percent or more.[7] They include standards for non-residential buildings requiring that all exterior doors, during the hours of darkness, shall be illuminated with a minimum of one foot-candle of light. The standards also limit the maximum height of lighting fixtures to 25 feet in the Business Technology Park (BTP) district. The standards also require that all lighting fixtures shall be shielded so as to not produce obtrusive glare onto the public right-of-way or adjoining properties.

All projects that require a building permit for new construction, alterations, or other improvements to the exterior of a structure or parking area require design review approval—except for projects developed in compliance with a previous design review approval.[8] The Planning Commission has design review authority for all projects requiring Planning Commission approval (such as projects that require a conditional use permit) and all new commercial, employment, mixed-use, and office developments.[9] The Design Review Board has design review authority for all other projects, and will provide

[7] Municipal Code Section 20.300.008.
[8] Municipal Code Section 20.480.002.
[9] Municipal Code Section 20.480.003(C).

recommendations to the Planning Commission or Chief Planner, as required.[10] Decisions regarding design review made by the Chief Planner are appealable to the Planning Commission, and decisions made by the Planning Commission are appealable to the City Council.[11]

SIGNIFICANCE CRITERIA

Based on the CEQA Guidelines, Appendix G, a project is considered to have significant impacts if implementation of the project would:

a. have a substantial adverse effect on a scenic vista;

b. substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;

c. substantially degrade the existing visual character or quality of the site and its surroundings; or

d. create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

In addition, the City Design Review guidelines under South San Francisco Municipal Code (Municipal Code) Section 20.480.006 state that a project's design features would be reviewed in consideration of achieving a safe, efficient, and harmonious development, and shadow patterns, and that components considered in design review shall include safety. A comment on the Notice of Preparation (NOP) noted concerns about wind safety and shadow impacts as a result of the proposed project. The City does not have specific CEQA criteria for determining a project's wind and/or shadow impacts; however, this EIR provides an analysis of wind conditions and shadow patterns in response to the NOP comment and CEQA Guidelines Section 15128.

APPROACH TO ANALYSIS

The project site is not located within a locally or state- designated scenic vista. The proposed project is evaluated based on the potential to impact scenic vistas defined under the General Plan and the Bay Plan, Sign Hill Park, and the Bay. However, the proposed project is not on or near a designated vista point, wildlife refuge, or waterfront park mapped on Bay Plan Map 5. The nearest vista point, Point San Bruno, and its associated waterfront trail is located approximately 0.25 mile to the east of the project site. Point San Bruno provides east-facing views of the Bay and the project site is located 0.25 mile west of Point Saint Bruno. Therefore, the proposed project would not interfere with east-facing Bay views provided by Point San Bruno.

U.S. 101, located 1 mile west of the project site, is not an officially designated or eligible state scenic highway.[12] The nearest officially designated state scenic highway, Interstate 280 (I-280), is located 3 miles west of the project site. The project site is not within the I-280 viewshed. Furthermore, there are no

[10] Municipal Code Section 20.480.003.

[11] Municipal Code Section 20.480.010.

[12] California Department of Transportation, California Scenic Highway Mapping System – San Mateo County (website). Available online at: http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/. Accessed April 22, 2018.

scenic resources such as protected trees, rock outcroppings, or historic buildings on the project site. Therefore, criterion (b) does not apply to the proposed project and is not discussed further.

IMPACT EVALUATION

Impact AE-1: The proposed project would not have a substantial adverse effect on a scenic vista. ***(Less than Significant)***

The site is in a low-lying developed urban area consisting of industrial and office/research and development (R&D) uses. San Bruno Mountain is a prominent visual landmark in South San Francisco that contains Sign Hill Park, and the mountain can be seen from many locations throughout the City, including many portions of the East of 101 Area. There are no designated scenic overlooks of the mountain in the project vicinity. The proposed project would involve construction of new structures of up to 99 feet in height, which would partially obscure existing views of Sign Hill Park on San Bruno Mountain as seen from the project site and vicinity. However, the project site is in a low-lying area where existing views of the mountain are obscured by existing buildings, trees, and topography. The areas from which views of the mountain may be blocked are not prominent places where people gather in order to gain a view of Sign Hill Park. Impacts related to views of Sign Hill Park would therefore be less than significant.

The project site also has views of the Bay. The proposed project would involve construction of new structures of up to 99 feet in height, which would partially obscure existing views of the Bay. However, the areas from which views of the Bay may be blocked are not designated scenic overlooks and are not places where people gather in order to gain a view of the Bay. The adjacent San Francisco Bay Trail (Bay Trail) would continue to serve as a public recreation amenity and a Bayside viewing resource that would not be affected by new buildings on the land-side of the trail. Furthermore, the Phase 1 site plan and the conceptual project buildout site plan would create a central visual spine and pedestrian link from the Bay to the 201 Haskins Way Building (during Phase 1) and from the 201 Haskins Way Building to the East Grand Building and East Grand Avenue (during project buildout). The proposed three-story central atrium building connector in the 201 Haskins Way Building and the East Grand Building would provide a visual link to the pedestrian path and Bay view corridor. New sidewalks would be constructed along East Jamie Court, Haskins Way, and East Grand Avenue at project buildout (portions of Haskins Way and East Jamie Court during Phase 1 development, and the remaining areas during Phase 2 development) and would improve access to the Bay Trail from the project site. Development of Phase 1 and project buildout would be subject to design review to ensure that development of the project supports General Plan policies. Therefore, effects on existing views under the proposed project during Phase 1 or project buildout would be less than significant. No mitigation is required.

Impact AE-2: The proposed project would not substantially degrade the existing visual character or quality of the site and its surroundings. ***(Less than Significant)***

The site is in a low-lying developed urban area consisting primarily of industrial and office/R&D uses. There are no residential uses within 1 mile of the project site, and neither the project site nor the nearby area are zoned for residential use. The proposed project would involve office/R&D development

consistent with the existing office/R&D setting. No substantial change to the existing visual character of surrounding industrial or office/R&D uses would occur.

One parcel within the project site, the 400-450 East Jamie Court parcel, is adjacent to the Bay Trail and a portion of that parcel is within the 100-foot BCDC jurisdictional Bay shoreline band. As described above, the parcel is currently developed with existing office/R&D uses. Under the proposed project, additional office/R&D use on this parcel would be allowed through rezoning of the parcel. The remaining project parcels are not within 100 feet of the Bay shoreline and are not subject to BCDC jurisdiction. Impacts related to the existing visual character of the Bay shoreline from development on the 400-450 East Jamie Court parcel are discussed below.

Phase 1 Development

The proposed additional office/R&D use on the 400-450 East Jamie Court parcel would be consistent with the character of existing office/R&D uses in the East of 101 Area. The proposed two-story 25,000-square-foot (sq.-ft.) building addition to be constructed on the 400-450 East Jamie Court parcel during Phase 1 would be located north of the existing three-story 400 Jamie Court building, outside of the 100-foot shoreline band of BCDC jurisdiction.

The massing of the proposed building addition at 400-450 East Jamie Court would not extend further east or west than the existing building and would be within the existing building's silhouette against the Bay. The proposed site plan and building addition at the 400-450 East Jamie Court parcel would maintain compatibility with appearance, design, and scenic view policies established by the Bay Plan, and site development would not require issuance of a permit from BCDC.

The proposed new structures at 201 Haskins Way would also be typical of the office/R&D buildings and the parking facilities existing in the vicinity, and views down Haskins Way to Bay waters would not change as a result of development in Phase 1. Furthermore, the Phase 1 site plan would create a central visual spine and a pedestrian link from the Bay to the 201 Haskins Way Building, and new sidewalks would improve access to the Bay Trail from the project site.

In conclusion, Phase 1 of the proposed project would be typical of the existing industrial and office/R&D setting and would not substantially alter the existing visual character of the project site and its surroundings. The impact under the proposed project during Phase 1 would be less than significant. No mitigation is required.

Project Buildout

The Phase 1 site plan and the conceptual project buildout site plan would create a central visual spine and pedestrian link from the Bay to the 201 Haskins Way Building (during Phase 1) and from the 201 Haskins Way Building to the East Grand Building and East Grand Avenue (during project buildout). The proposed three-story central atrium building connector in the 201 Haskins Way Building and the East Grand Building would provide a visual link to the pedestrian path and Bay view corridor. New sidewalks would be constructed along East Jamie Court, Haskins Way, and East Grand Avenue at project buildout

(portions of Haskins Way and East Jamie Court during Phase 1 development, and the remaining areas during Phase 2 development) and would improve access to the Bay Trail from the project site.

Additional office/R&D use on the 400-450 East Jamie Court parcel would be consistent with the character of the existing industrial and office/R&D uses in the project vicinity. However, site-specific, project-level design of Phase 2 is not currently proposed and would be subject to a separate plan review and discretionary approval process. If Phase 2 development were proposed within the 100-foot shoreline band, that development would be subject to BCDC review and approval.

Inside the shoreline band, the 400-450 East Jamie Court parcel contains a portion of parking lot access road, asphalt walking paths, viewing and seating area, concrete plaza, landscaping, and assorted public access amenities (e.g., benches, tables).[13] Views of the Bay from local roads or from the project site may change with additional development of office/R&D uses at 400-450 East Jamie Court, such as new additions to existing buildings, new or taller buildings, or reduced open surface parking area.

Nonetheless, new development or changes to the existing site plan at the 400-450 East Jamie Court parcel that would occur under project buildout would involve BCDC consultation to determine consistency with Bay Plan policies and BCDC Permit No. M02-70 for any portions of the project site that could be within its permit jurisdiction. No development on other Phase 2 parcels would directly affect public vistas or major scenic views of the Bay, although existing occasional glimpses of Bay waters from various points along East Grand Avenue or East Jamie Court could change. Views of the Bay looking south on Haskins Way would not change. Therefore, project buildout would not substantially alter the existing character of views of the Bay. The impact under the proposed project during project buildout would be less than significant. No mitigation is required.

Impact AE-3: The proposed project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. ***(Less than Significant)***

The project site is located in an industrial area with no adjacent residential uses. The project site is located adjacent to the Bay Trail. Residential uses and natural areas are particularly sensitive to light and glare impacts, particularly from nearby non-residential sources. Sources of light and glare in the project vicinity include interior and exterior building lights, lighting for service areas and surface parking lots, and City street lights. Vehicular traffic along major thoroughfares in the area also creates sources of glare.

The proposed project would increase the active building area on the project site and therefore would increase the amount of nighttime lighting and glare. However, the proposed office/R&D uses would be consistent with existing office/R&D development in the East of 101 Area and would not substantially affect the overall ambient light levels in the project vicinity, which is a fully developed, urban context. The existing level and sources of light and glare are typical of those in a developed urban setting. New lighting would be required to conform to standards that limit the amount of light that can spill over to

[13] In 2003, BCDC issued a permit (BCDC Permit No. M02-70, originally issued on July 17, 2003, and currently consisting of Corrected Permit No. M02-70 dated October 30, 2003, and Amendment No. Two dated June 26, 2006; as corrected and amended, the "BCDC Permit") regarding the use of certain portions of the 400-450 East Jamie Court parcel for public Bay shore access.

other properties through the use of shielded lighting fixtures as required by Section 20.300.008 of the zoning ordinance.

In summary, since the project would consist of development and lighting treatments typical of the existing industrial and office/R&D setting and would incorporate standard lighting measures to address undue lighting on adjacent areas, it would not result in new sources of substantial adverse light or glare. The impact under the proposed project during Phase 1 or project buildout would be less than significant. No mitigation is required.

Impact C-AE-1: The proposed project would not result in a cumulatively considerable contribution to significant cumulative impacts on aesthetics. (*Less than Significant*)

The proposed project's potential contribution to cumulative impacts on aesthetics is evaluated in the context of past, present, and reasonably foreseeable probable future development expected in the City and includes the additional baseline and cumulative projects and plans listed in Section 4.1, pp. 4.1.4-4.1.9.

Aesthetics are dependent upon the location of users, the breadth of the viewshed, and the contiguousness of scenic vistas and views. The nearest cumulative project, the *Genentech Master Plan Update* project, adjacent to the project site, would involve new office/R&D development consistent with the existing character of the Genentech campus. The remaining cumulative projects would also primarily involve construction of additional office/R&D uses. These developments are consistent with past redevelopment of industrial uses in the East of 101 Area and would be consistent with the existing visual character of the area. There is no designated historic district or neighborhood that would be impacted by the development of the proposed project or past, present, and reasonably foreseeable probable future developments. Furthermore, the *Oyster Point Specific Plan Update* and *Downtown Station Area Specific Plan* projects would enhance the visual setting of their respective project sites by providing new pedestrian, bicycle, and recreational improvements. Therefore, cumulative impacts on aesthetic resources would be less than significant. The proposed project would not substantially contribute to a significant cumulative impact. No mitigation is required.

Wind Safety

Pursuant to Section 20.480.006(A)(6) of the Municipal Code, open space, pedestrian walks, and other amenities (signs, illumination, and landscaping) shall be designed to enhance the environmental quality of the site and achieve a safe, efficient, and harmonious development. Similarly, per Section 20.480.006(A)(8) of the Municipal Code, components considered in design review shall include safety. As such, one such component that may be considered in the design review process is wind safety for pedestrians and people in outdoor settings.

Winds can be relatively strong and turbulent gusts may affect a pedestrian's balance and footing. Wind gusts are usually rare events, but are given special attention due to their potential safety impact on pedestrians. To consider Municipal Code requirements regarding wind safety, Rowan Williams Davies & Irwin Inc. (RWDI) prepared a screening-level wind analysis to provide a qualitative evaluation of the

potential wind conditions under the proposed development.[14] This assessment was based on long-term meteorological data for the South San Francisco area, project design information, the proprietary Windestimator modeling tool, and other knowledge of wind flows around buildings. For the wind safety criterion, RWDI considered whether gust wind speeds would exceed 56 miles per hour for 0.1 percent of the time, or 9 hours on an annual basis. The City does not consider exceedances of the wind safety condition to be a significant impact for CEQA purposes. However, the results of this assessment are summarized in response to the NOP comment and CEQA Guidelines Section 15128. Potential conceptual wind control design features would be considered on an as-needed basis during the City design review process in accordance with the Municipal Code.

Impact AE-4: The proposed project would not alter wind conditions in a manner that would substantially, adversely affect public safety. ***(Less than Significant)***

Based on long-term wind data recorded at San Francisco International Airport (SFO) between 1948 and 2015, four primary wind directions have the greatest frequency occurrence and make up the majority of the strong winds that occur. These wind directions are west-northwest, west, northwest, and west-southwest.

The direction and speed of wind currents can be altered by natural features of the land or by buildings and structures. Groups of buildings clustered together tend to act as obstacles that reduce wind speeds. Tall buildings that stand alone or are much taller than the surrounding buildings can intercept and redirect strong winds at high elevations and redirect them down to ground level. In addition, wide building axes perpendicular to prevailing winds will intercept more wind and cause stronger ground-level wind than buildings oriented with a narrow axis perpendicular to prevailing winds. Lastly, buildings with more simple, slab building shapes can cause stronger winds than articulated, complex building shapes.

The existing buildings on-site are low (between one to three stories) and surrounded by dense buildings of similar height to the west and northwest directions from where the prevailing winds come. As a result, the existing conditions on and around the project site are generally appropriate for the existing uses and do not exceed the wind safety criterion.

Phase 1 Development

The Phase 1 site plan features the elongated 201 Haskins Way Building and parking garage, which would have their longer axes in an east-west direction, reducing exposure to prevailing west and west-northwest winds. The entrances to the 201 Haskins Way Building would also be recessed and protected by large frames extruding from the main façade. In addition, the proposed landscaping would likely reduce the wind activity on and around the 201 Haskins Way parcel.

However, due to the local wind climate and the increased building massing on the site, the future wind speeds on the site are expected to be higher than those that currently exist, particularly around the southwest corners of the proposed and existing buildings, and in exposed gaps between buildings. In particular, the proposed 201 Haskins Way Building would have a five-story, 99-foot-tall wing on the west

[14] Rowan Williams Davies & Irwin, 2018. 201 Haskins Way Screening-Level Wind Analysis, October 2018.

end. Wind speeds at the southwest corner of this building might be elevated, but would not exceed the wind safety criterion. However, conceptual wind control design features could be considered to further reduce wind speeds, such as protecting sidewalks with additional trees and canopies or trellises around west façades and building corners; increasing the distance between the southwest corner of the 201 Haskins Way Building and the proposed sidewalk; chamfering the southwest and northwest building corners; adding a setback on the five-story wing to provide a low podium along the west and north façades; or flipping the taller west wing with the lower east wing.

Another potential windy area is the open area between the proposed 201 Haskins Way Building and the parking garage. Wind speeds at west end of the gap between the two buildings might be elevated, but would not exceed the wind safety criterion. Conceptual wind control design features to proposed walkways in this area could include screens, fences, or dense landscaping, if feasible.

The roof above the center core of the proposed 201 Haskins Way Building would be used as a green roof and amenity space. This space would not be aligned with the prevailing winds and the future wind conditions would not exceed the safety criterion. However, due to the increased elevation, wind speeds in these areas are likely higher than ground level. Conceptual wind control design features could include tall guardrails or planters.

In addition, the wind conditions at the central plaza are expected to not exceed the wind safety criterion. However, to further reduce wind speeds, landscaping could be placed on the west side of the plaza, rather than the east side as proposed.

The proposed two-story building addition on the north side of the existing three-story 400 East Jamie Court building would reduce exposure of the existing building to the northwest winds. It would also protect the existing central plaza. In addition, the existing and proposed landscaping would reduce the wind activity on and around the 400-450 East Jamie Court parcel.

Project Buildout

Similar to the Phase 1 site plan, the conceptual Phase 2 site plan for project buildout would feature the East Grand Building, which would have its longer axes in an east-west direction. In addition, the Phase 1 parking garage, under the conceptual Phase 2 site plan, would be expanded further to the east. This design would continue the east-west axes of the garage. Wind flows around the proposed Phase 1 buildings are not expected to be altered by the East Grand Building or the expanded parking garage, and new wind conditions would not exceed wind safety criterion.

The conceptual East Grand Building would have three levels on the west wing and five levels on the east wing. The lower west wing of the conceptual East Grand Building would not redirect the west-northwest wind flows as much as the 201 Haskins Way Building, and would not exceed generate ground-level winds that would exceed the wind safety criterion.

The roof above the center core of the proposed East Grand Building would be used as a green roof and amenity space. The future wind conditions would not exceed the wind safety criterion. As with the 201 Haskins Way Building (see Phase 1, above), wind speeds on this amenity would be higher than ground

level. In addition, the five-level east wing façade might deflect the prevailing west and west-northwest winds down the amenity space. Therefore, in addition to guard rails or planters, conceptual horizontal wind control design features, such as trellises, may also be considered during design review.

If Phase 2 design differs from conceptual plan, subsequent design review would consider wind safety of that design.

Shadow

Per Section 20.480.006(A)(8) of the Municipal Code, components considered in design review shall include but not be limited to exterior design, materials, textures, colors, means of illumination, landscaping, irrigation, height, shadow patterns, parking, access, security, safety, and other usual on-site development elements. The City does not consider alteration of shadow patterns to be a significant impact for CEQA purposes. However, changes to shadow patterns as a result of the proposed project are summarized qualitatively in response to the NOP comment and pursuant to CEQA Guidelines Section 15128.

Impact AE-5: The proposed project would not create new shadow in a manner that would substantially, adversely affect the use of public open space. ***(Less than Significant)***

This discussion analyzes whether buildings associated with the proposed project would shade open spaces and pedestrian areas in a manner that would substantially affect outdoor activities. This discussion considers the following general characteristics: open space usage; time of day and/or time of year; physical layout of the affected facilities; duration, size, shape, and location of the shadow; and proportion of open space affected.

Shadow diagrams were prepared by WRNS and are the primary sources of the information presented in this section.[15] The shadow diagrams are a tool that plot the potential reach of project shadow over the course of a year (from 1 hour after sunrise until 1 hour before sunset for the spring and fall equinoxes and the summer and spring solstices) relative to the location of nearby open spaces. The shadow diagrams account for topographical variation and shadows cast by existing buildings.

The project site and vicinity is primarily characterized by industrial and office/R&D uses with a substantial existing daytime employee population. There are no City parks located within 1 mile of the project site. The project site, particularly the 400-450 East Jamie Court parcel, is adjacent to the Bay Trail to the south. Other existing pedestrian areas include public sidewalks. These public areas in the project vicinity are shadowed by existing buildings throughout the day as well as throughout the year. In general, these areas are shadowed in the early morning and the late afternoon, and receive the greatest amount of sunlight during the middle of the day.

[15] SWCA Environmental Consultants, 2018. 201 Haskins Way Shadow Memorandum, August 30, 2018; WRNS, 2018. *Shadow Study for the 201 Haskins Way Project*, August 27, 2018.

Phase 1 Development

The Bay Trail, located to the south of the project site, is primarily affected by shadows from the existing 400-450 East Jamie Court buildings. The proposed new 25,000-sq.-ft. building addition to be constructed in Phase 1 would be north of the existing 400 East Jamie Court building, and would not exceed the height of the existing structure. Therefore, this proposed building addition would not contribute substantial new shadows to the Bay Trail. Due to the moderate height and relatively far distance of other proposed project buildings, no other proposed structures would contribute substantially to shadows on the Bay Trail.

The remaining open spaces in the project vicinity are public sidewalks. Each of these areas experience existing shadow from existing one- to two-story light industrial buildings, in addition to existing trees. During Phase 1, the proposed project would involve construction of new office/R&D buildings up to five stories tall on the 201 Haskins Way parcel, which would exceed the average height of existing structures in the project vicinity. Shadows produced from the proposed 201 Haskins Way Building and parking garage would primarily occur on proposed new public sidewalks on Haskins Way in the early morning hours throughout the year and East Jamie Court in the late afternoon hours in the summer. Shadows produced from the proposed 201 Haskins Way Building would be typical of a mid-rise building, and would not produce shadows at a substantial distance from the project site. Therefore, the proposed project would not contribute substantial new shadows to existing sidewalks and other pedestrian areas.

A comment on the NOP inquired as to the proposed project's shadow impact on nearby existing building rooftops, and whether new shadows may impact the ability to install and operate rooftop photovoltaic solar systems. Rooftop photovoltaic solar systems are the most effective and efficient during peak daytime hours. As illustrated in the shadow study, the proposed project buildings would not create new shadows on existing building rooftops in the project vicinity between the hours of 9 a.m. and 3 p.m., when rooftop photovoltaic solar systems would be in peak use. Therefore, the proposed project would not contribute substantial new shadows to existing rooftops or prospective rooftops in the project vicinity.

As shown on Figure 3.4, p. 3.21, new sidewalks with street trees and landscaping buffers would be constructed along portions of Haskins Way and East Jamie Court during Phase 1 development. An outdoor eating area located along Haskins Way fronting the 201 Haskins Way parcel would also be used as pedestrian access through the northwest frontage of the 201 Haskins Way parcel. In addition, a new Central Plaza would be constructed on the 201 Haskins Way parcel during Phase 1 development with landscaping, seating areas, and a basketball court to provide outdoor recreation space for daytime office workers. The proposed office/R&D buildings would cast shadows on these new outdoor amenities, but the majority of shadows would be present during the early morning and later afternoon hours when outdoor amenities are less likely to be in use. Therefore, the proposed project would not contribute substantial new shadows to proposed open spaces.

Project Buildout

As discussed above, the Bay Trail located south of the project site is primarily affected by shadows from the existing 400-450 East Jamie Court buildings in the summer months in the late afternoon hours. During project buildout with the conceptual Phase 2 development plan, additional office/R&D use on the 400-

450 East Jamie Court parcel would be constructed in a manner consistent with the character of the existing industrial and office/R&D uses in the project vicinity. Phase 2 development on the 400-450 East Jamie Court parcel may change shadow patterns in the vicinity, including on the Bay Trail. Site-specific, project-level design of Phase 2 is not currently proposed and would be subject to a separate plan design review. That design review process would include consideration of shadow patterns.

Under the conceptual Phase 2 plan, project buildout would involve construction of another office/R&D building up to five stories tall (the conceptual East Grand Building), which would exceed the average height of existing structures in the project vicinity. Conceptual Phase 2 development would also involve expansion of the five-story Phase 1 parking garage to the east. Shadows produced from the conceptual East Grand Building and expanded parking garage would primarily occur on proposed new public sidewalks on Haskins Way and East Grand Avenue in the early morning hours throughout the year and East Grand Avenue in the afternoon hours in the fall, winter, and spring. Shadows produced from proposed office buildings would be typical of a mid-rise building, and would not produce shadows at a substantial distance from the project site. Due to the moderate height and relatively far distance of the conceptual Phase 2 buildings, these structures would not contribute substantially to shadows on the Bay Trail. Therefore, the proposed project would not contribute substantial new shadows to existing sidewalks and other pedestrian areas.

As shown on Figure 3.4, p. 3.XX, new sidewalks with street trees and landscaping buffers would be constructed along East Jamie Court, Haskins Way, and East Grand Avenue at project buildout (portions of Haskins Way and East Jamie Court during Phase 1 development, and the remaining areas during Phase 2 development, as depicted in the conceptual plan). The conceptual East Grand Building would cast shadows on the proposed Phase 1 Central Plaza and outdoor eating area amenities, but the majority of shadows would be present during the early morning and later afternoon hours when outdoor amenities are less likely to be in use. Therefore, the proposed project would not contribute substantial new adverse shadows to proposed open spaces.

4.11.2 Agriculture and Forest Resources

REGULATORY FRAMEWORK

There are no local, state, or federal laws, regulations, plans, or policies related to agricultural and forest resources applicable to the project site or to implementation of the proposed project.

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, agriculture and forestry resource impacts are considered to be significant if a project would:

a. convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use;

b. conflict with existing zoning for agricultural use, or a Williamson Act contract;

c. conflict with existing zoning for, or cause rezoning of, forestland (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g));

d. result in the loss of forestland or conversion of forestland to non-forest use; or

e. involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forestland to non-forest use.

APPROACH TO ANALYSIS

Agricultural and forest resources impacts were evaluated based on the California Department of Conservation Farmland Mapping and Monitoring Program, the San Mateo County Williamson Act Program map, site visits, and aerial imagery from Google Earth.[16,17]

IMPACT EVALUATION

Impact AG-1: The proposed project would not convert designated farmland under the Farmland Mapping and Monitoring Program, nor would it conflict with any existing agricultural zoning or a Williamson Act contract, nor would it involve any changes to the environment that would result in the conversion of designated farmland. (*No Impact*)

The California Department of Conservation, Division of Land Resource Protection, maps important farmland, including Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, and Grazing Land. Agricultural land is rated according to soil quality and irrigation status; the best quality land is called Prime Farmland. The California Department of Conservation's Farmland Mapping and Monitoring Program identifies the project site as "Urban and Built-up."[18]

Because the project site does not contain any designated farmland, the proposed project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use.

The proposed project would not conflict with any agricultural zoning, because the existing Mixed Industrial (MI) and Business Commercial (BC) zoning districts are not for agricultural use. It would not conflict with a Williamson Act contract, because there are no Williamson Act contracts for land within the East of 101 Area.[19] There is no urban agriculture on the project site.

In conclusion, the proposed project would have no impact on farmland and land zoned or contracted for agricultural uses. No mitigation measures are necessary.

[16] California Department of Conservation, 2016. Farmland Mapping and Monitoring Program – San Mateo County Map. Available online at: http://www.conservation.ca.gov/dlrp/fmmp/Pages/SanMateo.aspx. Accessed May 10, 2018.
[17] California Department of Conservation, 2007. San Mateo County Williamson Act FY 2006/2007. Available online at: http://www.conservation.ca.gov/dlrp/lca. Accessed May 10, 2018.
[18] California Department of Conservation, 2010. San Francisco Bay Area Important Farmland 2010. Available online at ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/regional/2010/bay_area_fmmp2010.pdf. Accessed April 5, 2018.
[19] The Williamson Act is a California law enacted in 1965 that provides property tax relief to owners of farmland and open space land in exchange for a 10-year agreement that the land will not be developed or converted into another use.

Impact AG-2: The proposed project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland, nor would it result in the loss of or conversion of forest land to non-forest uses. (*No Impact*)

There is no timberland or timberland zoned Timberland Production on the project site.[20] None of the trees currently growing on or adjacent to the project site are managed for a public benefit, and therefore the project site is not "forest land."[21] Thus, the proposed project would not result in the loss of forest land or the conversion of forest land to non-forest use. There would be no impact with respect to forest land or timberland, and no mitigation measures are necessary.

Impact C-AG-1: The proposed project would not result in a cumulatively considerable contribution to a significant cumulative impact on agricultural resources or forest land or timberland. (*No Impact*)

The proposed project would have no impact on agricultural resources and forest land, nor would other proposed reasonably foreseeable probable cumulative projects in the vicinity because the project site and its vicinity are mapped as "Urban and Built Up Land" by the California Department of Conservation. There are no parcels in the East of 101 Area designated as Prime Farmland, Unique Farmland, or Farmland of Statewide or Local Importance, nor are there parcels under Williamson Act contract. There is no timberland or timberland zoned Timberland Production in the East of 101 Area where the proposed reasonably foreseeable cumulative projects are located. Therefore, there would be no cumulative impact on farmland or forest resources and no contribution by the proposed project to a significant cumulative impact with respect to agricultural or forest resources. No mitigation measures are necessary.

4.11.3 Geology and Soils

REGULATORY FRAMEWORK

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting in structures for human occupancy. In accordance with this act, the state geologist established regulatory zones, called "earthquake fault zones," around the surface traces of active faults and has published maps showing these zones.[22] Within these zones, buildings for human occupancy cannot be constructed across the surface trace of active faults. Each earthquake fault zone extends approximately 200 to 500 feet on either side of the mapped fault trace because many active faults are complex and

[20] As defined by California Public Resources Code Section 4526 and California Government Code Section 51104(g).

[21] Pursuant to California Public Resources Code Section 12220(g)

[22] California Department of Conservation, 2018. The Alquist-Priolo Earthquake Fault zoning (AP) Act (website). Available online at: http://www.conservation.ca.gov/cgs/rghm/ap. Accessed May 10, 2018.

consist of more than one branch that may experience ground surface rupture. The project site is not located within an Alquist-Priolo earthquake fault zone.[23]

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (California Public Resources Code Sections 2690–2699.6), adopted following the Loma Prieta earthquake, addresses threats to public health and safety and to minimize property damage caused by earthquakes. The act directs the California Geological Survey to identify and map areas prone to the earthquake hazards of liquefaction and earthquake-induced landslides. For structures intended for human occupancy, the act requires that project sponsors perform site-specific geotechnical investigations to identify potential seismic hazards and formulate mitigation measures prior to permitting of most developments within the zones of required investigation. San Mateo County, where the project site is located, has not been evaluated for seismic hazard zones for liquefaction or seismic landslides.[24]

California Building Code (2016)

The California Building Code has been codified in the California Code of Regulations (CCR) as Title 24, Part 2.[25] Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under state law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the California Building Code is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all buildings and structures within its jurisdiction. The California Building Code is based on the International Building Code, previously known as the Uniform Building Code. The 2016 California Building Code is based on the 2015 International Building Code published by the International Code Conference.[26]

In addition, the California Building Code contains necessary California amendments, which are based on reference standards obtained from various technical committees and organizations such as the American Society of Civil Engineers (ASCE), Structural Engineering Institute (SEI), American Institute of Steel Construction, and American Concrete Institute. ASCE/SEI "Minimum Design Loads for Building and Other Structures" (ASC/SEI 7-10) provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (flood, snow, wind, etc.) for inclusion in building codes.[27] The provisions of the California Building Code apply to the construction, alteration, movement,

[23] California Geological Survey, 2000. San Francisco South Quadrangle Earthquake Fault Zones and Seismic Hazard Zones Map, released November 17, 2000. Available online at: http://gmw.conservation.ca.gov/SHP/EZRIM/Maps/SAN_FRANCISCO_SOUTH_EZRIM.pdf. Accessed May 10, 2018.
[24] Ibid.
[25] California Building Standards Commission, 2017. California Building Standards Code (California Code of Regulations, Title 24). Available online at: http://www.bsc.ca.gov/Codes.aspx. Accessed May 10, 2018.
[26] California Building Standards Commission, 2016. Building Standards Information Bulletin 16-01. Available online at: https://www.documents.dgs.ca.gov/bsc/2015TriCycle/Information%20Bulletins/BSC-Bulletin-16-01.pdf. Accessed May 10, 2018.
[27] American Society of Civil Engineers, 2013. ASCE/SEI 7-10, Minimum Design Loads for Buildings and Other Structures.

replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

In particular, Chapter 16 of the California Building Code prescribes minimum structural loading requirements for use in the design and construction of buildings and structural components. It includes minimum design loads, assignment of risk categories, as well as permitted design methodologies. Standards are provided for the minimum design loads under various conditions, including wind, rain, flood, and earthquake. In addition, Chapter 18 of the California Building Code provides criteria for geotechnical and structural considerations in the selection, design, and installation of foundation systems to support the loads from the structure above. Chapter 18 further includes requirements for soils investigation and site preparation for receiving a foundation, including the allowed load-bearing values for soils and for protecting the foundation from water intrusion. Section 1808 of the California Building Code addresses the basic requirements for foundation types, and later sections address shallow foundations (Section 1809) and deep foundations (Section 1810).

Local

City of South San Francisco General Plan

The General Plan provides a vision for the long-range physical and economic development for the City, provides strategies and specific implementing actions, and establishes a basis for judging whether specific development proposals and public projects are consistent with the City's plans and policy standards. The General Plan contains a Health and Safety Element, which includes Policy 8.1-G-1 to minimize the risk to life and property from seismic activity and geologic hazards in the City.

City of South San Francisco Hazard Mitigation Plan

The City had adopted the Association of Bay Area Governments (ABAG) Local Hazard Mitigation Plan as the Hazard Mitigation Plan (HMP) for the City by Resolution 65-2006, on August 16, 2006. In 2011, ABAG adopted an updated 2010 HMP.[28] Participating local governments have also prepared annexes for this HMP to explain how it specifically applies to their jurisdiction. The City has not yet adopted the City of South San Francisco HMP annex and the annex has not been approved by ABAG and the Federal Emergency Management Agency.[29] The goal of the HMP is to maintain and enhance a disaster-resistant region by reducing the potential for loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters. This goal is unchanged from the 2005 plan and continues to be the goal in designing its mitigation program. Additionally, the City has the specific objective of reducing the number of public and private buildings within the City that are vulnerable to the effects of earthquakes.[30] The City's HMP Annex identifies the specific areas where

[28] Association of Bay Area Governments, 2011. Regional Hazard Mitigation Plan. Available online at: http://resilience.abag.ca.gov/2011mitigation/. Accessed June 22, 2018.
[29] Association of Bay Area Governments, 2018. 2010 Jurisdiction Annexes. Available online at: http://resilience.abag.ca.gov/2011mitigation/2010annex/. Accessed June 22, 2018.
[30] City of South San Francisco, 2011. Annex to 2010 Association of Bay Area Governments Local Hazard Mitigation Plan – Taming Natural Disasters. Available online at: http://resilience.abag.ca.gov/wp-content/documents/2010LHMP/SSF-Annex-2011.pdf. Accessed June 22, 018.

people or structures may have higher vulnerability to earthquakes, flood, wildland fires, and other natural hazards. The plan identifies policies and actions that may be implemented by the City to reduce the potential for loss of life and property damage in these areas based on an analysis of the frequency of earthquakes, floods, wildland fires and landslides in terms of frequency, intensity, location, history, and damage effects. The HMP and HMP Annex serves as a guide for decision-makers as they commit resources to reduce the effects of natural hazards. The City has many ongoing mitigation programs that help create a more disaster-resistant region, including increased efforts to reduce landslides and erosion in existing and future development through continuing education of design professionals on mitigation strategies.[31]

City of South San Francisco Building Code

The City Building Division is tasked with enforcing the minimum standards found in the various model codes adopted by the state through the Building Standards Commission and as adopted and amended by the City Council. In particular, the City amended the California Building Code regarding concrete slab design.[32] The City building code also provides standards of construction for flood damage prevention.[33]

SIGNIFICANCE CRITERIA

Based on the CEQA Guidelines, Appendix G, a geology and soils impact is considered significant if the project would:

a. expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
    i. rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence or other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42;
    ii. strong seismic ground shaking;
    iii. seismic-related ground failure, including liquefaction; or
    iv. landslides.

b. result in substantial soil erosion or the loss of topsoil;

c. be located on a geologic unit or soil that is unstable, or that would become unstable as result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;

d. be located on expansive soils, as defined in Table 18-1-B of the Uniform Building Code and in ASTM D4829-11, creating substantial risk to life or property; or

e. have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

[31] Ibid, p. 12.
[32] Municipal Code Section 15.08.050.
[33] Municipal Code Section 15.56.160.

APPROACH TO ANALYSIS

In the *California Building Industry Association v. Bay Area Air Quality Management District* case decided in 2015,[34] the California Supreme Court held that CEQA does not generally require lead agencies to consider how existing environmental conditions might impact a project's occupants, except where the project would significantly exacerbate an existing environmental condition. Accordingly, hazards resulting from a project that would place development in an existing or future seismic hazard area or an area with unstable soils are not considered impacts under CEQA unless the project would significantly exacerbate the seismic hazard or unstable soil conditions. Thus, the analysis below evaluates whether the proposed project or project buildout would exacerbate existing or future seismic hazards or unstable soils at the project site and result in a substantial risk of loss, injury, or death.

The information in this section is based on Langan's 2017 *Preliminary Geotechnical Investigation* prepared for the 201 Haskins Way parcel of the proposed project.[35] The scope of the geotechnical investigation included reviewing, exploring, and analyzing the subsurface conditions regarding soil and groundwater at the project site. The geotechnical investigation's conclusions and recommendations are based on available geotechnical data from the surrounding area and on limited field investigations, which included soil borings.

A site-specific geotechnical investigation for the Phase 2 area has not been performed, but is anticipated to be similar to conditions identified at the 201 Haskins Way parcel. Geotechnical investigation for the Phase 2 parcels would be required prior to commencement of any future Phase 2 development activities, pursuant to General Plan Policy GEO-10.

The project site is located on largely developed land with few areas of exposed soils. Exposed soils are generally limited to ornamental landscaping and ruderal vegetation between parcels. Therefore, criterion (b) as it pertains to topsoil is not applicable and is not further discussed. Impacts associated with soil erosion are discussed below.

The proposed project would not involve the construction or operation of septic tanks or alternative wastewater disposal systems. The proposed project would utilize existing municipal sewers. Therefore, criterion (e) is not applicable and is not further discussed.

[34] California Building Industry Association v. Bay Area Air Quality Management District, 62 Cal.4th 369. Opinion Filed December 17, 2015. Available online at: https://caselaw.findlaw.com/ca-supreme-court/1721100.html. Accessed May 11, 2018.
[35] Langan, 2017. *Preliminary Geotechnical Evaluation – 201 Haskins Way, South San Francisco, California* (Preliminary Geotechnical Evaluation). This evaluation is provided as part of the Administrative Record of this EIR.

IMPACT EVALUATION

Impact GE-1: The proposed project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, liquefaction, or landslides, with implementation of regulatory compliance measures. (*Less than Significant*)

The strong ground motions that occur during earthquakes are capable of inducing landslides, generally where unstable soil conditions already exist. Hilly areas underlain by weak bedrock units of slope greater than 15 percent have the greatest susceptibility to land sliding. In the City, this hazard is primarily located on the southern flank of San Bruno Mountain, located 1.5 miles northwest of the project site, and near Skyline Boulevard, located 4 miles west of the project site.[36] The project site is located in a low-lying area with relatively flat topography. The nearest area containing slopes over 15 percent are located north of East Grand Avenue surrounding the San Bruno Point hilltop, but the City has not otherwise provided any specific designation of landslide hazard zones in this area.[37] Landslide research conducted by the U.S. Geological Survey (USGS) in the Bay Area indicates that the project site is considered flat land and the San Bruno Point area contains few, if any, mapped historical landslides. [38] Therefore, the proposed project would not expose people or structures to adverse effects associated with landslides. No mitigation is necessary.

The project site is located in an area on the Bay shoreline subject to historic fill. Portions of the 201 Haskins Way parcel were previously bayward of the original shoreline and on reclaimed land.[39] In general, construction on the 201 Haskins Way parcel and southward is expected to occur over fill. The fill at and near this part of the project site is variable, consisting of clay, silt, sand, gravel, organics, debris, and rubble. The fill varies from soft to very stiff and loose to dense. The fill is undocumented and may not have been compacted when placed. The fill is likely underlain by soft to medium stiff, compressible, marine clay, known as Bay Mud. Bay Mud is underlain by medium dense to very dense silty sand and sand with silt and by stiff to hard sandy clay and clay. Geologic maps indicate that the depth to bedrock varies, but generally increases to the south and the southwest.[40] Material that was identified in borings as bedrock may be very dense sand of the Colma formation, which can be cemented and may have been interpreted as bedrock. Groundwater was measured at nearby sites at depths varying from about 8 to 15 feet below the ground surface.

The 400-450 East Jamie Court parcel was developed in the early 2000s and included the construction of two office/R&D buildings, a subsurface parking structure, and surface parking. The parcel was initially part of the Bay and was reclaimed by placing fill across the site between 1970 and 1972.[41] The fill was retained by constructing a perimeter dyke that extends beneath the southern edge of the site. Detailed soil

[36] City of South San Francisco, 1999. *City of South San Francisco General Plan*, as amended in 2011. Chapter 8, p. 8-6.
[37] Ibid, Figure 8-1, p. 8-3.
[38] U.S. Geological Survey, 1997. Summary Distribution of Slides and Earth Flows in San Mateo County, California (Open File Report 97-745). Available online at: https://pubs.usgs.gov/of/1997/of97-745/sm-sef.pdf. Accessed June 22, 2018.
[39] *Preliminary Geotechnical Evaluation*, p. 2.
[40] *Preliminary Geotechnical Evaluation*, p. 3
[41] City of South San Francisco, 2002. Initial Study and Mitigated Negative Declaration for the East Jamie Court Project, pp. 35–41. Available online at: http://weblink.ssf.net/weblink/Browse.aspx?startid=51192&row=1&dbid=0. Accessed May 10, 2018.

studies were conducted on the site to ensure that the buildings can be supported. The 2002 Initial Study for that project found that all impacts related to seismic ground shaking, ground failure, soil erosion, liquefaction, and expansive soil would be reduced to a less-than-significant level by adherence to geotechnical policies included in the *East of 101 Area Plan* and applicable provisions of the California Building Code. It is assumed that any known subsurface soil and geological conditions were handled appropriately in compliance with all applicable regulations when the parcel was developed with those uses.

Fault Rupture

The project site is not within an Earthquake Fault Zone as defined by the Alquist-Priolo Earthquake Fault Zoning Act, and no known fault or potentially active fault exists on the project site.[42] In a seismically active area such as the San Francisco Bay Area, there is a small chance that future faulting could develop in areas where no faults previously existed; however, the geotechnical investigation found no evidence of active faulting on the project site and concluded that the risk of surface faulting and consequent secondary failure from previous unknown faults is very low.[43] Therefore, this impact would be less than significant. No mitigation measures are necessary.

Ground Shaking

The major active faults in the area are the San Andreas, Monte Vista-Shannon, San Gregorio, Hayward, and Calaveras faults.[44] The nearest fault is the North San Andreas – Peninsula fault segment, located approximately 5 kilometers (about 3.1 miles) west of the project site. This fault has an estimated mean characteristic magnitude of 7.23. The intensity of potential future earthquake ground motion at the site depends upon the characteristics of the generating fault, distance to the earthquake epicenter, magnitude and duration of the earthquake, and specific subsurface conditions. Ground shaking at the project site during a major earthquake would be very strong.[45]

A magnitude 6.0 earthquake is felt by everyone, indoors and outdoors, and poorly built buildings may be damaged. A magnitude 7.0 earthquake causes damage and severe damage or the partial or complete collapse of poorly built structures, and is felt across great distances (a 7.0 earthquake is approximately 1/16 as strong at a distance of 50 miles).[46,47] However, the proposed project must comply with California Building Code seismic requirements, which are established to reduce the risk to life safety from damage to newly constructed buildings due to seismic hazards to less-than-significant levels.

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[42] California Geologic Survey, 2000. San Francisco South Quadrangle Earthquake Fault Zones and Seismic Hazard Zones Map, released November 17, 2000. Available online at: http://gmw.conservation.ca.gov/SHP/EZRIM/Maps/SAN_FRANCISCO_SOUTH_EZRIM.pdf. Accessed May 10, 2018.

[43] *Preliminary Geotechnical Evaluation*, p. 6.

[44] Ibid, p. 3.

[45] Ibid, p. 4.

[46] U.S. Geological Survey, Magnitude/Intensity Comparison, https://earthquake.usgs.gov/learn/topics/mag_vs_int.php, accessed April 2, 2018.

[47] University of Portland, 2017. Building and Earthquakes – Which stands? Which falls?, http://www.iris.edu/hq/files/programs/education_and_outreach/retm/tm_100112_haiti/BuildingsInEQs_2.pdf, accessed on January 5, 2018.

Soil Liquefaction, Seismic Densification, and Lateral Spreading

A seismic hazard zone map has not been prepared for the site by the California Geological Survey.[48] During the 1906 earthquake, lateral spreading was observed near the site and previous geotechnical evaluations performed south and east of the 201 Haskins Way parcel concluded there is a potential for liquefaction to occur. [49] Due to the shallow depth to groundwater, the variability of the fill, and the presence of medium dense sand below the Bay Mud, an evaluation of liquefaction potential and seismically induced settlement in accordance with State of California Special Publication 117, Guidelines for Evaluation and Mitigation of Seismic Hazards in California (SP-117) is recommended in the *Preliminary Geotechnical Evaluation* as part of a final geotechnical investigation.[50]

The available subsurface information indicates that layers of loose to medium dense sand are likely present below the groundwater.[51] Medium dense sand could liquefy during a major earthquake on a nearby active fault. Potentially liquefiable soil layers in the area are anticipated to be discontinuous. Previous studies analyzed in the *Preliminary Geotechnical Evaluation* concluded that up to three inches of settlement may occur due to liquefaction from a major earthquake. The potential for liquefaction and resulting settlement would be evaluated as part of a final geotechnical investigation that includes drilled borings and/or core penetration tests.

Lateral spreading is associated with liquefaction. In general, the parameters used to estimate the magnitude of horizontal ground movement resulting from lateral spreading include the thickness of the liquefiable layer, the fines content and mean grain-size diameter of the liquefiable soil, the magnitude and distance of the earthquake from the site, the slope of the ground surface, and boundary conditions (such as free face of a channel). Previous studies at nearby sites concluded that the potential for lateral spreading is low; however, a more thorough evaluation would be made during the final geotechnical investigation.

Seismic densification can occur during strong ground shaking in loose, clean granular deposits above the water table, resulting in ground surface settlement. A previous study nearby analyzed in the *Preliminary Geotechnical Evaluation* concluded that the soil deposits above the water table are likely sufficiently clayey such that the potential for differential compaction to occur at the site is low.

Due to the heterogeneity of the subsurface conditions, the *Preliminary Geotechnical Evaluation* recommends that development on the 201 Haskins Way parcel under the proposed project be designed to provide uniform foundation support to limit the differential settlements of the proposed structures. Design will also consider differential settlement between on-site structures and other elements (e.g., pavements, utilities, etc.). Liquefaction may occur at the site during a large earthquake. In addition, even where not liquefiable, the fill is heterogeneous and not likely engineered when placed. Therefore, structures would

[48] California Geological Survey, 2000. San Francisco South Quadrangle Earthquake Fault Zones and Seismic Hazard Zones Map, released November 17, 2000. Available online at: http://gmw.conservation.ca.gov/SHP/EZRIM/Maps/SAN_FRANCISCO_SOUTH_EZRIM.pdf. Accessed May 10, 2018.
[49] *Preliminary Geotechnical Evaluation*, p. 5.
[50] California Geological Survey, 2008. Special Publication 117A – Guidelines for Evaluating and Mitigating Seismic Hazards in California. Available online at: http://www.conservation.ca.gov/cgs/information/publications/sp/Documents/sp117.pdf. Accessed May 10, 2018.
[51] *Preliminary Geotechnical Evaluation*, p. 5.

be required to be supported in the soils and bedrock below fill and Bay Mud through implementation of deep auger cast piles or shafts. Floor slabs in areas requiring deep foundations would need to be structurally supported. Further geotechnical investigation of the Phase 2 development would be required. It is assumed that geotechnical conditions in the Phase 2 area are similar to those discussed in the 201 Haskins Way *Preliminary Geotechnical Evaluation*, and would involve similar structural design recommendations.

Detailed geotechnical investigation would be performed for all parcels in the project site, including sufficient borings and/or core penetration tests to perform a detailed evaluation of subsurface characteristics. The results of the field exploration would be used to develop design level recommendations for use in the design of proposed improvements. The number and depth of borings, core penetration tests and test pits will depend upon where the buildings are proposed. Geotechnical investigation would be performed to determine the presence of fill and expansive soil, presence and thickness of Bay Mud, strength of the alluvial soils below the Bay Mud, estimates of total and differential settlements from static loads and seismically induced settlements, evaluate potential variations of near surface soil characteristics beneath proposed improvements, and provide design level geotechnical recommendations.

The proposed project would comply with standard regulatory requirements—including completion of a detailed geotechnical investigation required by the California Building Code, which are adopted by reference under the South San Francisco Building Code—and therefore would result in a less-than-significant impact related to liquefaction, seismic densification, and lateral spreading under either Phase 1 or project buildout. No mitigation is needed.

Impact GE-2: The proposed project would not result in substantial soil erosion or the loss of topsoil. (*Less than Significant*)

The project site ranges from relatively level to gently sloping. The proposed project under both Phase 1 and project buildout would involve limited grading to accommodate the new proposed office/R&D buildings, parking structure, surface parking, and landscaping. The proposed project would not involve substantial changes to the existing grade, and no unprotected, exposed soils at risk of substantial erosion would remain on the project site.

As discussed in Section 4.6, Hydrology and Water Quality, compliance with the Construction General Stormwater Permit would ensure that water quality impacts related to violation of water quality standards or degradation of water quality due to discharge of construction-related stormwater runoff to the Bay, including eroded soils, would be less than significant. No mitigation is necessary.

Impact GE-3: The proposed project would be located on expansive soils but would not create substantial risk to life or property with implementation of standard regulatory measures. (*Less than Significant*)

In general, construction is expected to occur over fill. Overall, the fill is not expansive, except where Bay Mud was mixed in with the fill; in this case, it is highly expansive but was not encountered near the

ground surface.[52] The fill is likely underlain by up to about soft to medium stiff, compressible, marine clay, known as Bay Mud. The Bay Mud is highly expansive.

Detailed geotechnical investigations would be performed for all parcels in the project site to evaluate site-specific subsurface conditions. The results of the field exploration would be used to develop design-level recommendations for use in the design of proposed improvements. The investigation would determine the presence of fill and expansive soil, the presence and thickness of Bay Mud, and the strength of the alluvial soils below the Bay Mud; estimate total and differential settlements from static loads and seismically induced settlements; evaluate potential variations of near-surface soil characteristics beneath proposed improvements; and provide design-level geotechnical recommendations.

Therefore, in compliance with the California Building Code as adopted by reference under the South San Francisco Building Code, including completion of a detailed geotechnical investigation, the proposed project under either Phase 1 or project buildout would have a less-than-significant impact related to expansive soils. No mitigation is needed.

Impact GE-4: The proposed project would be located on a geologic unit or soil that is unstable, but would not result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse with implementation of standard regulatory measures. (*Less than Significant*)

As discussed in Impact GE-1, above, the project site is underlain by fill and Bay Mud. Based on the geotechnical investigation, the fill at nearby sites is variable, consisting of clay, silt, sand, gravel, organics, debris, and rubble. The fill conditions vary from soft to very stiff and loose to dense. The fill is undocumented and may not have been compacted when placed. For these reasons, the project site may include unstable subsurface conditions.

The project site is located in a low-lying area with relatively flat topography with slopes less than 10 percent which are below typical landslide hazard conditions. The nearest area containing slopes over 15 percent are located north of East Grand Avenue surrounding the San Bruno Point hilltop, but the City has not otherwise provided any specific designation of landslide hazard zones in this area.[53] Landslide research conducted by USGS in the Bay Area indicates that the project site is considered flat land and the San Bruno Point area contains few, if any, mapped historical landslides.[54] Furthermore, the USGS mapping indicates the project site is not in an area likely to produce debris flows or mudslides.[55] Therefore, the proposed project would not expose people or structures to adverse effects associated with landslides or mudslides. No mitigation is necessary.

As discussed in Impact GE-1, above, the project site is in an area subject to potential lateral spreading, subsidence, and liquefaction. Previous studies at nearby sites concluded that the potential for lateral

[52] *Preliminary Geotechnical Evaluation*, p. 2.
[53] Ibid, Figure 8-1, p. 8-3.
[54] U.S. Geological Survey, 1997. Summary Distribution of Slides and Earth Flows in San Mateo County, California (Open File Report 97-745). Available online at: https://pubs.usgs.gov/of/1997/of97-745/sm-sef.pdf. Accessed June 22, 2018.
[55] U.S. Geological Survey, 1997. Map Showing Principal Debris-Flow Source Areas in San Mateo County, California (Open File Report 97-745). Available online at: https://pubs.usgs.gov/of/1997/of97-745/sm-df.pdf. Accessed June 22, 2018.

spreading is low; however, a more thorough evaluation would be made during the final geotechnical investigation. Due to the shallow depth to groundwater, the variability of the fill, and the presence of medium dense sand below the Bay Mud, an evaluation of liquefaction potential and seismically induced settlement in accordance with State of California Special Publication 117, Guidelines for Evaluation and Mitigation of Seismic Hazards in California (SP-117) is recommended in the *Preliminary Geotechnical Evaluation* as part of a final geotechnical investigation that includes drilled borings and/or core penetration test.[56]

Due to the heterogeneity of the subsurface conditions, the *Preliminary Geotechnical Evaluation* recommends that development on the 201 Haskins Way parcel under the proposed project be designed to provide uniform foundation support to limit the differential settlements of the proposed structures. Structures would be required to be supported in the soils and bedrock below fill and Bay Mud through implementation of deep auger cast piles or shafts. Floor slabs in areas requiring deep foundations would need to be structurally supported. Further geotechnical investigation of the Phase 2 development would be required. It is assumed that geotechnical conditions in the Phase 2 area are similar to those discussed in the 201 Haskins Way *Preliminary Geotechnical Evaluation*, and would involve similar structural design recommendations.

Detailed geotechnical investigation would be performed for all parcels in the project site to develop design level recommendations in conformity with Chapter 18 of the California Building Code. This would include conformance to soils investigation and site preparation requirements for receiving a foundation (soil load-bearing capacity and protection from water intrusion) and foundation design types (including deep foundations as specified in Section 1810 of the California Building Code). This investigation would inform the overall structural design as specified in Chapter 16 of the California Building Code, specifically the required minimum design loads, risks, and methodologies under site-specific conditions and events such as wind, rain, flood, and earthquakes. Therefore, with compliance to standard regulatory requirements, including completion of a detailed geotechnical investigation, as required by the California Building Code as adopted by reference under the South San Francisco Building Code, the proposed project under either Phase 1 or project buildout would have a less-than-significant impact related unstable soils. No mitigation is needed.

Impact C-GE-1: The proposed project would not result in a cumulatively considerable contribution to a significant adverse cumulative impact on geology and soils. (*Less than Significant*)

Geologic and soils impacts are generally site-specific and localized. Past, present, and reasonably foreseeable probable projects are identified in Section 4.1, Approach to Environmental Analysis, pp. 4.1.4-4.1.9, and shown on Figure 4.1.1: Location of Baseline and Cumulative Projects, p. 4.1.5. The cumulative projects could require various levels of excavation or cut-and-fill, which would affect local geologic conditions. However, the cumulative projects would also be subject to the regulatory requirements for geotechnical review and would be required to comply with the local and state building codes. In addition, site-specific geotechnical review would reduce each project's impacts associated with

[56] California Geological Survey, 2008. Special Publication 117A – Guidelines for Evaluating and Mitigating Seismic Hazards in California. Available online at: http://www.conservation.ca.gov/cgs/information/publications/sp/Documents/sp117.pdf. Accessed May 10, 2018.

geology and seismic safety, and site-specific design features would be developed, when necessary, based on site conditions. Similar to the proposed project, cumulative projects in the project site vicinity would be subject to these mandatory seismic safety standards and design review procedures, if applicable. Compliance with these standards and procedures would ensure that the effects from nearby cumulative projects would be less than significant.

4.11.4 Hazards and Hazardous Materials

REGULATORY FRAMEWORK

Federal

Local and state agencies often have either parallel or more stringent rules than federal agencies. In most cases, to the extent that state law is more stringent than federal law, it applies in addition to federal law and enforcement of these laws is typically the responsibility of the state, or of a local agency to which enforcement powers are delegated.

PCB Regulations

Under the Toxic Substance Control Act, the U.S. Environmental Protection Agency (U.S. EPA) began to impose bans on polychlorinated biphenyl (PCB) manufacturing and sales and on most PCB uses in 1978;[57] however, some electrical transformers still in operation today use oils that contain PCBs.[58] Title 40 of the Code of Federal Regulations (CFR), Section 761.60, regulates the disposal of transformers. Title 40 of the CFR, Section 761.61, governs the management of PCB waste generated as the result of PCB spills and associated cleanup activities (e.g., contaminated environmental media, rags, debris). The U.S. EPA provides guidance for compliance with these regulations in their publication "Polychlorinated Biphenyl (PCB) Site Revitalization Guidance Under the Toxic Substances Control Act."[59] Any wastes produced as part of the cleanup must be disposed of in accordance with the requirements of Section 761.61.

State

Hazardous Waste Classification Criteria

In accordance with Title 22 of the CCR, excavated soil would be classified as a hazardous waste for off-site disposal purposes if it exhibits the characteristics of ignitability, corrosivity, reactivity, or toxicity.[60]

[57] U.S. Environmental Protection Agency, 2018. Summary of the Toxic Substances Control Act (website). Available online at: https://www.epa.gov/laws-regulations/summary-toxic-substances-control-act. Accessed May 10, 2018.
[58] U.S. Environmental Protection Agency, 2018. Learn about Polychlorinated Biphenyls (PCBs) (website). Available online at: https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs. Accessed May 10, 2018.
[59] U.S. EPA, 2005. Polychlorinated Biphenyl (PCB) Site Revitalization Guidance Under the Toxic Substances Control Act (TSCA). Available online at: https://www.epa.gov/sites/production/files/2015-08/documents/pcb-guid3-06.pdf. Accessed May 10, 2018.
[60] California Code of Regulations Section 66261.20 *et seq*.

A waste is considered toxic if it contains certain substances at concentrations that meet Title 22 thresholds.[61]

Asbestos-Containing Materials

Asbestos wastes transported off-site are considered a hazardous waste in accordance with Title 22 of the CCR, Division 4.5, Article 3 Section 66261.24.[62] Section 19827.5 of the California Health and Safety Code requires that local agencies not issue demolition or alteration permits until an applicant has demonstrated compliance with notification requirements under applicable federal regulations regarding hazardous air pollutants, including asbestos.[63] The Bay Area Air Quality Management District (BAAQMD) is vested by the California legislature with authority to regulate airborne pollutants, including asbestos, through both inspection and law enforcement, and implements the California regulatory requirements through Regulation 11, Rule 2 (Asbestos Demolition, Renovation, and Manufacturing). Rule 11, Regulation 2 requires a survey of any building planned for demolition to identify asbestos-containing materials that may be present. If asbestos-containing materials are identified, the BAAQMD must be notified, and the materials must be removed by an appropriately licensed contractor prior to demolition activities.[64] During removal activities, the contractor must implement controls to ensure that there are no visible asbestos emissions to the outside air.

Lead-Based Paint

Demolition debris that is painted with lead-based paint that is intact may be considered hazardous waste if lead concentrations exceed thresholds under Title 22 of the CCR, Division 4.5, Article 3 Section 66261.24.[65] In most cases, the lead concentration from the intact paint alone would not exceed hazardous lead levels for both the item and the intact paint; therefore, most materials with intact lead-based paint can be disposed of through normal practices at a regularly licensed waste facility.[66] If the paint has been separated from the building material (e.g., chemically or physically removed), then the paint waste should be evaluated independently from the building material to determine if it is hazardous and to identify the proper management practice.

[61] California Code of Regulations Section 66261.24.

[62] California Department of Toxic Substances Control, 2010. Official California Code of Regulations (CCR), Title 22, Division 4.5. Available online at: http://www.dtsc.ca.gov/LawsRegsPolicies/Title22/. Accessed May 10, 2018.

[63] California Health and Safety Code, Section 19827.5. Available online at: http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=HSC&sectionNum=19827.5. Accessed May 14, 2018.

[64] Bay Area Air Quality Management District, 2016. Compliance Advisory, Asbestos Notifications, April 7, 2016. Available online at: http://www.baaqmd.gov/~/media/files/compliance-and-enforcement/advisories/asbestos-renovation/adv_040716_notification_advisory_2-pdf.pdf?la=en. Accessed May 10, 2018.

[65] California Department of Toxic Substances Control, 2010. Official California Code of Regulations (CCR), Title 22, Division 4.5. Available online at: http://www.dtsc.ca.gov/LawsRegsPolicies/Title22/. Accessed May 10, 2018.

[66] U.S. Environmental Protection Agency, 1995. *Federal Register* Volume 60, No. 175. Available online at: https://www.gpo.gov/fdsys/pkg/FR-1995-09-11/pdf/95-22497.pdf. Accessed May 10, 2018.

PCBs

In California, PCB wastes are regulated as hazardous waste under Title 22 of the CCR, Division 4.5, Chapter 11, Section 66261.24. Most fluorescent light ballasts manufactured before 1978 contain PCBs in their capacitor and potting material. California requirements for management of fluorescent lights containing PCBs are specified in Title 22 of the CCR, Division 4.5, Chapter 42. In accordance with 40 CFR 761.60, fluorescent lights with PCBs in their potting material must be disposed of in an approved landfill or decontaminated.

Between 1979 and the early 1990s, bis(2-ethylhexyl) phthalate (DEHP) was used in place of PCB as a dielectric fluid in some fluorescent light ballasts and other electrical equipment.[67] DEHP is classified as a probable human carcinogen by the U.S. Department of Health and Human Services and as a hazardous substance by the U.S. EPA in accordance with Title 40 of the CFR, Chapter I, Subchapter I, Part 261, Subpart D, Section 261.33. Because of this, ballasts containing DEHP must be legally disposed of or recycled and are commonly handled in the same manner as PCB ballasts.

Disposal of Mercury-Containing Equipment

Spent fluorescent lamps and tubes commonly contain mercury vapors.[68] These, and electrical switches that contain mercury, are considered a hazardous waste in California under Title 22 of the CCR, Division 4.5, Chapter 11, Section 66261.50. Because they are considered a hazardous waste, all fluorescent lamps and mercury-containing switches must be recycled or taken to a universal waste handler.[69]

Naturally Occurring Asbestos

Asbestos-containing material is defined in 17 CCR Section 93105(h)(9) as any material that has an asbestos content of 0.25 percent or greater. In 2001, the California Air Resources Board adopted the Asbestos Airborne Toxic Control Measures for Construction, Grading, Quarrying, and Surface Mining Operations in areas of serpentine and other ultramafic rocks.[70] The Airborne Toxic Control Measures protects public health and the environment by requiring the use of best available dust mitigation measures to prevent the offsite migration of asbestos-containing dust from road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas of ultramafic rock, serpentine, or naturally occurring asbestos. The BAAQMD implements the regulation.

Hazardous Waste Tracking and Transportation

The "Generator" of hazardous waste is defined in 40 CFR 260.10 as the person or entity whose action produces a waste or causes a hazardous waste to become subject to regulation. Generators of hazardous

[67] DuPont Engineering, 2007. PCB Pollutant Minimization Plan Workshop – Managing Polychlorinated Biphenyls (PCBs) From Electrical Equipment. Available online at: https://www.nj.gov/drbc/library/documents/PMPWorkshop_0107/dupont_electrical.pdf. Accessed May 10, 2018.

[68] U.S. Environmental Protection Agency, 2007. Fluorescent Lamp Disposal and Recycling in EPA Region 2. Available online at: https://www3.epa.gov/region02/waste/spent-lamp.pdf. Accessed May 10, 2018.

[69] U.S. Environmental Protection Agency, 2018. Frequent Questions About Universal Waste (website). Available online at: https://www.epa.gov/hw/frequent-questions-about-universal-waste. Accessed May 10, 2018.

[70] California Code of Regulations, Section 93105

wastes are subject to the regulatory requirements of the California Department of Toxic Substances Control. In accordance with 22 CCR Division 4.5, Chapter 12, the generator of hazardous waste must have a Hazardous Waste Generator Number assigned by and registered with the California Department of Toxic Substances Control.

Regulatory requirements for the transport of hazardous wastes in California are specified in 22 CCR Division 4.5, Chapters 13 and 29. In accordance with these regulations, all hazardous waste transporters must have identification numbers. Hazardous waste transporters must comply with the California Vehicle Code, California Highway Patrol regulations (contained in 13 CCR); the California State Fire Marshal regulations (contained in 19 CCR); U.S. Department of Transportation regulations (contained in 49 CFR); and U.S. EPA regulations (contained in 40 CFR).

A hazardous waste manifest is required for transport of hazardous wastes.[71] The hazardous waste manifest documents the legal transport and disposal of the waste, and is signed by the generator and transporter(s) of the waste as well as the disposal facility. California regulations require specific cleanup actions that must be taken by a hazardous waste transporter in the event of a discharge or spill, and for the safe packaging and transport of hazardous wastes.[72]

Emergency Plan

The *State California Emergency Plan* describes how response to natural or human-caused emergencies occurs in California.[73] The plan is a requirement of the California Emergency Services Act, and describes methods for conducting emergency operations; the process for rendering mutual aid; emergency services of government agencies; how resources are mobilized; how the public is informed; how continuity of government is maintained during an emergency; hazard mitigation actions to reduce risk; and preparedness and recovery from disaster.

Regional

Comprehensive Airport Land Use Compatibility Plan

State law requires Airport Land Use Commissions (ALUCs) to prepare and adopt an Airport Land Use Compatibility Plan (ALUCP) for each public use and military airport within their jurisdiction. Further, ALUCs are required to review the plans, regulations, and other actions of local agencies and airport operators within each Commission's jurisdiction. SFO is located 1 mile south of the project site. Based on state law and guidance provided in the *California Airport Land Use Planning Handbook*, the *2012 Comprehensive Airport Land Use Compatibility Plan* prepared for SFO (2012 SFO ALUCP)[74] has four primary areas of concern:

[71] California Code of Regulations, Section 66263.20

[72] California Code of Regulations, Section 66263.30

[73] California Governor's Office of Emergency Services, 2017. State of California Emergency Plan & Emergency Support Functions. Available online at: http://www.caloes.ca.gov/cal-oes-divisions/planning-preparedness/state-of-california-emergency-plan-emergency-support-functions. Accessed June 22, 2018.

[74] City/County Association of Governments of San Mateo County, 2012. Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport (20120 SFO ALUCP). Available online at: http://ccag.ca.gov/plansreportslibrary/airport-land-use/. Accessed May 10, 2018.

- **Aircraft Noise Impact Reduction** – To reduce the potential number of future airport area residents who could be exposed to noise impacts from airport and aircraft operations.
- **Safety of Persons on the Ground and in Aircraft in Flight** – To minimize the potential number of future residents and land use occupants exposed to hazards related to aircraft operations and accidents.
- **Height Restrictions/Airspace Protection** – To protect the navigable airspace around the Airport for the safe and efficient operation of aircraft in flight.
- **Overflight Notification** – To establish an area within which aircraft flights to and from the Airport occur frequently enough and at a low enough altitude to be noticeable by sensitive residents. Within this area, real estate disclosure notices shall be required, pursuant to state law.

The 2012 SFO ALUCP contains airport/land use compatibility policies and criteria that apply to all land uses except those considered as existing land uses. ALUCs were given authority to: (1) specify how land near airports is to be used, based on safety and noise compatibility considerations; (2) develop height restrictions for new development to protect airspace in the vicinity of the airport; and (3) establish construction standards for new buildings near airports, including sound insulation requirements.

After an ALUC has adopted its ALUCP, affected local governments must update their general plans, specific plans, and land use regulations to be consistent with the ALUCP. Even if the local government has amended its plans to be consistent with the ALUCP, it must still submit proposed new and amended general plans, specific plans, land use ordinances (including rezoning), regulations, and facility master plans to the ALUC for review. The City/County Association of Governments of San Mateo County (C/CAG) ALUC reviews local land use policy actions and administrates consistency review and submits recommendations to the C/CAG Commission.

As identified in the 2012 SFO ALUCP, the project site is located within the Federal Aviation Regulation Part 77 sphere of influence, which is the boundary established to regulate obstructions to airspace navigation, including building heights.[75]

County of San Mateo Emergency Operations Plan

In 2011, the County of San Mateo updated its Emergency Operations Plan (EOP). The EOP provides an overview of the County's actions during a response to an emergency. Additional appendices and annexes to this plan describe in more detail response actions and hazards specific to the County. As such, the EOP is a living document with existing departmental plans and hazard specific annexes remaining in effect until the updated appendices and annexes are completed. The EOP describes the Emergency Operations Center's role and the coordination that occurs between the county, cities, towns, and other agencies in San Mateo County in an emergency.

[75] 2012 SFO ALUCP, Exhibit IV-2, p. IV-5.

Local

City of South San Francisco General Plan

The General Plan provides a vision for the long-range physical and economic development for the City, provides strategies and specific implementing actions, and establishes a basis for judging whether specific development proposals and public projects are consistent with the City's plans and policy standards. The General Plan contains a Land Use Element, Planning Sub-Areas Element, and Health and Safety Element that provide policies related to hazards and hazardous materials as described below.

Policy 2-I-22: Require that all future development conforms with the relevant height, aircraft noise, and safety policies and compatibility criteria contained in the most recently adopted version of the San Mateo County Comprehensive Airport Land Use Plan for the environs of San Francisco International Airport. (Amended by City Council Resolution 19-2010, Adopted February 10, 2010)

Policy 3.5-I-4: Unless otherwise stipulated in a specific plan, allow building heights in the East of 101 area to the maximum limits permissible under Federal Aviation Regulations Part 77.

Policy 8.3-G-1: Reduce the generation of solid waste, including hazardous waste, and recycle those materials that are used, to slow the filling of local and regional landfills, in accord with the California Integrated Waste Management Act of 1989.

Policy 8.3-G-12: Minimize the risk to life and property from the generation, storage, and transportation of hazardous materials and waste in South San Francisco. Comply with all applicable regulations and provisions for the storage, use and handling of hazardous substances as established by federal (EPA), State (DTSC, RWQCB, Cal OSHA, Cal EPA), and local (County of San Mateo, City of South San Francisco) regulations.

Policy 8.4-G-1: Minimize the risk to life and property from fire hazards in South San Francisco.

Policy 8.4-I-4: Require site design features, fire retardant building materials, and adequate access as conditions for approval of development or improvements to reduce the risk of fire within the City.

Policy 8.6-G-1: Use the City’s Emergency Response Plan as the guide for emergency management in South San Francisco.

Policy 8.7-G-1: Minimize the risk of life and property from aircraft accidents in South San Francisco.

Policy 8.7-I-1: Do not permit land uses that pose potential hazards to air navigation in the vicinity of SFO. These land uses include the following:

- Any use that would direct a steady or flashing light of white, red, green or amber color towards an aircraft engaged in an initial straight climb following takeoff or toward a landing, other than FAA-approved navigational lights;
- Any use that would cause sunlight to be reflected toward an aircraft engaged in an initial straight climb following takeoff or toward an aircraft engaged in a straight final approach toward a landing;
- Any use that would generate smoke or rising columns of air;
- Any use that would attract large concentrations of birds within approach and climbout areas; and
- Any use that would engage electrical interference that may interfere with aircraft communications or aircraft instrumentation.

The Health and Safety Element also includes polices applicable to fire hazards in locations designated as "fire hazard management units" for areas that need vegetation management or other measures to reduce wildland fire risk. The project site, and the East of 101 Area in its entirety, is not located within a fire hazard management unit, and policies related to wildland fire hazards are not applicable to the proposed project.[76]

City of South San Francisco Fire Department Emergency Planning

The South San Francisco Fire Department (SSFFD) manages and maintains emergency plans and training of City staff and community members. Through public education events and training sessions, the SSFFD focuses on activities that will prepare the community to take care of itself in the period immediately following a local disaster. For example, the SSFFD administers the Community Emergency Response Team program to educate volunteers about disaster preparedness for the hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. The SSFFD provides general information about how the community can better prepare for emergencies such as earthquakes, power outages, floods, wildland fires, and winter storms.

SIGNIFICANCE CRITERIA

Based on the standards identified in CEQA Guidelines Appendix G, a hazards and hazardous materials impact is considered significant if the project would:

a. create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

b. create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

c. emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

d. be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;

e. for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard for people residing or working in the project area;

f. for a project in the vicinity of a private airstrip, result in a safety hazard for people residing or working in the project area;

g. impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or

h. expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

[76] City of South San Francisco, 1999. *City of South San Francisco General Plan*, Chapter 8, Health and Safety, Figure 8, p. 8-21.

APPROACH TO ANALYSIS

Information in this section is based on the *Phase I Environmental Site Assessment*,[77] Future Environmental Costs Memorandum,[78] and *Building Materials Survey*[79] of the 201 Haskins Way site completed for the project by Ramboll Environ. Review of the California Department of Toxic Substances Control's data management system, EnviroStor, was also considered in evaluating impacts.

There are no private airports within the vicinity of the proposed project. The project site is in an urbanized area several miles removed from areas in the coastal mountains of San Mateo County that are the nearest open spaces subject to wildland fire. Therefore, topics (f) and (h) are not applicable and are not further discussed below.

IMPACT EVALUATION

Impact HZ-1: The proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. (*Less than Significant*)

Construction and operation under the proposed project during either Phase 1 or project buildout are not expected to create a significant hazard through the routine transport, use, or disposal of hazardous materials because the use or disposal of any hazardous materials are required to comply with applicable regulations as discussed above. State and federal laws require proper handling, use, and disposal of hazardous materials.

The proposed project would include operation of office/R&D uses. Depending upon the nature of research planned at the proposed facilities, for which detailed information has not yet been provided, there are likely to be biomedical hazards and chemical hazards. Future tenants at the project site are required to check the state and federal lists of regulated substances available from the San Mateo County Environmental Health Department (SMCEHD). Chemicals on the list pose a major threat to public health and safety or the environment because they are highly toxic, flammable, or explosive. If handling of hazardous materials would be required during the R&D process, businesses are required to determine which list to use in consultation with the SMCEHD and to apply for all applicable permits and comply with all applicable state and local regulations. Further, in the event that hazardous materials would be used during R&D activities, registration in the San Mateo County Environmental Health Hazardous Material Business Plan Program would be required to ensure safe and responsible handling of hazardous materials by site tenants.

The City requires that building spaces be designed to handle the intended office use, with sprinklers, alarms, vents, and secondary containment structures, in accordance with the guidelines laid out in the

[77] Ramboll Environ, 2017. *Phase 1 Environmental Site Assessment, 201 Haskins Way, South San Francisco, California*. This document is available as part of the Administrative Record of this EIR.
[78] Ramboll Environ, 2017. Future Environmental Costs Memorandum. This document is available as part of the Administrative Record of this EIR.
[79] Ramboll Environ, 2017. *Building Materials Survey, 201 Haskins Way, South San Francisco, California*. This document is available as part of the Administrative Record of this EIR.

City's Fire Code. Compliance with state and local regulations would ensure that buildings are equipped with safety measures including sprinklers, alarms, etc., to minimize potential impacts of the presence of hazardous materials. The City further requires that upon completion of each proposed project building, occupancy is not allowed until a final inspection is made by the SSFFD for conformance of all building systems with the Fire Code and National Fire Protection Association requirements. The inspection includes a review of the emergency evacuation plans. Finally, compliance with the California Department of Transportation regulations would ensure that all necessary safety precautions would be taken during transport of hazardous materials during all phases of the project. Therefore, the proposed project would have a less-than-significant impact related to routine transport, use, or disposal of hazardous materials. No mitigation is necessary.

Impact HZ-2: The proposed project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. (*Less than Significant*)

During operation of the proposed project under Phase 1 or project buildout, the proposed office/R&D uses would not involve substantial industrial use of hazardous materials that could be released into the environment. Operation of the proposed project may involve the use of regulated hazardous materials related to biomedical R&D in addition to common commercial products for cleaning and maintenance purposes. As described in Impact HZ-1, the proposed project would not involve the routine handling of substantial quantities of hazardous materials in such a way that substantial hazards associated with the accidental release of hazardous materials into the environment would occur. Impact HZ-2 focuses on known subsurface site conditions, and discusses the potential for encountering contaminated soils and groundwater during construction of Phase 1 and project buildout. This section also discusses the potential for existing on-site buildings to contain potentially hazardous building materials and the potential release of hazardous materials during demolition of these buildings.

The project site is located on historic Bay tidelands subject to fill and development in the post-war industrial period. The Bay tidelands are underlain by slope debris deposits and rocks of the Franciscan Complex, which crop out in the northern half of the project area, including 101, 151 and the northern portion of 201 Haskins Way; 410 and 430 East Grand Avenue; and the northern portion of 451 East Jamie Court. The project site does not overlay naturally occurring asbestos, such as that found in serpentinite formations. The southern portion of the site was filled in the 1970s with unspecified imported material. The material has not been specifically evaluated for its contents, and constituents present may include materials common in fill such as metals, petroleum hydrocarbons, and polycyclic aromatic hydrocarbons.

Phase 1 Development

For the purposes of this EIR, this analysis discusses the results of the preliminary geotechnical evaluation for the 201 Haskins Way parcel. A detailed analysis of conditions on the 400-450 East Jamie Court project has not been performed for this project, although recent evaluation of site conditions was performed under previous development of the project.

201 Haskins Way

The approximately 6.45-acre 201 Haskins Way parcel is improved with an approximately 24,075-sq.-ft. building. The southern half of the site was originally part of the Bay and was filled with imported material from unknown sources during the 1960s and 1970s.[80] Historic site development included at least one structure as early as 1915, and additional structures may have been present in the 1940s. By 1977, historical structures were demolished and replaced with the current building.

FORMER UNDERGROUND STORAGE TANKS

According to prior environmental reports evaluated in the *Phase 1 Environmental Site Assessment*, three underground storage tanks (USTs) were removed from the site including a 2,000-gallon waste oil UST and two 10,000-gallon diesel USTs.[81] Groundwater sampling in 1987 identified low concentrations of volatile organic compounds (VOCs) including chlorinated solvents 1,1-dichloroethane, trichloroethene, benzene and toluene. The waste oil was removed in 1987, and the SMCEHD issued closure (No Further Action determination) for the site, acknowledging that limited hazardous materials remain in soil and groundwater beneath the site and residual soil contamination occurs deeper than 10 feet below the ground surface.

SOILS AND GEOLOGY

The 201 Haskins Way parcel is underlain by slope debris deposits and rocks of the Franciscan Complex, which crop out in the northern half of the parcel. The southern portion of the site was filled in the 1970s with unspecified imported material. The material has not been specifically evaluated for its contents, and constituents present may include materials common in fill such as metals, petroleum hydrocarbons and polycyclic aromatic hydrocarbons.

ASBESTOS, LEAD, AND PCBS

The existing building includes one asbestos-containing material (vinyl sheet flooring) and several coatings of lead-based paint.[82] The building also includes mercury-containing lamps, and light ballasts that are suspected to contain PCBs.

400-450 East Jamie Court

The 400-450 East Jamie Court parcel was developed in the early 2000s and included the construction of two office/R&D buildings, a subsurface parking structure, and surface parking. Although previous investigation of this parcel indicated several metals were present in the soils, the most recent soil samples collected were found to be within naturally occurring background concentration levels.[83] Groundwater sampling did not detect metals, VOCs, or petroleum hydrocarbons at or above any level of regulatory limit. It is assumed that any environmental hazards from historic uses were handled appropriately in

[80] *Phase 1 Environmental Site Assessment*, p. 1.
[81] *Phase 1 Environmental Site Assessment*, p. 25.
[82] Ramboll Environ, 2017. *Building Materials Survey*, Attachment A, p. 6.
[83] City of South San Francisco, 2002. *Initial Study and Mitigated Negative Declaration of the East Jamie Court Project*, pp. 42–43.

compliance with all applicable regulations if any were encountered when the parcel was developed with the current 400 and 450 East Jamie Court office buildings and basement parking garage.

Project Buildout

In addition to the existing subsurface conditions of the 400-450 East Jamie Court parcel as described above, five of the six additional parcels included in the Phase 2 area are currently occupied by five one- to two-story buildings constructed in the 1980s and occupied by light industrial uses, including a kiteboarding equipment distribution warehouse, a packaging manufacturer, a van rental service, audio and visual equipment rental services, and a janitorial equipment supplier. The sixth parcel is a surface parking lot (Assessor's Parcel Number 015-102-290) containing 44 parking spaces. These sites are north of the presumed fill line established on 201 Haskins Way and are assumed to have been constructed over Bay Mud, although historic land uses on these sites are unknown.

Since the existing buildings in the Phase 2 area were constructed after 1980, after building materials such as asbestos, lead-based paint, and PCBs were banned, it is assumed that hazardous building materials are possible but not likely. Existing subsurface environmental conditions, such as USTs or groundwater VOCs, are unknown. However, it is assumed potential subsurface environmental concerns may be present on one or more of the six parcels, similar to conditions found on the 201 Haskins Way parcel described above.

Discussion

Construction activities have the potential to result in the release of contaminated soils and groundwater. On the project site, groundwater depths ranging from approximately 8 to 15 feet below ground surface have been encountered, generally shallowest in the southern areas of the site.

During Phase 1 development, to address existing environmental issues on the 201 Haskins Way site, soil excavation would generally occur from the upper approximately 2 feet beneath the proposed future building footprints. Excavation may also include removal of the former UST hot spot area to a depth of 13 feet below ground surface to address the residual soil contaminants greater than 10 feet below ground surface. A *Phase I Environmental Site Assessment* of the additional six Phase 2 area parcels has not been conducted. However, it is assumed that similar environmental conditions related to subsurface contaminated soils may be present. With implementation of standard regulatory compliance measures, potentially contaminated soils and groundwater would be handled, transported, and disposed of in accordance with applicable local, state, and federal regulations and requirements. This impact is less than significant.

Demolition of the existing building would have the potential to expose workers and surrounding receptors to asbestos, lead, mercury, and PCBs. Handling of PCBs is regulated under 24 CFR and handling of PCBs, asbestos, lead, and mercury is regulated under 22 CCR. Project applicants are required to study existing building materials, and implement handling and disposal controls. With compliance with standard local, state, and federal regulatory requirements, impacts to the accidental release of hazardous materials would be less than significant. No mitigation is required.

Impact HZ-3: The proposed project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. (*Less than Significant*)

No schools are located within 0.25 mile of the project site. However, the proposed project is within 0.25 mile of one existing childcare center, the Early Years preschool located at 371 Allerton Avenue. The project site is also within 0.25 mile of the Genentech Childcare Facility at 342 Allerton Avenue, which is currently under construction as described in Section 4.1, Approach to Environmental Analysis under "Approach to Baseline Setting", on p. 4.1.4-4.1.7. However, as discussed under Impact HZ-1 and Impact HZ-2, the proposed project would be required to comply with standard local, state, and federal regulatory requirements associated with the handling of hazardous materials. The proposed project would not involve any uses that would involve hazardous emissions that are typical of heavy industrial uses. Therefore, this impact would be less than significant. No mitigation measures are necessary.

Impact HZ-4: The proposed project is not located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would not create a significant hazard to the public or the environment with compliance of applicable regulations. (*Less than Significant*)

The project site is located near multiple closed cleanup sites included on EnviroStor, a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.[84] No active cleanup sites are located in or within 0.25 mile of the project site. Nonetheless, as described in Impact HZ-2, above, the exposure of known or unknown subsurface conditions could occur, but with implementation of standard local, state, and federal regulatory requirements that would ensure the proper handling of potentially hazardous subsurface soils and groundwater, this impact would be less than significant. No mitigation is required.

Impact HZ-5: The proposed project is located within an airport land use plan, but would not result in a safety hazard for people residing or working in the project area. (*Less than Significant*)

The closest airport is SFO, approximately 1 mile south of the project site. The project site is within the boundary of the ALUCP. Because the proposed buildings under either the Phase 1 development or project buildout would have an area of greater than 100,000 sf and would require a rezoning of the project site, the proposed project is subject to advisory review by the ALUC. With the proposed buildings at a maximum height of approximately 99 feet, the proposed project would not exceed the 2012 SFO ALUCP height limit of 161 feet. Due to proximity to the airport, however, the project would be required to submit a Notification of Proposed Construction or Alteration under 14 CFR Part 77 to allow the Federal Aviation Administration to chart the new structures in their database and provide a formal determination of the effect of the proposed structures on navigable airspace. Overall, the proposed project would be compatible with the ALUCP and the proposed structures would remain below the established height limits of the project site, and would not pose a safety hazard for people working in the project area. Therefore, this impact would be less than significant. No mitigation is necessary.

[84] California Department of Toxic Substances Control, 2018. EnviroStor. Available online at: https://www.envirostor.dtsc.ca.gov/public/. Accessed May 9, 2018.

Impact HZ-6: The proposed project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (*No Impact*)

The proposed project would not alter traffic patterns or make substantial changes to the existing roadways other than relocating or removing driveway entrances into the project site, and would not impair implementation of the State Emergency Plan or the County Emergency Operations Plan. Therefore, no impact would occur. No mitigation is necessary.

Impact C-HZ-1: The proposed project would not result in a cumulatively considerable contribution to a significant adverse cumulative impact related to hazards and hazardous materials. (*Less than Significant*)

Environmental impacts related to hazards and hazardous materials are generally site-specific. Nearby cumulative development projects would be subject to the same fire safety and hazardous materials handling and disposal regulations applicable to the proposed project or project buildout. Although the proposed project or project buildout could result in potential impacts related to conducting construction activities within potentially contaminated soil and demolishing and reusing structures that contain hazardous building materials, conformance with applicable regulatory requirements would ensure less-than-significant impacts. Similarly, operation of the proposed project combined with operation of nearby cumulative projects would include several new office/R&D uses from which there are likely to be biological hazards and chemical hazards. Future tenants at each site are required to check the state and federal lists of regulated substances available from SMCEHD, and registration in the San Mateo County Environmental Health Hazardous Material Business Plan Program would be required to ensure safe and responsible handling of hazardous materials by site tenants. Furthermore, each project would be required to comply with local and state fire safety codes and inspections, and would involve a review of emergency evacuation plans. Finally, compliance with California Department of Transportation regulations would ensure that all necessary safety precautions would be taken during transport of hazardous materials for each project. For these reasons, the proposed project would not combine with past, present, and reasonably foreseeable probable future projects in the project vicinity to create a significant cumulative impact related to hazards and hazardous materials. No mitigation is required.

4.11.5 Mineral Resources

REGULATORY FRAMEWORK

Local

There are no local, state, or federal ordinances or policies related to mineral resources that apply to the project site.

SIGNIFICANCE CRITERIA

Based on CEQA Guidelines Appendix G, the proposed project would have a significant environmental impact related to mineral resources if it would:

a. result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or

b. result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

APPROACH TO ANALYSIS

In accordance with the Surface Mining and Reclamation Act of 1975, the project site was evaluated in accordance with the California Department of Conservation, Division of Mines and Geology Mineral Lands Classification system.[85]

IMPACT EVALUATION

Impact ME-1: The proposed project would not have a significant adverse impact on the availability of a known mineral resource and/or a locally important mineral resource recovery site. (*No Impact*)

The project site has historically been developed and is located in an urbanized area of South San Francisco. The project site is within mineral lands classification area Mineral Resource Zone 4 (MRZ-4) (areas where available information is inadequate for assignment to any other zone).[86] Thus, the site is not a designated area of significant mineral deposits. The project site has not been delineated as a locally important mineral recovery site in the General Plan, on any specific plan, or on any other land use plan. There are no mining activities on the project site, and no mining activities are known to have occurred there. In addition, on portions of the project site located over Bay fill, no subsurface mineral resources would be expected.

Therefore, implementation of the proposed project would not impact any known mineral resources on the project site. Additionally, there are no designated mineral resource recovery sites in the project vicinity whose operations or accessibility would be affected by the construction or operation of the proposed project. Therefore, the proposed project would have no impact on known mineral resources or any locally important mineral resource recovery site. No mitigation measures are necessary.

Impact C-ME-1: The proposed project would not result in a cumulatively considerable contribution to a significant adverse cumulative impact on mineral and energy resources. (*Less than Significant*)

There are no known mineral resources or resource recovery sites on the project site or in the vicinity. All land in the East of 101 Area, including the project site, is designated MRZ 4. Therefore, none of the projects identified as cumulative development are likely to have mineral resources or resource recovery sites. There would be no cumulative impact on mineral resources. No mitigation measures are necessary.

[85] California Department of Conservation. Surface Mining and Reclamation Act (SMARA) Mineral Lands Classification (MLC) data portal (website). Available online at: http://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=regulatorymaps. Accessed May 10, 2018.

[86] California Division of Mines and Geology,1996. Open File Report 96-03. Available online at: ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/OFR_96-03/OFR_96-03_Text.pdf. Accessed April 5, 2018); Special Report 146 Parts I and II, 1986.

4.11.6 Population and Housing

REGULATORY FRAMEWORK

Regional

Plan Bay Area

Plan Bay Area is a long-range (2040) integrated transportation and land use/housing strategy for the San Francisco Bay Area. *Plan Bay Area* marks the nine-county region's first long-range plan to meet the requirements of California's 2008 Senate Bill (SB) 375, which calls on each of the state's 18 metropolitan areas to develop a Sustainable Communities Strategy, an integrated transportation, land use, and housing plan that addresses ways to accommodate future population growth and reduce greenhouse gas emissions from cars and light trucks.[87] *Plan Bay Area* advances initiatives to expand housing and transportation choices, create healthier communities, and build a stronger regional economy. ABAG and the Metropolitan Transportation Commission jointly approved *Plan Bay Area* on July 18, 2013.

Since 2002, the regional population, household, and jobs forecast prepared by ABAG has been "policy-based," meaning that the forecast promotes policy objectives which increase housing development and alternative transportation modes, specifically by increasing the proportion of growth near transit and in existing urban areas. The most recent forecast of population and housing was prepared in ABAG's *Projections 2013*.[88]

Regional Housing Need Plan for the San Francisco Bay Area: 2014–2022

The Regional Housing Need Allocation (RHNA) process is a state mandate designed to ensure that each jurisdiction recognizes its responsibility to provide housing that represents the number of additional residential units that would be required to accommodate the anticipated growth in households; to replace expected demolitions and conversions of housing units to non-housing uses; and to achieve a future vacancy rate that allows for the healthy functioning of the housing market. According to state law, each jurisdiction's housing element must include a strategy to meet its share of the region's housing need. Jurisdictions that do not have capacity to meet their RHNA must rezone sites with appropriate development standards to accommodate the unmet capacity.[89]

The *Regional Housing Need Plan for the San Francisco Bay Area: 2014-2022* was published in July 2013 and covers the planning period from January 31, 2015, to January 31, 2023.[90] The plan determined that the Bay Area must plan for 187,990 new housing units from 2014–2022. The housing allocation is expressed not only as an overall housing production target but also as separate targets for production of

[87] Association of Bay Area Governments, 2017. *Plan Bay Area 2040*. Available online at: http://2040.planbayarea.org/reports. Accessed May 10, 2018.
[88] Association of Bay Area Governments, 2013. Projections 2013 (website). Available online at: https://abag.ca.gov/planning/housing/projections13.html. Accessed May 10, 2018.
[89] California Government Code, Section 65584.
[90] Association of Bay Area Governments, 2013. *Regional Housing Need Plan*, San Francisco Bay Area, 2014-2022. Available online at: https://abag.ca.gov/files/ABAG_Final_RHNA_Publication.pdf. Accessed May 10, 2018.

housing affordable to various household income categories. South San Francisco's share of the regional housing need for 2014 through 2022 is 1,864 new units, with approximately 62 percent to be affordable.[91,92] This represents a little under 1 percent of the regional total over the 2014–2022 time frame and amounts to a Citywide housing production goal of about 233 units per year. South San Francisco's share of the RHNA is incorporated into the City's Housing Element.[93] As required by state law, the Housing Element of the General Plan discusses the City's fair share allocation of regional housing needs by income as projected by ABAG.

Local

City of South San Francisco General Plan

The General Plan includes objectives, policies, and programs related to population, housing, and employment. Several of the priority policies of the General Plan establish the City's interest in affordable housing, economic diversity, and a broad range of employment opportunities for residents. The Economic Development Element of the General Plan provides a policy framework for ensuring South San Francisco's long-term competitiveness in the region. Based on the analysis of recognized business trends and available resources, the Economic Development Element outlines the City's economic development objectives, serves to ensure that economic decision-making is integrated with other aspects of the City's development, and provides a framework for detailed implementing actions.

The Housing Element of the General Plan is the City's primary policy document regarding the development, rehabilitation, and preservation of housing for all economic segments of the population within the City's boundaries. Accordingly, the Housing Element identifies and analyzes the existing and projected housing needs of the City and states goals, policies, quantified objectives, and implementation programs for the preservation, improvement, and development of housing. The Housing Element describes housing needs and identifies the capacity for new housing in the City based on land supply and development capacity. This element focuses on the City's critical need for affordable housing. The Housing Element establishes goals for housing production, as well as policies related to mitigating the impacts of growth on the housing market that are relevant to evaluation of the proposed project. The Housing Element also identifies sites for housing development that are adequate to accommodate the City's allocation of the regional housing need.

As provided in the General Plan, none of the parcels located within the East of 101 Area, including the project site, are designated Residential.[94] Furthermore, Policy 3.5-I-3 of the Planning Sub-Areas Element of the General Plan states, "Do not permit any residential uses in the East of 101 area."[95] This is due to the area's sensitivity both from aircraft noise and safety perspectives.

[91] Ibid, p. 25.
[92] The jurisdictions in Napa, San Mateo, and Solano Counties each chose to form a subregion to carry out the RHNA process. These numbers reflect the final allocations adopted by San Mateo County.
[93] City of South San Francisco, 2015. 2015-2023 Housing Element. Available online at: http://www.ssf.net/home/showdocument?id=476. Accessed May 10, 2018.
[94] City of South San Francisco, 2018. General Plan Map. Available online at: http://www.ssf.net/home/showdocument?id=512. Accessed May 11, 2018.
[95] General Plan, Chapter 3, p. 3-45.

SIGNIFICANCE CRITERIA

According to CEQA Guidelines, Appendix G, impacts on population and housing are considered significant if implementation of the project would:

a. induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure);

b. displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere; or

c. displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

APPROACH TO ANALYSIS

This topic analyzes the existing uses on the project site and the new uses that would be constructed under the proposed project based on employment estimates by land use provided in the General Plan Land Use Element employment, and the projected employment growth of the City as provided by ABAG *Projections 2013.*

The proposed project would involve a rezoning under Phase 1 and project buildout to allow new office/R&D uses. Development under Phase 2 during project buildout is conceptual at this time and the proposed rezoning would not involve the physical construction removal of existing uses or the physical displacement of employees until such development is pursued by the existing or future property owners. However, for the purposes of conservative analysis, the potential transition from the existing light industrial uses to the proposed office/R&D uses, including prospective changes to employment, is considered below.

IMPACT EVALUATION

Impact PH-1: The proposed project would not induce substantial population growth in an area, either directly or indirectly. *(Less than Significant)*

The proposed project does not propose any new housing units in either Phase 1 or project buildout and would not directly induce population growth. However, the displacement of existing light industrial uses and employees, and the new employees introduced as a result of new BTP development would, on the whole, increase the number of employees in the City and the East of 101 Area.

The existing light industrial uses support a total of approximately 191 employees who would vacate the project site and be displaced or relocated. The existing project site at 201 Haskins Way is currently vacant, but previously hosted a trucking terminal use with approximately 25 employees.[96] The 400-450

[96] City of South San Francisco, 1999. General Plan Land Use Element, p. 2-34. The General Plan assumes 955 sq. ft. of industrial use per employee, and 450 sq. ft. of office/R&D use per employee. Alexandria Real Estate Equities (ARE) facilitated relocation of the previous trucking facility employees since acquiring that property in early 2018. However, for the purposes of conservative analysis, the EIR assumes that those employees are still on the project site and therefore are included in the number of existing employees on the site.

East Jamie Court site hosts an existing business and technology park use that would remain under both Phase 1 development and project buildout. The five light industrial warehouse and distribution buildings in the Phase 2 area contain approximately 191 existing employees that would be displaced or relocated as a result of project buildout.

The estimated number of jobs provided by the proposed project is summarized in **Table 4.11.1: Proposed Project Employment**. This type of growth is consistent with past office/R&D development in the East of 101 Area, including the Genentech Campus.

According to ABAG *Projections 2013*, the City will have 51,510 jobs in 2020 and 53,790 jobs in 2040, or growth of 2,280 jobs in 20 years.[97] The new 748 employees introduced during Phase 1 and 1,506 during project buildout would represent 33 percent and 66 percent, respectively, of the total projected growth in the City between 2020 and 2020 according to *Projections 2013*. By this measure, the proposed project would contribute a substantial portion of projected job growth in the City. However, the General Plan Land Use Element, as amended in 2011, plans for much higher job growth, and projects an employment of 80,600 jobs in the City by 2035 at buildout of the General Plan, or a growth of 29,090 jobs from the 2020 job count predicted by ABAG.[98] The proposed project employees introduced during Phase 1 and project buildout would represent 2.5 percent and 5.2 percent of the total job growth in the City at General Plan buildout. The proposed project's new employees would not represent a substantial portion of projected employment growth as planned for under the General Plan, and the proposed project would not result in substantial unplanned employment growth.

Table 4.11.1: Proposed Project Employment

	Phase 1 Development	Project Buildout
Existing Industrial Use to be Removed (gsf)	24,075	182,070
Existing Employees[1]	*25*	*191*
Proposed New Business Technology Park Use (gsf)	336,368	677,600
New Employees[2]	*748*	*1,506*
Net Employment	**723**	**1,315**

Notes:

[1] Based on General Plan Land Use Element employment estimates of 955 sq. ft. of industrial use per employee

[2] Based on General Plan Land Use Element employment estimates of 450 sq. ft. of office/R&D use per employee

Source: City of South San Francisco (1999), Alexandria Real Estate Equities (ARE) (2018)

The new 748 employees introduced during Phase 1 and 1,506 during project buildout in the City could result in an increase in demand for housing. The City is primarily built out and any housing constructed within the City limits would most likely be infill housing. The total number of jobs and the total number of residential units make up an area's jobs–housing ratio. The jobs–housing ratio indicates the ability of an area to provide both adequate employment and housing opportunities for its existing and projected population. A balance of jobs and housing can benefit the regional environment by reducing commute

[97] Association of Bay Area Governments, 2013. *Projections 2013*. p. 87.

[98] General Plan, Chapter 2, Table 2.4-4, p. 2-35.

times and distances between residential areas and employment centers. Longer commutes result in increased vehicle trip length, which creates environmental effects such as those associated with transportation, air quality, and noise.

According to ABAG *Projections 2013*, the City will have 23,250 households and 51,510 jobs in 2020, and 27,900 households and 53,790 jobs in 2040.[99] This means that South San Francisco is a job center that imports employees from surrounding communities or, alternatively, that exports housing, and a high level of in-commuting. Housing availability, already projected to be out of balance, would decrease with implementation of Phase 1 development or project buildout. Therefore, the proposed project would result in an increased unfavorable jobs/housing ratio in the City, which would increase over the implementation of Phase 1 and, subsequently, project buildout. However, continued job growth in the City will promote a greater regional balance between jobs and housing. The City is located in Bay Area and is well served by all modes of transit, including shuttles, bus, rail, and air. Therefore, additional potential future employees have access to a variety of transportation options for reaching the project site.

Based on *Projections 2013*, San Mateo County, on average would have a ratio of approximately 1.44 employed residents per household.[100] Accordingly, the proposed project would create the need for up to 519 new units of housing in Phase 1 and 1,046 new units of housing at project buildout. Although it is likely that some of these new employees would be existing residents in South San Francisco or in the region, the potential employment increase resulting from the proposed project would result in indirect growth that may not be accommodated by existing or proposed housing projections for the City. However, the City recognizes that much of its land area, including the East of 101 Area, is not well suited for housing development due to existing land use conflicts, including proximity to SFO and the historic and existing industrial uses of the East of 101 Area, as well as the emerging office/R&D uses in the area.[101] In that light, the City does not have an adopted jobs/housing ratio goal applicable to development within the East of 101 Area, and relies upon the greater Bay Area's regional jobs–housing balance. Nonetheless, on August 22, 2018, the City adopted Chapter 8.69 of the Municipal Code to establish a commercial linkage fee for non-residential development projects (including office, medical, and R&D) to address the effect of increased jobs on the need for affordable housing. Project applications deemed complete prior to January 1, 2019, are not subject to the fee.

The proposed project under both Phase 1 and project buildout would construct new office/R&D uses on an existing infill site in an urbanized area consistent with the General Plan designation for the project site. Development of infrastructure could remove obstacles to population growth if it would allow for development in an area that was not previously considered feasible for development because of infrastructure limitations, which could induce population growth indirectly. The proposed project under Phase 1 and project buildout would not include the extension of area roadways or expansion of infrastructure to areas lacking existing development. No indirect impacts related to population growth as a result of expansion of infrastructure would occur.

[99] Association of Bay Area Governments, 2013. *Projections 2013*. pp. 86–87.
[100] Association of Bay Area Governments, 2013. *Projections 2013*, p. 84. Calculated based on employed residents divided by households in 2020.
[101] General Plan, Chapter 3, Policy 3.5-I-3, p. 3-45.

Overall, the City does not have an adopted jobs–housing ratio, the project would promote a greater regional jobs and housing balance, the project would be an appropriate land use for the project site's limitations consistent with the General Plan designation, and the job growth that would occur under the proposed project would be within the projected employment growth of the City. If the project application is not deemed complete prior to January 1, 2019, the proposed project would not require payment of the commercial linkage fee under Chapter 8.69 of the Municipal Code which would contribute to the development of affordable housing. The impact of the Phase 1 development or project buildout on indirect population growth would be less than significant. No mitigation is required.

Impact PH-2: The proposed project would not displace housing or people, and would not necessitate the construction of replacement housing elsewhere. *(Less than Significant)*

The project site does not contain any existing residents or housing units. There would be no impact under Phase 1 or project buildout. This topic focuses on the displacement of existing employment on the project site.

The existing light industrial uses support a total of approximately 216 employees who would vacate the project site, and potentially relocate, should prospective construction of the conceptual project build out occur. The existing project site at 201 Haskins Way is currently vacant, but previously hosted a trucking terminal use with approximately 25 employees. The five light industrial warehouse and distribution buildings in the Phase 2 area contain approximately 191 existing employees that would be displaced as a result of project buildout.

The existing light industrial uses include a former trucking terminal use and warehouse/distribution uses. These types of uses are not limited to the East of 101 Area, and existing businesses could relocate to other industrial areas in the City or the Bay Area. The relocation of 25 employees under Phase 1 development or displacement or relocation of up to 191 employees under project buildout is less than 1 percent of the total jobs projected to be available in the City by 2040. The proposed project would not displace housing and would not necessitate the construction of replacement housing, and would not displace substantial numbers of employees. This impact would be less than significant. No mitigation is required.

Impact C-PH-1: The proposed project would not result in a cumulatively considerable contribution to significant cumulative population and housing impacts. (*Less than Significant*)

The proposed project's potential contribution to cumulative impacts on population and housing is evaluated in the context of past, present, and reasonably foreseeable probable future development expected in the City and includes the additional baseline and cumulative projects and plans listed in Section 4.1, Approach to Analysis, pp. 4.1.4-4.4.1.9.

The proposed project does not include the construction of new housing units, and would not directly induce population growth. The *Downtown Station Area Specific Plan* would involve the development of a new mix of uses including 1,400 housing units. None of the remaining foreseeable future projects in the East of 101 Area propose housing, and mainly propose office/R&D and other commercial uses. Although these projects would generate demand for new housing units in the City, this would not constitute direct population growth. According to ABAG *Projections 2013*, the City will have 23,250 households and

51,510 jobs in 2020, and 27,900 households and 53,790 jobs in 2040.[102] The Bay Area is expected to grow from 2,837,680 households in 2020 to 3,308,090 households in 2040, for a total growth of 470,410 households in 20 years.[103] The proposed project does not propose housing, and would not contribute any cumulatively considerable unplanned direct growth as compared to projected Bay Area household growth from the construction of residential units. The cumulative impact related to direct population growth from construction of new housing would not occur. Therefore, the proposed project would not substantially contribute to a significant direct population growth impact. No mitigation is required.

The proposed project, in combination with the foreseeable future projects, would involve construction of new office/R&D uses, commercial uses, or industrial uses. Each of the cumulative projects would involve construction of new office/R&D uses, including the 494 Forbes Boulevard project (326,020 sq. ft.), the 328 Roebling Road project (105,536 sq. ft.), the *Genentech Master Plan Update* (4,300,000 sq. ft), the *Oyster Point Specific Plan Update* project (1,742,000 sq. ft.) and the *Downtown Station Area Specific Plan* (1,185,049 sq. ft.), totaling approximately 7,658,605 sq. ft. of new office/R&D use. The new office/R&D uses would generate approximately 17,019 new office/R&D employees in the City.[104] The proposed project at project buildout would generate 1,506 additional office/R&D employees. The *Downtown Station Area Plan* would also introduce new Business Commercial use (511,780 sq. ft.), Commercial use (268,800 sq. ft.), and Industrial use (21,250 sq. ft.). The *Oyster Point Specific Plan Update* project would also provide 40,000 sq. ft. of Commercial use. These new Business Commercial, Commercial, and Industrial uses would generate approximately 2,075 new employees in the City.[105] Therefore, the proposed project at project buildout, in combination with these reasonably foreseeable future projects would generate a total of approximately 20,600 new employees in the City. As stated above, the City will have 51,510 jobs in 2020 according to ABAG *Projections 2013*, and 80,600 jobs in the City by 2035 at buildout of the General Plan, or a growth of 29,090 jobs. The proposed project at buildout, in combination with these reasonably foreseeable future projects, would represent approximately 70 percent of the total job growth in the City at General Plan buildout. This growth would be within the projected job growth in the City, and would be consistent with the long-term goal of developing and intensifying office/R&D uses in the East of 101 area.

The City is a job center that imports employees from surrounding communities or, alternatively, that exports housing. Housing availability, already projected to be out of balance, would decrease with implementation of the proposed project in combination with reasonably foreseeable future projects, and would result in an increased unfavorable jobs/housing ratio in the City. The proposed project at project buildout would represent approximately 7.3 percent of the total jobs generated under the sum of these cumulative projects.

Based on the San Mateo County average under *Projections 2013* in 2020, the proposed project in combination with the reasonably foreseeable probable future projects, would create the need for

[102] Association of Bay Area Governments, 2013. *Projections 2013*. pp. 86-87.
[103] Association of Bay Area Governments, 2013. *Projections 2013*. p. 21.
[104] Based on 450 sq. ft. of office use per employee.
[105] Based on 400 sq. ft. of commercial use per employee, and 955 sq. ft. of industrial use per employee.

approximately 14,305 new units of housing,[106] which cannot all be provided for within South San Francisco city limits. However, it is likely that some of these new employees would be existing residents in South San Francisco or in the region. The proposed project at project buildout, in combination with the reasonably foreseeable future projects, would represent approximately 3 percent of Bay Area household growth between 2020 and 2040, and could be reasonably accommodated by existing projected growth.

The potential employment increase resulting from the proposed project would result in indirect growth that may not be accommodated by existing or proposed housing projections for the City. However, the City recognizes that much of its land area, including the East of 101 Area, is not well suited for housing development due to its proximity to SFO and the historic and existing industrial uses of the East of 101 Area and the ongoing development of new office/R&D uses. In that light, the City does not have an adopted jobs/housing ratio goal applicable to development within the East of 101 Area, and relies upon the greater San Francisco Bay Area's regional jobs–housing balance. Furthermore, the City has several residential and mixed-use projects west of U.S. 101 that are either under construction or in development which would add to the City's housing supply.

Each of the cumulative projects listed in Section 4.1, Approach to Environmental Analysis, on pp. 4.1.7-4.1.9, would construct new uses on existing infill sites in an urbanized area. Development of infrastructure could remove obstacles to population growth if it would allow for development in an area that was not previously considered feasible for development because of infrastructure limitations, which could induce population growth indirectly. The proposed project would not include the extension of area roadways or expansion of infrastructure to areas lacking existing development. The East of 101 Area is confined by the Bay on the north, east and south sides, and existing development west of U.S. 101. Therefore the amount of development potential is limited by the amount of land available for infill development, and not generally limited by the availability of infrastructure. The *Genentech Master Plan Update* project, the *Gateway Business Park Master Plan* project, the *Oyster Point Specific Plan Update* project, and the *Downtown Station Area Specific Plan* project would each require off-site improvements to utility infrastructure proportional to the scale of development proposed by each project. However, this infrastructure would not indirectly induce substantial population growth in the project area because these projects are located on infill sites surrounded by existing development and the proposed infrastructure improvements would be sized to meet only project needs and would not enable additional development. Furthermore, each of these projects would be required to provide impact fees associated with City infrastructure improvements. Therefore, no indirect population growth would occur as a result of expansion of infrastructure that would occur as a result of the proposed project in combination with past, present, and reasonably foreseeable future projects.

Overall, the proposed project, in combination with reasonably foreseeable future projects, would involve development of land uses that are appropriate for the limitations of the East of 101 Area. Moreover, the proposed project would be consistent with the General Plan designation and policies applicable to the project site. The impact of the proposed project in combination with reasonably foreseeable future projects on indirect population growth would be less than significant. Therefore, the proposed project

[106] Association of Bay Area Governments, 2013. *Projections 2013,* p. 84. Based on 1.44 employed residents per household in 2020.

would not contribute considerably to a significant population-related cumulative impact. No mitigation measures are required.

4.11.7 Public Services

REGULATORY FRAMEWORK

State

California Fire Code

The California Fire Code 2016 Edition, as published by the International Code Council and adopted by the State Fire Marshal, is adopted by reference by the City of South San Francisco. State fire regulations are set forth in Sections 13000 *et seq.* of the California Health and Safety Code, which include regulations concerning building standards (as also set forth in the California Building Code), fire protection and notification systems, fire protection devices (such as extinguishers and smoke alarms) and standards (such as those for high-rise buildings), and fire suppression training.

Local

City of South San Francisco General Plan

The General Plan provides a vision for the long-range physical and economic development for the City, provides strategies and specific implementing actions, and establishes a basis for judging whether specific development proposals and public projects are consistent with the City's plans and policy standards. The General Plan contains a Health and Safety Element. The purpose of this element is to acknowledge and mitigate the risk posed by hazards. Topics discussed include seismic and geologic, flooding, hazardous materials and waste, fire, and law enforcement. Policies applicable to police and fire services are provided below.

Policy 8.4-G-1: Minimize the risk to life and property from fire hazards in South San Francisco.

Policy 8.4-G-2: Provide fire protection that is responsive to citizens' needs.

Policy 8.4-I-4: Require site design features, fire retardant building materials, and adequate access as conditions for approval of development or improvements to reduce the risk of fire within the City.

Policy 8.5-G-1: Provide police services that are responsive to citizen's needs to ensure a safe and secure environment for people and property in the community.

Policy 8.5-I-1: Ensure adequate police staff to provide rapid and timely response to all emergencies and maintain the capability to have minimum average response times.

SIGNIFICANCE CRITERIA

Based on the CEQA Guidelines, Appendix G, a project is considered to have significant impacts if implementation of the project would:

result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental

impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

a. fire protection
b. police protection
c. schools
d. parks
e. other public facilities

APPROACH TO ANALYSIS

As provided by CEQA Guidelines Section 15382, changes in demand for public services or service ratios, response times, or other performance objectives is not a physical environmental impact. Rather, this analysis discusses whether the demand generated by the proposed project would result in the need to construct new facilities in order to meet demand or performance objectives, and if the construction of new facilities would cause a physical environmental impact. Physical impacts associated with parks are discussed in Section 4.11.8, below.

IMPACT EVALUATION

Impact PS-1: Operation of the proposed project would not require the provision of new or physically altered fire and emergency medical services in order to maintain acceptable service ratios, response times, or other performance objectives. ***(Less than Significant)***

Fire protection and emergency services in the project area is the responsibility of the SSFFD. The SSFFD staffing consists of emergency response, fire prevention, and administrative personnel, for a total of 87 full-time equivalent and 5.68 hourly and contract employees.[107] There are a minimum of 20 on-duty emergency response personnel staffing each of the three shifts. The General Plan Health and Safety Element does not identify a personnel-to-service population target ratio.

There are currently five fire stations located throughout South San Francisco. Station #62 is the closest existing station to the project site, approximately 0.65 miles away at 249 Harbor Way. Fire Station No. 62 serves the East of 101 Area and has three apparatus bays and sufficient space to accommodate an on-duty crew of four personnel.

The project site is not located in any of the City's fire hazard management unit areas, and access to the site via East Grand Avenue, Haskins Way, and East Jamie Court is standard and would not change as a result of the proposed project.

Response time is defined as the time that elapses between the moment a call is received by dispatch and the moment when the first unit assigned to the call arrives at the scene. The SSFFD goal is to arrive at emergency incidents within seven minutes after a 9-1-1 call is received, which includes a 4-minute travel

[107] City of South San Francisco, 2016. Adopted Biennial Operating Budget & Capital Improvement Program, Fiscal Years 2017-19, p. E-39. Available online at: http://www.ssf.net/home/showdocument?id=2027. Accessed May 10, 2018.

time with 7-minute total response time. To determine the adequacy of fire and emergency medical service in the East of 101 Area, the City mapped areas that can be traveled to within 4 minutes from Station No. 62.[108] Areas at the southeastern end of the East of 101 Area, including the project site, are within the existing Fire Station No. 62 4-minute travel time capability. Therefore, no new firefighting facilities would be necessary to serve the proposed project.

The proposed project is estimated to increase incident volume per day at Phase 1 and again at project build-out (assumed to occur in 2021 and 2023, respectively), as shown in **Table 4.11.2: Estimated Fire Protection and Emergency Medical Response Incidents Generated under the Proposed Project**. The proposed project, at either Phase 1 or project buildout, would generate fewer than 40 calls per year and fewer than three calls per month; therefore, no additional emergency response staffing would be required.

Table 4.11.2: Estimated Fire Protection and Emergency Medical Response Incidents Generated under the Proposed Project

Phase	Proposed Office/ R&D Use (gsf)	Annual Service Calls	Total Calls Per Day	Firefighter Demand
Phase 1	336,368	15	0.04	0
Project Buildout	677,600	32	0.08	0

Note: The average annual call volume per 1,000 gsf of Office/R&D use is calculated as follows: square footage of office/BTP use / ((189 average service calls per year between 2013–2017 / (5,600,000 gsf existing Office/R&D use at similar density / 1,000 gsf) = 0.0338) x 3% annual increase from 2017 through 2021 and 2023 for Phase 1 and project buildout, respectively).

Source: Michael Baker International (2017), Alexandria Real Estate Equities (ARE) (2018)

The SSFFD also commented on the proposed project through the City's standard review process. Staffing and service issues were not identified with respect to proposed site development. The proposed project would be designed comply with the California Fire Code and the City Fire Marshall's code requirements that require on site access for emergency vehicles, a standard condition for any new project approval. Fire sprinkler, extinguisher, alarm, pump, and piping standards; access road and vehicle clearance standards; fire hydrant location and specifications; utility shutoff locations; hazardous material planning; emergency radio coverage; elevator specifications; and application of the Public Safety Impact Fee of the East of 101 Area all were identified as conditions of project approval.

Therefore, the proposed project would have a less-than-significant impact on the City's fire protection services under both Phase 1 and project buildout. No mitigation is required.

Impact PS-2: Operation of the proposed project would not require the provision of new or physically altered police protection services in order to maintain acceptable service ratios, response times, or other performance objectives. ***(Less than Significant)***

The South San Francisco Police Department (SSFPD) provides police service to the entire City. As of 2016, the SSFPD had a total of 83 sworn officers and 35 civilian employees with ratio of 1.23 officers per

[108] Michael Baker International, 2017. *2017 Oyster Point Specific Plan Update Municipal Services Assessment*. Attachment A-1 – South San Francisco Fire Map 7b, 4 Minute Travel from Station 62. Available online at: http://weblink.ssf.net/weblink/Browse.aspx?startid=51192&row=1&dbid=0. Accessed May 10, 2018.

1,000 residents.[109,110] The SSFPD operates out of one main station (as opposed to having substations), which is currently located at 33 Arroyo Drive.

Implementing Policy 8.1.I-2 of the General Plan Health and Safety Element seeks to maintain a target ratio of 1.5 officers per 1,000 residents to ensure rapid and timely response to all emergencies. The proposed project would not construct new housing, and would not impact the ratio of officers per resident. In 2016, the SSFPD response times to emergency calls averaged 3:59 minutes and to nonemergency calls averaged 6:03 minutes.[111] These response times are considered acceptable under SSFFD goals, though there are no adopted standards.

The proposed project is estimated increase incident volume per day at Phase 1 and at project build-out (assumed to occur in 2021 and 2023, respectively), as shown in **Table 4.11.3: Estimated Police Protection Incidents Generated under the Proposed Project**. The proposed project, at either Phase 1 or project buildout, would generate fewer than 20 calls per year and fewer than two calls per month; therefore, no additional staffing would be required.

Table 4.11.3: Estimated Police Protection Incidents Generated under the Proposed Project

Phase	Proposed Office/ R&D Use (gsf)	Annual Service Calls	Total Calls Per Day	Police Demand
Phase 1	336,368	9	0.02	0
Project Buildout	677,600	18	0.05	0

Note: The average annual call volume per 1,000 gsf of Office/R&D use is calculated as follows: square footage of office/BTP use / ((124 average service calls per year between 2013–2017 / (5,600,000 gsf existing Office/R&D use at similar density / 1,000 gsf) = 0.0338) x 3% annual increase from 2017 through 2021 and 2023 for Phase 1 and project buildout, respectively).

Source: Michael Baker International (2017), Alexandria Real Estate Equities (ARE) (2018)

The SSFPD also commented on the proposed project through the City's standard review process. Staffing and service issues were not identified with respect to site development. Conformance to Municipal Code Chapter 15.48.070, minimum security standards for nonresidential buildings, including a list of security design measures, was identified as a condition of project approval.

A new police headquarters that will replace the current main station is proposed as part of the City's Community Civic Campus project, which is currently undergoing its own environmental review, with construction planned for 2019. The City will be constructing a new, approximately 39,000-sq.-ft. police headquarters that will replace the existing approximately 29,000-sq.-ft. station as part of the Community Civic Campus project. The new facility will result in an additional 10,000 sq. ft. of facility space.

Though the project would result in more employees onsite, it is expected that the proposed office/R&D land use would not lead to a substantial increase in service calls to SSFPD. It is not expected that the project would lead to an increase in SSFPD service call response times, and existing ongoing plans to

[109] City of South San Francisco, 2016. Adopted Biennial Operating Budget & Capital Improvement Program, Fiscal Years 2017-19, p. E-39. Available online at: http://www.ssf.net/home/showdocument?id=2027. Accessed May 10, 2018.

[110] Based on a population of 67,200 residents in 2015 as provided in ABAG *Projections 2013*, p. 85.

[111] Michael Baker International, 2017. *2017 Oyster Point Specific Plan Update Municipal Services Assessment*. p. 8. Available online at: http://weblink.ssf.net/weblink/Browse.aspx?startid=51192&row=1&dbid=0. Accessed May 10, 2018.

upgrade police facilities would further reduce response times and service ratios. Therefore, no new facilities would be necessary to serve the proposed project, and the proposed project would have a less-than-significant-impact on police services under both Phase 1 and project buildout. No mitigation is required.

Impact PS-3: Operation of the proposed project would not require the provision of new or physically altered schools or other public facilities in order to maintain acceptable service ratios, response times, or other performance objectives. ***(Less than Significant)***

Schools and Libraries

The City is served by the South San Francisco Unified School District. As discussed in Section 13.8, Population and Housing, some of the proposed project employees may relocate to the City, thereby generating a small indirect student population increase or an increase in library use. However, because the project would not involve construction of new residences, it is not likely that the school district or existing libraries would experience a substantial growth in demand. Nonetheless, the proposed project would be subject to development fees, including a school district fee based on square footage of commercial/industrial development. Therefore, the impact on the South San Francisco Unified School District and local libraries would be less than significant. No mitigation is required.

Childcare

The proposed office/R&D uses would result in the need for childcare facilities for infants to 4-year-olds (infant to preschool). There is currently a shortage of preschool childcare facilities in the City.[112] However, the proposed project would be required to pay a fee under the City's Childcare Impact Fee Program. The purpose of the Childcare Impact Fee Program is to impose a fee on new development based on a nexus study which analyzed the projected need for new childcare facilities and calculated the fee amount necessary to fund the new spaces to serve the increased demand for childcare generated by new development.

In addition, the City's zoning ordinance provides a development bonus for accessory childcare uses on new nonresidential projects to encourage the development of new childcare facilities. For example, future development during Phase 2 of the proposed project could include FAR-excluded accessory uses such as childcare, to be determined in coordination with the City and upon completion of final design.

In summary, the impact of the proposed project on childcare facilities would be less than significant under both Phase 1 and project buildout. No mitigation is required.

Impact C-PS-1: Operation of the proposed project would not require the provision of new or physically altered public services in order to maintain acceptable service ratios, response times, or other performance objectives. ***(Less than Significant)***

The proposed project's potential contribution to cumulative impacts on public services is evaluated in the context of past, present, and reasonably foreseeable future development expected in the City and includes

[112] Michael Baker International, 2017. *2017 Oyster Point Specific Plan Update Municipal Services Assessment*. p. 40.

the additional baseline and cumulative projects and plans listed in Section 4.1, Approach to Environmental Analysis, pp. 4.1.4-4.4.1.9.

The proposed project does not include the construction of new housing units. Some of the proposed project employees may relocate to the City, thereby generating a small indirect student population increase or an increase in library use. However, because the project would not involve construction of new residences, it is not likely that the school district or existing libraries would experience a substantial growth in demand. Nonetheless, the proposed project would be subject to development fees, including a school district fee based on square footage of commercial/industrial development. Therefore, the proposed project would not contribute to any cumulative impacts related to schools or libraries. The *Downtown Station Area Specific Plan* would involve the development of a new mix of uses including 1,400 housing units. In addition, each of the cumulative projects would involve construction of new office/R&D uses, including the 494 Forbes Boulevard project (326,020 sq. ft.), the 328 Roebling Road project (105,536 sq. ft.), the *Genentech Master Plan Update* (4,300,000 sq. ft), the *Oyster Point Specific Plan Update* project (1,742,000 sq. ft.) and the *Downtown Station Area Specific Plan* project (1,185,049 sq. ft.), totaling approximately 6,986,605 sq. ft. of new office/R&D use. The *Downtown Station Area Plan* would also introduce new Business Commercial use (511,780 sq. ft.), Commercial use (268,800 sq. ft.), and Industrial use (21,250 sq. ft.). The *Oyster Point Specific Plan Update* project would also provide 40,000 sq. ft. of Commercial use.

As discussed in Section 13.8, Population and Housing, these projects would not constitute substantial unplanned population or employment growth such that substantial impacts on the provision of public services would occur. Therefore, the proposed project would not contribute considerably to significant cumulative impacts on fire protection from reasonably foreseeable future projects.

Similar to the proposed project, developers of other reasonably foreseeable projects in the East of 101 area would be required to adhere to conditions of approval set forth by the SSFFD or SSFPD related to fire-safe and security design measures, and applicable impact fees such as the City Childcare Impact Fee and School District Fee, as applicable. The proposed project, in combination with reasonably foreseeable probable future projects, would not substantially impact existing public services and no significant cumulative impact would occur. Therefore, the proposed project would not contribute considerably to a significant cumulative public services impact. This impact would be less than significant. No mitigation is required.

4.11.8 Recreation

REGULATORY FRAMEWORK

Significance Criteria

Based on State CEQA Guidelines, Appendix G, the proposed project would have a significant environmental impact related to recreation if it would:

a. increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or

b. require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

APPROACH TO ANALYSIS

There are no City-, state- or federally owned parks or recreation centers within 1 mile of the project site. This analysis focuses on the potential for the proposed project to impact the existing regional Bay Trail. The proposed project site plan at Phase 1 and project buildout also have outdoor public and private open space, including a basketball court in the central plaza located at 201 Haskins Way, as well as new outdoor eating areas and sidewalks, as required by the zoning ordinance. These amenities are considered in light of recreation demand generated under the proposed project as discussed below.

IMPACT EVALUATION

Impact RE-1: The proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. (*Less than Significant*)

The Parks and Recreation Department manages parks and recreation centers within City boundaries. As of 2015, there are an estimated 251.2 acres of parks and open space in the City, including community parks, neighborhood parks, mini-parks, linear parks, open spaces, and school lands.[113]

The project site and vicinity are primarily characterized by industrial and office/R&D uses with a substantial existing daytime employee population. There are no City parks located within 1 mile of the project site. The project site, particularly the 400-450 East Jamie Court parcel, is adjacent to the Bay Trail to the south. This segment of the Bay Trail is part of a planned 500-mile hiking and bicycling path that will encircle San Francisco and San Pablo bays and follow the shoreline of nine counties, pass through 47 cities, and cross seven toll bridges. Approximately 350 miles of the trail have been completed.[114] The trail provides scenic recreation, wildlife viewing, and environmental education opportunities. The Bay Trail is used for recreational activities by regional users from outside the City, bicycle commuters, and local workers.

Impacts on the Bay Trail under Phase 1 and project buildout as a result of the construction and operation of new BTP uses are discussed below.

Phase 1

As detailed in Section 4.10.6, Population and Housing, the proposed project under Phase 1 would not generate any residents nor a substantial population of employees. The proposed project would not substantially increase demand on the Bay Trail. The Bay Trail is a paved hardscaped resource that is designed for repetitive use for commuting and recreational use for users across the entire Bay Area. Though some employees of the project site may use the Bay Trail, this use would not substantially

[113] City of South San Francisco, 2015. *Parks and Recreation Master Plan*. p. 23. Available online at: http://www.ssf.net/home/showdocument?id=498. Accessed May 10, 2018.
[114] San Francisco Bay Trail, 2018. Welcome to the San Francisco Bay Trail (website). Available online at: http://baytrail.org/about-the-trail/welcome-to-the-san-francisco-bay-trail/. Accessed May 10, 2018.

deteriorate existing parks or recreational facilities based on the relatively small number of new employees expected to occupy the proposed new buildings (748 employees at Phase 1). Furthermore, the proposed project, under Phase 1, would involve construction of on-site open space and landscaping as required under the zoning ordinance. Open space amenities would include a basketball court in the central plaza located at 201 Haskins Way, as well as new outdoor eating areas and sidewalks. These amenities would partially offset recreation demand from employees on site.

In conclusion, the proposed project during Phase 1 would not cause substantial deterioration of the Bay Trail. Impacts related to existing recreational resources would be considered less than significant during Phase 1. No mitigation is required.

Project Buildout

As discussed in Section 13.8, Population and Housing, the proposed project under project buildout would not generate any new residential units or a substantial population of new employees. The proposed project at project buildout would not substantially increase demand on the City's public parks or the Bay Trail. Though some employees of the project site may use the Bay Trail, this use would not substantially deteriorate existing parks or recreational facilities based on the relatively small number of new employees expected to occupy the proposed new buildings (1,506 employees at project buildout). No other neighborhood or regional parks are located close enough to the project site that they would be substantially affected by the proposed project. Furthermore, the proposed project, under project buildout, would involve construction of on-site open space and landscaping as required under the zoning ordinance and as advised by the Design Review Board. This includes a basketball court in the central plaza located at 201 Haskins Way, as well as new outdoor eating areas and sidewalks. These amenities would partially offset recreation demand from employees on site.

In conclusion, the proposed project at project buildout would not cause substantial deterioration of the Bay Trail, and no other recreational facilities are expected to be used by employees of the project site. Impacts related to existing recreational resources would be considered less than significant during project buildout. No mitigation is required.

Impact RE-2: The proposed project would not require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. (*Less than Significant*)

As discussed in Impact RE-1, above, the proposed project would not cause substantial deterioration of local or regional recreation resources under either Phase 1 or project buildout. The proposed project would not require the construction of new recreational facilities or expansion of recreational facilities in order to replace or compensate for the loss of or deterioration of existing recreational resources. The proposed project, under both Phase 1 and project buildout, would involve construction of on-site open space and landscaping as required under the zoning ordinance. This includes a basketball court in the central plaza located at 201 Haskins Way, as well as new outdoor eating areas and sidewalks. The construction of these facilities would occur concurrently during construction of office/R&D buildings at Phase 1 and at project buildout. Physical effects on the environment as a result of construction of the proposed project during Phase 1 and project buildout are discussed in their respective environmental

topics in this EIR. No further environmental effects as a result of construction of on-site recreational amenities would occur. This impact would be less than significant. No mitigation is required.

Impact C-RE-1: The proposed project, would not result in a cumulatively considerable contribution to significant cumulative impacts on recreation. (*Less than Significant*)

The proposed project's potential contribution to cumulative impacts on recreation is evaluated in the context of past, present, and reasonably foreseeable probable future development expected in the City and includes the additional baseline and cumulative projects and plans listed in Section 4.1, Approach to Environmental Analysis, pp. 4.1.4-4.1.9.

As discussed in Section 4.10.6, Population and Housing, the proposed project, in combination with past, present, and reasonably foreseeable future development, would not generate any new residents or a substantial population of employees. The proposed project at project buildout would not substantially increase demand on the City's public parks or the Bay Trail. Though some employees at the project site may use the Bay Trail, this use would not substantially deteriorate existing parks or recreational facilities. Similarly, new employees and residents in other areas of the East of 101 Area would also use portions of the Bay Trail that are near their sites. Because the Bay Trail is a paved hardscaped resource that is designed for repetitive use for commuting and recreational use for users across the entire Bay Area, the additional use by new development would not result in a significant cumulative impact on this recreational facility. There are no other neighborhood or regional parks that would be substantially affected by the proposed project. The proposed project, in combination with past, present, and reasonably foreseeable probable future development, would not cause substantial deterioration of the Bay Trail. As with the proposed project, other development projects proposed or under consideration nearby would be required to include on-site recreational open space and amenities for the residents and employees who would occupy their developments. Therefore, the proposed project would not contribute considerably to a significant cumulative impact on recreation. Cumulative impacts would be considered less than significant. No mitigation is required.

5 ALTERNATIVES

5.1 Introduction

Chapter 5, Alternatives, evaluates alternatives to the proposed project and examines the potential environmental impacts associated with each alternative. By comparing these alternatives to the proposed project, the relative environmental advantages and disadvantages of each may be analyzed and weighed. California Environmental Quality Act (CEQA) Guidelines section 15126.6(a) states that an environmental impact report (EIR) must describe and evaluate a reasonable range of alternatives to the proposed project which would feasibly attain most of the proposed project's basic objectives but would avoid or substantially lessen any identified significant adverse environmental impacts of the proposed project.

The range of alternatives required in an EIR is governed by a "rule of reason" that requires the EIR to set forth only those potentially feasible alternatives necessary to foster informed public participation and an informed and reasoned choice by the decision-making body (CEQA Guidelines section 15126.6(f)). Therefore, an EIR does not need to address every conceivable alternative or consider infeasible alternatives. CEQA generally defines "feasible" to mean the ability to be accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, technological, and legal factors (CEQA Guidelines section 15364). The following factors may also be considered: site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, and the ability of the proponent to attain site control (CEQA Guidelines section 15126.6(f)(1)). An EIR does not need to consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (CEQA Guidelines, Section 15126.6(f)(3)).

Two alternatives are evaluated in this chapter:

- Alternative A: No Project Alternative
- Alternative B: Reduced Development Alternative

Under Alternative A: No Project Alternative, the existing land uses and site conditions at the project site would not change, and the project site would not be rezoned to Business Technology Park (BTP) and the floor area ratio (FAR) would remain 0.4 or 1.0 for the various parcels. Alternative B: Reduced Development Alternative would comply with the existing City of South San Francisco (City) zoning code and regulations established for this site. Under this alternative, the project site would remain in a Business Commercial (BC) district on one parcel (Assessor's Parcel Number [APN] 015-102-250), and a Mixed Industrial district on the remaining seven parcels (APNs 015-102-230, 015-102-210, 015-102-220, 015-102-180, 015-102-160, 015-102-240, and 015-102-290).

Table 5.1: Comparison of Characteristics of the Proposed Project to the Alternatives and **Table 5.2: Comparison of Significant Impacts of the Proposed Project to the Alternatives**, shown below on pp. 5.3-5.4, compare the main features and impacts of the proposed project to those of the alternatives. Alternative B would reduce the project-level impact on one intersection but not to a less-than-significant level; this impact would remain significant and unavoidable (see Impact TR-2). Alternative B would reduce the project's contribution to a significant cumulative impact to a less-than-significant level for six intersections and would reduce queue-related traffic impacts (see Impacts C-TR-3, C-TR-5 [Phase 1 only], C-TR-10, C-TR-11, C-TR-12, and C-TR-13), one freeway segment impact (see Impact C-TR-19), and one freeway ramp impact (see Impact CR-20 [Phase 1 only]). Alternative B would also reduce the proposed project's contribution to 12 significant cumulative transportation impacts but not to a less-than-significant level; these impacts would remain significant and unavoidable (see Impacts C-TR-4, C-TR-5 [buildout only], C-TR-6, C-TR-7, C-TR-8, C-TR-9, C-TR-15, C-TR-16, C-TR-17, C-TR-18, C-TR-20 [buildout only], and C-TR-21). This alternative would reduce less-than-significant air quality, greenhouse gas (GHG) emissions, land use, noise and vibration, and utilities impacts of the proposed project, which are analyzed below. This alternative would result in similar less-than-significant impacts on biological resources, cultural resources, hydrology and water quality, and impacts listed in Section 4.11 (aesthetics, agriculture and forest resources, geology and soils, hazards and hazardous materials, mineral resources, and recreation) to those with the proposed project, which are analyzed below. This chapter identifies the Reduced Development Alternative as the environmentally superior alternative (i.e., the alternative that would result in the least adverse effect on the physical environment). This chapter concludes with a discussion of the alternatives that were considered but not analyzed further because they were rejected as infeasible or failed to meet the basic project objectives.

The project sponsor's objectives for the proposed project in furtherance of the City's General Plan and City's policies for developing the East of 101 Area are presented in Chapter 3, Project Description, pp. 3.2-3.3. The ability of each alternative to meet these objectives is presented in **Table 5.3: Ability of Alternatives to Meet Project Objectives**.

As shown in the table, the No Project Alternative (Alternative A) would not meet any of the basic project objectives. The Reduced Development Intensity Alternative (Alternative B) would only attain several of the project sponsor's objectives to a lesser or partial extent. For example, this alternative would provide less office/research and development (R&D) development than the proposed project (459,514 gross square feet [gsf] with the alternative, compared to 677,600 gsf with the proposed project), and would not maximize the opportunity to increase office/R&D uses in an area designated for the promotion of new biotechnology and research and development. Due to the reduced allowable development under Alternative B, it would not result in the degree of positive fiscal impact on the City through the creation of jobs, enhancement of property values, and generation of property tax and other development fees.

Table 5.1: Comparison of Characteristics and Significant Impacts of the Proposed Project to the Alternatives

Parcel Address (APN)	Lot Size (sq. ft.)	Alternative A: No Project Alternative[1]			Proposed Project						Alternative B: Reduced Development Potential Alternative[3]					
		Total Floor Area			Total Floor Area			Gross Square Feet			Total Floor Area			Gross Square Feet[4]		
		Phase 1 Area Existing Development (sq. ft.)	*Phase 2 Area Existing Development (sq. ft.)*	Total Existing Development (sq. ft.)	Phase 1 Development (sq. ft.)	*Phase 2 Development (sq. ft.)*	Project Buildout (sq. ft.)	Phase 1 Development (gsf)	*Phase 2 Development (gsf)*	Project Buildout (gsf)	Phase 1 Development (sq. ft.)	*Phase 2 Development (sq. ft.)*	Project Buildout (sq. ft.)	Phase 1 Development (gsf)	*Phase 2 Development (gsf)*	Project Buildout (gsf)
201 Haskins Way (015-102-230)	280,765	24,075	-	24,075	280,765	-	280,765	311,368	-	311,368	168,459	-	168,459	186,990	-	186,990
400-450 East Jamie Court (015-102-250)	267,000	157,000	-	157,000	25,000	*85,000[1,2]*	110,000[1,2]	25,000	*85,000[1]*	110,000	25,000	*85,000[1,2]*	110,000[1,2]	25,000	*85,000[1]*	110,000
101 Haskins Way (015-102-210)	24,535	-	7,000	7,000	-	*24,535*	24,535	-	*25,762*	25,762	-	14,721	14,721	-	16,340	16,340
151 Haskins Way (015-102-220)	28,602	-	11,599	11,599	-	*28,602*	28,602	-	*30,032*	30,032	-	17,161	17,161	-	19,049	19,049
410 East Grand Avenue (015-102-180)	40,384	-	27,300	27,300	-	*40,384*	40,384	-	*42,403*	42,403	-	24,230	24,230	-	26,895	26,895
430 East Grand Avenue (015-102-160)	72,076	-	37,096	37,096	-	*72,076*	72,076	-	*75,680*	75,680	-	43,246	43,246	-	48,003	48,003
451 East Jamie Court (015-102-240)	62,087	-	75,000	75,000	-	*62,087*	62,087	-	*65,191*	65,191	-	37,252	37,252	-	41,350	41,350
(015-102-290)	16,347	-	-	-	-	*16,347*	16,347	-	*17,164*	17,164	-	9,808	9,808	-	10,887	10,887
Total	**791,796**	**181,075**	**157,995**	**339,070**	**305,765**	*329,031*	**634,796**	***336,368***	*341,232*	**677,600**	**193,459**	***231,418***	***424,877***	**211,990**	**247,524**	**459,514**
Existing Parking Spaces to Remain	-	464 spaces	114 spaces	578 spaces	-	-	-	424 spaces	-	424 spaces	-	-	-	424 spaces	-	424 spaces
New Parking Spaces	-	-	-	-	-	-	-	903 Spaces	603 Spaces	1,506 spaces	-	-	-	605 spaces	707 spaces	1,312 spaces
Total Parking Spaces	-	464 spaces	114 spaces	578 spaces	-	-	-	1,327 Spaces	603 Spaces	1,930 spaces	-	-	-	1,029 spaces	707 spaces	1,736 spaces

Notes:

[1] Existing floor area that would remain under Alternative A is based on the FAR-defined square footage of development for the land use analysis purposes. For Transportation analysis and other quantitative environmental analyses, development impacts are calculated based on gross square feet. Therefore, this table provides both FAR-defined floor area and gross square feet.

[2] The 110,000 sq. ft. of available floor area at 400-450 East Jamie Court would be developed through construction of the planned approximately 25,000 sq. ft. building addition to 400-450 East Jamie Court plus the remaining development potential of BTP use under Phase 2. When the total floor area of the Phase 1 building addition is determined, the remaining balance of floor area would be applied to the design of the BTP use under Phase 2 development. It is assumed that the total floor area of the building addition is approximately 25,000 sq. ft of floor area. Therefore, for the purposes of plan-level analysis, it is assumed that Phase 2 development would result in, at minimum, 85,000 sq. ft. total floor area of BTP use.

[2] Section 20.040.008 of the zoning ordinance specifies that floor area includes, but is not limited to, habitable (as defined in the California Building Code) basements and cellars that are below the roof and within the outer surface of the main walls of principal or accessory buildings or the centerlines of party walls separating such buildings or portions thereof or within lines drawn parallel to and two feet within the roof line of any building without walls. In the case of a multi-story building that has covered or enclosed stairways, stairwells or elevator shafts, the horizontal area of such features shall be counted only once at the floor level of their greatest area of horizontal extent. The ordinance specifies that floor area does not include mechanical, electrical, and communication equipment rooms that do not exceed two percent of the building's gross floor area; bay windows or other architectural projections where the vertical distance between the lowest surface of the projection and the finished floor is 30 inches or greater;

Table 5.2: Comparison of Significant Impacts of the Proposed Project to the Alternatives

Impact Statement	Alternative A: No Project Alternative	Proposed Project	Alternative B: Reduced Development Potential Alternative
Summary of Significant Impacts of the No Project, the Proposed Project, and the Reduced Project Alternative Legend: NI = No Impact; LS = Less than Significant; LTSM = Less than Significant with Mitigation; SU = Significant and unavoidable; SUM = Significant and unavoidable impact with mitigation; NA = Not Applicable			
Section 4.9: Transportation and Circulation- Project Impacts			
TR-2: The proposed project (Phase 1 or buildout) would cause the intersection of Allerton Avenue and East Grand Avenue to exceed LOS D operations during the PM peak hour, and the project would contribute more than 2 percent of the total traffic through the intersection.	NI	SU	SU
Section 4.9: Transportation and Circulation - Cumulative Impacts			
C-TR-3: Buildout of the proposed project (Phases 1 & 2) would contribute considerably to the significant impact at the intersection of Airport Boulevard and Grand Avenue during the AM peak hour.	NI	SU	LTS
C-TR-4: Buildout of the proposed project (Phases 1 & 2) would contribute considerably to a significant cumulative at the intersection of Dubuque Avenue and Grand Avenue during the PM peak hour.	NI	SU	SU
C-TR-5: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact the intersection of East Grand Avenue and Grand Avenue Overcrossing during the PM peak hour.	NI	SU	LTS (Phase 1) SU (buildout)
C-TR-6: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Gateway Boulevard and East Grand Avenue during the PM peak hour.	NI	SU	SU
C-TR-7: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Harbor Way/Forbes Boulevard and East Grand Avenue in both the AM and PM peak hours.	NI	SU	SU
C-TR-8: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative at the intersection of Littlefield Avenue and East Grand Avenue in the AM peak hour.	NI	SU	SU
C-TR-9: The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Allerton Avenue and East Grand Avenue in the PM peak hour.	NI	SU	SU
C-TR-10: The proposed project at buildout would contribute considerably to a significant cumulative impact at the intersection of Airport Boulevard/Produce Avenue/San Mateo Avenue in the PM peak hour.	NI	SU	LTS
C-TR-11: The proposed project at buildout would contribute considerably to a significant cumulative impact at the intersection of Gateway Boulevard/South Airport Boulevard/Mitchell Avenue in the PM peak hour.	NI	SU	LTS
C-TR-12: The proposed project at buildout would contribute considerably to a significant cumulative impact at the freeway ramp intersection of South Airport Boulevard and U.S. 101 Northbound Hook Ramps/Wondercolor Lane in the AM peak hour.	NI	SU	LTS
C-TR-13: The proposed project at buildout would contribute considerably to a significant cumulative impact at the intersection of South Airport Boulevard and Utah Avenue in the AM peak hour.	NI	SU	LTS
C-TR-15: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impacts on the southbound left turn movement in the AM peak hour and the westbound right-turn movement in the AM and PM peak hours at the intersection of Airport Boulevard and Grand Avenue where the 95th percentile queues with future cumulative growth in 2040 would exceed the available storage length without the project.	NI	SU	SU
C-TR-16: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impacts on the eastbound and westbound through movements in the PM peak hour and westbound left turn movement in the AM and PM peak hours on East Grand Avenue at Gateway Boulevard where the 95th percentile queues would exceed the available storage lengths during these peak hours without the proposed project.	NI	SU	SU
C-TR-17: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the westbound left turn movement on Airport Boulevard at the intersection of Airport Boulevard/Produce Avenue where the 95th percentile queue would exceed the available storage length during the AM and PM peak hours in 2040 without the proposed project.	NI	SU	SU
C-TR-18: The proposed project (Phase 1 or buildout) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the eastbound left turn movement on the northbound U.S. 101 off-ramp at South Airport Boulevard/Wondercolor Lane where the 95th percentile queue would exceed the available storage length during the AM peak hour in 2040 without the proposed project.	NI	SU	SU
C-TR-19: The freeway segments serving the proposed project site would operate at unacceptable LOS F in the future with forecast development in 2040, resulting in a significant cumulative impact. The proposed project at buildout (Phases 1 & 2) \would add more than 1 percent of total traffic to two freeway segments during the PM peak hour which would operate at LOS F under cumulative conditions without the project.	NI	SU	LTS
C-TR-20. The proposed project (Phase 1 or Phases 1 & 2) would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the northbound U.S. 101 off-ramp at South Airport Boulevard/Wondercolor Lane where the volume would exceed the available capacity during the AM peak hour in 2040 without the proposed project.	NI	SU	LTS (Phase 1) SU (buildout)
C-TR-21. The proposed project (Phase 1 or Phases 1 & 2) would add traffic volumes which would cause total traffic to exceed capacity and therefore would contribute considerably to the significant cumulative impact on the southbound U.S. 101 on-ramp from Produce Avenue where the volume would not exceed the available capacity during the PM peak hour in 2040 without the proposed project.	NI	SU	SU

Table 5.3. Ability of Alternatives to Meet Project Objectives

Project Objective	Alternative A: No Project Alternative	Alternative B: Reduced Development Alternative
	Would the alternative meet this objective?	
Create state-of-the-art research and development facilities consistent with the General Plan designation of the site, and General Plan goals and policies.	No	Partial: Alternative B does not fully maximize allowable density under the existing General Plan land use designations (CC/MI)
Promote the City's ongoing development of the East of 101 Area into a nationally recognized biotechnology and research and development center that will attract other life science uses.	No	Partial
Further the City's policies of developing the East of 101 Area with new opportunities for continued evolution from manufacturing and warehousing/distribution to biotechnology and research and development.	No	Partial
Redevelop underutilized parcels within the project site at a higher density to take advantage of the opportunities offered in the East of 101 Area to create a vibrant research and development campus.	No	Partial: Alternative B does not fully maximize density[1]
Develop a research and development campus with a high level of design quality as called for in the Design Policies and Guidelines of the East of 101 Area Plan	No	Partial
Build a project that creates quality jobs for the City;	No	Less than the proposed project
Provide sufficient space for tenants to employ key scientific and business personnel in proximity to each other to foster efficient collaboration and productivity;	No	Partial: Alternative B does not fully maximize allowable floor area[1]
Capitalize on the project's proximity to the City's Bay shoreline and San Francisco Bay Trail (Bay Trail) by providing views and access to the waterfront.	No	Yes
Enhance the visual quality of development around the Bay shoreline and take advantage of the attractive setting it provides.	No	Partial
Promote alternatives to automobile transportation to further the City's transportation objectives by emphasizing linkages, TDM, and pedestrian access and ease of movement between buildings.	No	Yes
Enhance vehicular, bicycle, and pedestrian circulation and access in the area surrounding the project site.	No	Yes
Build a project that is viable in the East of 101 Area based upon market conditions and project service requirements for the area.	No	Less than the proposed project
Incorporate flexibility for office and research and development uses to ensure that the project is responsive to tenant demands based on market conditions	No	Less than the proposed project
Provide a positive fiscal impact on the City through the creation of jobs, enhancement of property values, and generation of property tax and other development fees.	No	Less than the proposed project
Retain the flexibility to build the project in phases that respond to market conditions.	No	Yes
Allow for the continued operation of existing manufacturing and warehousing/distribution uses until new development occurs, consistent with City policies.	No	Yes

Note: [1] Alternative B provides 32 percent of the Office/R&D space proposed for the project.

Source: ARE, City of South San Francisco (2018)

5.2 Alternative A: No Project Alternative

CEQA Guidelines section 15126.6(e) requires that a "no project" alternative be evaluated: "The purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." CEQA Guidelines section 15126.6(e)(2) requires that the no project alternative analysis "discuss the existing conditions…as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and policies and consistent with the available infrastructure and community services." As noted in CEQA Guidelines section 15126.6, an EIR for "a development project on identifiable property" typically analyzes a no project alternative, i.e., "the circumstance under which the project does not proceed. Such a discussion would compare the environmental effects of the property remaining in its existing state against environmental effects that would occur if the project is approved. If disapproval of the project under consideration would result in predictable actions by others, such as the proposal of some other project, this 'no project' consequence should be discussed."

5.2.1 Description

Under Alternative A: No Project, the existing land uses and site conditions at the project site would not change. The existing seven buildings on the project site would remain, as would the existing ingress and egress points, and the surface parking which accommodates 578 vehicles, 20 semi-tractors, and 35 trailers. Under the No Project Alternative, the project site would not be rezoned to BTP and the FAR would remain 0.4 or 1.0 for the various parcels. The No Project Alternative would not preclude potential future development of the project site with a range of land uses that are permitted at the project site.

5.2.2 Impacts

This environmental analysis assumes that the existing structures and uses on the project site would not change and that the existing physical conditions, as described in detail for each environmental topic in Chapter 4, Environmental Setting, Impacts, and Mitigation, would remain the same. If the No Project Alternative were implemented, none of the impacts associated with the proposed project, as described in Chapter 4, would occur. However, development and growth would continue within the vicinity of the project site as reasonably foreseeable future projects are approved, constructed, and occupied. These projects could contribute to cumulative impacts in the vicinity, but under the No Project Alternative, land use activity on the project site would not contribute to these cumulative impacts beyond existing levels.

AIR QUALITY

Under Alternative A there would be no demolition or construction activities and no new operational sources of air pollutants on the project site. Existing stationary sources of air pollution near the project site and major roadways contributing to air pollution in the project vicinity would remain in existing conditions. Compared to the proposed project, which would result in less-than-significant project-level air quality impacts with mitigation and a less than cumulatively considerable contribution to significant cumulative air quality impacts with mitigation, the No Project Alternative would have no impact related to air quality. Because potential air quality impacts that would occur under the proposed project would

not occur under this alternative, implementing air quality mitigation measures MM-AQ-1a through MM-AQ-1b would not be necessary.

BIOLOGICAL RESOURCES

Under Alternative A there would be no demolition of buildings or removal of any trees or vegetation. Compared to the proposed project, which would result in a less-than-significant project-level biological resources impacts with mitigation and a less than cumulatively considerable contribution to significant cumulative biological impacts with mitigation, the No Project Alternative would have no impact related to biological resources. Because potential biological resources impacts that would occur under the proposed project would not occur under this alternative, implementing mitigation measures MM-BI-1a through MM-BI-1d would not be necessary.

CULTURAL RESOURCES

Under Alternative A no excavation and demolition of buildings would occur on the site. The site would remain in its current condition. Compared to the proposed project, which would result in a less-than-significant project-level cultural resources impacts with mitigation and a contribution to significant cumulative cultural impacts that is less than cumulatively considerable with mitigation, the No Project Alternative would have no impact related to cultural resources. Because potential cultural resources impacts that would occur under the proposed project would not occur under this alternative, implementing mitigation measures MM-CR-2a through MM-CR-2c, and MM-CR-3, would not be necessary.

GREENHOUSE GAS EMISSIONS

Alternative A would not result in new GHG emissions. No demolition or new construction activities would occur. There would be no new development to adhere to Leadership in Energy and Environmental Design (LEED) requirements. Sources of GHG emissions would continue under existing conditions but there would be no cumulatively considerable contribution to significant GHG impacts.

HYDROLOGY AND WATER QUALITY

Under Alternative A, there would be no demolition or construction of new buildings, and no changes to existing impervious surfaced, hardscape, or landscaped and vegetated areas on the project site. The No Project Alternative would not alter the site drainage pattern or substantially deplete groundwater supplies, or interfere substantially with groundwater recharge. Compared to the proposed project, which would result in a less-than-significant project-level hydrology and water quality impact and a less-than-cumulatively considerable contribution to significant cumulative hydrology and water quality impacts, the No Project Alternative would have no impact related to hydrology and water quality.

LAND USE AND PLANNING

The No Project Alternative would not involve a rezoning of the parcels on the project site. The project site would remain zoned as Business Commercial on one parcel (APN 015-102-250), and as Mixed Industrial on the remaining seven parcels (APNs 015-102-230, 015-102-210, 015-102-220, 015-102-180,

015-102-160, 015-102-240, and 015-102-290). Under the No Project Alternative, land use would remain as under existing conditions. Compared to the proposed project, which would result in a less-than-significant project-level land use and planning impact and a less-than-significant cumulatively considerable contribution to significant cumulative land use and planning impact, the No Project Alternative would have no impact related to land use and planning.

NOISE

Under the No Project Alternative, there would be no demolition or construction activities and no new temporary or operational noise or vibration impacts in the project vicinity or within the project site. Noise conditions in the area would remain as in existing conditions. Compared to the proposed project, which would result in less-than-significant project-level noise impacts with mitigation and a less than cumulatively considerable contribution to cumulative noise impacts with mitigation, the No Project Alternative would have no impact related to noise. Because potential noise impacts that would occur under the proposed project would not occur under this alternative, implementing noise mitigation measures MM-NO-2 and MM-NO-3 would not be necessary.

TRANSPORTATION AND CIRCULATION

Unlike the proposed project, under the No Project Alternative there would be no changes to traffic and circulation. The existing commercial and industrial buildings on the project site would continue to operate in their current condition and traffic conditions under existing conditions would remain. Compared to the proposed project, which would result in a significant and unavoidable project-level transportation and circulation impact and a cumulatively considerable contribution to significant unavoidable cumulative transportation and circulation impacts, the No Project Alternative would have no impact related to transportation and circulation. Because the impacts that would occur under the proposed project would not occur under this alternative, mitigation measures would not be applicable.

UTILITIES AND SERVICE SYSTEMS

The No Project Alternative would not involve any new construction or new land uses on the project site. This alternative would not alter the existing stormwater conveyances and would not exceed the capacity of the wastewater treatment provider serving the project site. This alternative would also not require the construction of new, or expansion of existing, wastewater treatment facilities. The No Project Alternative would not require the construction of new, or expansion of existing, stormwater drainage facilities, the construction of which could cause significant environmental effects. Compared to the proposed project, which would result in a less-than-significant project-level utilities and service systems impact and a less-than-cumulatively considerable contribution to significant cumulative utilities and service systems impact, the No Project Alternative would have no impact related to utilities and services systems.

OTHER TOPICS

The Draft EIR concludes that the proposed project would have no impact or less-than-significant impacts in the following analysis areas:

- Agriculture and Forest Resources (all topics)
- Aesthetics (all topics)
- Geology and Soils (all topics)
- Hazards and Hazardous Materials (all topics)
- Mineral and Energy Resources (all topics)
- Population and Housing (all topics)
- Public Services (all topics)
- Biological Resources (all topics)
- Recreation (all topics)

The No Project Alternative would result in no impact related to any of the above-listed environmental topics, because this alternative would result in no changes to existing site conditions.

5.3 Alternative B: Reduced Development Alternative

5.3.1 Description

Unlike the proposed project, Alternative B: Reduced Development Alternative, would comply with the existing City zoning code and regulations established for this site. Under this alternative, the project site would remain zoned as Business Commercial on one parcel (APN 015-102-250), and as Mixed Industrial on the remaining seven parcels (APNs 015-102-230, 015-102-210, 015-102-220, 015-102-180, 015-102-160, 015-102-240, and 015-102-290). Under existing zoning, parcels would provide new office/R&D development potential of up to 1.0 FAR for the Business Commercial District, similar to the proposed BTP use under the proposed project. Under existing zoning, the Mixed Industrial district provides a new office/R&D development potential of 0.4 FAR, or up to 0.6 FAR with development and implementation of a Transportation Demand Management (TDM) Plan and design and green building standards, subject to approval of a Conditional Use Permit (CUP). As a result, Alternative B would include approximately 459,514 gsf of office/R&D development, 218,086 gsf less than under the proposed project overall, as shown in Table 5.1, on p. 5.3.

Similar to the proposed project, Alternative B would involve the removal of existing light industrial uses and associated parking on seven parcels (101, 151, and 201 Haskins Way; 410 and 430 East Grand Avenue; 451 East Jamie Court; and one parcel with no address [APN 015-102-290]), the construction of new office/R&D use on those seven parcels, and the expansion of existing office/R&D use on one parcel (400-450 East Jamie Court), as shown on **Figure 5.1: Alternative B - Reduced Development Alternative – Conceptual Site Plan**. Like the proposed project, this alternative would be constructed using at least two development phases. For the purposes of analysis under CEQA, the EIR considers a Phase 1 site plan and conceptual Phase 2 site plan. Alternative B would result in the construction of approximately 193,459 square feet of office/R&D use during Phase 1 development, and approximately 231,418 square feet during Phase 2 development.



Source: City of South San Francisco, SWCA (2018)

201 HASKINS WAY PROJECT

FIGURE 5.1: ALTERNATIVE B - REDUCED DEVELOPMENT ALTERNATIVE - CONCEPTUAL SITE PLAN

Like the proposed project, this alternative would involve construction of two primary office/R&D buildings: the 201 Haskins Way Building under Phase 1 development, and the conceptual East Grand Building under Phase 2 development at project buildout. However, the density of the development would be reduced and each building would be constructed to a maximum height of three stories, as compared to five stories under the proposed project. In addition, the conceptual East Grand Building in the Phase 2 area would have a slightly smaller development footprint. Similarly, the proposed parking garage would also be reduced to three stories under Alternative B, as compared to five stories under the proposed project. See **Figure 5.2: Alternative B – Reduced Development Alternative 201 Haskins Way Building Elevations** and **Figure 5.3: Alternative B – Reduced Development Alternative Conceptual East Grand Avenue Building Elevations**.

Under existing Business Commercial zoning, the 400-450 East Jamie Court parcel would have the development potential of 1.0 FAR, the same as for the proposed project. Accordingly, Alternative B would also involve construction of a 25,000 gsf building addition on the 400-450 East Jamie Court parcel during Phase 1. As with the proposed project, Phase 2 development on the 400-450 East Jamie Court parcel is conceptual. Because detailed information about Phase 2 development is not known at this time, the EIR considers the maximum potential development that could occur under existing zoning. Phase 2 development would require subsequent project-level site design review. For illustrative purposes, the EIR includes a conceptual Phase 2 development plan. As with the proposed project, the Phase 2 development plan would include future office/R&D development capacity of up to approximately 85,000 square feet of floor area on the 400-450 East Jamie Court parcel (APN 015-102-250).

As with the proposed project, the existing driveways would be removed and four new driveways would be constructed: two new driveways on Haskins Way, one new driveway on East Jamie Court, and one new driveway on East Grand Avenue, as shown on Figure 5.1, p. 5.10. At project buildout, Alternative B would provide 1,312 off-street parking spaces in surface parking lots and a three-story parking garage on the site, reduced from 1,930 spaces with a five-story parking garage under the proposed project. See **Figure 5.4: Alternative B – Reduced Development Alternative Conceptual Parking Structure Elevations at Project Buildout**. The surface parking lot constructed in the Phase 2 area would be slightly larger than under the proposed project to account for a smaller conceptual East Grand Building footprint.

Similar to the proposed project, Alternative B would include the same overall pedestrian and landscape improvements to the site. New sidewalks with street trees and landscaping buffers would be constructed along East Jamie Court, Haskins Way, and East Grand Avenue. Like the proposed project, this alternative would include at least 15 percent of lot coverage for landscaping and a similar number of new street trees would be planted to the site. Both of the proposed office/R&D buildings (the 201 Haskins Way Building and the conceptual East Grand Building) would include showers and clothes locker facilities, and short-term and long-term bicycle parking spaces in accordance with the State's Title 24 Green Building Standards (CALGreen) Section 5.106.4.1.2, and would meet LEED Version 4 bicycle parking standards.

North Elevation



South Elevation



Source: WRNS (2018)

201 HASKINS WAY PROJECT

FIGURE 5.2: ALTERNATIVE B - REDUCED DEVELOPMENT ALTERNATIVE
201 HASKINS WAY BUILDING ELEVATIONS

North Elevation



South Elevation



Source: WRNS (2017)

201 HASKINS WAY PROJECT

FIGURE 5.3: ALTERNATIVE B - REDUCED DEVELOPMENT ALTERNATIVE CONCEPTUAL EAST GRAND BUILDING ELEVATIONS

South Elevation



North Elevation



Source: WRNS (2018)

201 HASKINS WAY PROJECT

FIGURE 5.4: ALTERNATIVE B - REDUCED DEVELOPMENT ALTERNATIVE CONCEPTUAL PARKING STRUCTURE ELEVATIONS AT PROJECT BUILDOUT

Infrastructure activities associated with Alternative B would be similar to those described for the proposed project. The project site is serviced by existing potable water, stormwater, sanitary sewer, natural gas, electric, and trash and recycling services. New on-site facilities would be connected to existing services along East Grand Avenue, Haskins Way, and East Jamie Court. No expansion or increased capacity of off-site infrastructure would be necessary.

Construction activities associated Alternative B would be similar to those described for the proposed project. Build-out of this alternative would be similar to the proposed project, and is assumed to occur over two phases and approximately 4 years after project entitlements, if executed from start to finish. Construction would not commence until the existing uses within each phase area have vacated. As with the proposed project, Phase 1 development under Alternative B is anticipated to take approximately 18 months after project entitlements. The preliminary construction schedule assumes 2019 as the start of construction and 2021 as the end of construction.

Under existing zoning, Alternative B would allow the existing uses in the Phase 2 area to continue. At this time, no specific Phase 2 development is proposed, and it is uncertain when or if such development would occur. As with the proposed project, it is assumed for purposes of this EIR that Phase 2 construction would commence in 2021 (immediately after completion of Phase 1 construction) and would occur over an 18-month period. Construction would not commence until the existing uses have vacated.

As for discretionary approvals, unlike the proposed project Alternative B would not involve zoning map amendments. However, this alternative would still require a CUP, TDM Plan approval, design review, and subdivision maps. Alternative B would also require standard City engineering, building, and fire permits, along with other agency approvals (Bay Area Regional Water Quality Control Board, Bay Area Air Quality Management District (BAAQMD), San Mateo County Department of Environmental Health, Federal Aviation Administration, and the San Francisco Bay Conservation and Development Commission). Because this alternative would not involve rezoning, the proposed project would not require referral to the Airport Land Use Commission.

5.3.2 Impacts

The impact analysis below focuses on those impacts that were determined to be potentially significant under the proposed project. Less than significant impacts are generally discussed only if implementation of the alternative would substantially increase the impact.

Reducing the allowable office/R&D development to the amount currently allowed under existing zoning (i.e., a reduction of 218,086 gsf) would primarily reduce impacts related to vehicle trips and, to some degree, construction-period impacts, such as air pollutant emissions, traffic, and noise. Alternative B would also avoid considerable contribution to significant and unavoidable impacts due to the reduced number of vehicle trips for Impacts C-TR-3, Impact C-TR-5 (Phase 1 only), Impact C-TR-10 (buildout), Impact C-TR-11 (buildout), Impact C-TR-12 (buildout), Impact C-TR-13 (buildout), Impact C-TR-19 (buildout), and Impact C-TR-20 (Phase 1 only). However, Alternative B would not, as discussed below, result in the avoidance or lessening of any other significant and unavoidable impacts to a less-than-

significant level (Impacts TR-2, C-TR-4, C-TR-5 [buildout only], C-TR-6, C-TR-7, C-TR-8, C-TR-9, C-TR-15, C-TR-16, C-TR-17, C-TR-18, C-TR-20 [buildout only], and C-TR-21).

AIR QUALITY

Because this alternative would involve a reduction of 218,086 gsf compared to the proposed project, Alternative B would result in fewer vehicle trips to the site than the proposed project as well as less building space that would require water and energy use. This alternative would marginally reduce the already less-than-significant air quality impacts identified under the proposed project.

Less building space under Alternative B would equate to marginally lower construction-period emissions, though BAAQMD fugitive dust and emissions reduction measures would be required to reduce the impact to less than significant, as under the proposed project.

As with the proposed project, impacts that can be brought to a less-than-significant level through mitigation would also be marginally reduced. Mitigation Measures AQ-1a and AQ-1b, would continue to apply to Alternative B and would reduce project-level air quality impacts and the less than cumulatively considerable contribution to significant air quality impacts to less-than-significant levels.

BIOLOGICAL RESOURCES

Because Alternative B would involve a similar development footprint, demolition, and excavation program as the proposed project, impacts on biological resources during the construction period would remain largely the same. Removal of existing light industrial buildings and on-site landscaping would be expected to have the same impacts on wildlife species such as migratory birds and roosting bats. Mitigation Measure MM-BI-1a: Pre-Construction Nesting Bird Surveys and Buffer Areas, MM BI-1b: Lighting Measures to Reduce Impacts to Birds, MM-BI-1c: Building Design Measures to Minimize Bird Strike Risk would continue to apply to Alternative B and would reduce impacts to a less-than significant-level. Mitigation Measure BI-1d: Pre-construction Bat Survey for Roosting Bats and Roosting Habitat Abatement (Phase 2), would continue to apply to Alternative B during Phase 2 development for project buildout and would reduce project-level impacts to a less-than significant-level. Mitigation Measure BI-1d would also reduce Alternative B's cumulatively considerable contribution to significant biological resources impacts to less-than-significant levels. Removal of any protected trees as defined under the City's Tree Preservation Ordinance would be required to comply with the Tree Preservation Ordinance under Alternative B and impacts would continue to be less than significant. As with the proposed project, impacts that can be brought to a less-than-significant level through mitigation would also be marginally reduced. Mitigation Measures MM-BI-1a, MMBi-1b, MM-BI-1c, and MM-BI-1d continue to apply to Alternative B and would reduce project-level impacts and reduce the less than cumulatively considerable contribution to cumulative impacts.

CULTURAL RESOURCES

Alternative B would involve a similar excavation program as the proposed project, and impacts on cultural resources during the construction period would remain largely the same. Excavation activities could encounter archeological resources such as shell mounds, as identified in Impact CR-2, or other

previously unrecorded archaeological resources. Mitigation Measures MM-CR-2a: Cultural Resources Worker Environmental Awareness Program (WEAP), MM-CR-2b: Cultural Resources Monitoring During Ground Disturbing Activities, and MM-CR-2c: Halt Construction Activity, Evaluate Find and Implement Mitigation would continue to apply to Alternative B and would reduce impacts on archaeological resources to a less-than-significant level. Application of the same mitigation measures would also ensure that impacts associated with tribal cultural resources would be reduced to a less-than-significant level under Alternative B. Application of MM-CR-3: Halt Construction Activity, Evaluate Remains and Take Appropriate Action in Coordination with Native American Heritage Commission would continue to apply to Alternative B and would reduce impacts associated with the potential inadvertent discovery of human remains to a less-than-significant level. As with the proposed project, Mitigation Measures MM-CR-2a, MM-CR-2b, MM-CR-2c, and MM-CR-3 would continue to apply to Alternative B and would reduce project-level impacts and reduce the less than cumulatively considerable contribution to cumulative impacts.

GREENHOUSE GAS EMISSIONS

Because this alternative would involve a reduction of 218,086 gsf compared to the proposed project, Alternative B would result in fewer vehicle trips to the site than the proposed project as well as less building space that would require water and energy use. This alternative would marginally reduce the already less-than-significant GHG emissions impacts identified under the proposed project. BAAQMD-recommended construction GHG reduction measures would continue to apply to Alternative B and would be implemented to further reduce impacts. As with the proposed project, Alternative B would not contribute considerably to significant cumulative GHG emissions impacts.

HYDROLOGY AND WATER QUALITY

Because Alternative B would involve a similar development footprint and excavation program as the proposed project, impacts on hydrology and water quality during the construction period would remain largely the same. Water quality effects of construction activities and groundwater dewatering would remain less-than-significant under Alternative B through compliance with applicable regulatory requirements including the Construction General Stormwater Permit.

As with the proposed project, Alternative B would not place structures within a future 100-year flood zone that would impede or redirect flood flows, and would not expose people or structures to a significant risk or loss, injury, or death involving flooding or inundation by seiche, tsunami or mudflow, and these impacts would remain less than significant. As with the proposed project, Alternative B would not alter drainage in a manner which would result in substantial erosion or flooding, runoff water would not exceed the capacity of existing stormwater drainage systems, and no additional sources of polluted runoff would be created; these impacts would remain less than significant. As with the proposed project, the Alternative B site plan would include low-impact development infrastructure that would ensure that peak post-development operational stormwater flows would not exceed the pre-development peak stormwater flow. As with the proposed project, cumulative development would not cause significant cumulative hydrology and water quality impacts.

LAND USE AND PLANNING

Unlike the proposed project, Alternative B would not involve a rezoning of the parcels on the project site. Instead, the project site would remain zoned as Business Commercial on one parcel (APN 015-102-250), and as Mixed Industrial on the remaining seven parcels (APNs 015-102-230, 015-102-210, 015-102-220, 015-102-180, 015-102-160, 015-102-240, and 015-102-290). Under existing zoning, parcels would provide new office/R&D development potential of up to 1.0 FAR for the Business Commercial District, similar to the proposed BTP use under the proposed project. Under the existing zoning, the Mixed Industrial district provides a new office/R&D development potential of 0.4 FAR, or up to 0.6 FAR with development and implementation of a TDM Plan and design and green building standards, subject to approval of a CUP. As a result, Alternative B would include approximately 424,877 square feet of floor area, or 459,514 gsf of office/R&D development (see Table 5.1, Comparison of Characteristics of the Proposed Project to the Alternatives).

Alternative B, the Reduced Development Alterative, would reduce overall office/R&D development compared to the proposed project (about 218,086 gsf less than the proposed project overall) in compliance with existing zoning, but it is assumed for purposes of this analysis that the general site plan and proposed land uses would be the same as the proposed project.

Because this alternative would not involve rezoning, the proposed project would not require referral to the Airport Land Use Commission. However, all other City and agency approvals, including a CUP and TDM Plan approval, would continue to apply. As with the proposed project, under Alterative B, the project sponsor would be required to comply with Federal Aviation Administration height and airspace compatibility notification requirements, San Francisco Bay Conservation and Development Commission consultation, and Climate Action Plan measure review and selection. Alternative B would not conflict with any applicable land use plan, policy or regulation with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect, and this impact would remain less than significant. As with the proposed project, cumulative development would not cause significant cumulative land use and planning impacts.

NOISE

Because construction of Alternative B would still require demolition of existing light industrial uses and construction of new office/R&D buildings, impacts would remain largely similar to those identified for the proposed project. Because the square-footage of office/R&D uses would be reduced by 218,086 gsf under Alternative B, it is expected that construction phases would be the same length and activities as the proposed project, thereby resulting in the same construction-related noise impacts as those described for the proposed project. These noise impacts would remain less than significant and, to further reduce impacts, Improvement Measure IM-NO-1, Construction Noise Minimization and Notification, would continue to apply to Alternative B. Mitigation Measure MM-NO-2, Groundborne Vibration Minimization and Avoidance would continue to apply to Alternative B and would reduce impacts associated with groundborne vibration during construction to a less-than-significant level.

Because of the reduced intensity of development including fewer vehicle trips and less traffic, operational increases in noise at and in the vicinity of the project site would be marginally less under Alternative B than under the proposed project. Mitigation Measure MM-NO-3, Mechanical Equipment Noise Reductions, would continue to apply to Alternative B, and would reduce project-level impacts associated with operational mechanical equipment noise to a less-than-significant level. As with the proposed project, MM-NO-3 would reduce the less than cumulatively considerable contribution to significant cumulative noise impacts.

TRANSPORTATION AND CIRCULATION

Similar to the proposed project, Alternative B would remove existing industrial uses from the site. Since these industrial uses were active and generating traffic that is included in the base traffic counts from 2016 and 2017, their trips are subtracted from the total project trip generation to determine the net added vehicle trips for each project phase. Similar to the proposed project, Alternative B would result in new vehicle trips in the project vicinity, with a reduction of approximately 40 percent of net new vehicle trips compared to the proposed project.

As shown in **Table 5.4: Vehicle Trip Generation – Alternative B**, the Phase 1 project under Alternative B would generate 1,551 net daily vehicle trips, with 157 in the AM peak hour and 182 in the PM peak hour (as compared to 2,533 net daily vehicle trips, with 258 in the AM peak hour and 298 in the PM peak hour under the proposed project). Phase 2 of Alternative B would generate an additional 1,176 net daily vehicle trips, with 102 in the AM peak hour and 132 in the PM peak hour (as compared to 1,913 net daily vehicle trips, with 178 in the AM peak hour and 219 in the PM peak hour under the proposed project). Phases 1 and 2 combined at project buildout would add 2,727 net daily vehicle trips, with 259 in the AM peak hour and 314 in the PM peak hour (as compared to 4,777 net daily vehicle trips, with 436 in the AM peak hour and 517 in the PM peak hour under the proposed project).

The trip distribution percentages and choices of routes to and from the project site for Alternative B were assumed to be consistent with the assumptions used for the analysis of the proposed project as shown in Table 4.9.8: Project Vehicle Trip Distribution, p. 4.9.34. These assumptions are from the City of South San Francisco traffic model as updated in July 2018. The vehicle trips generated by Alternative B result in some reduced transportation impacts as compared to the proposed project as detailed in **Table 5.5: Summary of Transportation Impacts for the Proposed Project and Alternative B.**

Table 5.4: Vehicle Trip Generation – Alternative B

Land Use	Land Use	Size (Sq.Ft.)	Vehicle Trip Generation Rates per KSF AM (PM)	Vehicle Trips		
				Daily	AM Peak Hour	PM Peak Hour
PHASE 1 (Est Complete 2021)						
Existing Land Use (To Be Removed)						
Existing Mixed Industrial (MI)	Industrial	-24,075	0.62 (0.62)	-118	-15	-15
Proposed Land Use						
New Office/R&D under Existing MI District with incentive-based FAR density bonus.	Office	211,990	0.81 (0.93)	1,669	172	197
Net New Trips (Phase 1)				*1,551*	*157*	*182*
PHASE 2 (Est Complete 2023)						
Existing Land Use (To Be Removed)						
Existing Mixed Industrial (MI)	Industrial	-157,995	0.62 (0.62)	-772	-98	-98
Proposed Land Use						
New Office/R&D under Existing MI District incentive-based FAR density bonus	Office	247,524	0.81 (0.93)	1,948	200	230
Net New Trips (Phase 2)				*1,176*	*102*	*132*
Net New Trips (Phases 1 & 2)				**2,727**	**259**	**314**
Proposed Project Net New Trips				4,777	436	517
Alternative B Compared to Proposed Project				**57%**	**59%**	**61%**

Notes: Trip generation rates from City of South San Francisco Traffic Forecast Model

KSF = thousand square feet

Daily vehicle trips estimated by using the ratio between Daily and PM peak hour trips from ITE Trip Generation Manual, 10th Edition

Source: Kittelson & Associates, Inc. (2018)

Table 5.5: Summary of Transportation Impacts for the Proposed Project and Alternative B

Impact	Threshold	Project Phase 1		Project Buildout		Alternative B Phase 1		Alternative B Buildout	
		Impact	CEQA Determination	Impact	CEQA Determination	Impact	CEQA Determination	Impact	CEQA Determination
EXISTING PLUS PROJECT									
Intersection LOS									
TR-1: Littlefield/E. Grand	LOS D +2%	AM: **LOS E +10.9%***	LTS with Mit	AM: **LOS F +18.5%***	LTS with Mit	AM: **LOS E +6.5%***	LTS with Mit	AM: **LOS E +11.1%***	LTS with Mit
TR-2: Allerton/E. Grand	LOS D +2%	PM: **+16.0%***	SU	PM: **+27.9%***	SU	PM: **+9.6%***	SU	PM: **+16.7%***	SU
TR-3: Gateway/S. Airport	LOS D +2%	PM: **+3.2%***	LTS with Mit	**PM: +5.7%***	LTS with Mit	PM: **+1.9%**	LTS	PM: **+3.4%***	LTS with Mit
Intersection Queues									
TR-4: Gateway/Oyster Pt.	+1%	AM: **+<1%**	LTS	AM: **+<1%**	LTS	AM: **+<1%**	LTS	AM: **+<1%**	LTS
TR-5: Gateway/E. Grand	+1%	AM: **+6.1%*** PM: **+17.5%***	LTS with Mit	AM: **+8.8%*** PM: **+31.7%***	LTS with Mit	AM: **+3.7%*** PM: **+10.5%***	LTS with Mit	AM: **+5.3%*** PM: **+19.0%***	LTS with Mit
TR-6: Airport/Produce	+1%	PM: **+8.8%***	LTS with Mit	PM: **+15.9%***	LTS with Mit	PM: **+5.3%***	LTS with Mit	PM: **+9.5%***	LTS with Mit
TR-7: Airport/Grand	+1%	AM: **+15.3%***	LTS with Mit	PM: **+21.2%***	LTS with Mit	PM: **+9.2%***	LTS with Mit	PM: **+12.7%***	LTS with Mit
Freeway Ramps									
TR-8: Freeway Ramps	Capacity +1%	<1%	LTS	<1%	LTS	<1%	LTS	<1%	LTS
Trip Generation									
TR-9: Trip Generation	>100 Trips	**>100***	LTS with Mit.	**>100***	LTS with Mit.	**>100***	LTS with Mit.	**>100***	LTS with Mit.
Freeway Segments									
TR-10: Freeway Segments	LOS E +1%	LOS E	LTS	LOS E	LTS	LOS E	LTS	LOS E	LTS

Impact	Threshold	Project Phase 1		Project Buildout		Alternative B Phase 1		Alternative B Buildout	
		Impact	CEQA Determination	Impact	CEQA Determination	Impact	CEQA Determination	Impact	CEQA Determination
Other									
TR-11: Safety			LTS		LTS		LTS		LTS
TR-12: Emergency Access			LTS		LTS		LTS		LTS
TR-13: Transit Capacity		**Adds passengers***	LTS with Mit.	**Adds passengers***	LTS with Mit.	**Adds passengers***	LTS with Mit.	**Adds passengers***	LTS with Mit.
TR-14: Transit Amenities		**Adds passengers***	LTS with Mit.	**Adds passengers***	LTS with Mit.	**Adds passengers***	LTS with Mit.	**Adds passengers***	LTS with Mit.
TR-15: Bicycle/Pedestrian			LTS		LTS		LTS		LTS
TR-16: Vehicle-Miles of Travel			LTS		LTS		LTS		LTS
CUMULATIVE									
Intersection LOS									
C-TR-1: Gateway/Oyster Pt.	LOS D +1%	**LOS F <1%**	LTS	**LOS F <1%**	LTS	**LOS F <1%**	LTS	**LOS F <1%**	LTS
C-TR-2: Airport/Grand	LOS D +2%	**LOS F <2%**	LTS		LTS	**LOS F <2%**	LTS		LTS
C-TR-3: Airport/Grand	LOS D +2%			AM: **LOS F +3.2%***	SU			AM: **LOS F +1.9%**	LTS
C-TR-4: Dubuque/Grand OC	LOS D +2%	PM: LOS D	LTS	PM: **LOS E +4.3%***	SU	PM: LOS D	LTS	PM: **LOS E +2.6%***	SU
C-TR-5: E. Grand/Grand OC	LOS D +2%	PM: **LOS E +2.7%***	SU	PM: **LOS F +4.6%***	SU	PM: **LOS E +1.6%**	LTS	PM: **LOS E +2.8%***	SU
C-TR-6: Gateway/E. Grand	LOS D +2%	PM: **LOS F +3.4%***	SU	PM: **LOS F +5.9%***	SU	PM: **LOS F +2.0%***	SU	PM: **LOS F +3.5%***	SU

Impact	Threshold	Project Phase 1		Project Buildout		Alternative B Phase 1		Alternative B Buildout	
		Impact	**CEQA Determination**	**Impact**	**CEQA Determination**	**Impact**	**CEQA Determination**	**Impact**	**CEQA Determination**
C-TR-7: Harbor/E. Grand	LOS D +2%	AM: **LOS E** **+4.0%*** PM: **LOS F** **+5.1%***	SU	AM: **LOS F** **+6.8%*** PM: **LOS F** **+8.8%***	SU	AM: **LOS E** **+2.4%*** PM: **LOS F** **+3.1%***	SU	AM: **LOS E** **+4.1%*** PM: **LOS F** **+5.3%***	SU
C-TR-8: Littlefield/E. Grand	LOS D +2%	AM: **LOS E** **+7.5%***	SU	AM: **LOS F** **+12.8%***	SU	AM: **LOS E** **+4.5%***	SU	AM: **LOS E** **+7.7%***	SU
C-TR-9: Allerton/E. Grand	LOS D +2%	PM: **LOS F** **+9.0%***	SU	PM: **LOS F** **+15.6%**	SU	PM: **LOS F** **+5.4%***	SU	PM: **LOS F** **+9.4%**	SU
C-TR-10: Airport/Produce	LOS D +2%	PM: **LOS F** **+1.3%**	LTS	PM: **LOS F** **+2.4%***	SU	PM: **LOS F** **+0.8%**	LTS	PM: **LOS F** **+1.4%**	LTS
C-TR-11: Gateway/S. Airport	LOS D +2%	PM: **LOS F** **+1.7%**	LTS	PM: **LOS F** **+2.9%***	SU	PM: **LOS F** **+1.0%**	LTS	PM: **LOS F** **+1.7%**	LTS
C-TR-12: S. Airport/US 101 Ramps	LOS D +1%	AM: **LOS F** **+0.9%**	LTS	AM: **LOS F** **+1.6%***	SU	AM: **LOS F** **+0.5%**	LTS	AM: **LOS F** **+1.0%**	LTS
C-TR-13: S. Airport/Utah	LOS D +2%	AM: **LOS F** **+1.3%**	LTS	AM: **LOS F** **+2.3%***	SU	AM: **LOS F** **+0.8%**	LTS	AM: **LOS F** **+1.4%**	LTS
Intersection Queues									
C-TR-14: Gateway/Oyster Pt.	+1%	AM: **+<1%**	LTS	AM: **+<1%**	LTS	AM: **+<1%**	LTS	AM: **+<1%**	LTS
C-TR-15: Airport/Grand	+1%	AM: **+4.5%*** PM: **+2.8%***	SU	AM: **+7.8%*** PM: **+3.9%***	SU	AM: **+2.7%*** PM: **+1.7%***	SU	AM: **+4.7%*** PM: **+2.3%***	SU
C-TR-16: Gateway/E. Grand	+1%	AM: +**2.6%*** PM: +**6.9%***	SU	AM: +**3.7%*** PM: +**12.5%***	SU	AM: +**1.6%*** PM: +**4.1%***	SU	AM: +**2.2%*** PM: +**7.5%***	SU
C-TR-17: Airport/Produce	+1%	AM: +**1.0%*** PM: +**3.6%***	SU	AM: +**1.5%*** PM: +**6.6%***	SU	AM: +**0.6%** PM: +**2.2%***	SU	AM: +**0.9%** PM: +**4.0%***	SU
C-TR-18: S. Airport/US 101 Ramps	+1%	AM: +**1.7%***	SU	AM: +**2.8%***	SU	AM: +**1.0%***	SU	AM: +**1.7%***	SU

Impact	Threshold	Project Phase 1		Project Buildout		Alternative B Phase 1		Alternative B Buildout	
		Impact	**CEQA Determination**	**Impact**	**CEQA Determination**	**Impact**	**CEQA Determination**	**Impact**	**CEQA Determination**
Freeway Segments									
C-TR-19: US 101 N. of Oyster Pt. NB	LOS E +1%	PM: **LOS F** **+0.6%**	LTS	PM: **LOS F** **+1.0%***	SU	PM: **LOS F** **+0.4%**	LTS	PM: **LOS F** **+0.6%**	LTS
US 101 N. of I-380 SB		PM: **LOS F** **+0.6%**		PM: **LOS F** **+1.1%***		PM: **LOS F** **+0.4%**		PM: **LOS F** **+0.7%**	
Freeway Ramps									
C-TR-20: NB Off-Ramp to S. Airport	Capacity +1%	AM: **+1.3%***	SU	AM: **+2.3%***	SU	AM: **+0.8%**	LTS	AM: **+1.4%***	SU
C-TR-21: SB On-Ramp from Produce	Capacity +1%	PM: **+2.1%***	SU	PM: **+3.9%***	SU	PM: **+1.3%***	SU	PM: **+2.3%***	SU

Bolded results = exceeds threshold *** significant impact**

Source: Kittelson & Associates, Inc. (2018)

Existing Plus Project Conditions – Alternative B

The reduction in trips for Alternative B compared to the proposed project would reduce impacts, but would not eliminate significant impacts on intersection operations and queues under existing plus project conditions. Therefore, Mitigation Measures MM-TR-1: Add a Northbound Right-Turn Lane at the Intersection of Littlefield Avenue and East Grand Avenue; MM-TR-3: Widen and Restripe the Southbound, Eastbound and Westbound Approaches at the Intersection of Gateway Boulevard/South Airport Boulevard/Mitchell Avenue; MM-TR-5: Adjust Signal Timing at Gateway Boulevard and East Grand Avenue; MM-TR-6: Adjust Signal Timing at the intersection of Airport Boulevard/San Mateo Avenue/Produce Avenue; MM-TR-7: Adjust Signal Timing at Airport Boulevard and Grand Avenue; MM-TR-9: Implement Transportation Demand Management measures listed in San Mateo County Congestion Management Program Appendix I; MM-TR-13: Expand local shuttle services; and MM-TR-14: Provide shuttle stop amenities at Phase 2, as described in Section 4.9 of this EIR, would continue to apply to Alternative B and would reduce impacts to a less-than-significant level.

The reduction in vehicle trips for Alternative B compared to the proposed project would reduce impacts to operation of the Allerton Avenue and East Grand Avenue intersection. Mitigation Measure TR-2: Add a Traffic Signal and a Southbound Right-Turn Lane at the Intersection of Allerton Avenue and East Grand Avenue would continue to apply to Alternative B, but as described in Section 4.9 of this EIR, the mitigation measure would remove a portion of the Class II bicycle lanes on Allerton Avenue, disrupting an existing bicycle facility and resulting in a significant impact. To avoid the significant impact of this mitigation measure, additional right-of-way would need to be acquired to widen the roadway. Acquisition would require removal of parking spaces associated with adjacent business; these parking spaces could not be replaced in alternative locations, such that the associated buildings would not be able to be occupied. The City of South San Francisco has determined that causing businesses to be non-viable due to lack of parking would reduce the city's tax base, and that funding sources for acquisition of property for additional right-of-way are unknown and may not be available for the additional turn lane; therefore, the mitigation measure is considered infeasible, Similar to the proposed project, while the mitigation measure could reduce the traffic impact to a less-than-significant level, the mitigation measure under Alternative B remains infeasible. The cumulative impact would remain significant and Alternative B's contribution would remain cumulatively considerable.

CUMULATIVE CONDITIONS – ALTERNATIVE B

Unlike the proposed project, Alternative B's contribution to Intersection Impacts C-TR-3 for the intersection of Airport Boulevard and Grand Avenue; C-TR-5 for the intersection of East Grand Avenue/Grand Avenue Overcrossing (Phase 1 only); C-TR-10 for the intersection of Airport Boulevard/Produce Avenue/San Mateo Avenue; C-TR-11 for the intersection of Gateway Boulevard/South Airport Boulevard/Mitchell Avenue; C-TR-12 for the freeway ramp intersection of South Airport Boulevard and U.S. 101 Northbound Hook Ramps/Wondercolor Lane; and C-TR-13 for the intersection of South Airport Boulevard and Utah Avenue, as described in Section 4.9 of this EIR, would not be cumulatively considerable, as the traffic generated by Alternative B (Phase 1 or buildout) would add less than the threshold of 2 percent of total traffic at the intersections during peak hours when the

intersections would operate at LOS E or F without the project (or the 1 percent threshold at a freeway ramp intersection for C-TR-12). Therefore, under Alternative B, no mitigation would be necessary for these intersections. However, Alternative B's contribution to significant cumulative impacts for C-TR-5 at project buildout would continue to be cumulatively considerable, as further discussed below.

As with the proposed project, Alternative B's contribution to Impact C-TR-4, Impact C-TR-5 (buildout only), Impact C-TR-6, Impact C-TR-7, Impact C-TR-10, Impact C-TR-13, Impact C-TR-15, Impact C-TR-16, Impact C-TR-17, and Impact C-TR-18 on the intersection of East Grand Avenue and Grand Avenue would continue to be cumulatively considerable. Unlike the proposed project, Alternative B's contribution to Impact C-TR-5 would not be significant under Phase 1. Mitigation Measure MM-C-TR-5: Add a Second Northbound Left-Turn Lane would no longer apply to Alternative B under Phase 1. As discussed in Section 4.9, the City is in the process of updating its East of 101 Area Traffic Impact Fee (TIF) and Capital Improvement Program (CIP). The City is considering including the improvements contemplated under Mitigation Measures MM-C-TR-4, MM-C-TR-5, MM-C-TR-6, MM-C-TR-7, MM-C-TR-10, MM-C-TR-13, MM-C-TR-14, MM-C-TR-15, MM-C-TR-16, MM-C-TR-17, and MM-C-TR-18 in the updated TIF and CIP. The Phase 1 and Phase 2 project sponsors would pay the applicable TIF in effect at the time building permits are issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding these mitigation measures. At this time, the City, therefore, cannot guarantee that these mitigation measures will be implemented. Thus, while the proposed mitigation measures could reduce the traffic impact to a less-than-significant level, the City has not yet completed the TIF and CIP updates to include or fund these mitigation measures, so the overall impact would remain significant. A TDM program would be required to be prepared and implemented pursuant South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The impacts would be significant and unavoidable.

Intersection Impact C-TR-8 for the intersection of Littlefield Avenue and East Grand Avenue and C-TR-9 for the intersection of Allerton Avenue and East Grand Avenue as described in Section 4.9 of this EIR, would be reduced under Alternative B compared to the proposed project, but Alternative B's contribution to these impacts would remain cumulatively considerable. Mitigation Measure C-TR-8: Add an Eastbound Through Lane to the Intersection of Littlefield Avenue/East Grand Avenue and C-TR-9: Add a Westbound Through Lane and a Southbound Right-Turn Lane at the intersection of Allerton Avenue/East Grand Avenue would continue to apply to Alternative B. Implementation of these mitigation measures would provide LOS D or better operations; however, the revisions could impact existing bike lanes. This secondary impact of these mitigation measures would be significant relative to the bicycle and pedestrian impact criteria. Mitigation of the secondary impact would require the acquisition of additional right-of-way from adjacent property owners. The acquisition of property would require removal of parking spaces for properties that do not have alternative locations for replacement parking, such that the associated buildings would not be able to be occupied. Because the City of South San Francisco has determined that acquisition of property for the additional right-of-way to widen East Grand Avenue would economically affect existing businesses that need parking to remain viable, and that funding for the acquisition is not

assured, these mitigation measures are considered to be infeasible. As with the proposed project, Impacts C-TR-8 and C-TR-9 would remain significant and unavoidable with mitigation under Alternative B.

Under Alternative B, the degree of trip reduction would be sufficient to reduce traffic levels and reduce Alternative B's contribution to significant and unavoidable cumulative impacts to two freeway segments of U.S. 101 in the PM peak hour, northbound north of Oyster Point Boulevard and southbound north of I-380 as described under Impact C-TR-19. Under Alternative B, these freeway segments would still operate at unacceptable LOS F in the future, but project vehicle trips under this alternative would add less than 1 percent of total traffic to the segments during the PM peak hour. Therefore, Alternative B's contribution to Impact C-TR-19 as described in Section 4.9 of this EIR would not be cumulatively considerable under Alternative B.

Alternative B's contribution at buildout to Freeway Ramp Impact C-TR-20 for the northbound off-ramp to South Airport would continue to be a cumulatively considerable but unlike the proposed project, Alternative B's contribution to Impact C-TR-20 would not be cumulatively considerable under Phase 1. Freeway Ramp Impacts C-TR-20 for the northbound off-ramp to South Airport (at buildout) and C-TR-21 for the Southbound on-ramp from Produce Avenue (at Phase 1 and buildout), as described in Section 4.9 of this EIR, would be reduced under Alternative B compared to the proposed project, but Alternative B's contribution to these significant cumulative impacts would remain cumulatively considerable. No feasible mitigation is available under the proposed project or Alternative B. Alternative B's contribution to these significant cumulative impacts would remain significant and unavoidable.

UTILITIES AND SERVICE SYSTEMS

Because Alternative B would result in development of 218,086 gsf less office/R&D land use and less occupied building space than the proposed project, Alternative B's use of potable water supplies and production of wastewater and solid waste would be less than that identified under the proposed project. This alternative would marginally reduce the already less-than-significant water supply, wastewater, and solid waste impacts that had been identified under the proposed project. Alternative B would continue to involve contribution to the City's Sewer System Capacity Study and Improvement Fee; stormwater design regulations provided by the City and the Regional Water Quality Control Board; and implementation of water consumption and solid waste reduction measures provided by the City Climate Action Plan and CALGreen requirements.

As with the proposed project, the Alternative B site plan would include low-impact development infrastructure that would ensure that peak post-development operational stormwater flows would not exceed the pre-development peak stormwater flow and impacts to stormwater systems would remain less than significant. As with the proposed project, cumulative development would not cause significant cumulative utilities and service systems impacts.

LESS-THAN-SIGNIFICANT IMPACTS

Section 4.11, Less-than-Significant Impacts, concluded that the proposed project would have no impacts or less-than-significant impacts in the following analysis areas:

- Aesthetics (all topics)
- Agriculture and Forest Resources (all topics)
- Geology and Soils (all topics)
- Hazards and Hazardous Materials (all topics)
- Mineral Resources (all topics)
- Population and Housing (all topics)
- Public Services (all topics)
- Recreation (all topics)

Alternative B would occupy the same project site footprint as the proposed project and would have a similar, though less intensive development program overall (459,514 gsf of development under this alternative compared to 677,600 gsf under the proposed project). As a result, the construction and operational impacts of Alternative B, the Reduced Development Alternative, for each of the environmental topics noted above in Section 4.11, Less Than Significant Impacts would be similar to, but reduced from, those of the proposed project.

5.4 Environmentally Superior Alternative

CEQA Guidelines Section 15126.6(e)(2) requires identification of an environmentally superior alternative (the alternative that has the fewest significant environmental impacts) from among the other alternatives evaluated if the proposed project has significant impacts that cannot be mitigated to a less-than-significant level. If the No Project Alternative is found to be the environmentally superior alternative, the EIR must identify an environmentally superior alternative among the other alternatives.

The No Project Alternative would not result in any change to existing environmental conditions. Alternative B, the Reduced Development Alternative, would result in an overall reduction of impacts identified for the proposed project. Alternative B would have less square footage (by 218,086 square feet, or 32 percent less) of office/R&D land use than the proposed project. As such, it would result in lower trip generation than the proposed project and reduced impacts related to transportation and circulation. The one project-level impact under the proposed project would remain significant and unavoidable under Alternative B. The proposed project's contribution to 12 significant cumulative traffic impacts would remain cumulatively considerable under Alternative B and these impacts would remain significant and unavoidable. However, due to the reduced number of vehicle trips, Alternative B's contribution to eight significant cumulative impacts, which would be cumulatively considerable under the proposed project, would be less than cumulatively considerable under Alternative B. A detailed discussion of the traffic impact analysis and applicable mitigation measures for Alternative B, the Reduced Development Alternative, is provided in Section 5.3 under "Transportation and Circulation".

5.5 Alternatives Considered but Rejected

Section 15126.6(c) of the CEQA Guidelines provides that an EIR should "identify any alternatives that were considered by the lead agency but rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination." The screening process for identifying viable EIR alternatives included consideration of the following criteria: ability to meet the project objectives; potential ability to substantially lessen or avoid environmental effects associated with the proposed project; and potential feasibility. The discussion below describes alternatives that were considered in the preparation and scoping of the EIR, and provides the reasons for eliminating these alternatives from detailed consideration in the EIR.

5.5.1 Off-Site Alternative

An off-site alternative was eliminated from consideration as an alternative to the proposed project. Due to the limited primary road network of the East of 101 Area, construction of any similarly sized new office/R&D uses on land located elsewhere in the East of 101 Area would result in similar project-level impacts and cumulatively considerable contributions to significant cumulative transportation and traffic impacts. An off-site alternative in other areas in South San Francisco would not further the City's policies of developing the East of 101 Area with new opportunities for biotechnology and office/R&D uses and would not achieve the City's goals in the East of 101 Area. Therefore, an off-site alternative was considered and rejected.

5.5.2 Revised Design Alternative

An alternative design option was considered and rejected because configuration or changes to the site plan or architectural design would not reduce transportation and traffic impacts. Therefore, a revised design alternative was considered and rejected.

5.5.3 Further Reduced Density Alternative

A further reduced density alternative was considered for the purposes of eliminating additional significant and unavoidable impacts as compared to Alternative B. Reducing the scale of the development to a level that would eliminate project-level impacts and cumulatively considerable contributions to significant cumulative traffic impacts would not result in a feasible project. Reducing the amount of development below allowable FAR would effectively downzone the property and would not be practical. Therefore, a further reduced density alternative was considered and rejected.

5.5.4 Alternative Land Use

An alternative land use, such as residential or retail, that may result in fewer significant and unavoidable transportation impacts was also considered and rejected. An alternative land use of industrial would, in effect, be equivalent to Alternative A, the No Project Alternative. Other alternative land uses (such as residential or retail) would not be permitted under current City General Plan policies for the East of 101 Area, nor would they be consistent with existing land uses in the vicinity of the project site. Therefore, an alternative land use development was considered and rejected.

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6 OTHER CEQA CONSIDERATIONS

Chapter 6, Other CEQA Considerations, discusses mandatory findings of significance regarding cumulative impacts pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15065(a); significant environmental effects which cannot be avoided as identified in the Environmental Impact Report (EIR); significant irreversible environmental changes, including energy and consumption of nonrenewable resources; and growth-inducing impacts pursuant to CEQA Guidelines Section 15126.2, and areas of known controversy and issues to be resolve pursuant to CEQA Guidelines Section 15123.

6.1 Mandatory Findings of Significance

CEQA Guidelines Section 15065(a) requires a finding of significance if a project has the potential to impact the quality of the environment, impact fish or wildlife species, impact historic resources, impact long-term environmental goals, create cumulatively considerable impacts, or create substantial adverse effects on human beings.

6.1.1 Quality of the Environment

CEQA Guidelines Section 15065(a)(1) requires a finding of significance if a project "has the potential to substantially degrade the quality of the environment." In practice, this is the same standard as a significant effect on the environment, which is defined in CEQA Guidelines Section 15382 as "a substantial or potentially substantial adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance."

As described in Chapter 4, Environmental Setting, Impacts, and Mitigation, the proposed project would have no impact or a less-than-significant impact associated with aesthetics, agriculture and forest resources, geology and soils, hazardous and hazardous materials, mineral resources, population and housing, public services, and recreation. Environmental impacts associated with air quality, greenhouse gas emissions, biological resources, cultural resources, hydrology and water quality, land use and planning, noise, and utilities and service systems are considered less than significant or less than significant with mitigation. Certain environmental impacts associated with transportation and circulation are considered significant and unavoidable, as discussed in Section 6.3 below.

6.1.2 Impacts on Species

CEQA Guidelines Section 15065(a)(1) states that a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has the potential to (1) substantially reduce the habitat of a fish or wildlife species; (2) cause a fish or wildlife population to drop below self-sustaining levels; or (3) substantially reduce the number or restrict the range of an endangered, rare, or threatened species. Section 4.3, Biological Resources, of this EIR fully addresses any impacts that might relate to the reduction of the fish or wildlife habitat, the reduction of fish or wildlife

populations, and the reduction or restriction of the range of special-status species as a result of project implementation. The proposed project would have either no impact, a less-than-significant impact, or a less-than-significant impact with mitigation with respect to the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal.

6.1.3 Impacts on Historical Resources

CEQA Guidelines Section 15065(a)(1) states that a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has the potential to eliminate important examples of a major period of California history or prehistory. CEQA Guidelines Section 15065(a)(1) amplifies Public Resources Code Section 21001(c) by requiring preservation of major periods of California history for the benefit of future generations. It also reflects the provisions of Public Resource Code Section 21084.1 in requiring a finding of significance for substantial adverse changes to historical resources. CEQA Guidelines Section 15064.5 establishes standards for determining the significance of impacts to historical resources and archaeological sites that are an historical resource. Section 4.4, Cultural Resources, of this EIR fully addresses impacts related to California history and prehistory, historic resources, archaeological resources, and paleontological resources. The proposed project would have either a less-than-significant impact or a less-than-significant impact with mitigation with respect to the potential to eliminate important examples of the major periods of California history or prehistory.

6.1.4 Long-Term Impacts

CEQA Guidelines Section 15065(a)(2) states that a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals. Section 6.2, Significant Environmental Effects, below, identifies all significant and unavoidable impacts that could occur, thereby creating a long-term impact on the environment. Section 6.3, Significant Irreversible Environmental Changes, below, addresses the short-term and irretrievable commitment of natural resources to ensure that the consumption is justified on a long-term basis. Lastly, Section 6.4, Growth Inducing Impacts, identifies any long-term environmental impacts caused by the proposed project with respect to economic or population growth.

6.1.5 Impacts on Human Beings

CEQA Guidelines Section 15065(a)(4) states that a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly. As described in Chapter 4, Environmental Setting, Impacts, and Mitigation, the proposed project would have no impact or a less-than-significant impact associated with human beings such as seismic hazards (geology and soils), and hazardous and hazardous materials. Environmental impacts associated with air quality, water quality, noise, and utilities and service systems are considered less than significant or less than significant

with mitigation. Certain environmental impacts associated with transportation and circulation are considered significant and unavoidable, as discussed in Section 6.3 below.

6.2 Cumulative Impacts

An EIR is required to examine cumulative impacts. California Code of Regulations Section 15130(a)(1), defines a cumulative impact as consisting "of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts." The analysis of cumulative impacts need not provide the same level of detail as that for project-specific impacts, but it shall "reflect the severity of the impacts and their likelihood of occurrence" (California Code of Regulations Section 15130(b)).

CEQA Guidelines Section 15065 states that a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has potential environmental effects that are individually limited but cumulatively considerable. As defined in CEQA Guidelines Section 15065(a)(3) , cumulatively considerable means "that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects."

The cumulative impacts analysis in an EIR must analyze either a list of past, present, and probable future projects or a summary of projections contained in an adopted general plan or related planning document. A list of reasonably foreseeable future projects and projections used to analyze cumulative impacts is provided in Section 4.A, Approach to Environmental Analysis. Cumulative impacts related to each environmental topic are discussed in Chapter 4, Environmental Setting, Impacts, and Mitigation.

As described in Chapter 4, either there would be no cumulative impacts, cumulative impacts would be less than significant, or the project would have a less than cumulatively considerable contribution (either with or without mitigation) to significant cumulative impacts in the areas of aesthetics, air quality, agriculture and forest resources, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazardous and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise and vibration, population and housing, public services, recreation, and utilities and service systems are considered less than significant. However, Chapter 4 did identify significant and unavoidable cumulative transportation and circulation impacts to which the project's contribution would be cumulatively considerable, as detailed below.

6.3 Significant Environmental Effects that Cannot Be Avoided

In accordance with Section 21067 of CEQA and with Sections 15126(b) and 15126.2(b) of the CEQA Guidelines, the purpose of this section is to identify significant environmental impacts that could not be eliminated or reduced to less-than-significant levels by implementation of mitigation measures included in the proposed project or identified in Chapter 4, Environmental Setting, Impacts, and Mitigation. The

findings of significant impacts are subject to final determination by the City of South San Francisco City Council as part of the certification process for this EIR.

The proposed project would result in significant and unavoidable project-level impacts and cumulatively considerable contributions to significant and unavoidable cumulative impacts related to transportation and circulation. No other environmental topics discussed in Chapter 4 would result in significant and unavoidable environmental effects. As described in detail in Section 4.9, Transportation and Circulation, these significant and unavoidable impacts are listed below.

TR-2 (Allerton/East Grand Avenue): Phase 1 or project buildout would cause the intersection of Allerton Avenue and East Grand Avenue to exceed level of service (LOS) D operations during the PM peak hour and would contribute more than 2 percent of total traffic through the intersection. Mitigation Measure MM-TR-2 would reduce the impact by adding a traffic signal and a southbound right-turn lane. However, the mitigation measure would remove a portion of the Class II bicycle lanes on Allerton Avenue, disrupting an existing bicycle facility and resulting in a significant impact. To avoid the significant impact of this mitigation measure, additional right-of-way would need to be acquired to widen the roadway. Acquisition would require removal of parking spaces associated with adjacent business; these parking spaces could not be replaced in alternative locations, such that the associated buildings would not be able to be occupied. The City of South San Francisco has determined that causing businesses to be non-viable due to lack of parking would reduce the city's tax base, and that funding sources for acquisition of property for additional right-of-way are unknown and may not be available for the additional turn lane; therefore, the mitigation measure is considered infeasible, While the mitigation measure could reduce the traffic impact to a less-than-significant level, the mitigation measure is infeasible, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-3 (Airport Boulevard/Grand Avenue): Project buildout would contribute considerably to the significant cumulative impact at the intersection of Airport Boulevard and Grand Avenue during the AM peak hour. Mitigation Measure MM-C-TR-3 would compensate for the project's contribution to cumulative traffic. However, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-3 and cannot guarantee that this mitigation measure will be implemented. Implementation of a Transportation Demand Management (TDM) program would be required pursuant South San Francisco Municipal Code Chapter 20.400; however, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. Therefore. the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-4 (Dubuque Avenue and Grand Avenue): Project buildout would contribute considerably to the significant cumulative impact at the intersection of Dubuque Avenue and Grand Avenue during the PM peak hour. Mitigation Measure MM-C-TR-4 would compensate for the project's contribution to cumulative traffic. However, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-4 and cannot guarantee that this mitigation measure will be implemented. Implementation of a Transportation Demand Management (TDM) program would be required pursuant South San Francisco Municipal Code Chapter 20.400; however, it cannot be guaranteed that the required TDM program would

reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. Therefore, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-5 (East Grand Avenue and Grand Avenue Overcrossing): The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of East Grand Avenue and Grand Avenue Overcrossing during the PM peak hour. Mitigation Measure MM-C-TR-5 would compensate for the project's contribution to cumulative traffic. However, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-5 and cannot guarantee that this mitigation measure will be implemented. Implementation of a Transportation Demand Management (TDM) program would be required pursuant South San Francisco Municipal Code Chapter 20.400; however, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. Therefore, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-6 (Gateway Boulevard and East Grand Avenue): The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Gateway Boulevard and East Grand Avenue during the PM peak hour. Mitigation Measure MM-C-TR-6 would compensate for the project's contribution to cumulative traffic. However, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-6 and cannot guarantee that this mitigation measure will be implemented. Implementation of a Transportation Demand Management (TDM) program would be required pursuant South San Francisco Municipal Code Chapter 20.400; however, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. Therefore, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-7 (Harbor Way/Forbes Boulevard and East Grand Avenue): The proposed project (Phase 1 or buildout) would contribute considerably to a significant cumulative impact at the intersection of Harbor Way/Forbes Boulevard and East Grand Avenue in both the AM and PM peak hours. Mitigation Measure MM-C-TR-7 would compensate for the project's contribution to cumulative traffic. However, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-7 and cannot guarantee that this mitigation measure will be implemented. Implementation of a Transportation Demand Management (TDM) program would be required pursuant South San Francisco Municipal Code Chapter 20.400; however, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. Therefore, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-8 (Littlefield Avenue/East Grand Avenue): Phase 1 or project buildout would contribute considerably to the significant cumulative impact at the intersection of Littlefield Avenue and East Grand Avenue, in the AM peak hour. Mitigation Measure MM-C-TR-8 would improve operations and the

cumulative traffic impact after mitigation would be less than significant. However, the revisions to the lane striping could impact the existing bike lanes on East Grand Avenue. This secondary impact of the mitigation measure would be significant relative to the bicycle and pedestrian impact criteria. Mitigation of the secondary impact would require the acquisition of additional right-of-way from adjacent property owners so that East Grand Avenue could provide a third eastbound through lane and maintain bicycle lanes on each side. The acquisition of property would require removal of parking spaces for properties that do not have alternative locations for replacement parking, such that the associated buildings would not be able to be occupied. Because the City of South San Francisco has determined that acquisition of property for additional right-of-way would economically affect existing businesses that need parking to remain viable, and that funding for the acquisition is not assured, the mitigation measure is considered to be infeasible. While the mitigation measure could reduce the traffic impact to a less-than-significant level, the mitigation is infeasible, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-9 (Allerton Avenue/East Grand Avenue): Phase 1 or project buildout would contribute considerably to the significant cumulative impact at the intersection of Allerton Avenue and East Grand Avenue, in the PM peak hour. Mitigation Measure MM-C-TR-9 would improve operations and the cumulative traffic impact after mitigation would be less than significant. However, the revisions to the lane striping would remove a portion of the Class II bicycle lanes on Allerton Avenue and could impact the existing bike lanes on East Grand Avenue. This secondary impact of the mitigation measure would be significant relative to the bicycle and pedestrian impact criteria. Mitigation of the secondary impact would require the acquisition of additional right-of-way from adjacent property owners so that East Grand Avenue could provide a third eastbound through lane and maintain bicycle lanes on each side, and so that Allerton Avenue could provide an additional southbound lane and maintain bicycle lanes. The acquisition of property would require removal of parking spaces that do not have alternative locations for replacement parking, such that the associated buildings would not be able to be occupied. Because the City of South San Francisco has determined that acquisition of property for additional right-of-way could affect existing businesses, and that funding for the acquisition is not assured, the mitigation measure is considered to be infeasible. While the mitigation measure could reduce the traffic impact to a less-than-significant level, the mitigation is infeasible, and the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-10 (Airport Boulevard/Produce Avenue/San Mateo Avenue): Project buildout would contribute considerably to a significant cumulative impact at the intersection of Airport Boulevard/Produce Avenue/San Mateo Avenue in the PM peak hour. Mitigation Measure MM-C-TR-10 would compensate for the project's contribution to cumulative traffic. However, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-10 and cannot guarantee that this mitigation measure will be implemented. Implementation of a Transportation Demand Management (TDM) program would be required pursuant South San Francisco Municipal Code Chapter 20.400; however, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. Therefore, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-11 (Gateway Boulevard/South Airport Boulevard/Mitchell Avenue): Project buildout would contribute considerably to the significant cumulative impact at the intersection of Gateway Boulevard/South Airport Boulevard/Mitchell Avenue in the PM peak hour. No feasible physical mitigation has been identified. While a Transportation Demand Management (TDM) program would be required to be prepared and implemented pursuant to City ordinance, it cannot be demonstrated that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-12 (South Airport Boulevard/U.S. 101 Northbound Hook Ramps/Wondercolor Lane): Project buildout would contribute considerably to the significant cumulative impact at the freeway ramp intersection of South Airport Boulevard and U.S. 101 Northbound Hook Ramps/Wondercolor Lane in the AM peak hour. No feasible physical mitigation has been identified. While a TDM program would be required to be prepared and implemented pursuant to City ordinance, it cannot be demonstrated that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-considerable level. The cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-13 (South Airport Boulevard and Utah Avenue): Project buildout would contribute considerably to a significant cumulative impact at the intersection of South Airport Boulevard and Utah Avenue in the AM peak hour. Mitigation Measure MM-C-TR-13 would compensate for the project's contribution to cumulative traffic. However, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-13 and cannot guarantee that this mitigation measure will be implemented. Implementation of a Transportation Demand Management (TDM) program would be required pursuant South San Francisco Municipal Code Chapter 20.400; however, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. Therefore, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-15 (Airport Boulevard/Grand Avenue): Phase 1 or project buildout would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the southbound left turn movement in the AM and PM peak hours and the westbound right-turn movement in the PM peak hour at the intersection of Airport Boulevard and Grand Avenue without the project. Mitigation Measure MM-C-TR-15 would compensate for the project's contribution to cumulative traffic. However, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-15 and cannot guarantee that this mitigation measure will be implemented. Implementation of a Transportation Demand Management (TDM) program would be required pursuant South San Francisco Municipal Code Chapter 20.400; however, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. Therefore, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-16 (East Grand Avenue/Gateway Boulevard): Phase 1 or project buildout would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the eastbound and westbound through movements in the PM peak hour and the westbound left turn movement in the AM and PM peak hours on East Grand Avenue at Gateway Boulevard without the project. MM-C-TR-16 would compensate for the project's contribution to cumulative traffic. However, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-16 and cannot guarantee that this mitigation measure will be implemented. Implementation of a Transportation Demand Management (TDM) program would be required pursuant South San Francisco Municipal Code Chapter 20.400; however, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. Therefore, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-17 (Airport Boulevard/Produce Avenue): Phase 1 or project buildout would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the westbound left turn movement on Airport Boulevard at the intersection of Airport Boulevard/Produce Avenue during the AM and PM peak hours in 2040 without the project. Mitigation Measure MM-C-TR-17 would compensate for the project's contribution to cumulative traffic. However, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-17 and cannot guarantee that this mitigation measure will be implemented. Implementation of a Transportation Demand Management (TDM) program would be required pursuant South San Francisco Municipal Code Chapter 20.400; however, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. Therefore, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-18 (Northbound U.S.101 Off-Ramp/South Airport Boulevard/Wondercolor Lane): Phase 1 or project buildout would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the eastbound left turn movement on the northbound U.S. 101 off-ramp at South Airport Boulevard/Wondercolor Lane during the AM peak hour in 2040 without the project. Mitigation Measure MM-C-TR-18 would compensate for the project's contribution to cumulative traffic. However, the City does not have a mechanism for funding Mitigation Measure MM-C-TR-13 and cannot guarantee that this mitigation measure will be implemented. Implementation of a Transportation Demand Management (TDM) program would be required pursuant South San Francisco Municipal Code Chapter 20.400; however, it cannot be guaranteed that the required TDM program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. Therefore, the cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-19 (Freeway Segments): Project Buildout would add more than 1 percent of total traffic to two freeway segments during the PM peak hour which would operate at LOS F under cumulative conditions without the project. While a TDM program would be required to be prepared and implemented pursuant to City ordinance, it cannot be demonstrated that the required TDM program would reduce freeway traffic

by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-20 (Freeway Ramps): Phase 1 or project buildout would add more than 1 percent of total traffic and therefore would contribute considerably to the significant cumulative impact on the northbound U.S. 101 off-ramp at South Airport Boulevard/Wondercolor Lane during the AM peak hour in 2040 without the project. While a TDM program would be required to be prepared and implemented pursuant to City ordinance, it cannot be demonstrated that the required TDM program would reduce freeway ramp traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than- cumulatively considerable level. The cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

C-TR-21 (Freeway Ramps): Phase 1 or project buildout would add traffic volumes which would cause total traffic to exceed capacity and therefore would contribute considerably to the significant cumulative impact on the southbound U.S. 101 off-ramp from Produce Avenue during the AM peak hour in 2040 without the project. While a TDM program would be required to be prepared and implemented pursuant to City ordinance, it cannot be demonstrated that the required TDM program would reduce freeway ramp traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level. The cumulative impact would remain significant and the project's contribution would remain cumulatively considerable.

6.4 Significant Irreversible Environmental Changes

In accordance with Section 21100(b)(2)(B) of CEQA, and Section 15126.2(c) of the CEQA Guidelines, an EIR must identify any significant irreversible environmental changes that could result from implementation of the proposed project. The EIR is required to consider whether "uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or non-use thereafter unlikely" (CEQA Guidelines Section 15126.2(c)). "Nonrenewable resource" refers to the physical features of the natural environment, such as land, waterways, etc. This may include current or future uses of non-renewable resources and secondary or growth-inducing impacts that commit future generations to similar uses. According to the CEQA Guidelines, irretrievable commitments of resources should be evaluated to ensure that such current consumption is justified.

Chapter 4, Environmental Setting, Impacts, and Mitigation, discusses topics that could potentially be affected by irreversible environmental impacts, such as agriculture and forestry, biological resources, cultural resources, hydrology, and population and housing. None of these environmental topics were found to have significant impacts as a result of the proposed project.

No significant irreversible environmental damage related to hazardous materials is anticipated to occur with implementation of the proposed project. Compliance with federal, state, and local regulations related to office/research and development (R&D) uses identified in Section 4.10.5, Hazards and Hazardous

Materials, would ensure that the possibility that hazardous substances from the demolition, construction, and operation of proposed project would not cause significant and unavoidable environmental damage.

The proposed project would involve excavation of soils for grading and soil remediation. Grading would be required for general site preparation and design of on-site stormwater flows, but the proposed project would not substantially raise or lower the existing grade. However, grading would not be excessive or greater than what is necessary to achieve stormwater goals.

Construction and implementation of the proposed project would not result in a large commitment of natural resources, require highway improvements to previously inaccessible areas; or irreversible damage due to environmental accidents. No other irreversible permanent changes such as those that might result from construction of a large-scale mining project, hydroelectric dam, or other industrial project would result from development of the proposed project.

6.4.1 Energy and Consumption of Nonrenewable Resources

Section 21100(b)(3) of CEQA requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing any inefficient, wasteful, and unnecessary consumption of energy. Implementation of the proposed project would commit future generations to an irreversible commitment of energy resources in the form of usage of nonrenewable fossil fuels due to vehicle and equipment use during demolition, construction, and operation of the proposed project.

ENERGY AND NATURAL GAS AND LOCAL ENERGY SUPPLY

The estimated annual electricity demand associated with occupancy and operation of Phase 1 is approximately 4.22 million kilowatt hours per year (MM kWh/yr) and 4.28 MM kWh/yr for project buildout .Estimated natural gas demand associated with operation occupancy of Phase 1 is 6.26 billion British thermal units (BBTU/yr) (62,598 therms) and 6.35 BBTU/yr (63,503 therms) for project buildout. Electrical and natural gas service to the project site would be adequately provided by Pacific Gas and Electric Company (PG&E).[1]

The proposed project would comply with CALGreen requirements for energy efficiency in new buildings and would also be designed to meet Leadership in Energy and Environmental Design (LEED) v4 standards. For both electricity and natural gas, compared to the mix of other existing development in South San Francisco and the region, compliance with the latest CALGreen and other requirements would ensure that the proposed project would be more efficient than all but recent buildings built to the same requirements, or buildings for which owners decided to exceed efficiency requirements.

[1] Pacific Gas and Electric Company, 2018. 201 Haskins Way Will-Serve Letter from Tosin Ladeinde, Industrial Power Engineer, September 5, 2018.

TRANSPORTATION FUEL DEMAND

Comparison of transportation fuel use and efficiency between the proposed project and the mix of other existing development in the region is speculative; however, the proposed project includes a TDM plan to discourage single-occupancy vehicle trips and encourage transit and other modes of transportation.

Table 6.1, Approximate Transportation Fuel Demand for Phase 1 and Project Buildout provides estimated transportation-related gasoline and diesel demand for the proposed project.[2]

Table 6.1: Approximate Transportation Fuel Demand for Phase 1 and Project Buildout

	Estimated Gasoline Demand (gallons / year)	Estimated Diesel Demand (gallons / year)
Phase 1		
Phase 1 Total	36,488	6,420
Project Buildout		
Project Buildout Total	37,207	6,794

Notes: CalEEMod estimates vehicle miles traveled (VMT) based on building square footage by type of use. Vehicle fuel efficiency figures (gasoline, electric hybrid, electric only, and diesel) are rough approximations based on the EMFAC2014 model run.

Sources: Vehicle Miles Traveled from SWCA, CalEEMod model run (split is 88.9% gasoline and hybrid gasoline-electric, 6.4% electric-only, and 4.6% diesel); (2) Composite MPG from ESA, EMFAC2014 (v1.0.7) Emissions Inventory, San Francisco County, Calendar Year 2030 (annual), EMFAC2011 Vehicle Classification Categories.

Under the proposed project, the project applicant would develop and implement a TDM Plan and pedestrian- and bicycle-serving features to achieve a 35 percent minimum alternative mode use as required by the Zoning Ordinance. These design features would include secure covered bicycle parking proportional to development as required by City bicycle parking standards. The TDM Plan would include a parking reduction from the required parking standard of 1 space per 350 square feet of office use as provided by the zoning ordinance for a Business Technology Park District, and would also include electric vehicle parking spaces and charging stations. The proposed project would also provide designated carpool and vanpool parking. The project sponsor would coordinate with the City and other private landowners to continue and expand the Commute.org shuttle bus program to serve employees of the new research and development office uses. TDM Plan measures and design features would be subject to review and approval by the City Council. The proposed project TDM Plan would be subject to an annual survey and triennial report to monitor and enforce alternative mode use goals. For these reasons, the proposed project would have a less-than-significant impact on the use of transportation fuel energy and would not result in the use of large amounts or in the wasteful use of energy as a result of operational transportation.

[2] Diesel fuel would also be used for periodic testing and infrequent running of emergency generators. Testing is generally limited to 50 hours or less per year for each generator under BAAQMD air permits. It is difficult to forecast emergency use, as the events are typically rare.

OTHER NONRENEWABLE RESOURCES

Consumption of nonrenewable resources includes increased energy consumption, conversion of agricultural lands to urban uses, and loss of access to mineral reserves. No agricultural lands would be converted and no access to mining reserves would be lost with construction of the proposed project.

Resources consumed during demolition, construction, and operation would include lumber, concrete, gravel, asphalt, masonry, metals, and water. Similar to the existing uses on the project site, the proposed project would irreversibly use water and solid waste landfill resources. However, the proposed project would not involve a large commitment of resources relative to existing conditions and also relative to supply, nor would it consume any of those resources wastefully.

The proposed project would introduce new office/R&D uses to the project site to serve existing and projected demand for such uses as described in Section 3.1.1, Project Objectives, pp. 3.2-3.3, Section 4.7, Land Use, pp. 4.7.4-4.7.6, and Section 4.11.6, Population and Housing, pp. 4.11.42-4.11.45. The project site is fully served by existing utilities and construction of new utility infrastructure would not be necessary. The proposed project would not involve new or expanded water supply resources or entitlements. Section 4.10, Utilities and Service Systems, describes the water supply and demand aspects of the proposed project. The proposed project would include required water conservation practices to reduce the amount of water used. Water-efficient plumbing fixtures would be installed throughout the new and renovated buildings, pursuant to CALGreen and building code requirements. Landscaping and street trees would be water efficient. Therefore, the proposed project would include the application of required water conservation measures and would be in conformance with policies addressing water efficiency. Compared to the mix of other existing development in South San Francisco and the region, compliance with the latest CALGreen and other requirements would ensure that the proposed project would be more water efficient than all but recent buildings built to the same requirements, or buildings for which owners decided to exceed efficiency requirements. For these reasons, the proposed project would not result in the wasteful use of water.

6.5 Growth-Inducing Impacts

As required by Section 15126.2(d) of the CEQA Guidelines, an EIR must consider the ways in which the proposed project could directly or indirectly foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Growth-inducing impacts can result from the elimination of obstacles to growth; through increased stimulation of economic activity that would, in turn, generate increased employment or demand for housing and public services; or from the implementation of policies or measures that do not effectively minimize premature or unplanned growth.

Growth-inducing impacts such as those associated with job increases that might affect housing and retail demand in other areas over an extended time period are difficult to assess with precision, since future economic and population trends may be influenced by unforeseeable events and business development cycles. Moreover, long-term changes in economic and population growth are often regional in scope; they

are not influenced solely by changes in policies or specific development projects. Business trends are influenced by economic conditions throughout the state and country as well as around the world.

Another consideration is that the creation of growth-inducing potential does not automatically lead to growth. Growth occurs through capital investment in new economic opportunities by the private and/or public sector. Investment patterns reflect, in turn, the desires of investors to mobilize and allocate their resources to development in particular localities and regions. A combination of these and other pressures serve to fashion policy. The regulatory authority of local governments serves to mediate the growth-inducing potential or pressure created by a project or plan. Despite these limitations on the analysis, it is still possible to qualitatively assess the general potential growth-inducing impacts of the proposed project.

6.5.1 Projected Growth

Section 4.10.7, Population and Housing, discussed population and employment growth as a result of the proposed project and made the following findings. The proposed project does not include any new housing units in either Phase 1 or project buildout and would not directly induce population growth. The proposed project would construct new office/R&D uses on an existing infill site in an urbanized area.

Development of infrastructure could remove obstacles to population growth if it would allow for development in an area that was not previously considered feasible for development because of infrastructure limitations. The proposed project would not include the extension of area roadways or expansion of infrastructure to areas lacking existing development. No indirect impacts related to population growth as a result of expansion of infrastructure would occur.

The displacement of existing light industrial uses and employees, and the new employees introduced as a result of new Business Technology Park land uses would, on the whole, increase the number of employees in the City and the East of 101 Area. The existing light industrial uses support a total of approximately 191 employees who would vacate the project site and be displaced or relocated. The 400-450 East Jamie Court site hosts an existing business and technology park use that would remain under both Phase 1 development and project buildout. The estimated number of jobs provided by the proposed project is summarized in Table 4.11.1: Proposed Project Employment, on p. 4.11.44. The new 748 employees introduced in the City during Phase 1 and 1,506 during project buildout could result in an increase in demand for housing. The City is primarily built out and any housing constructed within the City limits would most likely be infill housing. South San Francisco is a job center that, overall, imports employees and exports housing demand. Implementation of Phase 1 development or project buildout would result in an increased unfavorable jobs/housing ratio in the City. The *City of South San Francisco* General Plan (General Plan) Land Use Element, as amended in 2011, projects an employment of 80,600 jobs in the City by 2035 at buildout of the General Plan.[3] The proposed project employees introduced during Phase 1 and project buildout would represent 2.5 percent and 5.2 percent of the total job growth in the City at General Plan buildout. The proposed project's new employees would not result in substantial unplanned employment growth.

[3] General Plan, Chapter 2, Table 2.4-4, p. 2-35.

The proposed project would create the need for up to 519 new units of housing in Phase 1 and 1,046 new units of housing at project buildout. Although it is likely that some of the new employees on the project site would be existing residents in the City or in the region, the employment increase would result in indirect growth that may not be accommodated by existing or projected housing developments for the City. However, the City recognizes that much of its land area, including the East of 101 Area, is not well suited for housing development due to existing land use conflicts, including proximity to the San Francisco International Airport and the historic and existing industrial uses of the East of 101 Area, as well as the emerging office/R&D uses in the area. In that light, the City relies upon the greater San Francisco Bay Area's regional jobs-housing balance.

If the project application is not deemed complete by January 1, 2019, the proposed project would require payment of the commercial linkage fee under Chapter 8.69 of the Municipal Code which would contribute to the development of affordable housing to serve the indirect demand generated by commercial development. Although affordable housing could eventually be developed through this fee, the resulting number of residential units would be small in relation to the total number of households in the City. Therefore, any indirect population growth impacts would be less than significant, as described in Section 4.11, Less-Than-Significant Impacts, in Section 4.11.6, Population and Housing.

Overall, the proposed project would be an appropriate land use for the project site's limitations, and the job growth that would occur under the proposed project would be within the projected employment growth of the City. The proposed project would not induce direct or indirect population growth.

6.6 Areas of Known Controversy and Issues To Be Resolved

The Planning Division published a Notice of Preparation of an EIR (NOP) on April 18, 2018, announcing its intent to prepare and distribute an EIR (the NOP is included in this EIR as Appendix A).The public review period began on April 18, 2018, and ended on May 18, 2018. During the NOP public review period, four comment letters were submitted to the Planning Division by public agencies and other interested parties. On May 3, 2018, a public scoping meeting was held and no speakers contributed comments at this meeting.

Comments on the NOP raised the following issues:

Transportation and Circulation

- Compliance with the San Mateo County Congestion Management Program (CMP) Traffic Impact Analysis (TIA) Policy and Land Use Guidelines as provided by the City/County Association of Governments (C/CAG), including preparation of a forecast and discussion of the expected impacts of the project on the Congestion Management Program roadway network, the immediate project area, and other areas.
- Project-related traffic generation and mitigation measures should the project generate a net of 100 or more peak-hour trips on the CMP roadway network. Inclusion of potential mitigation strategies documented in the C/CAG Land Use Guidelines policy such as reducing project scope, building

roadway and/or transit improvements, collecting traffic mitigation fees, and requiring project sponsors to implement TDM programs.

- C/CAG consultation regarding the scope and parameters of the analysis, and C/CAG review and comment on the TIA, EIR, and TDM plan.
- Project-related construction traffic impacts on the existing 451 East Jamie Court uses, and mitigation measures to minimize construction traffic during construction of the 201 Haskins Way Building and parking garage.
- Traffic and circulation impacts on Haskins Way, East Grand Avenue, Littlefield Avenue, and the northbound U.S. 101 on-ramp from East Grand Avenue during PM peak hours as a result of operation of the project, and mitigation measures to improve traffic and circulation.
- Analysis of implementing a TDM program as mitigation for VMT impacts, including design features, programs, and monitoring.
- Cumulative regional transportation impacts and mitigation through fair share contributions toward multi-modal and regional transit improvements.
- Project-related impacts on transit, pedestrians, bicycles, and disabled travelers, including analysis of mitigation for increased VMT, and design features that encourage the use of alternative transportation modes including transit and shuttles, such as improvements to shelters or benches, as well as pedestrian and bicycle design features.

Project Description

- Confirmation of where the project would occur within the San Francisco Bay (Bay) or the San Francisco Bay Conservation and Development Commission (BCDC) 100-foot shoreline jurisdictional band.
- Confirmation of the proposed public access to the Bay Trail and Bay shoreline per existing BCDC permits on-site and BCDC public access requirements.

Greenhouse Gas Emissions

- Analysis of implementing a TDM program as mitigation for greenhouse gas emission impacts, including design features, programs, and monitoring.

Noise

- Project-related construction noise impacts on the existing 451 East Jamie Court uses and mitigation measures to minimize construction noise during construction of the 201 Haskins Way Building and parking garage.

Land Use

- Project-related impacts on the continuation of existing business operations of parcels within the project site, including future property and building maintenance under the proposed rezoning.
- Project-related impacts on the potential for future development of parcels in the Phase 2 area as separate and individual parcels in compliance with the proposed rezoning, and the implications of development alternatives for each parcel not currently owned by the developer.

Recreation

- Project-related impacts on shoreline access due to an increased on-site worker population, and whether the proposed public access areas would be adequate to accommodate these additional users, in recognition of existing BCDC permits and BCDC public access requirements.

Aesthetics

- Project-related impacts on scenic views of the Bay in consideration of the height of the proposed buildings and parking structure.
- Project-related shadow on the existing 451 East Jamie Court Building and existing and planned roof solar photovoltaic systems.
- Project-related impacts on existing wind hazards and whether the project includes mitigation measures to reduce project-related wind impacts.

Hydrology and Water Quality

- Whether project impacts related to sea level rise would occur on transportation facilities in the project area due to higher water levels, including increased erosion, changing environmental characteristics that affect material durability, increased groundwater levels, change in sediment movement along shorelines, and soil pore pressure at dikes and levees on which transportation facilities are constructed.

6.6.1 Issues to be Resolved under Design Review

The City does not have codified standards or thresholds regarding wind and shadow impacts and these issues are not treated as environmental impacts for the purposes of CEQA. However, a discussion of these issues in relation to the design review standards set forth under the City Municipal Code is provided in response to the NOP comment and pursuant to CEQA Guidelines Section 15128 in Section 4.11, Less-than-Significant Impacts, under "Aesthetics."

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APPENDIX A

NOTICE OF PREPARATION AND COMMENTS

NOTICE OF PREPARATION
OF AN EIR FOR THE PROPOSED
201 HASKINS WAY PROJECT

To: Agencies, Organizations, and Interested Parties

From: City of South San Francisco, Economic and Community Development Department

Subject: Notice of Preparation (NOP) of an Environmental Impact Report (EIR) in Compliance with Title 14, Sections 15082(a), 15103, and 15375 of the California Code of Regulations (CCR). The City of South San Francisco (City) is the Lead Agency under the California Environmental Quality Act (CEQA) for the proposed project identified below. The City will prepare an EIR for the proposed project identified below:

Project Title: 201 Haskins Way Project. The project location and a summary of the project description are included on the following page.

Current Environmental Review: To ensure that the proposed project is fully analyzed under CEQA, an EIR will be prepared in compliance with Title 14, Section 15161 of the CCR. An Initial Study has not been prepared. The EIR will address all environmental topic areas.

Agency/Public Comments: The City requests your comments regarding the scope and content of the environmental review to be conducted for the proposed project. Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice. The City will accept written comments on this NOP between April 18, 2018 and May 18, 2018. Please send your comments by email to Ryan.Wassum@ssf.net or by mail to: City of South San Francisco, Economic and Community Development Department, 315 Maple Avenue, South San Francisco, CA 94083, Attention: Ryan Wassum, Associate Planner.

Scoping Meeting: The Lead Agency will conduct a scoping meeting on May 3, 2018, beginning at 1:00 PM, in the Annex Conference Room, 315 Maple Avenue, South San Francisco, California, at which agencies, organizations, and the public will have an opportunity to submit verbal comment. Please note that verbal comments are limited to three minutes per speaker.

EIR Process: Following the close of the NOP comment period, a Draft EIR will be prepared that will consider all environmental topic areas in Appendix G of the CEQA Guidelines and take into consideration NOP comments. In accordance with Title 14, Section 15105(a) of the CCR, the Draft EIR will be released for public review and comment for the required 45-day review period. Following the close of the 45-day public review period, the City will prepare a Final EIR that will include responses to all substantive comments received on the Draft EIR. The Draft EIR and Final EIR will be considered by the Planning Commission and City Council in making the decision to certify the EIR and to approve or deny the project.

Project Location: The proposed project site is part of the City's "East of 101" planning area, bound by the San Francisco Bay on the east and Highway 101 and railway lines on the west. The project site is comprised of eight parcels encompassing approximately 18 acres of land bounded by East Grand Avenue to the north, Haskins Way to the west, San Francisco Bay to the south, and a recycling center and the Genentech campus to the east (Figure 1).

Project Description: The project would rezone seven parcels from Mixed Industrial (MI) district to Business Technology Park (BTP) district and one parcel from Business Commercial (BC) district to BTP district. The project would allow development at a floor area ratio (FAR) of 1.0 or approximately 677,600 gross square feet (gsf) of new BTP office use, which would be built out in the Phase 1 area and the Phase 2 area.

In the Phase 1 area, 336,368 gsf of new BTP office use would be constructed on 201 Haskins Way and 400-450 East Jamie Court. The project would demolish a 24,075-gsf building at 201 Haskins Way which previously contained a light industrial trucking use and construct a new 311,368-gsf office building (201 Haskins Way Building) with a 63-foot-tall, 3-story wing and a 95-foot-tall, 5-story wing, a 700-stall, 5-level parking structure (up to 48 feet in height), and 203 surface parking spaces. At 400-450 East Jamie Court, the project would construct an approximately 25,000-gsf, 2-story addition to the existing western building. Construction in the Phase 1 area would begin in 2019 and occur over approximately 18 months, for anticipated completion in 2021.

Figure 1: Proposed Site Plan



At this time, no plan-level development in the Phase 2 area is proposed. The proposed rezoning of the parcels in the Phase 2 area would allow the existing uses to continue indefinitely, and would allow redevelopment at 1.0 FAR in accordance with the BTP rezoning. The project rezoning would allow up to 341,232 gsf of new BTP office use on 101 and 151 Haskins Way, 410 and 430 East Grand Avenue, 451 East Jamie Court, and an unaddressed parcel at APN 015-102-290. Five of the parcels contain 5 existing 1- to 2-story light industrial buildings totaling approximately 157,995 gsf that would be removed. A portion of the 451 East Jamie Court parcel and APN 015-102-290 contain a parking lot that would be removed. The EIR will identify a conceptual Phase 2 area development plan that would include construction of a new 256,232-gsf 3- and 5-story office building (East Grand Building) up to 95 feet in height. In addition, the parking garage would be expanded to two parcels east at 451 East Jamie Court (APN 015-102-240) and APN 015-102-290 to accommodate 1,060 stalls, and 243 additional surface parking stalls would be constructed (see Figure 1). It is uncertain when or if such development for the Phase 2 area would occur. To provide a conservative analysis of construction impacts in the EIR, it is assumed that construction in the Phase 2 area would commence in 2021 (immediately after completion of construction in the Phase 1 area) and would occur over an 18-month period.

The project would also allow future development potential at 400-450 East Jamie Court based on the remaining balance of FAR-defined square footage after implementation of the planned approximately 25,000-gsf building addition to 400-450 East Jamie Court that would occur in the Phase 1 area. It is assumed that the BTP use developed at 400-450 East Jamie Court would result in up to 85,000 gsf of development, excluding areas defined under Sections 20.040.008 and 20.040.009 of the zoning ordinance. Currently, there is no plan-level development proposed for Phase 2; development of Phase 2 would require subsequent project-level site design.

Probable Environmental Impacts: Each of the following CEQA environmental issue areas will be addressed in the EIR: Aesthetics, Agriculture and Forestry Resources, Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Minerals and Energy Resources, Noise, Population and Housing, Public Services, Recreation, Utilities and Service Systems, and Transportation and Traffic. There is reasonable potential that the project may result in environmental effects related to regional air quality, archeological and paleontological resources, greenhouse gas emissions, changes in land use, temporary and permanent increases in ambient noise, retaining acceptable public service levels and utility service systems, and increases in traffic.

Date: April 18, 2018

Ryan Wassum, Associate Planner
Telephone: (650) 877-8535

San Francisco Bay Conservation and Development Commission
455 Golden Gate Avenue, Suite 10600, San Francisco, California 94102 tel 415 352 3600 fax 415 352 3606

May 16, 2018

RECEIVED
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PLANNING DEPT.

Ryan Wassum
City of South San Francisco
315 Maple Avenue
South San Francisco, California 94083

SUBJECT: Comments on the Notice of Preparation (NOP) for the 201 Haskins Way Project Draft Environmental Impact Report (DEIR), State Clearinghouse Number 2018042047; BCDC Inquiry File No. SM.SS.6610.1.

Dear Mr. Wassum:

Thank you for the opportunity to comment on the Notice of Preparation (NOP) for the 201 Haskins Way Project draft Environmental Impact Report (DEIR), State Clearinghouse Number 2018042047, distributed on April 18, 2018, and received in our office on April 23, 2018. The proposed project in the City of South San Francisco, in San Mateo County, includes rezoning seven parcels from Mixed Industrial (MI) district to Business Technology Park (BTP) district and one parcel from Business Commercial (BC) district to BTP district. These eight parcels total approximately 18 acres and the project would allow development of approximately 677,600 gross square feet for new BTP office use through two proposed phases of development and additional future development. Phase 1 is planned to begin in 2019 and would involve demolishing a building, constructing a new office building, a parking structure, and surface parking. Phase 2 would include additional redevelopment that is currently in the conceptual phase and is planned to commence in 2021.

The Commission is a responsible agency for this project and will rely on the DEIR when it considers the project. The project is not specific enough at this time for us to comment on every issue raised with respect to the Commission's laws and policies. However, we have prepared comments outlining specific BCDC issues that should be addressed in the DEIR. Although the Commission itself has not reviewed the NOP, the staff comments are based on the McAteer-Petris Act and the Commission's San Francisco Bay Plan (Bay Plan), the Commission's federally approved management program for the San Francisco Bay.

Commission Jurisdiction

From reviewing the NOP, it appears that a portion of the project would be located within the Commission's jurisdiction. The Commission's jurisdiction includes both the Bay itself and the "shoreline band." The shoreline band extends 100 feet inland from and parallel to the Bay shoreline, that shoreline being defined as all tidal areas of the Bay up to the line of mean high tide, or where there is tidal marsh, all areas five feet above mean sea level. The Commission's jurisdiction also includes all areas formerly subject to tidal action that have been filled since September 17, 1965. Within its jurisdiction, the Commission permits are required for activities including shoreline development, the placement of fill, substantial changes in use, and dredging. Permits are issued if the Commission finds the activities to be consistent with the McAteer-Petris Act and the policies of the Bay Plan.

The DEIR should provide a detailed and complete project description, clarify where the project would occur within both the Commission's Bay and 100-foot shoreline band jurisdictions, and identify the Commission's permitting role.

Commission Law and Bay Plan Policies Relevant to the Project

Public Access. Section 66602 of the McAteer-Petris Act states, in part, "that maximum feasible public access, consistent with a proposed project, should be provided." The Commission can only approve a project within its jurisdiction if it provides maximum feasible public access, consistent with the project. The Bay Plan policies on public access state, in part that, "in addition to the public access to the Bay provided by waterfront parks, beaches, marinas, and fishing piers, maximum feasible access to and along the waterfront and on any permitted fills should be provided in and through every new development in the Bay or on the shoreline.... Public access should be sited, designed, managed and maintained to avoid significant adverse impacts from sea level rise and shoreline flooding, and prevent significant adverse effects on wildlife... Whenever public access to the Bay is provided as a condition of development, on fill or on the shoreline, the access should be permanently guaranteed...The improvements should be designed and built to encourage diverse Bay-related activities and movement to and along the shoreline, should permit barrier free access to persons with disabilities to the maximum feasible extent, should include an ongoing maintenance program, and should be identified with appropriate signs...Access to and along the waterfront should be provided by appropriate means and connect to the nearest public thoroughfare where convenient parking or public transportation may be available..."

The redevelopment project will by its nature bring more people to the site, and it will impact the existing public access spaces on this stretch of shoreline. Two existing BCDC permits detail public access requirements at the site:

- BCDC Permit No. M1990.001.00, held by the City of South San Francisco, authorized public access improvements along the shoreline at the foot of Haskins Street.

- BCDC Permit No. M2002.070.00, held by ARE-East Jaime Court, LLC., for a research and development office/laboratory complex at the southeast corner of Haskins Way and East Jaime Court, requires public access infrastructure along the shoreline.

In addition to mitigating adverse impacts to existing public access areas and use at the site, maximum feasible public access consistent with the project is to be provided.

In order to fully evaluate the public access proposed with the project, the DEIR should include more detailed information regarding existing and proposed public access. The design of the new and improved public areas should be fully described in the DEIR to allow us to fully evaluate the public access proposed with the project.

The DEIR should indicate the number of new workers, customers, and other users expected at the site, their potential impact to existing public access areas, and whether the proposed new public access areas will be adequate to accommodate these additional users and/or mitigate for these impacts. Providing this information will aid the Commission in determining whether the public access proposed with the project is the maximum feasible, consistent with the project. The DEIR should also consider the possible impacts the project may have on other nearby public access areas.

The project will likely require review by BCDC's Design Review Board.

Appearance, Design, and Scenic Views. The Bay Plan policies on Appearance, Design, and Scenic Views state, in part, that: "To enhance the visual quality of development around the Bay...the shores of the Bay should be developed in accordance with the Public Access Design guidelines...Maximum efforts should be made to provide, enhance or preserve views of the Bay and shoreline, especially from public areas...Parking areas should be located away from the shoreline...Shoreline developments should be built in clusters, leaving areas open around them to permit more frequent views of the Bay...towers should be designed as landmarks that suggest the location of the waterfront when it is not visible, especially in flat areas. But such landmarks should be low enough to assure the continued visual dominance of the hills around the Bay..."

The project site is located near a vista point designated in the Bay Plan, which should also be considered. The Bay Plan policy on Appearance, Design, and Scenic Views No. 15 states: "Vista points should be provided in the general locations indicated in the Plan maps. Access to vista points should be provided by walkways, trails, or other appropriate means and connect to the nearest public thoroughfare where parking or public transportation is available. In some cases, exhibits, museums, or markers would be desirable at vista points to explain the value or importance of the areas being viewed." The City should discuss how the Project will maintain views of the Bay, considering the height of the proposed buildings and parking structure.

Thank you for providing the staff with an opportunity to review the NOP of a DEIR for the 201 Haskins Way Project. We hope these comments aid you in preparation of the DEIR. If you have any questions regarding this letter or the Commission's policies and permitting process, please do not hesitate to contact me at (415) 352-3622 or via email walt.deppe@bcdc.ca.gov.

Sincerely,

R.W.D.

Walt Deppe
COASTAL ANALYST

RWD/cj

cc: State Clearinghouse

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
OFFICE OF TRANSIT AND COMMUNITY PLANNING
P.O. BOX 23660, MS-10D
OAKLAND, CA 94623-0660
PHONE (510) 286-5528
FAX (510) 286-5559
TTY 711
www.dot.ca.gov

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Making Conservation a California Way of Life.

May 17, 2018

SCH # 2018042047
GTS # 04-SM-2018-00175
GTS ID: 10341
PM: SM – 101 – 22.049

Ryan Wassum
City of South San Francisco
315 Maple Avenue
South San Francisco, CA 94083

201 Haskins Way Project – Notice of Preparation (NOP)

Dear Mr. Wassum:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the 201 Haskins Way Project. In tandem with the Metropolitan Transportation Commission's (MTC) Sustainable Communities Strategy (SCS), Caltrans' mission signals a modernization of our approach to evaluate and mitigate impacts to the State Transportation Network (STN). Caltrans' *Strategic Management Plan 2015-2020* aims to reduce Vehicle Miles Traveled (VMT) by tripling bicycle and doubling both pedestrian and transit travel by 2020. Our comments are based on the April 18, 2018 NOP for the draft Environmental Impact Report (EIR).

Project Understanding
The project would rezone seven parcels from Mixed Industrial (MI) district to Business Technology Park (BTP) district and one parcel from Business Commercial (BC) district to BTP district. The project would allow development at a floor area ration (FAR) of 1.0 or approximately 677,600 gross square feet (gsf) of new BTP office use, which would be built out in two phases. The proposed project site is part of the City of South San Francisco's "East of 101" planning area. Regional access to this project is provided from US Route (US) 101 via ramps at East Grand Avenue, approximately 1.25 miles from the project site.

Multimodal Planning
This project is located adjacent to the San Francisco Bay Trail, and a Commuting.org shuttle stop. Facilitating transit and active modes will be vital to reducing area VMT. The environmental document should analyze conditioning the project site to incorporate design features that encourage the use of transit and active transportation including improvements to the shuttle stop

to include shelters or benches, as well as site design to promote walkability and bicycle access. We encourage a sufficient allocation of fair share contributions toward multi-modal and regional transit improvements to fully mitigate cumulative impacts to regional transportation. Features such as blank street-walls, excess parking, and barriers to pedestrian travel should be avoided where feasible, as they discourage walking and can contribute to VMT.

Vehicle Trip Reduction

From Caltrans' *Smart Mobility 2010: A Call to Action for the New Decade*, the project site is identified as **Place Type 4c: Suburban Communities (Dedicated Use Areas)** where location efficiency factors, such as community design, are weak and regional accessibility varies. Given the place type and size of the project, it should include a robust Transportation Demand Management (TDM) Program to reduce VMT and greenhouse gas emissions. Such measures are critical to facilitating efficient site access. The measures listed below will promote smart mobility and reduce regional VMT.

- Project design to encourage walking, bicycling and transit access;
- Transit and trip planning resources such as a commute information kiosk;
- Real-time transit information system;
- Transit subsidies on an ongoing basis;
- Subsidized shuttle service for employees;
- Ten percent vehicle parking reductions;
- Charging stations and designated parking spaces for electric vehicles;
- Carpool and clean-fuel parking spaces;
- Designated parking spaces for a car share program;
- Unbundled parking;
- Bikeshare services;
- Showers, changing rooms and clothing lockers for employees that commute via active transportation;
- Emergency Ride Home program;
- Employee transportation coordinator;
- Secured bicycle storage facilities;
- Fix-it bicycle repair station(s);
- Bicycle route mapping resources;
- Participation/Formation in/of a Transportation Management Association (TMA) in partnership with other developments in the area; and
- Aggressive trip reduction targets with Lead Agency monitoring and enforcement.

Transportation Demand Management programs should be documented with annual monitoring reports by an onsite TDM coordinator to demonstrate effectiveness. If the project does not achieve the VMT reduction goals, the reports should also include next steps to take in order to achieve those targets. Also, reducing parking supply can encourage active forms of transportation, reduce regional VMT, and lessen future transportation impacts on State facilities.

These smart growth approaches are consistent with the MTC's Regional Transportation Plan/SCS goals and would meet Caltrans Strategic Management Plan sustainability goals.

For additional TDM options, please refer to the Federal Highway Administration's *Integrating Demand Management into the Transportation Planning Process: A Desk Reference* (Chapter 8). The reference is available online at: http://www.ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf.

Travel Demand Analysis

Please submit a travel demand analysis that provides VMT analysis resulting from the proposed project. With the enactment of Senate Bill (SB) 743, Caltrans is focusing on transportation infrastructure that supports smart growth and efficient development to ensure alignment with State policies through the use of efficient development patterns, innovative travel demand reduction strategies, multimodal improvements, and VMT as the primary transportation impact metric. Please ensure that the travel demand analysis includes:

- A vicinity map, regional location map, and site plan clearly showing project access in relation to the STN. Ingress and egress for all project components should be clearly identified. Clearly identify the State right-of-way (ROW). Project driveways, local roads and intersections, car/bike parking, and transit facilities should be mapped.

- A VMT analysis pursuant to the City's guidelines or, if the City has no guidelines, the Office of Planning and Research's Draft Guidelines. Projects that result in automobile VMT per capita greater than 15% below existing (i.e. baseline) city-wide or regional values for similar land use types may indicate a significant impact. If necessary, mitigation for increasing VMT should be identified. Mitigation should support the use of transit and active transportation modes. Potential mitigation measures that include the requirements of other agencies such as Caltrans are fully enforceable through permit conditions, agreements, or other legally-binding instruments under the control of the City.

- A schematic illustration of walking, biking, transit and auto conditions at the project site and study area roadways. Potential safety issues for all road users should be identified and fully mitigated.

- The project's primary and secondary effects on pedestrians, bicycles, disabled travelers and transit performance should be evaluated, including countermeasures and trade-offs resulting from mitigating VMT increases. Access to pedestrians, bicycle, and transit facilities must be maintained.

- Unmet transit needs in the project area including impacts under full build-out and cumulative scenarios.

Sea Level Rise
The effects of sea level rise may have impacts on transportation facilities located in the project area. Executive Order (EO) S-13-08 directs State agencies planning construction projects in areas vulnerable to sea level rise to begin planning for potential impacts by considering a range of sea level rise scenarios for years 2050 and 2100. Higher water levels may increase erosion rates, change environmental characteristics that affect material durability, lead to increased groundwater levels and change sediment movement along shores and at estuaries and river mouths, as well as affect soil pore pressure at dikes and levees on which transportation facilities are constructed. All these factors must be addressed through geotechnical and hydrological studies conducted in coordination with Caltrans.

Lead Agency
As the Lead Agency, the City of South San Francisco is responsible for all project mitigation, including any needed improvements to the STN. The project's fair share contribution, financing, scheduling, implementation responsibilities and Lead Agency monitoring should be fully discussed for all proposed mitigation measures. Furthermore, this project meets the criteria to be deemed of statewide, regional, or areawide significance per CEQA Guidelines Section 15206; therefore, the draft EIR should be submitted to the San Mateo Transportation Authority, the MTC, and the Association of Bay Area Governments (ABAG) for review and comment.

Encroachment Permit
Please be advised that any work or traffic control that encroaches onto the state ROW requires an encroachment permit that is issued by the Department. To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating state ROW must be submitted to: Office of Permits, California DOT, District 4, P.O. Box 23660, Oakland, CA 94623-0660. Traffic-related mitigation measures should be incorporated into the construction plans during the encroachment permit process. See the website link below for more information: http://www.dot.ca.gov/hq/traffops/developserv/permits/.

Thank you again for including Caltrans in the environmental review process. Should you have any questions regarding this letter, please contact Jake Freedman at 510-286-5518 or jake.freedman@dot.ca.gov.

Sincerely,

Becky Frank for

PATRICIA MAURICE
District Branch Chief
Local Development - Intergovernmental Review

c: State Clearinghouse

C/CAG
City/County Association of Governments
of San Mateo County

Atherton • Belmont • Brisbane • Burlingame • Colma • Daly City • East Palo Alto • Foster City • Half Moon Bay • Hillsborough • Menlo Park
Millbrae • Pacifica • Portola Valley • Redwood City • San Bruno • San Carlos • San Mateo • San Mateo County • South San Francisco • Woodside

April 26, 2018

Ryan Wassum
Associate Planner
City of South San Francisco, Economic and Community Development Department
315 Maple Avenue
South San Francisco, California 94083

RE: Notice of Preparation of an Environmental Impact Report for the proposed 201 Haskins Way Project in the City of South San Francisco

Dear Mr. Wassum:

Thank you for offering C/CAG the opportunity to review the Notice of Preparation of an Environmental Impact Report (EIR) for the proposed 201 Haskins Way Project. The following comments are provided for your consideration in complying with the San Mateo County Congestion Management Program (CMP) Traffic Impact Analysis (TIA) Policy and Land Use Guidelines. In preparing a TIA and EIR for this project, refer to these two policies, which are included as Appendix I and L of the 2017 CMP: http://ccag.ca.gov/wp-content/uploads/2018/02/2017-Final-Draft-CMP-Appendix-1.pdf.

Please forecast and discuss the expected impacts of the project on the CMP roadway network as outlined in the TIA policy. The scope of the TIA should not only include the immediate project area, but also other areas that may be impacted by the project. Please consult with C/CAG staff for any clarification on the scope and parameters of the analysis. The TIA policy provides a detailed definition of project impacts on CMP intersections, freeway segments, and arterial segments.

If the project will generate a net of 100 or more peak-hour trips on the CMP roadway network, mitigation measures are required to reduce the impact of the project. Potential mitigation strategies are documented in the Land Use Guidelines policy and include, but are not limited to, reducing project scope, building roadway and/or transit improvements, collecting traffic mitigation fees, and requiring project sponsors to implement transportation demand management (TDM) programs.

We request the opportunity to review and comment on the TIA, EIR, and project TDM plan (if applicable) upon their completion. If you have any questions, please contact me at jlacap@smcgov.org or 650-599-1455.

Sincerely,

Jeffrey Lacap
Transportation Programs Specialist

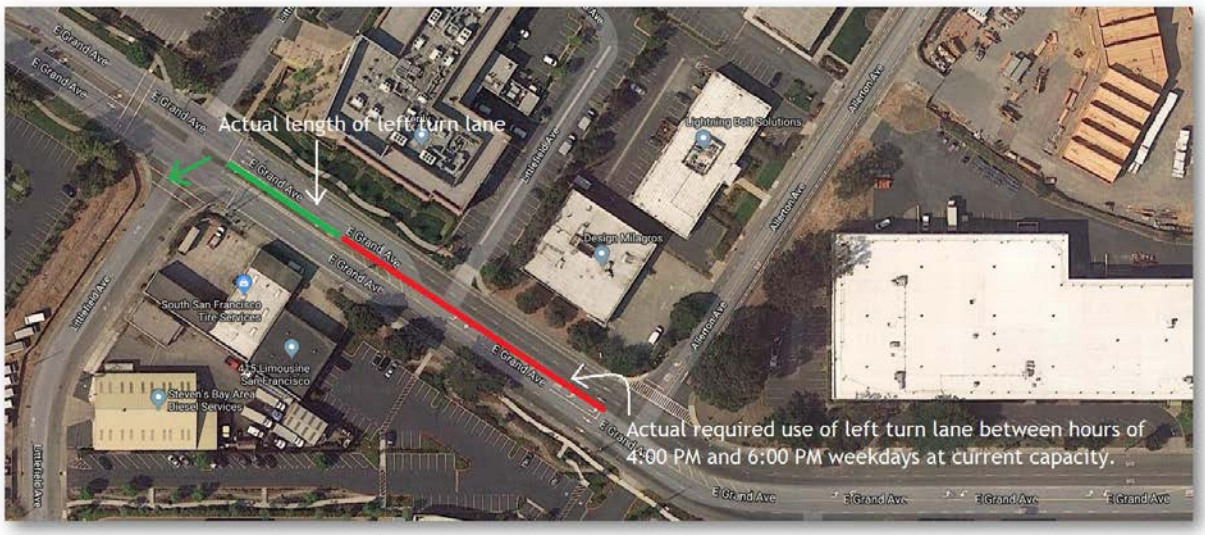
From: Randy Dilena <randy@lenaco.com>
Sent: Monday, May 14, 2018 2:41 PM
To: Wassum, Ryan <Ryan.Wassum@ssf.net>
Subject: RE: 201 Haskins Way - Environmental Impact Report
Importance: High

Thank you Ryan

I want to call your attention to one mention of "under-capacity" in my letter which I believe could be confusing. To clarify what I meant here, I want you to be aware that the left turn lane located on Westbound East Grand Avenue (shown in green below) cannot handle the number of cars that need to use it to keep traffic flowing well between approximately 4:00 PM – 6:00 PM on many weekdays. Consequently, cars back up in the middle multi-turn (two-way) lane (shown in red below) and sometimes extends over the Allerton intersection with East Grand. There is often a minor back up on Allerton – though it is less pronounced than the backup on East Grand. I cannot see this getting much better with the current and proposed vehicle / employment expansion occurring east of Allerton without something being done to make the turn lane more efficient at the critical time of day (and with a dramatic improvement to the horrific condition of the Littlefield pavement – see two Littlefield pavement photos attached) in order to improve the growing evening commute times.

If you have any questions, please let me know. I look forward to hearing from you.

All the best,
Randy



From: Wassum, Ryan <Ryan.Wassum@ssf.net>
Sent: Wednesday, May 9, 2018 2:04 PM
To: randy@lenaco.com
Subject: RE: 201 Haskins Way - Environmental Impact Report

Thanks Randy. I have added your comment letter to the file and have also shared with the EIR consultant. I will seek clarification on your comments and will be in touch.

Best,
Ryan

Ryan Wassum | Associate Planner
Planning Division | City of South San Francisco
315 Maple Avenue | South San Francisco, CA 94083
☎ (650) 877-8535 | www.ssf.net | Like us!

From: Randy Dilena <randy@lenaco.com>
Sent: Thursday, May 3, 2018 1:44 PM
To: Wassum, Ryan <Ryan.Wassum@ssf.net>
Subject: 201 Haskins Way - Environmental Impact Report
Importance: High

May 3, 2018

Attention: Ryan Wassum, Associate Planner
City of South San Francisco
Economic and Community Development Department
315 MAPLE ST
S SAN FRANCISCO, CA 94083
[Via Email]

Re: 201 Haskins Way - Environmental Impact Report

Dear Ryan,

Thank you for sending us a Notice of Preparation (NOP) for an Environmental Impact Report (EIR) for the proposed 201 Haskins Way Project dated April 18, 2018. I also want to thank you for providing us a copy of proposed development plans for our review. Due to conflicts in our scheduling, we are unable to attend the proposed Scoping Meeting on May 3, 2018. Instead, we are submitting our comments to you in writing here.

I am writing to you on behalf of Dilena Family LLC – the organization that owns what is known as 451 East Jamie Court. This address is comprised of APN 015-102-240 and APN 015-102-290, which has been included in the proposed rezoning areas. The following is a collection of comments we have pertaining to the "scope and content" of the proposed EIR:

1. While in principle we are not opposed to an up-zoning of the subject area from its current zoning to Business Technology Park (BTP), we want to be assured that we will be able to continue to operate our businesses as we have in the past, and that we will be able to maintain and improve our property and existing building in future.

2. Again, while we are not opposed to an up-zoning of the subject area, the proposed development site plan indicates two phases adding alternative structures and uses on the proposed project site. This planning submittal development plan in Phase 2 does not include development alternatives that could occur to each of the parcels not currently owned by the developer. As I understand it, alternative developments could be developed by other existing property owners in the subject area under the BTP district zoning. Am I correct about this, and would an EIR take into consideration the fact that our parcels (APN 015-102-240 and APN 015-102-290) could be eventually developed differently as separate and individual parcels in compliance with the new proposed BTP up-zoning? While the proposed site plan we have seen takes into consideration a continuation of current uses for all parcels not owned by the developer (under Phase 1), if possible, the EIR should alternatively anticipate all implications of development alternatives for each and every parcel not currently owned by the developer.

3. We currently have a 36.3 Kw rooftop solar power generation system comprised of 2 arrays with 162 Microinverters. When originally installed in 2012, the 36.3 kW rooftop system was (at that time) one of the largest for a company of its kind in South San Francisco. We generate over 100 percent of our electricity from solar power. The inverter units we have connect directly to each solar module to convert DC power into grid-compliant AC power while transmitting valuable performance data on each module to provide more reliable power and the ability to monitor and respond quickly to performance issues. We estimate this system saves our organizations approximately $15,000 in electricity costs annually and contributes to the available power supply in our area. It also reduces the company's carbon footprint by more than 40 metric tons of CO2 per year. The reason why I mention this is because it is in our plans to expand this system using a new "thin-film" solar power generation system that does not require angled panels to be applied solely to our roof. In fact, these can be attached to almost any external surface of our building that receives sunshine, including walls because of the wider angle of light these new advanced thin film products convert (see http://miasole.com/miasole_solutions/). It appears to us that a building of the proposed height of the 201 Haskins Way Building and the related Parking Garage may (depending on ground elevation) cast a shadow on the rooftop and western walls of our building located at 451 East Jamie Court. Since we do not wish for such the height, bulk and proximity of such a development to negatively impact our ability to currently (and most importantly in the foreseeable future) produce energy using solar power, we ask the EIR consider our continued (and future) ability to produce power using all existing walls and rooftops which could be affected by the height, bulk and proximity of this proposed project?

4. Winds in this area can be quite strong. While we welcome buildings and structures that use, block and/or control the wind effectively, we wonder if the specific siting configuration of the subject buildings (e.g. 201 Haskins Building, Parking Garage Phase 1 and Phase 2, and the East Grand Building) will have a Venturi Effect that could increase the winds on downwind parcels. We are unsure if this is in the scope of this EIR, however, we ask what steps will be

taken to be sure the completion of these buildings do not negatively impact (increase) the prevailing winds downwind from the development site?

5. Construction in this area may pose an increase in noise for the surrounding areas. We ask what steps will be taken to dramatically limit and/or reduce construction noise and traffic during the Phase 1 development of the 201 Haskins Way Building and Parking Garage?

6. With the completion on this proposed project, we anticipate vehicle traffic to dramatically increase in the area – making access to roadways and businesses in South San Francisco difficult, especially during morning and evening commute hours. Over the past two decades, traffic volume and traffic patterns have substantially changed – and these changes have increased the difficulty and time required to travel using any type of vehicle (public or private) on East Grand Avenue. One of the biggest problems during evening commute hours is the grossly under-capacity left turn lane on westbound East Grand Avenue at Littlefield Avenue. Dozens of vehicles are often backed up in the middle of the street awaiting the ability to turn left onto Littlefield Avenue from East Grand Avenue. Traffic flow difficulties in this area are also compounded by the poor condition of the roadway surface on Littlefield Avenue - making driving on that road a dangerous hazard for any type of vehicle. Another problem we see with the growth in traffic is the backup that is caused on westbound East Grand Avenue from Littlefield to Highway 101 – some of which (from Forbes to 101) is caused by the new freeway onramp signals that were recently installed to delay cars from entering the freeway. Due to the growth in worker housing being built in San Francisco, we are seeing more cars traveling northbound to cause more traffic issues on East Grand Avenue. We are unsure if this is in the scope of this EIR, but we ask what steps will be taken to dramatically improve the efficient flow of vehicle traffic along roadways (especially Haskins Way, East Grand and Littlefield) funneling vehicles to and from the proposed development? We also wonder how vehicles added by this development might cause additional problems accessing East Grand Avenue from Haskins Way, and how it might cause additional problems accessing northbound 101 from East Grand Avenue during the evening commute hours?

Please let me know if you have any questions.

Thank you,
Randy Dilena
Dilena Family LLC
201 W SANTA INEZ AVE
HILLSBOROUGH, CA 94010-6860

APPENDIX B

Transportation Appendix

201 HASKINS TRANSPORTATION TECHNICAL APPENDIX

1. Traffic Counts
2. Intersection Level of Service Calculations, Synchro Software, Existing Conditions
3. Traffic Signal Warrants, Caltrans Peak Hour Warrant 3, Existing Conditions
4. Freeway Level of Service Calculations, Highway Capacity Software (HCS), Existing Conditions
5. Intersection Level of Service Calculations, Synchro Software, Existing plus Project
6. Traffic Signal Warrants, Caltrans Peak Hour Warrant 3, Existing plus Project
7. Freeway Level of Service Calculations, Highway Capacity Software (HCS), Existing plus Project
8. Intersection Level of Service Calculations, Synchro Software, 2040 Cumulative without Project
9. Traffic Signal Warrants, Caltrans Peak Hour Warrant 3, 2040 Cumulative without Project
10. Freeway Level of Service Calculations, Highway Capacity Software (HCS), 2040 Cumulative without Project
11. Intersection Level of Service Calculations, Synchro Software, 2040 Cumulative plus Project
12. Traffic Signal Warrants, Caltrans Peak Hour Warrant 3, 2040 Cumulative plus Project
13. Freeway Level of Service Calculations, Highway Capacity Software (HCS), 2040 Cumulative plus Project

1. Traffic Counts

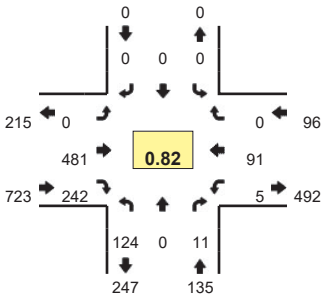
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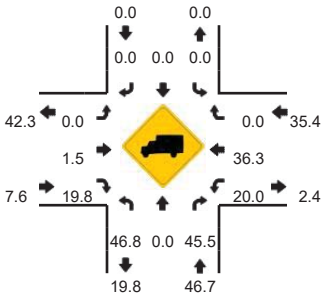
Method for determining peak hour: Total Entering Volume

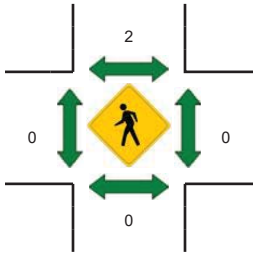
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CITY/STATE: South San Francisco, CA

QC JOB #: 14535701
DATE: Thu, Oct 12 2017

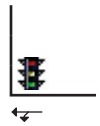
Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM

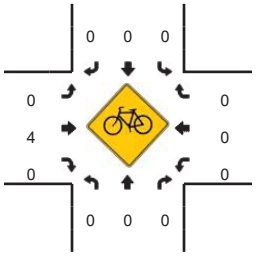


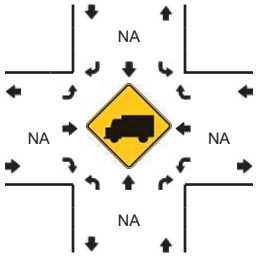


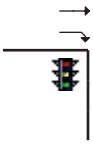


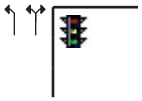


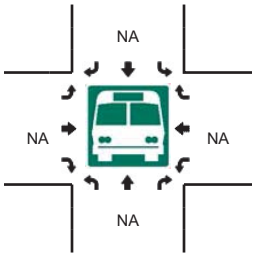












5-Min Count Period Beginning At	Haskins Way (Northbound)				Haskins Way (Southbound)				E Grand Ave (Eastbound)				E Grand Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	14	0	0	0	0	0	0	0	0	27	19	0	1	10	0	0	71	
7:05 AM	11	0	1	0	0	0	0	0	0	18	21	0	0	5	0	0	56	
7:10 AM	10	0	2	0	0	0	0	0	0	17	13	0	0	4	0	0	46	
7:15 AM	11	0	0	0	0	0	0	0	0	19	17	0	0	11	0	0	58	
7:20 AM	9	0	1	0	0	0	0	0	0	25	22	0	0	11	0	0	68	
7:25 AM	10	0	1	0	0	0	0	0	0	25	16	0	1	9	0	0	62	
7:30 AM	16	0	3	0	0	0	0	0	0	23	18	0	0	10	0	0	70	
7:35 AM	7	0	1	0	0	0	0	0	0	28	10	0	0	7	0	0	53	
7:40 AM	10	0	0	0	0	0	0	0	0	39	17	0	0	4	0	0	70	
7:45 AM	7	0	0	0	0	0	0	0	0	32	16	0	0	7	0	0	62	
7:50 AM	5	0	1	0	0	0	0	0	0	28	24	0	0	5	0	0	63	
7:55 AM	13	0	0	0	0	0	0	0	0	38	22	0	0	4	0	0	77	756
8:00 AM	9	0	0	0	0	0	0	0	0	40	27	0	0	4	0	0	80	765
8:05 AM	11	0	1	0	0	0	0	0	0	34	18	0	0	11	0	0	75	784
8:10 AM	11	0	0	0	0	0	0	0	0	37	16	0	0	8	0	0	72	810
8:15 AM	7	0	2	0	0	0	0	0	0	39	20	0	0	5	0	0	73	825
8:20 AM	7	0	1	0	0	0	0	0	0	32	19	0	0	5	0	0	64	821
8:25 AM	9	0	1	0	0	0	0	0	0	33	16	0	0	11	0	0	70	829
8:30 AM	12	0	1	0	0	0	0	0	0	44	26	0	1	8	0	0	92	851
8:35 AM	9	0	2	0	0	0	0	0	0	32	19	0	0	4	0	0	66	864
8:40 AM	14	0	2	0	0	0	0	0	0	27	22	0	0	7	0	0	72	866
8:45 AM	8	0	1	0	0	0	0	0	0	58	22	0	0	9	0	0	98	902
8:50 AM	14	0	0	0	0	0	0	0	0	46	22	0	4	8	0	0	94	933
8:55 AM	13	0	0	0	0	0	0	0	0	59	15	0	0	11	0	0	98	954

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	140	0	4	0	0	0	0	0	0	652	236	0	16	112	0	0	1160
Heavy Trucks	48	0	0		0	0	0		0	12	20		4	36	0		120
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/19/2017 12:27 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

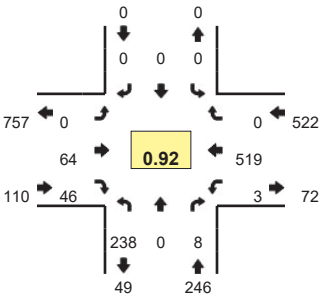
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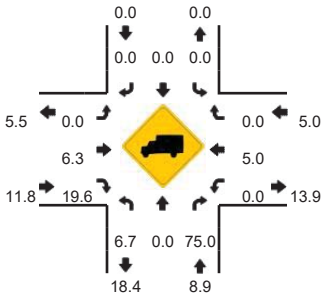
Method for determining peak hour: Total Entering Volume

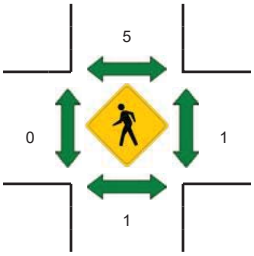
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CITY/STATE: South San Francisco, CA

QC JOB #: 14535702
DATE: Thu, Oct 12 2017

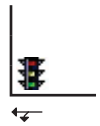
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Peak 15-Min: 5:00 PM -- 5:15 PM

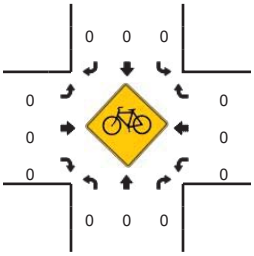


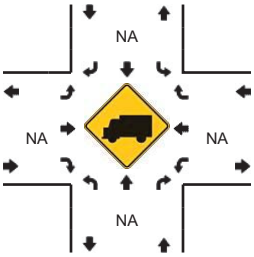


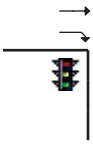


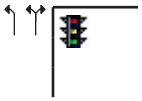


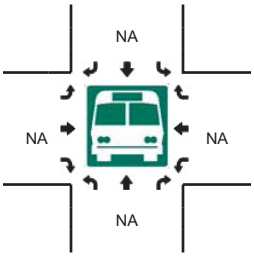












5-Min Count Period Beginning At	Haskins Way (Northbound)				Haskins Way (Southbound)				E Grand Ave (Eastbound)				E Grand Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	18	0	0	0	0	0	0	0	0	9	4	0	0	38	0	0	69	
4:05 PM	22	0	2	0	0	0	0	0	0	4	7	0	0	48	0	0	83	
4:10 PM	17	0	1	0	0	0	0	0	0	6	8	0	0	50	0	0	82	
4:15 PM	16	0	1	0	0	0	0	0	0	6	6	0	0	53	0	0	82	
4:20 PM	15	0	1	0	0	0	0	0	0	4	8	0	1	46	0	0	75	
4:25 PM	12	0	0	0	0	0	0	0	0	2	8	0	0	39	0	0	61	
4:30 PM	29	0	0	0	0	0	0	0	0	9	3	0	0	29	0	0	70	
4:35 PM	24	0	1	0	0	0	0	0	0	5	2	0	1	57	0	0	90	
4:40 PM	23	0	0	0	0	0	0	0	0	4	3	0	0	32	0	0	62	
4:45 PM	12	0	1	0	0	0	0	0	0	6	1	0	0	51	0	0	71	
4:50 PM	18	0	2	0	0	0	0	0	0	7	4	0	0	43	0	0	74	
4:55 PM	13	0	1	0	0	0	0	0	0	5	3	0	0	33	0	0	55	874
5:00 PM	20	0	0	0	0	0	0	0	0	2	2	0	1	38	0	0	63	868
5:05 PM	30	0	1	0	0	0	0	0	0	6	4	0	0	43	0	0	84	869
5:10 PM	26	0	0	0	0	0	0	0	0	8	2	0	0	55	0	0	91	878
5:15 PM	20	0	1	0	0	0	0	0	0	5	3	1	0	39	0	0	69	865
5:20 PM	23	0	0	0	0	0	0	0	0	3	2	0	0	40	0	0	68	858
5:25 PM	7	0	0	0	0	0	0	0	0	5	5	0	0	33	0	0	50	847
5:30 PM	13	0	0	0	0	0	0	0	0	1	0	0	1	38	0	0	53	830
5:35 PM	15	0	3	0	0	0	0	0	0	5	2	0	0	33	0	0	58	798
5:40 PM	13	0	0	0	0	0	0	0	0	4	0	0	0	34	0	0	51	787
5:45 PM	9	0	1	0	0	0	0	0	0	7	4	0	0	26	0	0	47	763
5:50 PM	12	0	0	0	0	0	0	0	0	6	2	0	1	27	0	0	48	737
5:55 PM	8	0	0	0	0	0	0	0	0	6	4	0	3	20	0	0	41	723

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	304	0	4	0	0	0	0	0	0	64	32	0	4	544	0	0	952
Heavy Trucks	8	0	4		0	0	0		0	8	12		0	20	0		52
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/19/2017 12:27 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

2. Intersection Level of Service Calculations
Synchro Software
Existing Conditions

Movement	EBT	EBR	WBL2	WBT	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations										
Traffic Volume (vph)	1214	320	42	349	226	0	141	0	664	347
Future Volume (vph)	1214	320	42	349	226	0	141	0	664	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.0	4.0	4.0		4.5	4.5
Lane Util. Factor	0.91		1.00	0.91	0.91	0.91	1.00		*1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Frt	0.97		1.00	1.00	1.00	1.00	0.85		1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (prot)	4898		1641	4396	2857	1428	1422		3762	1553
Flt Permitted	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (perm)	4898		1641	4396	2857	1428	1422		3762	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1320	348	46	379	246	0	153	0	722	377
RTOR Reduction (vph)	0	0	0	0	0	0	100	0	0	0
Lane Group Flow (vph)	1668	0	46	379	165	81	53	0	722	377
Confl. Peds. (#/hr)							4			
Confl. Bikes (#/hr)		11					4			6
Heavy Vehicles (%)	2%	3%	10%	18%	15%	0%	11%	0%	1%	4%
Turn Type	NA		Prot	NA	Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3	4	4			3	3
Permitted Phases							4	3 6		
Actuated Green, G (s)	41.4		3.6	80.0	11.5	11.5	11.5		26.5	26.5
Effective Green, g (s)	41.4		3.6	80.0	11.5	11.5	11.5		26.5	26.5
Actuated g/C Ratio	0.41		0.04	0.80	0.12	0.12	0.12		0.26	0.26
Clearance Time (s)	4.5		4.0		4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0		2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	2027		59	3516	328	164	163		996	411
v/s Ratio Prot	c0.34		c0.03	0.09	c0.06	0.06			0.19	c0.24
v/s Ratio Perm							0.04			
v/c Ratio	0.82		0.78	0.11	0.50	0.49	0.33		0.72	0.92
Uniform Delay, d1	26.0		47.8	2.2	41.6	41.5	40.7		33.4	35.7
Progression Factor	0.84		1.29	0.68	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.4		43.2	0.0	0.4	0.9	0.4		2.2	24.5
Delay (s)	25.2		104.9	1.5	42.0	42.4	41.1		35.7	60.2
Level of Service	C		F	A	D	D	D		D	E
Approach Delay (s)	25.2			12.7		41.7				
Approach LOS	C			B		D				

Intersection Summary			
HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	139	87	173	118	67	33	375	289	404	444	101
Future Volume (vph)	156	139	87	173	118	67	33	375	289	404	444	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1577	1555		2694	1660	1333	1624	2875	1411	1449	2928	1329
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1577	1555		2694	1660	1333	1624	2875	1411	1449	2928	1329
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	162	145	91	180	123	70	34	391	301	421	462	105
RTOR Reduction (vph)	0	25	0	0	0	62	0	0	0	0	0	68
Lane Group Flow (vph)	163	211	0	180	123	8	34	391	301	286	598	37
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA	pt+ov	Split	NA	Perm
Protected Phases	8	8		7	7		6	6	6 7	2	2	
Permitted Phases						7						2
Actuated Green, G (s)	18.1	18.1		11.9	11.9	11.9	17.5	17.5	29.4	35.5	35.5	35.5
Effective Green, g (s)	18.1	18.1		11.9	11.9	11.9	17.5	17.5	29.4	35.5	35.5	35.5
Actuated g/C Ratio	0.18	0.18		0.12	0.12	0.12	0.18	0.18	0.29	0.36	0.36	0.36
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	285	281		320	197	158	284	503	414	514	1039	471
v/s Ratio Prot	0.10	c0.14		0.07	0.07		0.02	c0.14	c0.21	0.20	c0.20	
v/s Ratio Perm						0.01						0.03
v/c Ratio	0.57	0.75		0.56	0.62	0.05	0.12	0.78	0.73	0.56	0.58	0.08
Uniform Delay, d1	37.4	38.8		41.6	41.9	39.1	34.8	39.4	31.7	25.9	26.1	21.4
Progression Factor	1.00	1.00		0.81	0.80	3.08	1.00	1.00	1.00	0.93	0.93	1.22
Incremental Delay, d2	2.3	10.3		2.3	6.0	0.1	0.1	7.1	5.9	3.7	2.0	0.3
Delay (s)	39.7	49.2		36.1	39.7	120.5	34.9	46.5	37.6	27.9	26.3	26.4
Level of Service	D	D		D	D	F	C	D	D	C	C	C
Approach Delay (s)		45.3			53.1			42.3			26.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	38.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	46	786	476	32	25	21
Future Volume (vph)	46	786	476	32	25	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.91
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4425		1805	1476
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4425		1805	1476
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	47	802	486	33	26	21
RTOR Reduction (vph)	0	0	3	0	0	20
Lane Group Flow (vph)	47	802	516	0	26	1
Confl. Peds. (#/hr)	8			8	9	9
Confl. Bikes (#/hr)				3		2
Heavy Vehicles (%)	2%	2%	17%	0%	0%	0%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		3	
Permitted Phases						3
Actuated Green, G (s)	5.1	87.9	78.8		4.1	4.1
Effective Green, g (s)	5.1	87.9	78.8		4.1	4.1
Actuated g/C Ratio	0.05	0.88	0.79		0.04	0.04
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	90	4469	3486		74	60
v/s Ratio Prot	c0.03	c0.16	0.12		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.52	0.18	0.15		0.35	0.01
Uniform Delay, d1	46.3	0.9	2.5		46.7	46.0
Progression Factor	1.17	0.97	1.06		1.00	1.00
Incremental Delay, d2	2.2	0.1	0.1		1.1	0.0
Delay (s)	56.1	0.9	2.8		47.7	46.0
Level of Service	E	A	A		D	D
Approach Delay (s)		4.0	2.8		47.0	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	750	61	10	359	149	667
Future Volume (veh/h)	750	61	10	359	149	667
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1866	1900	1727	1570	1810	1810
Adj Flow Rate, veh/h	806	66	11	386	160	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	10	21	5	5
Cap, veh/h	3638	296	12	3460	195	306
Arrive On Green	1.00	1.00	0.01	1.00	0.11	0.00
Sat Flow, veh/h	4955	390	1645	4428	1723	2707
Grp Volume(v), veh/h	570	302	11	386	160	0
Grp Sat Flow(s),veh/h/ln	1698	1782	1645	1429	1723	1354
Q Serve(g_s), s	0.0	0.0	0.7	0.0	9.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.7	0.0	9.1	0.0
Prop In Lane		0.22	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2580	1354	12	3460	195	306
V/C Ratio(X)	0.22	0.22	0.95	0.11	0.82	0.00
Avail Cap(c_a), veh/h	2580	1354	82	3460	810	1272
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.98	0.98	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	49.3	0.0	43.4	0.0
Incr Delay (d2), s/veh	0.2	0.4	62.4	0.1	3.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.3	0.9	0.0	8.0	0.0
LnGrp Delay(d),s/veh	0.2	0.4	111.7	0.1	46.7	0.0
LnGrp LOS	A	A	F	A	D	
Approach Vol, veh/h	872			397	160	
Approach Delay, s/veh	0.3			3.2	46.7	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	4.7	80.0				84.7		15.3
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	5.0	36.0				45.0		47.0
Max Q Clear Time (g_c+I1), s	2.7	2.0				2.0		11.1
Green Ext Time (p_c), s	0.0	6.4				6.5		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	6.3
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	159	1193	65	147	261	100	56	151	317	248	129	52
Future Volume (veh/h)	159	1193	65	147	261	100	56	151	317	248	129	52
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
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	1810	1810	1976	1545	1551	1976	1583	1787	1900	1810	1835	1900
Adj Flow Rate, veh/h	164	1230	67	152	269	103	58	156	0	256	133	0
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	23	25	25	20	7	7	5	5	5
Cap, veh/h	191	2197	120	173	1436	511	237	318	0	286	336	0
Arrive On Green	0.22	0.92	0.92	0.24	0.94	0.94	0.16	0.09	0.00	0.17	0.10	0.00
Sat Flow, veh/h	1723	4788	261	1471	3068	1092	1508	3485	0	1723	3578	0
Grp Volume(v), veh/h	164	846	451	152	246	126	58	156	0	256	133	0
Grp Sat Flow(s),veh/h/ln	1723	1647	1756	1471	1411	1336	1508	1698	0	1723	1743	0
Q Serve(g_s), s	9.2	4.3	4.4	10.0	0.7	0.7	3.4	4.4	0.0	14.6	3.6	0.0
Cycle Q Clear(g_c), s	9.2	4.3	4.4	10.0	0.7	0.7	3.4	4.4	0.0	14.6	3.6	0.0
Prop In Lane	1.00		0.15	1.00		0.82	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	191	1511	806	173	1321	625	237	318	0	286	336	0
V/C Ratio(X)	0.86	0.56	0.56	0.88	0.19	0.20	0.24	0.49	0.00	0.90	0.40	0.00
Avail Cap(c_a), veh/h	207	1511	806	174	1321	625	237	781	0	293	1060	0
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	0.95	0.95	0.95	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.2	2.4	2.4	37.5	1.7	1.7	36.9	43.1	0.0	40.9	42.5	0.0
Incr Delay (d2), s/veh	22.3	1.3	2.4	33.7	0.3	0.7	0.2	0.4	0.0	26.6	0.3	0.0
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(95%),veh/ln	9.0	3.4	4.1	9.5	0.5	0.6	2.5	3.7	0.0	13.9	3.1	0.0
LnGrp Delay(d),s/veh	60.5	3.7	4.8	71.2	2.0	2.4	37.1	43.5	0.0	67.5	42.7	0.0
LnGrp LOS	E	A	A	E	A	A	D	D		E	D	
Approach Vol, veh/h		1461			524			214			389	
Approach Delay, s/veh		10.4			22.2			41.8			59.0	
Approach LOS		B			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	50.1	19.7	14.2	15.1	51.0	20.6	13.4
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax), s	* 18	* 32	9.0	30.4	12.0	* 32	17.0	23.0
Max Q Clear Time (g_c+I1), s	12.0	6.4	5.4	5.6	11.2	2.7	16.6	6.4
Green Ext Time (p_c), s	0.0	8.7	0.3	0.5	0.0	9.0	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	22.7
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	407	1195	151	33	295	10	89	134	180	68	58	124
Future Volume (veh/h)	407	1195	151	33	295	10	89	134	180	68	58	124
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.98
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	1845	1825	1900	1338	1550	1900	1429	1750	1792	1610	1538	1652
Adj Flow Rate, veh/h	420	1232	156	34	304	10	92	138	186	70	232	128
Adj No. of Lanes	2	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97
Percent Heavy Veh, %	3	3	3	42	23	23	33	7	6	18	24	15
Cap, veh/h	495	1496	189	59	1137	37	161	206	176	263	264	237
Arrive On Green	0.29	0.97	0.97	0.05	0.39	0.39	0.12	0.12	0.12	0.17	0.17	0.17
Sat Flow, veh/h	3408	3091	390	1274	2909	95	1361	1750	1489	1533	1538	1379
Grp Volume(v), veh/h	420	689	699	34	153	161	92	138	186	70	232	128
Grp Sat Flow(s),veh/h/ln	1704	1734	1747	1274	1472	1532	1361	1750	1489	1533	1538	1379
Q Serve(g_s), s	11.6	6.2	6.4	2.6	7.1	7.1	6.4	7.6	11.8	4.0	14.7	8.5
Cycle Q Clear(g_c), s	11.6	6.2	6.4	2.6	7.1	7.1	6.4	7.6	11.8	4.0	14.7	8.5
Prop In Lane	1.00		0.22	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	495	839	845	59	575	599	161	206	176	263	264	237
V/C Ratio(X)	0.85	0.82	0.83	0.58	0.27	0.27	0.57	0.67	1.06	0.27	0.88	0.54
Avail Cap(c_a), veh/h	648	839	845	59	575	599	161	206	176	297	298	268
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.64	0.64	0.64	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.4	0.9	0.9	46.7	20.7	20.7	41.7	42.2	44.1	35.9	40.4	37.8
Incr Delay (d2), s/veh	5.4	5.8	6.0	8.9	1.1	1.1	3.2	6.6	84.2	0.2	21.0	0.7
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(95%),veh/ln	8.9	4.5	5.2	1.9	5.5	5.8	4.6	7.2	16.1	3.0	12.4	5.9
LnGrp Delay(d),s/veh	39.8	6.8	7.0	55.6	21.8	21.8	44.9	48.8	128.3	36.1	61.3	38.5
LnGrp LOS	D	A	A	E	C	C	D	D	F	D	E	D
Approach Vol, veh/h		1808			348			416			430	
Approach Delay, s/veh		14.5			25.1			83.5			50.4	
Approach LOS		B			C			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.5	43.7		21.8	9.2	53.0		16.0
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	9.6	32.4		19.4	3.0	* 48		11.8
Max Q Clear Time (g_c+I1), s	13.6	9.1		16.7	4.6	8.4		13.8
Green Ext Time (p_c), s	0.9	1.8		0.4	0.0	7.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	1209	52	69	305	6	21	24	626	4	0	5
Future Volume (veh/h)	15	1209	52	69	305	6	21	24	626	4	0	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		1.00	1.00		1.00
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	1776	1810	1900	1407	1526	1900	1900	1859	1900	1900	1900	1900
Adj Flow Rate, veh/h	16	1273	55	73	321	6	22	25	659	4	0	5
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	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, %	7	5	5	35	25	25	0	0	0	0	0	0
Cap, veh/h	18	1426	62	248	1759	33	48	34	636	123	19	112
Arrive On Green	0.01	0.43	0.43	0.19	0.60	0.60	0.43	0.43	0.43	0.43	0.00	0.43
Sat Flow, veh/h	1691	3354	145	1340	2911	54	25	80	1479	165	45	262
Grp Volume(v), veh/h	16	652	676	73	160	167	706	0	0	9	0	0
Grp Sat Flow(s),veh/h/ln	1691	1720	1779	1340	1449	1516	1584	0	0	471	0	0
Q Serve(g_s), s	0.9	35.1	35.2	4.7	4.9	4.9	22.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.9	35.1	35.2	4.7	4.9	4.9	43.0	0.0	0.0	0.3	0.0	0.0
Prop In Lane	1.00		0.08	1.00		0.04	0.03		0.93	0.44		0.56
Lane Grp Cap(c), veh/h	18	731	756	248	876	916	718	0	0	254	0	0
V/C Ratio(X)	0.90	0.89	0.89	0.29	0.18	0.18	0.98	0.00	0.00	0.04	0.00	0.00
Avail Cap(c_a), veh/h	51	731	756	248	876	916	718	0	0	254	0	0
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.4	26.6	26.7	35.1	8.8	8.8	29.2	0.0	0.0	16.3	0.0	0.0
Incr Delay (d2), s/veh	38.2	15.4	15.2	0.2	0.5	0.4	29.1	0.0	0.0	0.0	0.0	0.0
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(95%),veh/ln	1.1	26.9	27.9	3.2	3.7	3.9	33.5	0.0	0.0	0.3	0.0	0.0
LnGrp Delay(d),s/veh	87.6	42.1	41.9	35.4	9.2	9.2	58.3	0.0	0.0	16.4	0.0	0.0
LnGrp LOS	F	D	D	D	A	A	E			B		
Approach Vol, veh/h		1344			400			706			9	
Approach Delay, s/veh		42.5			14.0			58.3			16.4	
Approach LOS		D			B			E			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.5	47.0		47.0	5.1	65.4		47.0
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	2.0	* 43		43.0	3.0	41.5		43.0
Max Q Clear Time (g_c+I1), s	16.7	37.2		2.3	2.9	6.9		45.0
Green Ext Time (p_c), s	0.0	2.7		4.0	0.0	1.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	42.3
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	257	1556	309	17	6	74
Future Vol, veh/h	257	1556	309	17	6	74
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	70	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	3	4	28	29	0	19
Mvmt Flow	273	1655	329	18	6	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	348	0	-	0	1713	174
Stage 1	-	-	-	-	339	-
Stage 2	-	-	-	-	1374	-
Critical Hdwy	4.16	-	-	-	6.8	7.28
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.23	-	-	-	3.5	3.49
Pot Cap-1 Maneuver	1200	-	-	-	83	788
Stage 1	-	-	-	-	699	-
Stage 2	-	-	-	-	204	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1200	-	-	-	64	787
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	698	-
Stage 2	-	-	-	-	157	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1200	-	-	-	787
HCM Lane V/C Ratio	0.228	-	-	-	0.1
HCM Control Delay (s)	8.9	-	-	-	10.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.9	-	-	-	0.3

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	481	242	5	91	124	11
Future Volume (veh/h)	481	242	5	91	124	11
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1583	1900	1406	1293	1900
Adj Flow Rate, veh/h	587	295	6	111	163	0
Adj No. of Lanes	1	1	0	1	2	1
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	20	36	36	47	0
Cap, veh/h	898	649	166	652	407	267
Arrive On Green	0.48	0.48	0.48	0.48	0.17	0.00
Sat Flow, veh/h	1863	1346	18	1351	2463	1615
Grp Volume(v), veh/h	587	295	117	0	163	0
Grp Sat Flow(s),veh/h/ln	1863	1346	1369	0	1232	1615
Q Serve(g_s), s	5.7	3.5	0.0	0.0	1.4	0.0
Cycle Q Clear(g_c), s	5.7	3.5	1.1	0.0	1.4	0.0
Prop In Lane		1.00	0.05		1.00	1.00
Lane Grp Cap(c), veh/h	898	649	817	0	407	267
V/C Ratio(X)	0.65	0.45	0.14	0.00	0.40	0.00
Avail Cap(c_a), veh/h	3089	2232	2319	0	2655	1741
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	4.7	4.1	3.5	0.0	9.0	0.0
Incr Delay (d2), s/veh	0.3	0.2	0.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.1	2.3	0.8	0.0	0.9	0.0
LnGrp Delay(d),s/veh	5.0	4.3	3.6	0.0	9.2	0.0
LnGrp LOS	A	A	A		A	
Approach Vol, veh/h	882			117	163	
Approach Delay, s/veh	4.8			3.6	9.2	
Approach LOS	A			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		16.1		8.0		16.1		
Change Period (Y+Rc), s		4.5		4.0		4.5		
Max Green Setting (Gmax), s		40.0		26.0		40.0		
Max Q Clear Time (g_c+I1), s		7.7		3.4		3.1		
Green Ext Time (p_c), s		3.9		0.3		3.9		

Intersection Summary	
HCM 2010 Ctrl Delay	5.3
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	0	33	516	868	0	0
Future Vol, veh/h	0	33	516	868	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	4	2	2
Mvmt Flow	0	36	561	943	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	752	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.9	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.3	-	-
Pot Cap-1 Maneuver	0	357	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	357	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NE
HCM Control Delay, s	16.2	0
HCM LOS	C	

Minor Lane/Major Mvmt	NET	NER	WBLn1
Capacity (veh/h)	-	-	357
HCM Lane V/C Ratio	-	-	0.1
HCM Control Delay (s)	-	-	16.2
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	178	125	330	195	192	194	43	343	164	627	164
Future Volume (veh/h)	93	178	125	330	195	192	194	43	343	164	627	164
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1610	1782	1727	1520	1605	1792	1696	1736	1900	1776	1810	1827
Adj Flow Rate, veh/h	94	189	0	344	203	0	202	45	0	171	653	0
Adj No. of Lanes	1	2	1	2	1	1	1	2	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	18	6	10	25	13	6	12	21	21	7	5	4
Cap, veh/h	132	306	126	474	263	249	233	677	0	623	1497	676
Arrive On Green	0.09	0.09	0.00	0.05	0.05	0.00	0.14	0.21	0.00	0.37	0.44	0.00
Sat Flow, veh/h	1533	3564	1468	2895	1605	1524	1616	3385	0	1691	3438	1553
Grp Volume(v), veh/h	94	189	0	344	203	0	202	45	0	171	653	0
Grp Sat Flow(s),veh/h/ln	1533	1782	1468	1448	1605	1524	1616	1649	0	1691	1719	1553
Q Serve(g_s), s	6.0	5.1	0.0	11.7	12.5	0.0	12.2	1.1	0.0	7.1	13.2	0.0
Cycle Q Clear(g_c), s	6.0	5.1	0.0	11.7	12.5	0.0	12.2	1.1	0.0	7.1	13.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	132	306	126	474	263	249	233	677	0	623	1497	676
V/C Ratio(X)	0.71	0.62	0.00	0.73	0.77	0.00	0.87	0.07	0.00	0.27	0.44	0.00
Avail Cap(c_a), veh/h	184	428	176	651	361	343	339	937	0	623	1497	676
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.89	0.89	0.00	1.00	1.00	0.00	0.95	0.95	0.00
Uniform Delay (d), s/veh	44.5	44.1	0.0	45.1	45.5	0.0	41.9	32.0	0.0	22.2	19.7	0.0
Incr Delay (d2), s/veh	3.3	0.8	0.0	2.3	6.2	0.0	10.9	0.0	0.0	0.1	0.9	0.0
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(95%),veh/ln	4.8	4.6	0.0	8.3	9.8	0.0	10.2	0.9	0.0	6.0	10.5	0.0
LnGrp Delay(d),s/veh	47.8	44.9	0.0	47.4	51.6	0.0	52.8	32.0	0.0	22.3	20.6	0.0
LnGrp LOS	D	D		D	D		D	C		C	C	
Approach Vol, veh/h		283			547			247			824	
Approach Delay, s/veh		45.9			49.0			49.0			20.9	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.4	48.1		12.6	41.4	25.1		20.9
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	21.0	27.4		12.0	20.0	* 28		22.5
Max Q Clear Time (g_c+I1), s	14.2	15.2		8.0	9.1	3.1		14.5
Green Ext Time (p_c), s	0.2	4.1		0.4	3.9	0.1		1.8

Intersection Summary		
HCM 2010 Ctrl Delay		36.3
HCM 2010 LOS		D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	233	378	37	123	30	396	382	401	18	108	198
Future Volume (veh/h)	74	233	378	37	123	30	396	382	401	18	108	198
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.89
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	1532	1739	1652	1667	1332	1900	1727	1836	1900	1900	1845	1520
Adj Flow Rate, veh/h	78	360	322	39	129	32	417	402	0	19	114	208
Adj No. of Lanes	1	1	1	1	1	0	2	2	0	1	1	1
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, %	24	7	15	14	49	49	10	5	5	0	3	25
Cap, veh/h	95	417	326	60	218	54	1136	1242	0	353	360	224
Arrive On Green	0.02	0.08	0.08	0.04	0.21	0.21	0.36	0.36	0.00	0.19	0.19	0.19
Sat Flow, veh/h	1459	1739	1358	1587	1024	254	3191	3581	0	1810	1845	1151
Grp Volume(v), veh/h	78	360	322	39	0	161	417	402	0	19	114	208
Grp Sat Flow(s),veh/h/ln	1459	1739	1358	1587	0	1278	1596	1745	0	1810	1845	1151
Q Serve(g_s), s	5.3	20.5	23.7	2.4	0.0	11.3	9.7	8.4	0.0	0.9	5.3	17.8
Cycle Q Clear(g_c), s	5.3	20.5	23.7	2.4	0.0	11.3	9.7	8.4	0.0	0.9	5.3	17.8
Prop In Lane	1.00		1.00	1.00		0.20	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	95	417	326	60	0	272	1136	1242	0	353	360	224
V/C Ratio(X)	0.82	0.86	0.99	0.65	0.00	0.59	0.37	0.32	0.00	0.05	0.32	0.93
Avail Cap(c_a), veh/h	161	417	326	127	0	272	1136	1242	0	353	360	224
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	1.00	0.00	1.00	0.73	0.73	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	44.4	45.9	47.4	0.0	35.5	23.8	23.4	0.0	32.7	34.5	39.5
Incr Delay (d2), s/veh	5.9	15.2	44.2	4.3	0.0	2.4	0.7	0.5	0.0	0.0	0.2	39.8
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(95%),veh/ln	4.2	17.0	18.5	2.0	0.0	7.6	7.2	6.9	0.0	0.8	4.9	12.8
LnGrp Delay(d),s/veh	54.2	59.6	90.1	51.7	0.0	37.8	24.5	23.9	0.0	32.8	34.7	79.3
LnGrp LOS	D	E	F	D		D	C	C		C	C	E
Approach Vol, veh/h		760			200			819			341	
Approach Delay, s/veh		72.0			40.5			24.2			61.8	
Approach LOS		E			D			C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.8	28.0		40.2	10.5	25.3		24.0
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	3.8	24.0		31.4	11.0	21.0		19.5
Max Q Clear Time (g_c+I1), s	4.4	25.7		11.7	7.3	13.3		19.8
Green Ext Time (p_c), s	0.0	0.0		2.8	0.0	0.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	48.9
HCM 2010 LOS	D

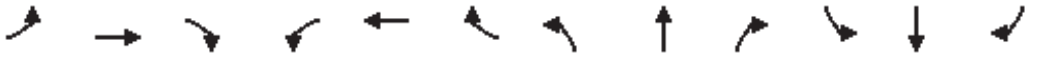
Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	985	18	564	19	8	16	163	232	14	22	404	108
Future Volume (vph)	985	18	564	19	8	16	163	232	14	22	404	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.99	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1649	1658	2694		1775	1592	1597	3236		1805	3374	1131
Flt Permitted	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1649	1658	2694		1775	1592	1597	3236		1805	3374	1131
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1059	19	606	20	9	17	175	249	15	24	434	116
RTOR Reduction (vph)	0	0	377	0	0	17	0	5	0	0	0	89
Lane Group Flow (vph)	540	538	229	0	29	0	175	259	0	24	434	27
Confl. Peds. (#/hr)	3		3	3		3			3	3		3
Confl. Bikes (#/hr)									13			
Heavy Vehicles (%)	4%	0%	3%	5%	0%	0%	13%	11%	0%	0%	7%	39%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	28.3	28.3	28.3		1.8	1.8	10.7	25.9		2.0	17.2	17.2
Effective Green, g (s)	28.3	28.3	28.3		1.8	1.8	10.7	25.9		2.0	17.2	17.2
Actuated g/C Ratio	0.38	0.38	0.38		0.02	0.02	0.14	0.35		0.03	0.23	0.23
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	622	625	1016		42	38	227	1117		48	773	259
v/s Ratio Prot	c0.33	0.32			c0.02		c0.11	0.08		0.01	c0.13	
v/s Ratio Perm			0.08			0.00						0.02
v/c Ratio	0.87	0.86	0.23		0.69	0.01	0.77	0.23		0.50	0.56	0.10
Uniform Delay, d1	21.6	21.5	15.9		36.3	35.7	31.0	17.5		36.0	25.6	22.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	11.9	11.3	0.0		32.7	0.0	14.9	0.5		3.0	2.9	0.8
Delay (s)	33.5	32.8	15.9		69.0	35.8	45.8	18.0		39.0	28.5	23.6
Level of Service	C	C	B		E	D	D	B		D	C	C
Approach Delay (s)		27.0			56.7			29.1			27.9	
Approach LOS		C			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	10	197	1	95	14	289	751	565	416	13
Future Volume (vph)	25	0	10	197	1	95	14	289	751	565	416	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.91	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1805	1464	1417	1424	1244	1805	3343	1508	3367	3392	
Flt Permitted		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1805	1464	1417	1424	1244	1805	3343	1508	3367	3392	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	27	0	11	212	1	102	15	311	808	608	447	14
RTOR Reduction (vph)	0	0	11	0	0	87	0	0	389	0	1	0
Lane Group Flow (vph)	0	27	0	106	107	15	15	311	419	608	460	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)									15			21
Heavy Vehicles (%)	0%	0%	0%	21%	0%	27%	0%	8%	3%	4%	6%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		3.6	3.6	14.4	14.4	14.4	2.6	36.6	36.6	29.4	63.4	
Effective Green, g (s)		3.6	3.6	14.4	14.4	14.4	2.6	36.6	36.6	29.4	63.4	
Actuated g/C Ratio		0.04	0.04	0.14	0.14	0.14	0.03	0.37	0.37	0.29	0.63	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		64	52	204	205	179	46	1223	551	989	2150	
v/s Ratio Prot		c0.01		0.07	c0.08		0.01	0.09		c0.18	0.14	
v/s Ratio Perm			0.00			0.01			c0.28			
v/c Ratio		0.42	0.01	0.52	0.52	0.08	0.33	0.25	0.76	0.61	0.21	
Uniform Delay, d1		47.2	46.5	39.6	39.6	37.1	47.8	22.2	27.8	30.4	7.7	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.6	0.0	0.9	1.1	0.1	1.5	0.0	5.3	2.9	0.2	
Delay (s)		48.8	46.5	40.5	40.7	37.1	49.3	22.2	33.2	33.3	8.0	
Level of Service		D	D	D	D	D	D	C	C	C	A	
Approach Delay (s)		48.1			39.5			30.4			22.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBT	EBR	WBL2	WBT	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations										
Traffic Volume (vph)	281	59	52	1658	862	0	83	0	123	64
Future Volume (vph)	281	59	52	1658	862	0	83	0	123	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.0	4.0	4.0		4.5	4.5
Lane Util. Factor	0.91		1.00	0.91	0.91	0.91	1.00		*1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Frt	0.97		1.00	1.00	1.00	1.00	0.85		1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (prot)	4512		1805	5187	3189	1595	1515		3551	1583
Flt Permitted	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (perm)	4512		1805	5187	3189	1595	1515		3551	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	305	64	57	1802	937	0	90	0	134	70
RTOR Reduction (vph)	0	0	0	0	0	0	65	0	0	0
Lane Group Flow (vph)	369	0	57	1802	628	309	25	0	134	70
Confl. Peds. (#/hr)							2			
Confl. Bikes (#/hr)		2					2			2
Heavy Vehicles (%)	11%	15%	0%	0%	3%	0%	5%	0%	7%	2%
Turn Type	NA		Prot	NA	Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3	4	4			3	3
Permitted Phases							4	3 6		
Actuated Green, G (s)	26.4		6.5	63.6	27.9	27.9	27.9		22.2	22.2
Effective Green, g (s)	26.4		6.5	63.6	27.9	27.9	27.9		22.2	22.2
Actuated g/C Ratio	0.26		0.06	0.64	0.28	0.28	0.28		0.22	0.22
Clearance Time (s)	4.5		4.0		4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0		2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	1191		117	3298	889	445	422		788	351
v/s Ratio Prot	0.08		0.03	c0.35	c0.20	0.19			0.04	0.04
v/s Ratio Perm							0.02			
v/c Ratio	0.31		0.49	0.55	0.71	0.69	0.06		0.17	0.20
Uniform Delay, d1	29.5		45.1	10.2	32.4	32.2	26.4		31.5	31.7
Progression Factor	0.55		1.18	1.18	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7		0.9	0.1	2.1	3.8	0.0		0.0	0.1
Delay (s)	16.8		54.1	12.1	34.5	36.0	26.5		31.5	31.8
Level of Service	B		D	B	C	D	C		C	C
Approach Delay (s)	16.8			13.4		34.2				
Approach LOS	B			B		C				

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	62	69	680	274	255	64	487	118	118	391	112
Future Volume (vph)	160	62	69	680	274	255	64	487	118	118	391	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1577	1511		2694	1660	1338	1624	2875	1411	1449	2935	1328
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1577	1511		2694	1660	1338	1624	2875	1411	1449	2935	1328
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	167	65	72	708	285	266	67	507	123	123	407	117
RTOR Reduction (vph)	0	40	0	0	0	188	0	0	0	0	0	94
Lane Group Flow (vph)	167	97	0	708	285	78	67	507	123	111	419	23
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA	pt+ov	Split	NA	Perm
Protected Phases	8	8		7	7		6	6	6 7	2	2	
Permitted Phases						7						2
Actuated Green, G (s)	14.0	14.0		29.5	29.5	29.5	19.5	19.5	49.0	20.0	20.0	20.0
Effective Green, g (s)	14.0	14.0		29.5	29.5	29.5	19.5	19.5	49.0	20.0	20.0	20.0
Actuated g/C Ratio	0.14	0.14		0.29	0.29	0.29	0.20	0.20	0.49	0.20	0.20	0.20
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	220	211		794	489	394	316	560	691	289	587	265
v/s Ratio Prot	c0.11	0.06		c0.26	0.17		0.04	c0.18	0.09	0.08	c0.14	
v/s Ratio Perm						0.06						0.02
v/c Ratio	0.76	0.46		0.89	0.58	0.20	0.21	0.91	0.18	0.38	0.71	0.09
Uniform Delay, d1	41.4	39.5		33.7	30.0	26.4	33.8	39.3	14.2	34.7	37.3	32.6
Progression Factor	1.00	1.00		0.93	0.92	0.74	1.00	1.00	1.00	0.98	0.97	1.16
Incremental Delay, d2	13.3	1.1		12.3	1.8	0.2	0.2	18.1	0.1	3.7	6.9	0.6
Delay (s)	54.7	40.7		43.7	29.3	19.8	34.0	57.5	14.3	37.6	43.2	38.4
Level of Service	D	D		D	C	B	C	E	B	D	D	D
Approach Delay (s)		48.4			35.4			47.6			41.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	44	254	1533	68	21	75
Future Volume (vph)	44	254	1533	68	21	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.92
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	5085	4821		1805	1488
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1805	5085	4821		1805	1488
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	46	265	1597	71	22	78
RTOR Reduction (vph)	0	0	0	0	0	74
Lane Group Flow (vph)	46	265	1668	0	22	4
Confl. Peds. (#/hr)	23			23	9	9
Confl. Bikes (#/hr)				20		4
Heavy Vehicles (%)	0%	2%	7%	0%	0%	0%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		3	
Permitted Phases						3
Actuated Green, G (s)	5.0	86.8	77.8		5.2	5.2
Effective Green, g (s)	5.0	86.8	77.8		5.2	5.2
Actuated g/C Ratio	0.05	0.87	0.78		0.05	0.05
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	90	4413	3750		93	77
v/s Ratio Prot	c0.03	0.05	c0.35		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.51	0.06	0.44		0.24	0.05
Uniform Delay, d1	46.3	0.9	3.8		45.5	45.1
Progression Factor	1.06	0.89	0.43		1.00	1.00
Incremental Delay, d2	2.0	0.0	0.4		0.5	0.1
Delay (s)	50.9	0.8	2.0		46.0	45.2
Level of Service	D	A	A		D	D
Approach Delay (s)		8.3	2.0		45.3	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	252	23	12	1321	280	175
Future Volume (veh/h)	252	23	12	1321	280	175
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1770	1900	1520	1863	1881	1681
Adj Flow Rate, veh/h	274	25	13	1436	304	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	25	2	1	13
Cap, veh/h	3062	273	13	3703	344	482
Arrive On Green	1.00	1.00	0.02	1.00	0.19	0.00
Sat Flow, veh/h	4666	402	1448	5253	1792	2515
Grp Volume(v), veh/h	194	105	13	1436	304	0
Grp Sat Flow(s),veh/h/ln	1611	1687	1448	1695	1792	1258
Q Serve(g_s), s	0.0	0.0	0.9	0.0	16.5	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.9	0.0	16.5	0.0
Prop In Lane		0.24	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2189	1146	13	3703	344	482
V/C Ratio(X)	0.09	0.09	1.03	0.39	0.88	0.00
Avail Cap(c_a), veh/h	2189	1146	87	3703	717	1006
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.82	0.82	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	49.1	0.0	39.3	0.0
Incr Delay (d2), s/veh	0.1	0.2	73.6	0.3	3.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.4	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.1	1.1	0.2	13.3	0.0
LnGrp Delay(d),s/veh	0.1	0.2	123.2	0.3	42.4	0.0
LnGrp LOS	A	A	F	A	D	
Approach Vol, veh/h	299			1449	304	
Approach Delay, s/veh	0.1			1.4	42.4	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	4.9	72.0				76.8		23.2
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	6.0	42.0				52.0		40.0
Max Q Clear Time (g_c+I1), s	2.9	2.0				2.0		18.5
Green Ext Time (p_c), s	0.0	11.0				11.4		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	7.3
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	252	91	325	1044	235	55	103	90	89	376	234
Future Volume (veh/h)	84	252	91	325	1044	235	55	103	90	89	376	234
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	1.00		1.00	1.00		1.00
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	1687	1976	1863	1863	1976	1712	1679	1900	1727	1877	1900
Adj Flow Rate, veh/h	89	268	97	346	1111	250	59	110	0	95	400	0
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	15	15	2	2	2	11	9	9	10	2	2
Cap, veh/h	115	1301	438	375	2205	496	75	433	0	172	673	0
Arrive On Green	0.02	0.13	0.13	0.42	1.00	1.00	0.05	0.14	0.00	0.10	0.19	0.00
Sat Flow, veh/h	1810	3385	1138	1774	4128	929	1630	3273	0	1645	3660	0
Grp Volume(v), veh/h	89	241	124	346	912	449	59	110	0	95	400	0
Grp Sat Flow(s),veh/h/ln	1810	1535	1453	1774	1695	1667	1630	1595	0	1645	1783	0
Q Serve(g_s), s	4.9	7.0	7.7	18.5	0.0	0.0	3.6	3.1	0.0	5.5	10.2	0.0
Cycle Q Clear(g_c), s	4.9	7.0	7.7	18.5	0.0	0.0	3.6	3.1	0.0	5.5	10.2	0.0
Prop In Lane	1.00		0.78	1.00		0.56	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	115	1180	558	375	1811	890	75	433	0	172	673	0
V/C Ratio(X)	0.78	0.20	0.22	0.92	0.50	0.50	0.79	0.25	0.00	0.55	0.59	0.00
Avail Cap(c_a), veh/h	181	1180	558	564	1811	890	147	734	0	197	906	0
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	0.66	0.66	0.66	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	48.2	30.0	30.2	28.1	0.0	0.0	47.2	38.7	0.0	42.5	37.1	0.0
Incr Delay (d2), s/veh	4.1	0.4	0.9	8.9	0.7	1.4	6.9	0.1	0.0	1.0	0.3	0.0
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(95%),veh/ln	4.7	5.5	5.8	13.9	0.3	0.6	3.2	2.5	0.0	4.6	8.8	0.0
LnGrp Delay(d),s/veh	52.4	30.3	31.1	37.0	0.7	1.4	54.1	38.8	0.0	43.5	37.4	0.0
LnGrp LOS	D	C	C	D	A	A	D	D		D	D	
Approach Vol, veh/h		454			1707			169			495	
Approach Delay, s/veh		34.9			8.2			44.1			38.6	
Approach LOS		C			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.3	42.6	8.6	23.5	10.3	57.6	14.5	17.6
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax), s	* 11	* 17	9.0	25.4	10.0	* 39	12.0	23.0
Max Q Clear Time (g_c+I1), s	20.5	9.7	5.6	12.2	6.9	2.0	7.5	5.1
Green Ext Time (p_c), s	0.6	4.4	0.1	1.3	0.0	10.2	0.1	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	20.0
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	208	77	117	1082	13	182	60	27	26	156	340
Future Volume (veh/h)	140	208	77	117	1082	13	182	60	27	26	156	340
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.95	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	1667	1646	1900	1776	1880	1900	1827	1613	1557	1545	1809	1863
Adj Flow Rate, veh/h	146	217	80	122	1127	14	126	152	28	27	306	258
Adj No. of Lanes	2	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	14	13	13	7	1	1	4	32	22	23	7	2
Cap, veh/h	203	751	268	296	1621	20	205	190	148	285	350	297
Arrive On Green	0.11	0.56	0.56	0.17	0.45	0.45	0.12	0.12	0.12	0.19	0.19	0.19
Sat Flow, veh/h	3079	2249	802	1691	3611	45	1740	1613	1262	1471	1809	1533
Grp Volume(v), veh/h	146	149	148	122	557	584	126	152	28	27	306	258
Grp Sat Flow(s),veh/h/ln	1540	1564	1487	1691	1786	1870	1740	1613	1262	1471	1809	1533
Q Serve(g_s), s	4.6	5.0	5.3	6.4	25.0	25.0	6.9	9.2	2.0	1.5	16.4	16.3
Cycle Q Clear(g_c), s	4.6	5.0	5.3	6.4	25.0	25.0	6.9	9.2	2.0	1.5	16.4	16.3
Prop In Lane	1.00		0.54	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	203	522	497	296	802	839	205	190	148	285	350	297
V/C Ratio(X)	0.72	0.28	0.30	0.41	0.70	0.70	0.62	0.80	0.19	0.09	0.87	0.87
Avail Cap(c_a), veh/h	216	522	497	296	802	839	240	223	174	315	387	328
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.97	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.6	15.8	15.9	36.7	22.1	22.1	42.0	43.0	39.8	33.1	39.1	39.1
Incr Delay (d2), s/veh	10.0	1.3	1.5	0.3	4.9	4.7	1.8	13.8	0.2	0.1	16.9	18.7
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(95%),veh/ln	4.0	4.2	4.2	5.4	19.3	20.0	6.2	8.4	1.3	1.1	14.9	13.2
LnGrp Delay(d),s/veh	53.6	17.2	17.4	37.0	27.0	26.8	43.7	56.8	40.0	33.2	56.1	57.8
LnGrp LOS	D	B	B	D	C	C	D	E	D	C	E	E
Approach Vol, veh/h		443			1263			306			591	
Approach Delay, s/veh		29.3			27.9			49.9			55.8	
Approach LOS		C			C			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	10.6	49.5		23.9	22.1	38.0		16.0
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	7.0	40.4		21.4	14.0	* 33		13.8
Max Q Clear Time (g_c+I1), s	6.6	27.0		18.4	8.4	7.3		11.2
Green Ext Time (p_c), s	0.0	6.1		0.6	3.3	1.0		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	37.0
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	224	48	437	1062	2	50	1	70	0	22	22
Future Volume (veh/h)	3	224	48	437	1062	2	50	1	70	0	22	22
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	0.98		0.96	1.00		0.98
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	1640	1900	1827	1863	1900	1900	1642	1900	1900	1900	1900
Adj Flow Rate, veh/h	3	238	51	465	1130	2	53	1	74	0	23	23
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	18	18	4	2	2	0	0	0	0	0	0
Cap, veh/h	3	573	120	913	2729	5	101	13	87	0	104	104
Arrive On Green	0.00	0.22	0.22	0.52	0.75	0.75	0.12	0.12	0.12	0.00	0.12	0.12
Sat Flow, veh/h	1810	2549	535	1740	3625	6	419	111	726	0	862	862
Grp Volume(v), veh/h	3	143	146	465	552	580	128	0	0	0	0	46
Grp Sat Flow(s),veh/h/ln	1810	1558	1526	1740	1770	1861	1255	0	0	0	0	1725
Q Serve(g_s), s	0.2	7.9	8.2	17.3	11.2	11.2	7.6	0.0	0.0	0.0	0.0	2.4
Cycle Q Clear(g_c), s	0.2	7.9	8.2	17.3	11.2	11.2	10.0	0.0	0.0	0.0	0.0	2.4
Prop In Lane	1.00		0.35	1.00		0.00	0.41		0.58	0.00		0.50
Lane Grp Cap(c), veh/h	3	350	343	913	1333	1402	202	0	0	0	0	207
V/C Ratio(X)	0.96	0.41	0.42	0.51	0.41	0.41	0.63	0.00	0.00	0.00	0.00	0.22
Avail Cap(c_a), veh/h	54	350	343	913	1333	1402	227	0	0	0	0	241
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	49.9	33.1	33.2	15.4	4.4	4.4	43.1	0.0	0.0	0.0	0.0	39.8
Incr Delay (d2), s/veh	131.6	3.5	3.8	0.2	1.0	0.9	3.0	0.0	0.0	0.0	0.0	0.2
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(95%),veh/ln	0.4	6.7	6.8	13.0	9.6	10.0	6.5	0.0	0.0	0.0	0.0	2.1
LnGrp Delay(d),s/veh	181.6	36.6	37.0	15.6	5.4	5.3	46.1	0.0	0.0	0.0	0.0	40.0
LnGrp LOS	F	D	D	B	A	A	D					D
Approach Vol, veh/h		292			1597			128			46	
Approach Delay, s/veh		38.3			8.3			46.1			40.0	
Approach LOS		D			A			D			D	

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	27.0		16.0	4.2	79.8		16.0
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	5.6	* 23		14.0	3.0	70.5		14.0
Max Q Clear Time (g_c+I1), s	19.3	10.2		4.4	2.2	13.2		12.0
Green Ext Time (p_c), s	6.4	0.8		0.4	0.0	6.6		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	15.6
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	56	231	1319	51	1	168
Future Vol, veh/h	56	231	1319	51	1	168
Conflicting Peds, #/hr	2	0	0	2	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	70	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	5	22	3	2	0	4
Mvmt Flow	63	260	1482	57	1	189

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1541	0	-	0	1771	774
Stage 1	-	-	-	-	1513	-
Stage 2	-	-	-	-	258	-
Critical Hdwy	4.2	-	-	-	6.8	6.98
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.25	-	-	-	3.5	3.34
Pot Cap-1 Maneuver	413	-	-	-	76	337
Stage 1	-	-	-	-	172	-
Stage 2	-	-	-	-	767	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	412	-	-	-	64	336
Mov Cap-2 Maneuver	-	-	-	-	142	-
Stage 1	-	-	-	-	172	-
Stage 2	-	-	-	-	649	-

Approach	EB	WB	SB
HCM Control Delay, s	3	0	28.6
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	412	-	-	-	336
HCM Lane V/C Ratio	0.153	-	-	-	0.562
HCM Control Delay (s)	15.3	-	-	-	28.6
HCM Lane LOS	C	-	-	-	D
HCM 95th %tile Q(veh)	0.5	-	-	-	3.3

HCM 2010 Computation does not support turning movement with Shared and Exclusive lanes.

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	0	10	49	432	0	0
Future Vol, veh/h	0	10	49	432	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	4	2	2
Mvmt Flow	0	11	53	470	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	261	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.9	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.3	-	-
Pot Cap-1 Maneuver	0	744	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	744	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NE
HCM Control Delay, s	9.9	0
HCM LOS	A	

Minor Lane/Major Mvmt	NET	NER	WBLn1
Capacity (veh/h)	-	-	744
HCM Lane V/C Ratio	-	-	0.015
HCM Control Delay (s)	-	-	9.9
HCM Lane LOS	-	-	A
HCM 95th %tile Q(veh)	-	-	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	141	208	785	224	373	101	29	221	129	898	99
Future Volume (veh/h)	149	141	208	785	224	373	101	29	221	129	898	99
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1863	1740	1759	1845	1776	1863	1439	1775	1900	1863	1863	1810
Adj Flow Rate, veh/h	165	125	0	801	229	0	103	30	0	132	916	0
Adj No. of Lanes	2	1	1	2	1	1	1	2	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	12	8	3	14	2	32	0	0	2	2	5
Cap, veh/h	328	161	138	958	484	432	122	306	0	652	1328	577
Arrive On Green	0.09	0.09	0.00	0.09	0.09	0.00	0.09	0.09	0.00	0.37	0.38	0.00
Sat Flow, veh/h	3548	1740	1495	3514	1776	1583	1371	3461	0	1774	3539	1538
Grp Volume(v), veh/h	165	125	0	801	229	0	103	30	0	132	916	0
Grp Sat Flow(s),veh/h/ln	1774	1740	1495	1757	1776	1583	1371	1686	0	1774	1770	1538
Q Serve(g_s), s	4.4	7.0	0.0	22.4	12.3	0.0	7.4	0.8	0.0	5.1	21.8	0.0
Cycle Q Clear(g_c), s	4.4	7.0	0.0	22.4	12.3	0.0	7.4	0.8	0.0	5.1	21.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	328	161	138	958	484	432	122	306	0	652	1328	577
V/C Ratio(X)	0.50	0.78	0.00	0.84	0.47	0.00	0.85	0.10	0.00	0.20	0.69	0.00
Avail Cap(c_a), veh/h	355	174	150	1072	542	483	151	897	0	652	1328	577
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.49	0.49	0.00	1.00	1.00	0.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	43.2	44.4	0.0	43.3	38.7	0.0	44.9	41.7	0.0	21.6	26.3	0.0
Incr Delay (d2), s/veh	0.4	16.3	0.0	2.7	0.4	0.0	24.8	0.1	0.0	0.0	2.4	0.0
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(95%),veh/ln	4.0	7.4	0.0	15.2	8.9	0.0	6.6	0.7	0.0	4.5	16.0	0.0
LnGrp Delay(d),s/veh	43.6	60.6	0.0	46.1	39.0	0.0	69.7	41.8	0.0	21.7	28.8	0.0
LnGrp LOS	D	E		D	D		E	D		C	C	
Approach Vol, veh/h		290			1030			133			1048	
Approach Delay, s/veh		51.0			44.5			63.4			27.9	
Approach LOS		D			D			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.9	42.1		13.2	41.3	13.7		31.8
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	11.0	31.4		10.0	15.8	* 27		30.5
Max Q Clear Time (g_c+I1), s	9.4	23.8		9.0	7.1	2.8		24.4
Green Ext Time (p_c), s	0.0	4.1		0.1	4.5	0.1		2.8

Intersection Summary	
HCM 2010 Ctrl Delay	39.3
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	55	402	100	425	13	469	178	46	9	260	488
Future Volume (veh/h)	34	55	402	100	425	13	469	178	46	9	260	488
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.94
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	1508	1775	1845	1863	1792	1900	1845	1718	1900	1712	1863	1863
Adj Flow Rate, veh/h	36	0	462	105	447	14	494	187	0	9	274	514
Adj No. of Lanes	1	0	2	1	1	0	2	2	0	1	1	1
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, %	26	20	3	2	6	6	3	10	10	11	2	2
Cap, veh/h	54	0	553	233	474	15	754	722	0	481	550	437
Arrive On Green	0.01	0.00	0.06	0.13	0.27	0.27	0.22	0.22	0.00	0.29	0.29	0.29
Sat Flow, veh/h	1436	0	3046	1774	1726	54	3408	3350	0	1630	1863	1481
Grp Volume(v), veh/h	36	0	462	105	0	461	494	187	0	9	274	514
Grp Sat Flow(s),veh/h/ln	1436	0	1523	1774	0	1780	1704	1632	0	1630	1863	1481
Q Serve(g_s), s	2.5	0.0	15.0	5.5	0.0	25.3	13.2	4.7	0.0	0.4	12.2	29.5
Cycle Q Clear(g_c), s	2.5	0.0	15.0	5.5	0.0	25.3	13.2	4.7	0.0	0.4	12.2	29.5
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	54	0	553	233	0	489	754	722	0	481	550	437
V/C Ratio(X)	0.66	0.00	0.84	0.45	0.00	0.94	0.66	0.26	0.00	0.02	0.50	1.18
Avail Cap(c_a), veh/h	86	0	670	233	0	499	754	722	0	481	550	437
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.00	0.86	1.00	0.00	1.00	0.93	0.93	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.7	0.0	45.5	40.1	0.0	35.5	35.5	32.2	0.0	25.0	29.1	35.3
Incr Delay (d2), s/veh	4.3	0.0	6.3	0.5	0.0	25.9	4.1	0.8	0.0	0.0	0.3	101.1
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(95%),veh/ln	1.9	0.0	10.8	4.9	0.0	22.5	10.7	4.0	0.0	0.3	10.4	43.8
LnGrp Delay(d),s/veh	53.1	0.0	51.8	40.6	0.0	61.4	39.6	33.0	0.0	25.0	29.4	136.4
LnGrp LOS	D		D	D		E	D	C		C	C	F
Approach Vol, veh/h		498			566			681			797	
Approach Delay, s/veh		51.9			57.5			37.8			98.4	
Approach LOS		D			E			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.1	22.2		26.7	7.8	31.5		34.0
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	12.6	22.0		19.4	6.0	28.0		29.5
Max Q Clear Time (g_c+I1), s	7.5	17.0		15.2	4.5	27.3		31.5
Green Ext Time (p_c), s	1.0	1.0		1.0	0.0	0.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	63.9
HCM 2010 LOS	E

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	10	163	28	15	12	311	355	16	41	556	178
Future Volume (vph)	380	10	163	28	15	12	311	355	16	41	556	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.97	1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1618	1623	2733		1806	1570	1805	3388		1805	3539	1512
Flt Permitted	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1618	1623	2733		1806	1570	1805	3388		1805	3539	1512
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	396	10	170	29	16	12	324	370	17	43	579	185
RTOR Reduction (vph)	0	0	141	0	0	13	0	4	0	0	0	121
Lane Group Flow (vph)	202	204	29	0	45	0	324	383	0	43	579	64
Confl. Peds. (#/hr)				11		11				2		2
Confl. Bikes (#/hr)						1			4			12
Heavy Vehicles (%)	6%	9%	4%	3%	0%	0%	0%	6%	0%	0%	2%	3%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	12.6	12.6	12.6		2.4	2.4	17.0	39.4		3.6	26.0	26.0
Effective Green, g (s)	12.6	12.6	12.6		2.4	2.4	17.0	39.4		3.6	26.0	26.0
Actuated g/C Ratio	0.17	0.17	0.17		0.03	0.03	0.23	0.53		0.05	0.35	0.35
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	271	272	459		57	50	409	1779		86	1226	524
v/s Ratio Prot	0.12	c0.13			c0.02		c0.18	0.11		0.02	c0.16	
v/s Ratio Perm			0.01			0.00						0.04
v/c Ratio	0.75	0.75	0.06		0.79	0.01	0.79	0.22		0.50	0.47	0.12
Uniform Delay, d1	29.7	29.7	26.2		36.0	35.1	27.3	9.5		34.8	19.1	16.7
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.3	9.9	0.0		47.4	0.0	10.1	0.3		1.7	1.3	0.5
Delay (s)	39.0	39.6	26.3		83.4	35.2	37.4	9.8		36.5	20.4	17.2
Level of Service	D	D	C		F	D	D	A		D	C	B
Approach Delay (s)		35.4			72.6			22.4			20.6	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	3	18	939	2	208	18	449	165	100	627	13
Future Volume (vph)	25	3	18	939	2	208	18	449	165	100	627	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.87	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1818	1406	1665	1669	1546	1805	3471	1335	3242	3520	
Flt Permitted		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1818	1406	1665	1669	1546	1805	3471	1335	3242	3520	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	3	19	988	2	219	19	473	174	105	660	14
RTOR Reduction (vph)	0	0	18	0	0	134	0	0	142	0	1	0
Lane Group Flow (vph)	0	29	1	494	496	85	19	473	32	105	673	0
Confl. Peds. (#/hr)	12		12	12		12	14		14	14		14
Confl. Bikes (#/hr)									4			13
Heavy Vehicles (%)	0%	0%	0%	3%	0%	2%	0%	4%	16%	8%	2%	8%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		3.0	3.0	36.1	36.1	36.1	2.2	18.6	18.6	26.3	42.7	
Effective Green, g (s)		3.0	3.0	36.1	36.1	36.1	2.2	18.6	18.6	26.3	42.7	
Actuated g/C Ratio		0.03	0.03	0.36	0.36	0.36	0.02	0.19	0.19	0.26	0.43	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		54	42	601	602	558	39	645	248	852	1503	
v/s Ratio Prot		c0.02		0.30	c0.30		0.01	c0.14		0.03	c0.19	
v/s Ratio Perm			0.00			0.05			0.02			
v/c Ratio		0.54	0.01	0.82	0.82	0.15	0.49	0.73	0.13	0.12	0.45	
Uniform Delay, d1		47.8	47.1	29.0	29.1	21.6	48.3	38.4	34.0	28.1	20.3	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		5.1	0.0	8.5	8.5	0.0	3.5	3.7	0.1	0.3	1.0	
Delay (s)		52.9	47.1	37.5	37.6	21.6	51.8	42.1	34.0	28.4	21.3	
Level of Service		D	D	D	D	C	D	D	C	C	C	
Approach Delay (s)		50.6			34.7			40.3			22.2	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

3. Traffic Signal Warrants
Caltrans Peak Hour Warrant 3
Existing Conditions

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: JGA
Date: 9/27/2018
Intersection: Grand Avenue and Allerton Avenue
Scenario: Existing AM

Input Assumptions	
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

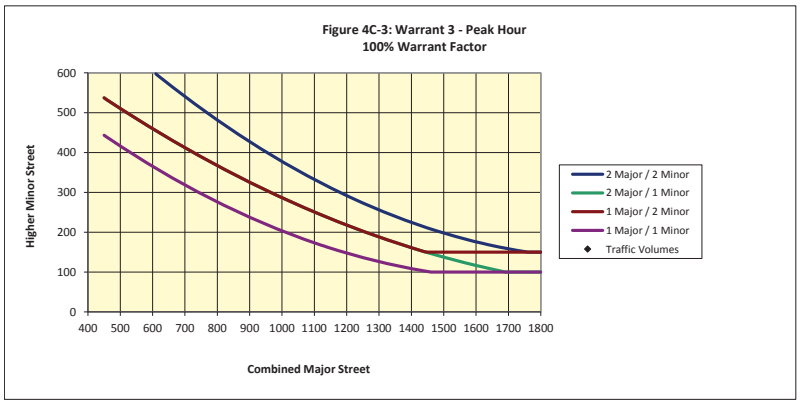
Analysis Volumes	
Major Street	
EB	1813
WB	326
Minor Street	
NB	0
SB	80

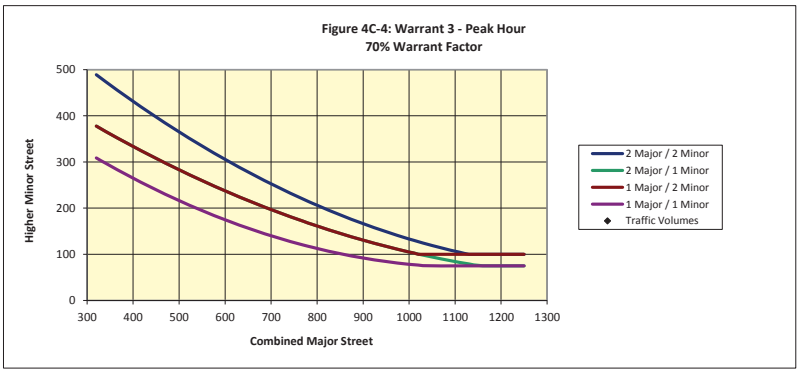
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		NB	SB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	10.1
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.22
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	80
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	2219	
	Number of Approaches to Intersection	3	
	Satisfied	**Yes**	

PART B **SATISFIED** No





File: H:\21\21673 - SSF 201 Haskins Way Rezoning Initial Study\analysis\04 - Signal Warrant\[21673_Signal Warrant_Exist AM_Grand at Allerton.xlsm]War #3 - Peak HR

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: JGA
Date: 9/27/2018
Intersection: Grand Avenue and Allerton Avenue
Scenario: Existing PM

Input Assumptions	
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

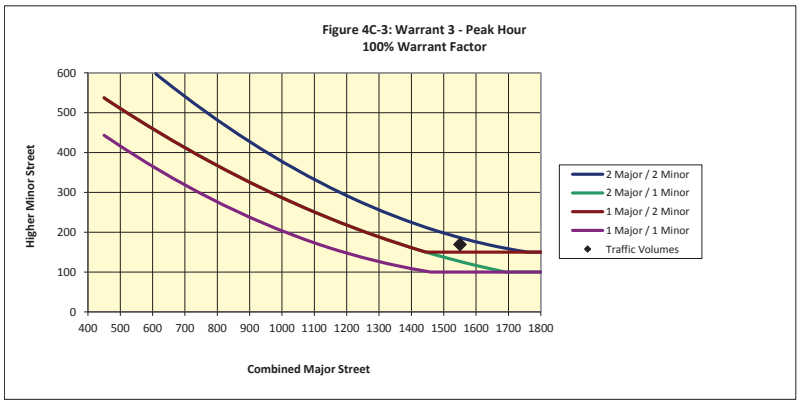
Analysis Volumes	
Major Street	
EB	231
WB	1319
Minor Street	
NB	0
SB	169

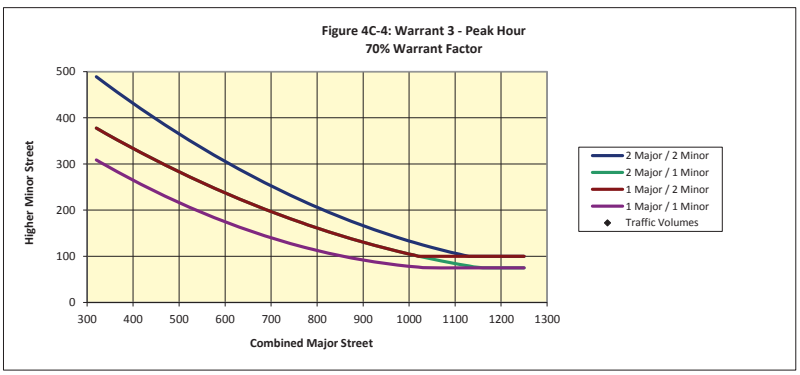
WARRANT 3 - Peak Hour **SATISFIED** Yes*

PART A **SATISFIED** No

		NB	SB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	28.6
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	1.34
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	169
	Satisfied	**No**	**Yes**
3	Total Entering Volume On All Approaches During Same Hour	1719	
	Number of Approaches to Intersection	3	
	Satisfied	**Yes**	

PART B **SATISFIED** Yes





File: H:\21\21673 - SSF 201 Haskins Way Rezoning Initial Study\analysis\04 - Signal Warrant\[21673_Signal Warrant_Exist PM_Grand at Allerton.xlsm]War #3 - Peak HR

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: Existing AM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

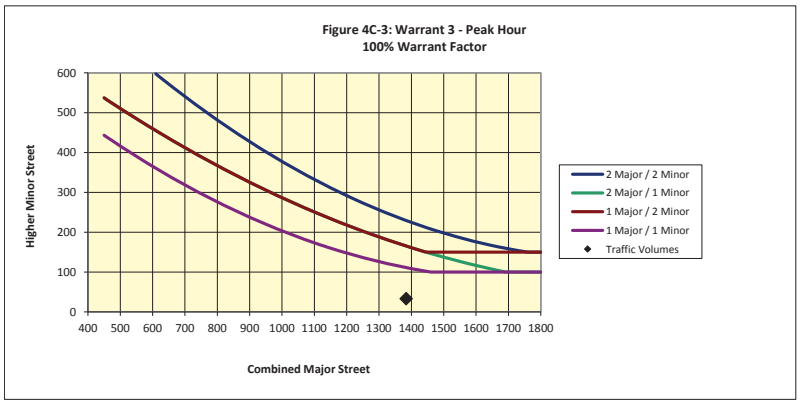
Analysis Volumes	
Major Street	
NB	1384
SB	0
Minor Street	
EB	0
WB	33

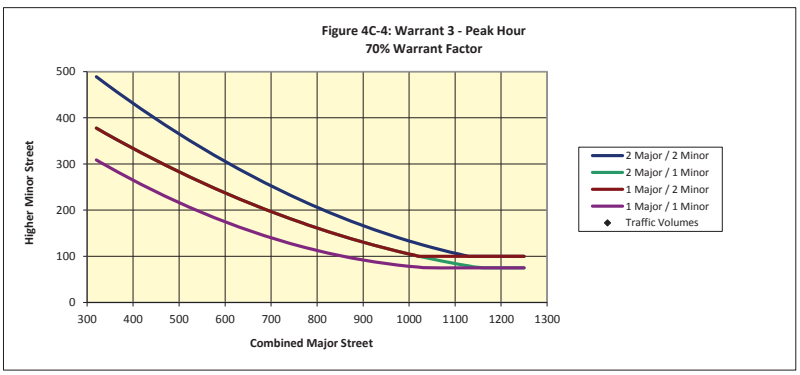
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	16.2
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.15
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	33
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	1417	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





File: H:\21\21673 - SSF 201 Haskins Way Rezoning Initial Study\analysis\04 - Signal Warrant\[21673_Signal Warrant_Exist AM_US101_EGrand.xlsm]Data Input

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: Existing PM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

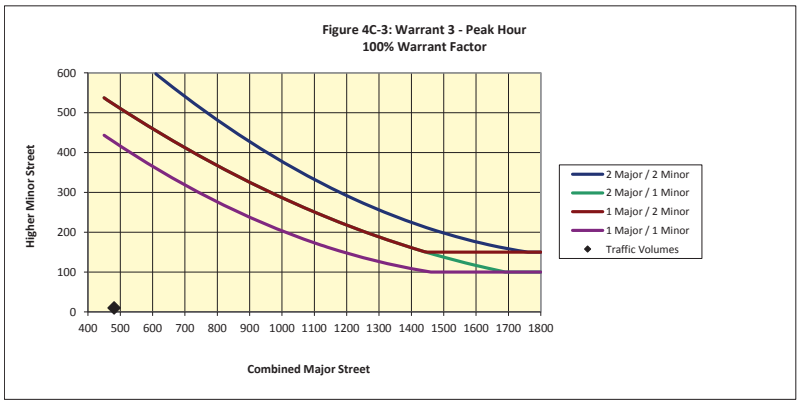
Analysis Volumes	
Major Street	
NB	481
SB	0
Minor Street	
EB	0
WB	10

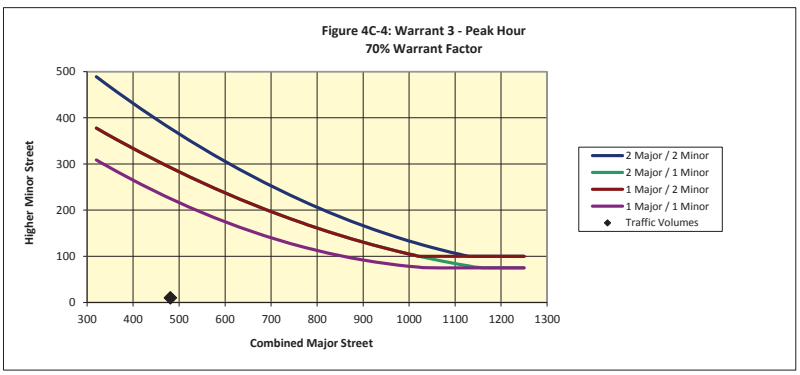
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	16.2
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.05
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	10
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	491	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





File: H:\21\21673 - SSF 201 Haskins Way Rezoning Initial Study\analysis\04 - Signal Warrant\[21673_Signal Warrant_Exist PM_US101_EGrand.xlsm]SummaryPeak

4. Freeway Level of Service Calculations
Highway Capacity Software (HCS)
Existing Conditions

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*5/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8023*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2187*	pc/h/ln
S	*56.2*	mph
D = v_p / S	*38.9*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*5/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7668*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2090*	pc/h/ln
S	*58.2*	mph
D = v_p / S	*35.9*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*5/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*10951*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1990*	pc/h/ln
S	*60.1*	mph
D = v_p / S	*33.1*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*5/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7551*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1372*	pc/h/ln
S	*65.0*	mph
D = v_p / S	*21.1*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*5/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7692*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2097*	pc/h/ln
S	*58.1*	mph
D = v_p / S	*36.1*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

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Date Performed	*5/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6852*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1868*	pc/h/ln
S	*61.9*	mph
D = v_p / S	*30.2*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
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Date Performed	*5/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7936*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1731*	pc/h/ln
S	*63.4*	mph
D = v_p / S	*27.3*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*5/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8677*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1892*	pc/h/ln
S	*61.6*	mph
D = v_p / S	*30.7*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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5. Intersection Level of Service Calculations
Synchro Software
Existing plus Project

Movement	EBT	EBR	WBL2	WBT	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations										
Traffic Volume (vph)	1214	346	42	349	227	0	141	0	664	347
Future Volume (vph)	1214	346	42	349	227	0	141	0	664	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.0	4.0	4.0		4.5	4.5
Lane Util. Factor	0.91		1.00	0.91	0.91	0.91	1.00		*1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Frt	0.97		1.00	1.00	1.00	1.00	0.85		1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (prot)	4886		1641	4396	2857	1428	1422		3762	1553
Flt Permitted	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (perm)	4886		1641	4396	2857	1428	1422		3762	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1320	376	46	379	247	0	153	0	722	377
RTOR Reduction (vph)	0	0	0	0	0	0	100	0	0	0
Lane Group Flow (vph)	1696	0	46	379	165	82	53	0	722	377
Confl. Peds. (#/hr)							4			
Confl. Bikes (#/hr)		11					4			6
Heavy Vehicles (%)	2%	3%	10%	18%	15%	0%	11%	0%	1%	4%
Turn Type	NA		Prot	NA	Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3	4	4			3	3
Permitted Phases							4	3 6		
Actuated Green, G (s)	41.6		3.6	79.9	11.6	11.6	11.6		26.2	26.2
Effective Green, g (s)	41.6		3.6	79.9	11.6	11.6	11.6		26.2	26.2
Actuated g/C Ratio	0.42		0.04	0.80	0.12	0.12	0.12		0.26	0.26
Clearance Time (s)	4.5		4.0		4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0		2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	2032		59	3512	331	165	164		985	406
v/s Ratio Prot	c0.35		c0.03	0.09	c0.06	0.06			0.19	c0.24
v/s Ratio Perm							0.04			
v/c Ratio	0.83		0.78	0.11	0.50	0.50	0.32		0.73	0.93
Uniform Delay, d1	26.1		47.8	2.2	41.5	41.5	40.6		33.7	36.0
Progression Factor	0.85		1.29	0.68	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7		43.2	0.0	0.4	0.9	0.4		2.5	26.9
Delay (s)	25.8		104.9	1.5	41.9	42.3	41.0		36.2	62.9
Level of Service	C		F	A	D	D	D		D	E
Approach Delay (s)	25.8			12.7		41.7				
Approach LOS	C			B		D				

Intersection Summary			
HCM 2000 Control Delay	31.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	146	87	174	119	68	33	375	295	464	444	101
Future Volume (vph)	156	146	87	174	119	68	33	375	295	464	444	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1577	1558		2694	1660	1333	1624	2875	1411	1449	2927	1329
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1577	1558		2694	1660	1333	1624	2875	1411	1449	2927	1329
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	162	152	91	181	124	71	34	391	307	483	462	105
RTOR Reduction (vph)	0	24	0	0	0	62	0	0	0	0	0	68
Lane Group Flow (vph)	163	219	0	181	124	9	34	391	307	309	637	37
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA	pt+ov	Split	NA	Perm
Protected Phases	8	8		7	7		6	6	6 7	2	2	
Permitted Phases						7						2
Actuated Green, G (s)	18.4	18.4		12.0	12.0	12.0	17.6	17.6	29.6	35.0	35.0	35.0
Effective Green, g (s)	18.4	18.4		12.0	12.0	12.0	17.6	17.6	29.6	35.0	35.0	35.0
Actuated g/C Ratio	0.18	0.18		0.12	0.12	0.12	0.18	0.18	0.30	0.35	0.35	0.35
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	290	286		323	199	159	285	506	417	507	1024	465
v/s Ratio Prot	0.10	c0.14		0.07	0.07		0.02	c0.14	c0.22	0.21	c0.22	
v/s Ratio Perm						0.01						0.03
v/c Ratio	0.56	0.77		0.56	0.62	0.05	0.12	0.77	0.74	0.61	0.62	0.08
Uniform Delay, d1	37.1	38.8		41.5	41.8	39.0	34.7	39.3	31.7	26.9	27.0	21.7
Progression Factor	1.00	1.00		0.80	0.78	3.00	1.00	1.00	1.00	0.93	0.93	1.19
Incremental Delay, d2	2.0	11.2		2.2	5.9	0.1	0.1	6.9	6.3	4.8	2.5	0.3
Delay (s)	39.2	49.9		35.3	38.7	117.0	34.8	46.2	38.0	29.8	27.7	26.2
Level of Service	D	D		D	D	F	C	D	D	C	C	C
Approach Delay (s)		45.6			51.8			42.2			28.2	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	38.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	46	860	492	32	25	21
Future Volume (vph)	46	860	492	32	25	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.91
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4425		1805	1476
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4425		1805	1476
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	47	878	502	33	26	21
RTOR Reduction (vph)	0	0	3	0	0	20
Lane Group Flow (vph)	47	878	532	0	26	1
Confl. Peds. (#/hr)	8			8	9	9
Confl. Bikes (#/hr)				3		2
Heavy Vehicles (%)	2%	2%	17%	0%	0%	0%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		3	
Permitted Phases						3
Actuated Green, G (s)	5.1	87.9	78.8		4.1	4.1
Effective Green, g (s)	5.1	87.9	78.8		4.1	4.1
Actuated g/C Ratio	0.05	0.88	0.79		0.04	0.04
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	90	4469	3486		74	60
v/s Ratio Prot	c0.03	c0.17	0.12		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.52	0.20	0.15		0.35	0.01
Uniform Delay, d1	46.3	0.9	2.6		46.7	46.0
Progression Factor	1.17	1.00	0.59		1.00	1.00
Incremental Delay, d2	2.2	0.1	0.1		1.1	0.0
Delay (s)	56.2	1.0	1.6		47.7	46.0
Level of Service	E	A	A		D	D
Approach Delay (s)		3.8	1.6		47.0	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	4.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	824	61	10	375	149	702
Future Volume (veh/h)	824	61	10	375	149	702
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1865	1900	1727	1570	1810	1810
Adj Flow Rate, veh/h	886	66	11	403	160	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	10	21	5	5
Cap, veh/h	3667	272	12	3460	195	306
Arrive On Green	1.00	1.00	0.01	1.00	0.11	0.00
Sat Flow, veh/h	4993	358	1645	4428	1723	2707
Grp Volume(v), veh/h	622	330	11	403	160	0
Grp Sat Flow(s),veh/h/ln	1697	1788	1645	1429	1723	1354
Q Serve(g_s), s	0.0	0.0	0.7	0.0	9.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.7	0.0	9.1	0.0
Prop In Lane		0.20	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2580	1359	12	3460	195	306
V/C Ratio(X)	0.24	0.24	0.95	0.12	0.82	0.00
Avail Cap(c_a), veh/h	2580	1359	82	3460	810	1272
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.98	0.98	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	49.3	0.0	43.4	0.0
Incr Delay (d2), s/veh	0.2	0.4	62.4	0.1	3.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.3	0.9	0.0	8.0	0.0
LnGrp Delay(d),s/veh	0.2	0.4	111.6	0.1	46.7	0.0
LnGrp LOS	A	A	F	A	D	
Approach Vol, veh/h	952			414	160	
Approach Delay, s/veh	0.3			3.0	46.7	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	4.7	80.0				84.7		15.3
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	5.0	36.0				45.0		47.0
Max Q Clear Time (g_c+I1), s	2.7	2.0				2.0		11.1
Green Ext Time (p_c), s	0.0	7.0				7.2		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	5.9
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	159	1302	65	156	277	101	56	151	356	248	129	52
Future Volume (veh/h)	159	1302	65	156	277	101	56	151	356	248	129	52
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
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	1810	1810	1976	1545	1550	1976	1583	1787	1900	1810	1835	1900
Adj Flow Rate, veh/h	164	1342	67	161	286	104	58	156	0	256	133	0
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	23	25	25	20	7	7	5	5	5
Cap, veh/h	191	2207	110	174	1454	494	237	318	0	286	336	0
Arrive On Green	0.22	0.92	0.92	0.24	0.94	0.94	0.16	0.09	0.00	0.17	0.10	0.00
Sat Flow, veh/h	1723	4813	240	1471	3107	1056	1508	3485	0	1723	3578	0
Grp Volume(v), veh/h	164	918	491	161	258	132	58	156	0	256	133	0
Grp Sat Flow(s),veh/h/ln	1723	1647	1760	1471	1410	1342	1508	1698	0	1723	1743	0
Q Serve(g_s), s	9.2	5.2	5.2	10.7	0.7	0.8	3.4	4.4	0.0	14.6	3.6	0.0
Cycle Q Clear(g_c), s	9.2	5.2	5.2	10.7	0.7	0.8	3.4	4.4	0.0	14.6	3.6	0.0
Prop In Lane	1.00		0.14	1.00		0.79	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	191	1510	807	174	1320	628	237	318	0	286	336	0
V/C Ratio(X)	0.86	0.61	0.61	0.93	0.20	0.21	0.24	0.49	0.00	0.90	0.40	0.00
Avail Cap(c_a), veh/h	207	1510	807	174	1320	628	237	781	0	293	1060	0
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	0.83	0.94	0.94	0.94	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.2	2.5	2.5	37.8	1.7	1.7	36.9	43.1	0.0	40.9	42.5	0.0
Incr Delay (d2), s/veh	22.1	1.5	2.8	45.3	0.3	0.7	0.2	0.4	0.0	26.6	0.3	0.0
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(95%),veh/ln	8.9	4.2	5.0	10.5	0.5	0.6	2.5	3.7	0.0	13.9	3.1	0.0
LnGrp Delay(d),s/veh	60.2	4.0	5.3	83.1	2.0	2.4	37.1	43.5	0.0	67.5	42.7	0.0
LnGrp LOS	E	A	A	F	A	A	D	D		E	D	
Approach Vol, veh/h		1573			551			214			389	
Approach Delay, s/veh		10.2			25.8			41.8			59.0	
Approach LOS		B			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	50.1	19.7	14.2	15.1	51.0	20.6	13.4
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax), s	* 18	* 32	9.0	30.4	12.0	* 32	17.0	23.0
Max Q Clear Time (g_c+I1), s	12.7	7.2	5.4	5.6	11.2	2.8	16.6	6.4
Green Ext Time (p_c), s	0.0	9.5	0.3	0.5	0.0	10.0	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	22.8
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	407	1343	151	33	321	10	89	134	182	94	58	124
Future Volume (veh/h)	407	1343	151	33	321	10	89	134	182	94	58	124
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.98
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	1845	1827	1900	1338	1550	1900	1429	1750	1792	1610	1538	1652
Adj Flow Rate, veh/h	420	1385	156	34	331	10	92	138	188	97	232	128
Adj No. of Lanes	2	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97
Percent Heavy Veh, %	3	3	3	42	23	23	33	7	6	18	24	15
Cap, veh/h	495	1520	170	59	1140	34	161	206	176	264	265	237
Arrive On Green	0.29	0.97	0.97	0.05	0.39	0.39	0.12	0.12	0.12	0.17	0.17	0.17
Sat Flow, veh/h	3408	3141	351	1274	2917	88	1361	1750	1489	1533	1538	1379
Grp Volume(v), veh/h	420	761	780	34	167	174	92	138	188	97	232	128
Grp Sat Flow(s),veh/h/ln	1704	1735	1756	1274	1472	1533	1361	1750	1489	1533	1538	1379
Q Serve(g_s), s	11.6	11.4	12.7	2.6	7.8	7.8	6.4	7.6	11.8	5.6	14.7	8.5
Cycle Q Clear(g_c), s	11.6	11.4	12.7	2.6	7.8	7.8	6.4	7.6	11.8	5.6	14.7	8.5
Prop In Lane	1.00		0.20	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	495	840	850	59	575	599	161	206	176	264	265	237
V/C Ratio(X)	0.85	0.91	0.92	0.58	0.29	0.29	0.57	0.67	1.07	0.37	0.88	0.54
Avail Cap(c_a), veh/h	648	840	850	59	575	599	161	206	176	297	298	268
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.53	0.53	0.53	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.4	1.0	1.0	46.8	20.9	21.0	41.7	42.2	44.1	36.6	40.4	37.8
Incr Delay (d2), s/veh	4.5	8.9	9.8	9.2	1.3	1.2	3.2	6.6	87.7	0.3	20.8	0.7
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(95%),veh/ln	8.5	6.6	7.6	1.9	6.0	6.3	4.6	7.2	16.4	4.3	12.4	5.9
LnGrp Delay(d),s/veh	38.9	10.0	10.9	56.0	22.2	22.2	44.9	48.8	131.8	36.9	61.2	38.5
LnGrp LOS	D	A	B	E	C	C	D	D	F	D	E	D
Approach Vol, veh/h		1961			375			418			457	
Approach Delay, s/veh		16.5			25.3			85.3			49.7	
Approach LOS		B			C			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.5	43.7		21.8	9.2	53.0		16.0
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	9.6	32.4		19.4	3.0	* 48		11.8
Max Q Clear Time (g_c+I1), s	13.6	9.8		16.7	4.6	14.7		13.8
Green Ext Time (p_c), s	0.9	1.9		0.4	0.0	8.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	31.2
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	1386	52	71	332	6	21	24	673	5	0	5
Future Volume (veh/h)	15	1386	52	71	332	6	21	24	673	5	0	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		1.00	1.00		1.00
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	1776	1810	1900	1407	1525	1900	1900	1860	1900	1900	1900	1900
Adj Flow Rate, veh/h	16	1459	55	75	349	6	22	25	708	5	0	5
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	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, %	7	5	5	35	25	25	0	0	0	0	0	0
Cap, veh/h	18	1435	54	248	1762	30	47	32	639	126	17	89
Arrive On Green	0.01	0.43	0.43	0.19	0.60	0.60	0.43	0.43	0.43	0.43	0.00	0.43
Sat Flow, veh/h	1691	3376	127	1340	2915	50	24	75	1485	167	41	208
Grp Volume(v), veh/h	16	742	772	75	173	182	755	0	0	10	0	0
Grp Sat Flow(s),veh/h/ln	1691	1720	1783	1340	1449	1516	1584	0	0	416	0	0
Q Serve(g_s), s	0.9	42.5	42.5	4.8	5.4	5.4	22.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.9	42.5	42.5	4.8	5.4	5.4	43.0	0.0	0.0	0.3	0.0	0.0
Prop In Lane	1.00		0.07	1.00		0.03	0.03		0.94	0.50		0.50
Lane Grp Cap(c), veh/h	18	731	758	248	876	916	718	0	0	233	0	0
V/C Ratio(X)	0.90	1.01	1.02	0.30	0.20	0.20	1.05	0.00	0.00	0.04	0.00	0.00
Avail Cap(c_a), veh/h	51	731	758	248	876	916	718	0	0	233	0	0
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.4	28.8	28.8	35.2	8.9	8.9	29.6	0.0	0.0	16.3	0.0	0.0
Incr Delay (d2), s/veh	38.2	37.0	37.7	0.3	0.5	0.5	47.9	0.0	0.0	0.0	0.0	0.0
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(95%),veh/ln	1.1	49.7	51.8	3.3	4.0	4.2	52.7	0.0	0.0	0.3	0.0	0.0
LnGrp Delay(d),s/veh	87.6	65.7	66.4	35.4	9.4	9.4	77.5	0.0	0.0	16.4	0.0	0.0
LnGrp LOS	F	F	F	D	A	A	F			B		
Approach Vol, veh/h		1530			430			755			10	
Approach Delay, s/veh		66.3			13.9			77.5			16.4	
Approach LOS		E			B			E			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.5	47.0		47.0	5.1	65.4		47.0
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	2.0	* 43		43.0	3.0	41.5		43.0
Max Q Clear Time (g_c+I1), s	16.8	44.5		2.3	2.9	7.4		45.0
Green Ext Time (p_c), s	0.0	0.0		4.5	0.0	1.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	61.0
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	257	1781	338	17	6	74
Future Vol, veh/h	257	1781	338	17	6	74
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	70	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	3	4	28	29	0	19
Mvmt Flow	273	1895	360	18	6	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	379	0	-	0	1864	190
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	1494	-
Critical Hdwy	4.16	-	-	-	6.8	7.28
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.23	-	-	-	3.5	3.49
Pot Cap-1 Maneuver	1169	-	-	-	66	769
Stage 1	-	-	-	-	675	-
Stage 2	-	-	-	-	176	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1169	-	-	-	51	768
Mov Cap-2 Maneuver	-	-	-	-	114	-
Stage 1	-	-	-	-	674	-
Stage 2	-	-	-	-	135	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1169	-	-	-	768
HCM Lane V/C Ratio	0.234	-	-	-	0.103
HCM Control Delay (s)	9	-	-	-	10.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.9	-	-	-	0.3

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	481	469	5	91	154	11
Future Volume (veh/h)	481	469	5	91	154	11
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1583	1900	1406	1293	1900
Adj Flow Rate, veh/h	587	572	6	111	200	0
Adj No. of Lanes	1	1	0	1	2	1
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	20	36	36	47	0
Cap, veh/h	1031	745	135	745	400	262
Arrive On Green	0.55	0.55	0.55	0.55	0.16	0.00
Sat Flow, veh/h	1863	1346	15	1347	2463	1615
Grp Volume(v), veh/h	587	572	117	0	200	0
Grp Sat Flow(s),veh/h/ln	1863	1346	1362	0	1232	1615
Q Serve(g_s), s	6.1	9.9	0.0	0.0	2.2	0.0
Cycle Q Clear(g_c), s	6.1	9.9	1.2	0.0	2.2	0.0
Prop In Lane		1.00	0.05		1.00	1.00
Lane Grp Cap(c), veh/h	1031	745	880	0	400	262
V/C Ratio(X)	0.57	0.77	0.13	0.00	0.50	0.00
Avail Cap(c_a), veh/h	2490	1799	1840	0	2140	1403
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	4.4	5.2	3.3	0.0	11.4	0.0
Incr Delay (d2), s/veh	0.2	0.6	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.7	6.5	0.8	0.0	1.4	0.0
LnGrp Delay(d),s/veh	4.5	5.8	3.3	0.0	11.8	0.0
LnGrp LOS	A	A	A		B	
Approach Vol, veh/h	1159			117	200	
Approach Delay, s/veh	5.2			3.3	11.8	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		21.1		8.9		21.1		
Change Period (Y+Rc), s		4.5		4.0		4.5		
Max Green Setting (Gmax), s		40.0		26.0		40.0		
Max Q Clear Time (g_c+I1), s		11.9		4.2		3.2		
Green Ext Time (p_c), s		4.7		0.4		4.8		

Intersection Summary	
HCM 2010 Ctrl Delay	5.9
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	0	33	516	903	0	0
Future Vol, veh/h	0	33	516	903	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	4	2	2
Mvmt Flow	0	36	561	982	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	771	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.9	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.3	-	-
Pot Cap-1 Maneuver	0	347	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	347	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NE
HCM Control Delay, s	16.6	0
HCM LOS	C	

Minor Lane/Major Mvmt	NET	NER	WBLn1
Capacity (veh/h)	-	-	347
HCM Lane V/C Ratio	-	-	0.103
HCM Control Delay (s)	-	-	16.6
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	179	125	339	195	192	194	43	344	164	627	164
Future Volume (veh/h)	93	179	125	339	195	192	194	43	344	164	627	164
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1610	1782	1727	1520	1604	1792	1696	1736	1900	1776	1810	1827
Adj Flow Rate, veh/h	94	190	0	353	203	0	202	45	0	171	653	0
Adj No. of Lanes	1	2	1	2	1	1	1	2	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	18	6	10	25	13	6	12	21	21	7	5	4
Cap, veh/h	132	306	126	475	263	250	233	675	0	623	1496	676
Arrive On Green	0.09	0.09	0.00	0.05	0.05	0.00	0.14	0.20	0.00	0.37	0.44	0.00
Sat Flow, veh/h	1533	3564	1468	2895	1604	1524	1616	3385	0	1691	3438	1553
Grp Volume(v), veh/h	94	190	0	353	203	0	202	45	0	171	653	0
Grp Sat Flow(s),veh/h/ln	1533	1782	1468	1448	1604	1524	1616	1649	0	1691	1719	1553
Q Serve(g_s), s	6.0	5.1	0.0	12.0	12.5	0.0	12.2	1.1	0.0	7.1	13.2	0.0
Cycle Q Clear(g_c), s	6.0	5.1	0.0	12.0	12.5	0.0	12.2	1.1	0.0	7.1	13.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	132	306	126	475	263	250	233	675	0	623	1496	676
V/C Ratio(X)	0.71	0.62	0.00	0.74	0.77	0.00	0.87	0.07	0.00	0.27	0.44	0.00
Avail Cap(c_a), veh/h	184	428	176	651	361	343	339	937	0	623	1496	676
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.89	0.89	0.00	1.00	1.00	0.00	0.95	0.95	0.00
Uniform Delay (d), s/veh	44.5	44.1	0.0	45.2	45.4	0.0	41.9	32.1	0.0	22.2	19.7	0.0
Incr Delay (d2), s/veh	3.3	0.8	0.0	2.7	6.1	0.0	10.9	0.0	0.0	0.1	0.9	0.0
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(95%),veh/ln	4.8	4.6	0.0	8.5	9.8	0.0	10.2	0.9	0.0	6.0	10.5	0.0
LnGrp Delay(d),s/veh	47.8	44.9	0.0	47.9	51.5	0.0	52.8	32.1	0.0	22.3	20.6	0.0
LnGrp LOS	D	D		D	D		D	C		C	C	
Approach Vol, veh/h		284			556			247			824	
Approach Delay, s/veh		45.9			49.2			49.0			20.9	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.4	48.1		12.6	41.4	25.1		20.9
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	21.0	27.4		12.0	20.0	* 28		22.5
Max Q Clear Time (g_c+I1), s	14.2	15.2		8.0	9.1	3.1		14.5
Green Ext Time (p_c), s	0.2	4.1		0.4	3.9	0.1		1.9

Intersection Summary		
HCM 2010 Ctrl Delay		36.5
HCM 2010 LOS		D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	233	378	37	123	30	396	414	401	18	108	207
Future Volume (veh/h)	74	233	378	37	123	30	396	414	401	18	108	207
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.89
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	1532	1739	1652	1667	1332	1900	1727	1835	1900	1900	1845	1520
Adj Flow Rate, veh/h	78	360	322	39	129	32	417	436	0	19	114	218
Adj No. of Lanes	1	1	1	1	1	0	2	2	0	1	1	1
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, %	24	7	15	14	49	49	10	5	5	0	3	25
Cap, veh/h	95	417	326	60	218	54	1136	1242	0	353	360	224
Arrive On Green	0.02	0.08	0.08	0.04	0.21	0.21	0.36	0.36	0.00	0.19	0.19	0.19
Sat Flow, veh/h	1459	1739	1358	1587	1024	254	3191	3579	0	1810	1845	1151
Grp Volume(v), veh/h	78	360	322	39	0	161	417	436	0	19	114	218
Grp Sat Flow(s),veh/h/ln	1459	1739	1358	1587	0	1278	1596	1744	0	1810	1845	1151
Q Serve(g_s), s	5.3	20.5	23.7	2.4	0.0	11.3	9.7	9.2	0.0	0.9	5.3	18.8
Cycle Q Clear(g_c), s	5.3	20.5	23.7	2.4	0.0	11.3	9.7	9.2	0.0	0.9	5.3	18.8
Prop In Lane	1.00		1.00	1.00		0.20	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	95	417	326	60	0	272	1136	1242	0	353	360	224
V/C Ratio(X)	0.82	0.86	0.99	0.65	0.00	0.59	0.37	0.35	0.00	0.05	0.32	0.97
Avail Cap(c_a), veh/h	161	417	326	127	0	272	1136	1242	0	353	360	224
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	1.00	0.00	1.00	0.71	0.71	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	44.4	45.9	47.4	0.0	35.5	23.8	23.7	0.0	32.7	34.5	40.0
Incr Delay (d2), s/veh	5.9	15.2	44.2	4.3	0.0	2.4	0.6	0.6	0.0	0.0	0.2	51.5
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(95%),veh/ln	4.2	17.0	18.5	2.0	0.0	7.6	7.2	7.4	0.0	0.8	4.9	14.1
LnGrp Delay(d),s/veh	54.2	59.6	90.0	51.7	0.0	37.8	24.5	24.2	0.0	32.8	34.7	91.5
LnGrp LOS	D	E	F	D		D	C	C		C	C	F
Approach Vol, veh/h		760			200			853			351	
Approach Delay, s/veh		71.9			40.5			24.4			69.9	
Approach LOS		E			D			C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.8	28.0		40.2	10.5	25.3		24.0
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	3.8	24.0		31.4	11.0	21.0		19.5
Max Q Clear Time (g_c+I1), s	4.4	25.7		11.7	7.3	13.3		20.8
Green Ext Time (p_c), s	0.0	0.0		2.9	0.0	0.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	50.0
HCM 2010 LOS	D

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1024	18	565	19	8	16	163	232	14	22	404	108
Future Volume (vph)	1024	18	565	19	8	16	163	232	14	22	404	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.99	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1649	1658	2694		1775	1592	1597	3236		1805	3374	1131
Flt Permitted	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1649	1658	2694		1775	1592	1597	3236		1805	3374	1131
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1101	19	608	20	9	17	175	249	15	24	434	116
RTOR Reduction (vph)	0	0	373	0	0	17	0	5	0	0	0	90
Lane Group Flow (vph)	562	558	235	0	29	0	175	259	0	24	434	26
Confl. Peds. (#/hr)	3		3	3		3			3	3		3
Confl. Bikes (#/hr)									13			
Heavy Vehicles (%)	4%	0%	3%	5%	0%	0%	13%	11%	0%	0%	7%	39%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	29.0	29.0	29.0		1.8	1.8	10.7	25.2		2.0	16.5	16.5
Effective Green, g (s)	29.0	29.0	29.0		1.8	1.8	10.7	25.2		2.0	16.5	16.5
Actuated g/C Ratio	0.39	0.39	0.39		0.02	0.02	0.14	0.34		0.03	0.22	0.22
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	637	641	1041		42	38	227	1087		48	742	248
v/s Ratio Prot	c0.34	0.34			c0.02		c0.11	0.08		0.01	c0.13	
v/s Ratio Perm			0.09			0.00						0.02
v/c Ratio	0.88	0.87	0.23		0.69	0.01	0.77	0.24		0.50	0.58	0.10
Uniform Delay, d1	21.4	21.3	15.5		36.3	35.7	31.0	18.0		36.0	26.2	23.3
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.3	12.0	0.0		32.7	0.0	14.9	0.5		3.0	3.4	0.8
Delay (s)	34.7	33.3	15.5		69.0	35.8	45.8	18.5		39.0	29.5	24.2
Level of Service	C	C	B		E	D	D	B		D	C	C
Approach Delay (s)		27.5			56.7			29.4			28.9	
Approach LOS		C			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	10	199	1	95	14	289	796	566	416	13
Future Volume (vph)	25	0	10	199	1	95	14	289	796	566	416	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.91	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1805	1464	1417	1424	1244	1805	3343	1509	3367	3392	
Flt Permitted		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1805	1464	1417	1424	1244	1805	3343	1509	3367	3392	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	27	0	11	214	1	102	15	311	856	609	447	14
RTOR Reduction (vph)	0	0	11	0	0	87	0	0	377	0	1	0
Lane Group Flow (vph)	0	27	0	107	108	15	15	311	479	609	460	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)									15			21
Heavy Vehicles (%)	0%	0%	0%	21%	0%	27%	0%	8%	3%	4%	6%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		3.6	3.6	14.5	14.5	14.5	2.6	38.5	38.5	27.4	63.3	
Effective Green, g (s)		3.6	3.6	14.5	14.5	14.5	2.6	38.5	38.5	27.4	63.3	
Actuated g/C Ratio		0.04	0.04	0.14	0.14	0.14	0.03	0.38	0.38	0.27	0.63	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		64	52	205	206	180	46	1287	580	922	2147	
v/s Ratio Prot		c0.01		0.08	c0.08		0.01	0.09		c0.18	0.14	
v/s Ratio Perm			0.00			0.01			c0.32			
v/c Ratio		0.42	0.01	0.52	0.52	0.08	0.33	0.24	0.83	0.66	0.21	
Uniform Delay, d1		47.2	46.5	39.5	39.6	37.0	47.8	20.9	27.7	32.2	7.8	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.6	0.0	1.1	1.1	0.1	1.5	0.0	8.9	3.7	0.2	
Delay (s)		48.8	46.5	40.7	40.7	37.1	49.3	20.9	36.7	35.9	8.0	
Level of Service		D	D	D	D	D	D	C	D	D	A	
Approach Delay (s)		48.1			39.5			32.7			23.9	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL2	WBT	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations										
Traffic Volume (vph)	281	62	52	1658	889	0	83	0	123	64
Future Volume (vph)	281	62	52	1658	889	0	83	0	123	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.0	4.0	4.0		4.5	4.5
Lane Util. Factor	0.91		1.00	0.91	0.91	0.91	1.00		*1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Frt	0.97		1.00	1.00	1.00	1.00	0.85		1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (prot)	4506		1805	5187	3189	1595	1515		3551	1583
Flt Permitted	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (perm)	4506		1805	5187	3189	1595	1515		3551	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	305	67	57	1802	966	0	90	0	134	70
RTOR Reduction (vph)	0	0	0	0	0	0	64	0	0	0
Lane Group Flow (vph)	372	0	57	1802	647	319	26	0	134	70
Confl. Peds. (#/hr)							2			
Confl. Bikes (#/hr)		2					2			2
Heavy Vehicles (%)	11%	15%	0%	0%	3%	0%	5%	0%	7%	2%
Turn Type	NA		Prot	NA	Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3	4	4			3	3
Permitted Phases							4	3 6		
Actuated Green, G (s)	26.5		6.5	63.0	28.5	28.5	28.5		21.5	21.5
Effective Green, g (s)	26.5		6.5	63.0	28.5	28.5	28.5		21.5	21.5
Actuated g/C Ratio	0.26		0.06	0.63	0.28	0.28	0.28		0.22	0.22
Clearance Time (s)	4.5		4.0		4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0		2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	1194		117	3267	908	454	431		763	340
v/s Ratio Prot	0.08		0.03	c0.35	c0.20	0.20			0.04	0.04
v/s Ratio Perm							0.02			
v/c Ratio	0.31		0.49	0.55	0.71	0.70	0.06		0.18	0.21
Uniform Delay, d1	29.4		45.1	10.5	32.1	32.0	26.0		32.0	32.2
Progression Factor	0.55		1.18	1.17	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7		0.9	0.1	2.2	4.0	0.0		0.0	0.1
Delay (s)	16.9		54.1	12.4	34.3	36.0	26.0		32.1	32.3
Level of Service	B		D	B	C	D	C		C	C
Approach Delay (s)	16.9			13.7		34.1				
Approach LOS	B			B		C				

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	63	69	688	281	265	64	487	119	136	391	112
Future Volume (vph)	160	63	69	688	281	265	64	487	119	136	391	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1577	1512		2694	1660	1338	1624	2875	1411	1449	2935	1328
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1577	1512		2694	1660	1338	1624	2875	1411	1449	2935	1328
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	167	66	72	717	293	276	67	507	124	142	407	117
RTOR Reduction (vph)	0	40	0	0	0	194	0	0	0	0	0	94
Lane Group Flow (vph)	167	98	0	717	293	82	67	507	124	128	421	23
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA	pt+ov	Split	NA	Perm
Protected Phases	8	8		7	7		6	6	6 7	2	2	
Permitted Phases						7						2
Actuated Green, G (s)	14.0	14.0		29.7	29.7	29.7	19.5	19.5	49.2	19.8	19.8	19.8
Effective Green, g (s)	14.0	14.0		29.7	29.7	29.7	19.5	19.5	49.2	19.8	19.8	19.8
Actuated g/C Ratio	0.14	0.14		0.30	0.30	0.30	0.20	0.20	0.49	0.20	0.20	0.20
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	220	211		800	493	397	316	560	694	286	581	262
v/s Ratio Prot	c0.11	0.06		c0.27	0.18		0.04	c0.18	0.09	0.09	c0.14	
v/s Ratio Perm						0.06						0.02
v/c Ratio	0.76	0.46		0.90	0.59	0.21	0.21	0.91	0.18	0.45	0.72	0.09
Uniform Delay, d1	41.4	39.5		33.7	30.0	26.3	33.8	39.3	14.1	35.3	37.5	32.7
Progression Factor	1.00	1.00		0.93	0.92	0.77	1.00	1.00	1.00	0.98	0.97	1.16
Incremental Delay, d2	13.3	1.2		12.6	1.9	0.3	0.2	18.1	0.1	4.8	7.4	0.6
Delay (s)	54.7	40.7		44.0	29.5	20.4	34.0	57.5	14.2	39.3	43.9	38.6
Level of Service	D	D		D	C	C	C	E	B	D	D	D
Approach Delay (s)		48.4			35.6			47.5			42.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	44	274	1633	68	21	75
Future Volume (vph)	44	274	1633	68	21	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.92
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	5085	4823		1805	1488
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1805	5085	4823		1805	1488
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	46	285	1701	71	22	78
RTOR Reduction (vph)	0	0	0	0	0	74
Lane Group Flow (vph)	46	285	1772	0	22	4
Confl. Peds. (#/hr)	23			23	9	9
Confl. Bikes (#/hr)				20		4
Heavy Vehicles (%)	0%	2%	7%	0%	0%	0%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		3	
Permitted Phases						3
Actuated Green, G (s)	5.0	86.8	77.8		5.2	5.2
Effective Green, g (s)	5.0	86.8	77.8		5.2	5.2
Actuated g/C Ratio	0.05	0.87	0.78		0.05	0.05
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	90	4413	3752		93	77
v/s Ratio Prot	c0.03	0.06	c0.37		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.51	0.06	0.47		0.24	0.05
Uniform Delay, d1	46.3	0.9	3.9		45.5	45.1
Progression Factor	1.09	1.04	0.53		1.00	1.00
Incremental Delay, d2	2.0	0.0	0.4		0.5	0.1
Delay (s)	52.4	1.0	2.4		46.0	45.2
Level of Service	D	A	A		D	D
Approach Delay (s)		8.1	2.4		45.3	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	272	23	12	1422	280	187
Future Volume (veh/h)	272	23	12	1422	280	187
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1769	1900	1520	1863	1881	1681
Adj Flow Rate, veh/h	296	25	13	1546	304	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	25	2	1	13
Cap, veh/h	3082	255	13	3703	344	482
Arrive On Green	1.00	1.00	0.02	1.00	0.19	0.00
Sat Flow, veh/h	4695	376	1448	5253	1792	2515
Grp Volume(v), veh/h	208	113	13	1546	304	0
Grp Sat Flow(s),veh/h/ln	1610	1692	1448	1695	1792	1258
Q Serve(g_s), s	0.0	0.0	0.9	0.0	16.5	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.9	0.0	16.5	0.0
Prop In Lane		0.22	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2188	1149	13	3703	344	482
V/C Ratio(X)	0.10	0.10	1.03	0.42	0.88	0.00
Avail Cap(c_a), veh/h	2188	1149	87	3703	717	1006
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.77	0.77	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	49.1	0.0	39.3	0.0
Incr Delay (d2), s/veh	0.1	0.2	71.5	0.3	3.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.4	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.1	1.1	0.2	13.3	0.0
LnGrp Delay(d),s/veh	0.1	0.2	121.1	0.3	42.4	0.0
LnGrp LOS	A	A	F	A	D	
Approach Vol, veh/h	321			1559	304	
Approach Delay, s/veh	0.1			1.3	42.4	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	4.9	72.0				76.8		23.2
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	6.0	42.0				52.0		40.0
Max Q Clear Time (g_c+I1), s	2.9	2.0				2.0		18.5
Green Ext Time (p_c), s	0.0	12.4				12.9		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	6.8
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	284	91	382	1145	264	55	103	100	89	376	234
Future Volume (veh/h)	84	284	91	382	1145	264	55	103	100	89	376	234
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
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	1684	1976	1863	1863	1976	1712	1675	1900	1727	1877	1900
Adj Flow Rate, veh/h	89	302	97	406	1218	281	59	110	0	95	400	0
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	15	15	2	2	2	11	9	9	10	2	2
Cap, veh/h	115	1226	370	432	2193	506	75	432	0	172	673	0
Arrive On Green	0.02	0.12	0.12	0.49	1.00	1.00	0.05	0.14	0.00	0.10	0.19	0.00
Sat Flow, veh/h	1810	3481	1051	1774	4106	947	1630	3267	0	1645	3660	0
Grp Volume(v), veh/h	89	264	135	406	1006	493	59	110	0	95	400	0
Grp Sat Flow(s),veh/h/ln	1810	1533	1466	1774	1695	1663	1630	1591	0	1645	1783	0
Q Serve(g_s), s	4.9	7.8	8.4	21.7	0.0	0.0	3.6	3.1	0.0	5.5	10.2	0.0
Cycle Q Clear(g_c), s	4.9	7.8	8.4	21.7	0.0	0.0	3.6	3.1	0.0	5.5	10.2	0.0
Prop In Lane	1.00		0.72	1.00		0.57	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	115	1080	516	432	1811	888	75	432	0	172	673	0
V/C Ratio(X)	0.78	0.24	0.26	0.94	0.56	0.56	0.79	0.25	0.00	0.55	0.59	0.00
Avail Cap(c_a), veh/h	181	1080	516	564	1811	888	147	732	0	197	906	0
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	0.52	0.52	0.52	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	48.2	32.1	32.3	25.0	0.0	0.0	47.2	38.7	0.0	42.5	37.1	0.0
Incr Delay (d2), s/veh	4.1	0.5	1.2	11.5	0.6	1.3	6.9	0.1	0.0	1.0	0.3	0.0
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(95%),veh/ln	4.7	6.1	6.5	15.8	0.3	0.6	3.2	2.5	0.0	4.6	8.8	0.0
LnGrp Delay(d),s/veh	52.4	32.6	33.6	36.5	0.6	1.3	54.1	38.8	0.0	43.6	37.4	0.0
LnGrp LOS	D	C	C	D	A	A	D	D		D	D	
Approach Vol, veh/h		488			1905			169			495	
Approach Delay, s/veh		36.5			8.5			44.1			38.6	
Approach LOS		D			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	39.4	8.6	23.5	10.3	57.6	14.5	17.6
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax), s	* 3	* 17	9.0	25.4	10.0	* 39	12.0	23.0
Max Q Clear Time (g_c+I1), s	23.7	10.4	5.6	12.2	6.9	2.0	7.5	5.1
Green Ext Time (p_c), s	0.7	4.4	0.1	1.3	0.0	11.8	0.1	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	19.8
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	250	77	131	1269	13	182	60	27	29	156	340
Future Volume (veh/h)	140	250	77	131	1269	13	182	60	27	29	156	340
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.95	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	1667	1650	1900	1776	1880	1900	1827	1613	1557	1545	1809	1863
Adj Flow Rate, veh/h	146	260	80	136	1322	14	126	152	28	30	306	258
Adj No. of Lanes	2	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	14	13	13	7	1	1	4	32	22	23	7	2
Cap, veh/h	202	791	237	296	1625	17	205	190	148	285	350	297
Arrive On Green	0.13	0.67	0.67	0.17	0.45	0.45	0.12	0.12	0.12	0.19	0.19	0.19
Sat Flow, veh/h	3079	2367	711	1691	3619	38	1740	1613	1262	1471	1809	1533
Grp Volume(v), veh/h	146	170	170	136	652	684	126	152	28	30	306	258
Grp Sat Flow(s),veh/h/ln	1540	1568	1510	1691	1786	1871	1740	1613	1262	1471	1809	1533
Q Serve(g_s), s	4.5	4.6	4.8	7.2	31.7	31.7	6.9	9.2	2.0	1.7	16.4	16.3
Cycle Q Clear(g_c), s	4.5	4.6	4.8	7.2	31.7	31.7	6.9	9.2	2.0	1.7	16.4	16.3
Prop In Lane	1.00		0.47	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	202	524	504	296	802	841	205	190	148	285	350	297
V/C Ratio(X)	0.72	0.32	0.34	0.46	0.81	0.81	0.62	0.80	0.19	0.11	0.87	0.87
Avail Cap(c_a), veh/h	216	524	504	296	802	841	240	223	174	315	387	328
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.5	11.8	11.9	37.0	23.9	23.9	42.0	43.0	39.8	33.2	39.1	39.1
Incr Delay (d2), s/veh	10.1	1.6	1.7	0.4	8.8	8.5	1.8	13.8	0.2	0.1	16.9	18.7
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(95%),veh/ln	3.9	3.8	4.0	6.1	24.4	25.3	6.2	8.4	1.3	1.2	14.9	13.2
LnGrp Delay(d),s/veh	52.7	13.4	13.6	37.4	32.7	32.4	43.7	56.8	40.0	33.3	56.0	57.8
LnGrp LOS	D	B	B	D	C	C	D	E	D	C	E	E
Approach Vol, veh/h		486			1472			306			594	
Approach Delay, s/veh		25.3			33.0			49.9			55.7	
Approach LOS		C			C			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	10.6	49.5		24.0	22.1	38.0		16.0
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	7.0	40.4		21.4	14.0	* 33		13.8
Max Q Clear Time (g_c+I1), s	6.5	33.7		18.4	9.2	6.8		11.2
Green Ext Time (p_c), s	0.0	4.4		0.7	3.3	1.2		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	38.2
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	270	48	478	1264	3	50	1	71	1	22	22
Future Volume (veh/h)	3	270	48	478	1264	3	50	1	71	1	22	22
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	0.98		0.96	0.99		0.98
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	1635	1900	1827	1863	1900	1900	1641	1900	1900	1900	1900
Adj Flow Rate, veh/h	3	287	51	509	1345	3	53	1	76	1	23	23
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	18	18	4	2	2	0	0	0	0	0	0
Cap, veh/h	3	592	104	919	2740	6	102	12	90	38	103	99
Arrive On Green	0.00	0.22	0.22	0.53	0.76	0.76	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1810	2630	460	1740	3623	8	438	106	766	10	878	851
Grp Volume(v), veh/h	3	168	170	509	657	691	130	0	0	47	0	0
Grp Sat Flow(s),veh/h/ln	1810	1553	1537	1740	1770	1861	1311	0	0	1739	0	0
Q Serve(g_s), s	0.2	9.4	9.7	19.5	14.4	14.4	7.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	9.4	9.7	19.5	14.4	14.4	9.6	0.0	0.0	2.5	0.0	0.0
Prop In Lane	1.00		0.30	1.00		0.00	0.41		0.58	0.02		0.49
Lane Grp Cap(c), veh/h	3	350	346	919	1338	1408	204	0	0	240	0	0
V/C Ratio(X)	0.96	0.48	0.49	0.55	0.49	0.49	0.64	0.00	0.00	0.20	0.00	0.00
Avail Cap(c_a), veh/h	54	350	346	919	1338	1408	233	0	0	280	0	0
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.9	33.7	33.8	15.7	4.7	4.7	43.1	0.0	0.0	40.1	0.0	0.0
Incr Delay (d2), s/veh	131.6	4.7	4.9	0.4	1.3	1.2	2.8	0.0	0.0	0.1	0.0	0.0
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(95%),veh/ln	0.4	7.9	8.1	14.5	11.9	12.3	6.6	0.0	0.0	2.1	0.0	0.0
LnGrp Delay(d),s/veh	181.6	38.3	38.7	16.2	6.0	5.9	45.9	0.0	0.0	40.2	0.0	0.0
LnGrp LOS	F	D	D	B	A	A	D			D		
Approach Vol, veh/h		341			1857			130			47	
Approach Delay, s/veh		39.8			8.8			45.9			40.2	
Approach LOS		D			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.3	27.0		15.7	4.2	80.1		15.7
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	5.6	* 23		14.0	3.0	70.5		14.0
Max Q Clear Time (g_c+I1), s	21.5	11.7		4.5	2.2	16.4		11.6
Green Ext Time (p_c), s	8.2	0.9		0.4	0.0	8.8		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	15.9
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	56	280	1563	51	1	168
Future Vol, veh/h	56	280	1563	51	1	168
Conflicting Peds, #/hr	2	0	0	2	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	70	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	5	22	3	2	0	4
Mvmt Flow	63	315	1756	57	1	189

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1815	0	-	0	2072	911
Stage 1	-	-	-	-	1787	-
Stage 2	-	-	-	-	285	-
Critical Hdwy	4.2	-	-	-	6.8	6.98
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.25	-	-	-	3.5	3.34
Pot Cap-1 Maneuver	322	-	-	-	48	273
Stage 1	-	-	-	-	122	-
Stage 2	-	-	-	-	744	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	321	-	-	-	38	272
Mov Cap-2 Maneuver	-	-	-	-	101	-
Stage 1	-	-	-	-	122	-
Stage 2	-	-	-	-	597	-

Approach	EB	WB	SB
HCM Control Delay, s	3.2	0	43.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	321	-	-	-	272
HCM Lane V/C Ratio	0.196	-	-	-	0.694
HCM Control Delay (s)	18.9	-	-	-	43.6
HCM Lane LOS	C	-	-	-	E
HCM 95th %tile Q(veh)	0.7	-	-	-	4.7

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	64	95	3	519	487	8
Future Volume (veh/h)	64	95	3	519	487	8
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1583	1900	1810	1757	1900
Adj Flow Rate, veh/h	70	103	3	564	537	0
Adj No. of Lanes	1	1	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	20	5	5	7	0
Cap, veh/h	788	591	133	795	837	404
Arrive On Green	0.44	0.44	0.44	0.44	0.25	0.00
Sat Flow, veh/h	1792	1344	2	1806	3347	1615
Grp Volume(v), veh/h	70	103	567	0	537	0
Grp Sat Flow(s),veh/h/ln	1792	1344	1809	0	1673	1615
Q Serve(g_s), s	0.6	1.3	0.0	0.0	3.9	0.0
Cycle Q Clear(g_c), s	0.6	1.3	7.0	0.0	3.9	0.0
Prop In Lane		1.00	0.01		1.00	1.00
Lane Grp Cap(c), veh/h	788	591	928	0	837	404
V/C Ratio(X)	0.09	0.17	0.61	0.00	0.64	0.00
Avail Cap(c_a), veh/h	2614	1961	2766	0	3173	1531
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	4.5	4.7	6.3	0.0	9.2	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.8	6.1	0.0	3.3	0.0
LnGrp Delay(d),s/veh	4.5	4.7	6.5	0.0	9.5	0.0
LnGrp LOS	A	A	A		A	
Approach Vol, veh/h	173			567	537	
Approach Delay, s/veh	4.6			6.5	9.5	
Approach LOS	A			A	A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		16.6		10.9		16.6		
Change Period (Y+Rc), s		4.5		4.0		4.5		
Max Green Setting (Gmax), s		40.0		26.0		40.0		
Max Q Clear Time (g_c+I1), s		3.3		5.9		9.0		
Green Ext Time (p_c), s		3.1		1.0		3.1		

Intersection Summary	
HCM 2010 Ctrl Delay	7.5
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	0	10	49	444	0	0
Future Vol, veh/h	0	10	49	444	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	4	2	2
Mvmt Flow	0	11	53	483	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	268	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.9	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.3	-	-
Pot Cap-1 Maneuver	0	736	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	736	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NE
HCM Control Delay, s	10	0
HCM LOS	B	

Minor Lane/Major Mvmt	NET	NER	WBLn1
Capacity (veh/h)	-	-	736
HCM Lane V/C Ratio	-	-	0.015
HCM Control Delay (s)	-	-	10
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	142	208	854	225	373	101	29	221	129	898	99
Future Volume (veh/h)	149	142	208	854	225	373	101	29	221	129	898	99
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1863	1739	1759	1845	1779	1863	1439	1775	1900	1863	1863	1810
Adj Flow Rate, veh/h	166	126	0	871	230	0	103	30	0	132	916	0
Adj No. of Lanes	2	1	1	2	1	1	1	2	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	12	8	3	14	2	32	0	0	2	2	5
Cap, veh/h	329	161	139	1006	509	453	122	258	0	651	1278	555
Arrive On Green	0.09	0.09	0.00	0.09	0.09	0.00	0.09	0.08	0.00	0.37	0.36	0.00
Sat Flow, veh/h	3548	1739	1495	3514	1779	1583	1371	3461	0	1774	3539	1538
Grp Volume(v), veh/h	166	126	0	871	230	0	103	30	0	132	916	0
Grp Sat Flow(s),veh/h/ln	1774	1739	1495	1757	1779	1583	1371	1686	0	1774	1770	1538
Q Serve(g_s), s	4.5	7.1	0.0	24.4	12.2	0.0	7.4	0.8	0.0	5.1	22.3	0.0
Cycle Q Clear(g_c), s	4.5	7.1	0.0	24.4	12.2	0.0	7.4	0.8	0.0	5.1	22.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	329	161	139	1006	509	453	122	258	0	651	1278	555
V/C Ratio(X)	0.50	0.78	0.00	0.87	0.45	0.00	0.85	0.12	0.00	0.20	0.72	0.00
Avail Cap(c_a), veh/h	355	174	150	1072	543	483	151	897	0	651	1278	555
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.40	0.40	0.00	1.00	1.00	0.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	43.2	44.4	0.0	43.4	37.9	0.0	44.9	43.0	0.0	21.6	27.5	0.0
Incr Delay (d2), s/veh	0.4	16.7	0.0	3.1	0.3	0.0	24.8	0.1	0.0	0.0	2.9	0.0
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(95%),veh/ln	4.0	7.5	0.0	16.0	8.6	0.0	6.6	0.7	0.0	4.5	16.3	0.0
LnGrp Delay(d),s/veh	43.6	61.1	0.0	46.5	38.1	0.0	69.7	43.1	0.0	21.7	30.4	0.0
LnGrp LOS	D	E		D	D		E	D		C	C	
Approach Vol, veh/h		292			1101			133			1048	
Approach Delay, s/veh		51.1			44.7			63.7			29.3	
Approach LOS		D			D			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.9	40.7		13.3	41.3	12.3		33.1
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	11.0	31.4		10.0	15.8	* 27		30.5
Max Q Clear Time (g_c+I1), s	9.4	24.3		9.1	7.1	2.8		26.4
Green Ext Time (p_c), s	0.0	3.9		0.1	4.5	0.1		2.2

Intersection Summary	
HCM 2010 Ctrl Delay	40.2
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	55	402	100	438	13	469	187	46	9	260	545
Future Volume (veh/h)	35	55	402	100	438	13	469	187	46	9	260	545
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.94
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	1508	1775	1845	1863	1792	1900	1845	1718	1900	1712	1863	1863
Adj Flow Rate, veh/h	37	0	462	105	461	14	494	197	0	9	274	574
Adj No. of Lanes	1	0	2	1	1	0	2	2	0	1	1	1
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, %	26	20	3	2	6	6	3	10	10	11	2	2
Cap, veh/h	55	0	553	243	484	15	734	703	0	481	550	437
Arrive On Green	0.01	0.00	0.06	0.14	0.28	0.28	0.22	0.22	0.00	0.29	0.29	0.29
Sat Flow, veh/h	1436	0	3046	1774	1728	52	3408	3350	0	1630	1863	1481
Grp Volume(v), veh/h	37	0	462	105	0	475	494	197	0	9	274	574
Grp Sat Flow(s),veh/h/ln	1436	0	1523	1774	0	1781	1704	1632	0	1630	1863	1481
Q Serve(g_s), s	2.6	0.0	15.0	5.4	0.0	26.2	13.3	5.0	0.0	0.4	12.2	29.5
Cycle Q Clear(g_c), s	2.6	0.0	15.0	5.4	0.0	26.2	13.3	5.0	0.0	0.4	12.2	29.5
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	55	0	553	243	0	499	734	703	0	481	550	437
V/C Ratio(X)	0.67	0.00	0.84	0.43	0.00	0.95	0.67	0.28	0.00	0.02	0.50	1.31
Avail Cap(c_a), veh/h	86	0	670	243	0	499	734	703	0	481	550	437
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.00	0.86	1.00	0.00	1.00	0.93	0.93	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.7	0.0	45.5	39.6	0.0	35.3	36.0	32.8	0.0	25.0	29.1	35.3
Incr Delay (d2), s/veh	4.4	0.0	6.3	0.5	0.0	28.4	4.5	0.9	0.0	0.0	0.3	156.9
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(95%),veh/ln	2.0	0.0	10.8	4.8	0.0	23.4	10.8	4.2	0.0	0.3	10.4	56.0
LnGrp Delay(d),s/veh	53.1	0.0	51.8	40.0	0.0	63.8	40.5	33.7	0.0	25.0	29.4	192.2
LnGrp LOS	D		D	D		E	D	C		C	C	F
Approach Vol, veh/h		499			580			691			857	
Approach Delay, s/veh		51.9			59.5			38.6			138.4	
Approach LOS		D			E			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.7	22.2		26.1	7.9	32.0		34.0
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	12.6	22.0		19.4	6.0	28.0		29.5
Max Q Clear Time (g_c+I1), s	7.4	17.0		15.3	4.6	28.2		31.5
Green Ext Time (p_c), s	1.0	1.0		1.0	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	78.3
HCM 2010 LOS	E

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	389	10	163	28	15	12	311	355	16	41	556	178
Future Volume (vph)	389	10	163	28	15	12	311	355	16	41	556	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.97	1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1618	1623	2733		1806	1570	1805	3388		1805	3539	1512
Flt Permitted	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1618	1623	2733		1806	1570	1805	3388		1805	3539	1512
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	405	10	170	29	16	12	324	370	17	43	579	185
RTOR Reduction (vph)	0	0	141	0	0	13	0	4	0	0	0	121
Lane Group Flow (vph)	207	208	29	0	45	0	324	383	0	43	579	64
Confl. Peds. (#/hr)				11		11				2		2
Confl. Bikes (#/hr)						1			4			12
Heavy Vehicles (%)	6%	9%	4%	3%	0%	0%	0%	6%	0%	0%	2%	3%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	12.8	12.8	12.8		2.4	2.4	17.0	39.2		3.6	25.8	25.8
Effective Green, g (s)	12.8	12.8	12.8		2.4	2.4	17.0	39.2		3.6	25.8	25.8
Actuated g/C Ratio	0.17	0.17	0.17		0.03	0.03	0.23	0.52		0.05	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	276	276	466		57	50	409	1770		86	1217	520
v/s Ratio Prot	0.13	c0.13			c0.02		c0.18	0.11		0.02	c0.16	
v/s Ratio Perm			0.01			0.00						0.04
v/c Ratio	0.75	0.75	0.06		0.79	0.01	0.79	0.22		0.50	0.48	0.12
Uniform Delay, d1	29.6	29.6	26.1		36.0	35.1	27.3	9.6		34.8	19.3	16.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.7	9.9	0.0		47.4	0.0	10.1	0.3		1.7	1.3	0.5
Delay (s)	39.3	39.5	26.1		83.4	35.2	37.4	9.9		36.5	20.6	17.3
Level of Service	D	D	C		F	D	D	A		D	C	B
Approach Delay (s)		35.5			72.6			22.4			20.7	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	3	18	980	3	208	18	449	166	100	627	13
Future Volume (vph)	25	3	18	980	3	208	18	449	166	100	627	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.87	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1818	1406	1665	1670	1546	1805	3471	1335	3242	3520	
Flt Permitted		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1818	1406	1665	1670	1546	1805	3471	1335	3242	3520	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	3	19	1032	3	219	19	473	175	105	660	14
RTOR Reduction (vph)	0	0	18	0	0	126	0	0	142	0	1	0
Lane Group Flow (vph)	0	29	1	516	519	93	19	473	33	105	673	0
Confl. Peds. (#/hr)	12		12	12		12	14		14	14		14
Confl. Bikes (#/hr)									4			13
Heavy Vehicles (%)	0%	0%	0%	3%	0%	2%	0%	4%	16%	8%	2%	8%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		3.0	3.0	37.2	37.2	37.2	2.2	18.6	18.6	25.2	41.6	
Effective Green, g (s)		3.0	3.0	37.2	37.2	37.2	2.2	18.6	18.6	25.2	41.6	
Actuated g/C Ratio		0.03	0.03	0.37	0.37	0.37	0.02	0.19	0.19	0.25	0.42	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		54	42	619	621	575	39	645	248	816	1464	
v/s Ratio Prot		c0.02		0.31	c0.31		0.01	c0.14		0.03	c0.19	
v/s Ratio Perm			0.00			0.06			0.02			
v/c Ratio		0.54	0.01	0.83	0.84	0.16	0.49	0.73	0.13	0.13	0.46	
Uniform Delay, d1		47.8	47.1	28.6	28.6	21.0	48.3	38.4	34.0	28.9	21.1	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		5.1	0.0	9.0	9.1	0.0	3.5	3.7	0.1	0.3	1.0	
Delay (s)		52.9	47.1	37.6	37.7	21.0	51.8	42.1	34.0	29.2	22.1	
Level of Service		D	D	D	D	C	D	D	C	C	C	
Approach Delay (s)		50.6			34.8			40.3			23.1	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL2	WBT	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations										
Traffic Volume (vph)	1214	365	42	349	227	0	141	0	664	347
Future Volume (vph)	1214	365	42	349	227	0	141	0	664	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.0	4.0	4.0		4.5	4.5
Lane Util. Factor	0.91		1.00	0.91	0.91	0.91	1.00		*1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Frt	0.97		1.00	1.00	1.00	1.00	0.85		1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (prot)	4878		1641	4396	2857	1428	1422		3762	1553
Flt Permitted	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (perm)	4878		1641	4396	2857	1428	1422		3762	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1320	397	46	379	247	0	153	0	722	377
RTOR Reduction (vph)	0	0	0	0	0	0	100	0	0	0
Lane Group Flow (vph)	1717	0	46	379	165	82	53	0	722	377
Confl. Peds. (#/hr)							4			
Confl. Bikes (#/hr)		11					4			6
Heavy Vehicles (%)	2%	3%	10%	18%	15%	0%	11%	0%	1%	4%
Turn Type	NA		Prot	NA	Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3	4	4			3	3
Permitted Phases							4	3 6		
Actuated Green, G (s)	41.9		3.6	79.9	11.6	11.6	11.6		25.9	25.9
Effective Green, g (s)	41.9		3.6	79.9	11.6	11.6	11.6		25.9	25.9
Actuated g/C Ratio	0.42		0.04	0.80	0.12	0.12	0.12		0.26	0.26
Clearance Time (s)	4.5		4.0		4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0		2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	2043		59	3512	331	165	164		974	402
v/s Ratio Prot	c0.35		c0.03	0.09	c0.06	0.06			0.19	c0.24
v/s Ratio Perm							0.04			
v/c Ratio	0.84		0.78	0.11	0.50	0.50	0.32		0.74	0.94
Uniform Delay, d1	26.1		47.8	2.2	41.5	41.5	40.6		34.0	36.3
Progression Factor	0.85		1.29	0.68	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.8		43.2	0.0	0.4	0.9	0.4		2.7	29.0
Delay (s)	26.0		104.9	1.5	41.9	42.3	41.0		36.7	65.2
Level of Service	C		F	A	D	D	D		D	E
Approach Delay (s)	26.0			12.7		41.7				
Approach LOS	C			B		D				

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	151	87	174	119	68	33	375	300	508	444	101
Future Volume (vph)	156	151	87	174	119	68	33	375	300	508	444	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1577	1560		2694	1660	1333	1624	2875	1411	1449	2926	1329
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00
Satd. Flow (perm)	1577	1560		2694	1660	1333	1624	2875	1411	1449	2926	1329
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	162	157	91	181	124	71	34	391	312	529	462	105
RTOR Reduction (vph)	0	23	0	0	0	62	0	0	0	0	0	69
Lane Group Flow (vph)	163	225	0	181	124	9	34	391	313	323	669	36
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA	pt+ov	Split	NA	Perm
Protected Phases	8	8		7	7		6	6	6 7	2	2	
Permitted Phases						7						2
Actuated Green, G (s)	18.7	18.7		12.2	12.2	12.2	17.6	17.6	29.8	34.5	34.5	34.5
Effective Green, g (s)	18.7	18.7		12.2	12.2	12.2	17.6	17.6	29.8	34.5	34.5	34.5
Actuated g/C Ratio	0.19	0.19		0.12	0.12	0.12	0.18	0.18	0.30	0.34	0.34	0.34
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	294	291		328	202	162	285	506	420	499	1009	458
v/s Ratio Prot	0.10	c0.14		0.07	0.07		0.02	c0.14	c0.22	0.22	c0.23	
v/s Ratio Perm						0.01						0.03
v/c Ratio	0.55	0.77		0.55	0.61	0.05	0.12	0.77	0.75	0.65	0.66	0.08
Uniform Delay, d1	36.9	38.6		41.3	41.7	38.8	34.7	39.3	31.7	27.6	27.8	22.1
Progression Factor	1.00	1.00		0.77	0.76	3.15	1.00	1.00	1.00	0.95	0.95	1.19
Incremental Delay, d2	1.8	11.6		2.0	5.4	0.1	0.1	6.9	6.7	5.7	3.1	0.3
Delay (s)	38.7	50.3		34.0	37.2	122.5	34.8	46.2	38.4	31.9	29.4	26.5
Level of Service	D	D		C	D	F	C	D	D	C	C	C
Approach Delay (s)		45.7			51.7			42.4			29.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	39.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	46	914	498	32	25	21
Future Volume (vph)	46	914	498	32	25	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.91
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4425		1805	1476
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4425		1805	1476
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	47	933	508	33	26	21
RTOR Reduction (vph)	0	0	3	0	0	20
Lane Group Flow (vph)	47	933	538	0	26	1
Confl. Peds. (#/hr)	8			8	9	9
Confl. Bikes (#/hr)				3		2
Heavy Vehicles (%)	2%	2%	17%	0%	0%	0%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		3	
Permitted Phases						3
Actuated Green, G (s)	5.1	87.9	78.8		4.1	4.1
Effective Green, g (s)	5.1	87.9	78.8		4.1	4.1
Actuated g/C Ratio	0.05	0.88	0.79		0.04	0.04
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	90	4469	3486		74	60
v/s Ratio Prot	c0.03	c0.18	0.12		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.52	0.21	0.15		0.35	0.01
Uniform Delay, d1	46.3	0.9	2.6		46.7	46.0
Progression Factor	1.16	1.00	0.58		1.00	1.00
Incremental Delay, d2	2.2	0.1	0.1		1.1	0.0
Delay (s)	55.9	1.0	1.6		47.7	46.0
Level of Service	E	A	A		D	D
Approach Delay (s)		3.6	1.6		47.0	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	4.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	27.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	878	61	10	381	149	727
Future Volume (veh/h)	878	61	10	381	149	727
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1865	1900	1727	1570	1810	1810
Adj Flow Rate, veh/h	944	66	11	410	160	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	10	21	5	5
Cap, veh/h	3685	257	12	3460	195	306
Arrive On Green	1.00	1.00	0.01	1.00	0.11	0.00
Sat Flow, veh/h	5017	338	1645	4428	1723	2707
Grp Volume(v), veh/h	660	350	11	410	160	0
Grp Sat Flow(s),veh/h/ln	1697	1792	1645	1429	1723	1354
Q Serve(g_s), s	0.0	0.0	0.7	0.0	9.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.7	0.0	9.1	0.0
Prop In Lane		0.19	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2580	1362	12	3460	195	306
V/C Ratio(X)	0.26	0.26	0.95	0.12	0.82	0.00
Avail Cap(c_a), veh/h	2580	1362	82	3460	810	1272
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.98	0.98	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	49.3	0.0	43.4	0.0
Incr Delay (d2), s/veh	0.2	0.5	62.3	0.1	3.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.3	0.9	0.0	8.0	0.0
LnGrp Delay(d),s/veh	0.2	0.5	111.6	0.1	46.7	0.0
LnGrp LOS	A	A	F	A	D	
Approach Vol, veh/h	1010			421	160	
Approach Delay, s/veh	0.3			3.0	46.7	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	4.7	80.0				84.7		15.3
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	5.0	36.0				45.0		47.0
Max Q Clear Time (g_c+I1), s	2.7	2.0				2.0		11.1
Green Ext Time (p_c), s	0.0	7.5				7.7		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	5.7
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	159	1381	65	160	283	101	56	151	384	248	129	52
Future Volume (veh/h)	159	1381	65	160	283	101	56	151	384	248	129	52
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
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	1810	1810	1976	1545	1549	1976	1583	1788	1900	1810	1835	1900
Adj Flow Rate, veh/h	164	1424	67	165	292	104	58	156	0	256	133	0
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	23	25	25	20	7	7	5	5	5
Cap, veh/h	191	2215	104	174	1461	488	237	318	0	286	336	0
Arrive On Green	0.22	0.92	0.92	0.24	0.94	0.94	0.16	0.09	0.00	0.17	0.10	0.00
Sat Flow, veh/h	1723	4829	227	1471	3123	1042	1508	3486	0	1723	3578	0
Grp Volume(v), veh/h	164	971	520	165	262	134	58	156	0	256	133	0
Grp Sat Flow(s),veh/h/ln	1723	1647	1763	1471	1410	1345	1508	1698	0	1723	1743	0
Q Serve(g_s), s	9.2	5.9	5.9	11.0	0.7	0.8	3.4	4.4	0.0	14.6	3.6	0.0
Cycle Q Clear(g_c), s	9.2	5.9	5.9	11.0	0.7	0.8	3.4	4.4	0.0	14.6	3.6	0.0
Prop In Lane	1.00		0.13	1.00		0.77	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	191	1510	808	174	1320	629	237	318	0	286	336	0
V/C Ratio(X)	0.86	0.64	0.64	0.95	0.20	0.21	0.24	0.49	0.00	0.90	0.40	0.00
Avail Cap(c_a), veh/h	207	1510	808	174	1320	629	237	781	0	293	1060	0
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.82	0.82	0.94	0.94	0.94	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.2	2.5	2.5	37.9	1.7	1.7	36.9	43.1	0.0	40.9	42.5	0.0
Incr Delay (d2), s/veh	21.8	1.7	3.2	51.4	0.3	0.7	0.2	0.4	0.0	26.6	0.3	0.0
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(95%),veh/ln	8.9	4.5	5.4	11.0	0.5	0.7	2.5	3.7	0.0	13.9	3.1	0.0
LnGrp Delay(d),s/veh	60.0	4.2	5.7	89.3	2.0	2.5	37.1	43.5	0.0	67.5	42.7	0.0
LnGrp LOS	E	A	A	F	A	A	D	D		E	D	
Approach Vol, veh/h		1655			561			214			389	
Approach Delay, s/veh		10.2			27.8			41.8			59.0	
Approach LOS		B			C			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	50.1	19.7	14.2	15.1	51.0	20.6	13.4
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax), s	* 12	* 32	9.0	30.4	12.0	* 32	17.0	23.0
Max Q Clear Time (g_c+I1), s	13.0	7.9	5.4	5.6	11.2	2.8	16.6	6.4
Green Ext Time (p_c), s	0.0	10.0	0.3	0.5	0.0	10.7	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	22.8
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	407	1451	151	33	331	10	89	134	184	113	58	124
Future Volume (veh/h)	407	1451	151	33	331	10	89	134	184	113	58	124
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.98
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	1845	1828	1900	1338	1549	1900	1429	1750	1792	1610	1538	1652
Adj Flow Rate, veh/h	420	1496	156	34	341	10	92	138	190	116	232	128
Adj No. of Lanes	2	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97
Percent Heavy Veh, %	3	3	3	42	23	23	33	7	6	18	24	15
Cap, veh/h	495	1535	159	58	1140	33	161	206	176	264	265	237
Arrive On Green	0.29	0.97	0.97	0.05	0.39	0.39	0.12	0.12	0.12	0.17	0.17	0.17
Sat Flow, veh/h	3408	3171	328	1274	2920	85	1361	1750	1489	1533	1538	1379
Grp Volume(v), veh/h	420	813	839	34	172	179	92	138	190	116	232	128
Grp Sat Flow(s),veh/h/ln	1704	1737	1762	1274	1472	1534	1361	1750	1489	1533	1538	1379
Q Serve(g_s), s	11.6	23.4	32.1	2.6	8.0	8.1	6.4	7.6	11.8	6.8	14.7	8.5
Cycle Q Clear(g_c), s	11.6	23.4	32.1	2.6	8.0	8.1	6.4	7.6	11.8	6.8	14.7	8.5
Prop In Lane	1.00		0.19	1.00		0.06	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	495	840	853	58	575	599	161	206	176	264	265	237
V/C Ratio(X)	0.85	0.97	0.98	0.58	0.30	0.30	0.57	0.67	1.08	0.44	0.88	0.54
Avail Cap(c_a), veh/h	648	840	853	58	575	599	161	206	176	297	298	268
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.43	0.43	0.43	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.4	1.2	1.3	46.8	21.0	21.0	41.7	42.2	44.1	37.1	40.4	37.8
Incr Delay (d2), s/veh	3.7	13.9	16.8	9.5	1.3	1.3	3.2	6.6	91.2	0.4	20.7	0.7
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(95%),veh/ln	8.2	10.8	13.5	1.9	6.2	6.5	4.6	7.2	16.7	5.2	12.3	5.9
LnGrp Delay(d),s/veh	38.1	15.1	18.2	56.2	22.4	22.3	44.9	48.8	135.3	37.5	61.0	38.5
LnGrp LOS	D	B	B	E	C	C	D	D	F	D	E	D
Approach Vol, veh/h		2072			385			420			476	
Approach Delay, s/veh		21.0			25.3			87.1			49.2	
Approach LOS		C			C			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.5	43.6		21.8	9.2	53.0		16.0
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	9.6	32.4		19.4	3.0	* 48		11.8
Max Q Clear Time (g_c+I1), s	13.6	10.1		16.7	4.6	34.1		13.8
Green Ext Time (p_c), s	0.9	2.0		0.5	0.0	6.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	33.8
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	1515	52	72	343	6	21	24	708	6	0	5
Future Volume (veh/h)	15	1515	52	72	343	6	21	24	708	6	0	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		1.00	1.00		1.00
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	1776	1810	1900	1407	1525	1900	1900	1860	1900	1900	1900	1900
Adj Flow Rate, veh/h	16	1595	55	76	361	6	22	25	745	6	0	5
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	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, %	7	5	5	35	25	25	0	0	0	0	0	0
Cap, veh/h	18	1440	49	248	1763	29	47	31	640	128	16	74
Arrive On Green	0.01	0.43	0.43	0.19	0.60	0.60	0.43	0.43	0.43	0.43	0.00	0.43
Sat Flow, veh/h	1691	3388	116	1340	2917	48	23	71	1489	169	37	172
Grp Volume(v), veh/h	16	807	843	76	179	188	792	0	0	11	0	0
Grp Sat Flow(s),veh/h/ln	1691	1720	1785	1340	1449	1516	1583	0	0	378	0	0
Q Serve(g_s), s	0.9	42.5	42.5	4.9	5.6	5.6	22.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.9	42.5	42.5	4.9	5.6	5.6	43.0	0.0	0.0	0.4	0.0	0.0
Prop In Lane	1.00		0.07	1.00		0.03	0.03		0.94	0.55		0.45
Lane Grp Cap(c), veh/h	18	731	759	248	876	917	718	0	0	218	0	0
V/C Ratio(X)	0.90	1.10	1.11	0.31	0.20	0.21	1.10	0.00	0.00	0.05	0.00	0.00
Avail Cap(c_a), veh/h	51	731	759	248	876	917	718	0	0	218	0	0
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.4	28.7	28.8	35.2	8.9	8.9	29.6	0.0	0.0	16.3	0.0	0.0
Incr Delay (d2), s/veh	38.2	65.5	67.7	0.3	0.5	0.5	65.5	0.0	0.0	0.0	0.0	0.0
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(95%),veh/ln	1.1	60.1	63.2	3.3	4.3	4.5	59.0	0.0	0.0	0.3	0.0	0.0
LnGrp Delay(d),s/veh	87.6	94.2	96.4	35.5	9.5	9.4	95.0	0.0	0.0	16.4	0.0	0.0
LnGrp LOS	F	F	F	D	A	A	F			B		
Approach Vol, veh/h		1666			443			792			11	
Approach Delay, s/veh		95.3			13.9			95.0			16.4	
Approach LOS		F			B			F			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.5	47.0		47.0	5.1	65.4		47.0
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	2.6	* 43		43.0	3.0	41.5		43.0
Max Q Clear Time (g_c+I1), s	16.3	44.5		2.4	2.9	7.6		45.0
Green Ext Time (p_c), s	0.0	0.0		4.9	0.0	1.5		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	82.5
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	257	1945	349	17	6	74
Future Vol, veh/h	257	1945	349	17	6	74
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	70	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	3	4	28	29	0	19
Mvmt Flow	273	2069	371	18	6	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	390	0	-	0	1962	196
Stage 1	-	-	-	-	381	-
Stage 2	-	-	-	-	1581	-
Critical Hdwy	4.16	-	-	-	6.8	7.28
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.23	-	-	-	3.5	3.49
Pot Cap-1 Maneuver	1158	-	-	-	57	762
Stage 1	-	-	-	-	666	-
Stage 2	-	-	-	-	158	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1158	-	-	-	43	761
Mov Cap-2 Maneuver	-	-	-	-	103	-
Stage 1	-	-	-	-	665	-
Stage 2	-	-	-	-	121	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1158	-	-	-	761
HCM Lane V/C Ratio	0.236	-	-	-	0.103
HCM Control Delay (s)	9.1	-	-	-	10.3
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.9	-	-	-	0.3

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	481	635	5	91	166	11
Future Volume (veh/h)	481	635	5	91	166	11
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1583	1900	1406	1293	1900
Adj Flow Rate, veh/h	587	774	6	111	214	0
Adj No. of Lanes	1	1	0	1	2	1
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	20	36	36	47	0
Cap, veh/h	1212	876	106	860	336	220
Arrive On Green	0.65	0.65	0.65	0.65	0.14	0.00
Sat Flow, veh/h	1863	1346	18	1322	2463	1615
Grp Volume(v), veh/h	587	774	117	0	214	0
Grp Sat Flow(s),veh/h/ln	1863	1346	1340	0	1231	1615
Q Serve(g_s), s	6.4	18.9	0.0	0.0	3.3	0.0
Cycle Q Clear(g_c), s	6.4	18.9	1.3	0.0	3.3	0.0
Prop In Lane		1.00	0.05		1.00	1.00
Lane Grp Cap(c), veh/h	1212	876	967	0	336	220
V/C Ratio(X)	0.48	0.88	0.12	0.00	0.64	0.00
Avail Cap(c_a), veh/h	1867	1349	1382	0	1604	1052
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	3.6	5.7	2.7	0.0	16.3	0.0
Incr Delay (d2), s/veh	0.1	3.2	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.6	11.9	0.9	0.0	2.0	0.0
LnGrp Delay(d),s/veh	3.7	8.9	2.7	0.0	17.1	0.0
LnGrp LOS	A	A	A		B	
Approach Vol, veh/h	1361			117	214	
Approach Delay, s/veh	6.7			2.7	17.1	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		30.5		9.4		30.5		
Change Period (Y+Rc), s		4.5		4.0		4.5		
Max Green Setting (Gmax), s		40.0		26.0		40.0		
Max Q Clear Time (g_c+I1), s		20.9		5.3		3.3		
Green Ext Time (p_c), s		5.1		0.4		5.7		

Intersection Summary	
HCM 2010 Ctrl Delay	7.7
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	0	33	516	928	0	0
Future Vol, veh/h	0	33	516	928	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	4	2	2
Mvmt Flow	0	36	561	1009	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	785	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.9	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.3	-	-
Pot Cap-1 Maneuver	0	340	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	340	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NE
HCM Control Delay, s	16.8	0
HCM LOS	C	

Minor Lane/Major Mvmt	NET	NER	WBLn1
Capacity (veh/h)	-	-	340
HCM Lane V/C Ratio	-	-	0.105
HCM Control Delay (s)	-	-	16.8
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	180	125	343	195	192	194	43	345	164	627	164
Future Volume (veh/h)	93	180	125	343	195	192	194	43	345	164	627	164
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1610	1782	1727	1520	1603	1792	1696	1736	1900	1776	1810	1827
Adj Flow Rate, veh/h	95	191	0	357	203	0	202	45	0	171	653	0
Adj No. of Lanes	1	2	1	2	1	1	1	2	0	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	18	6	10	25	13	6	12	21	21	7	5	4
Cap, veh/h	133	308	127	475	263	250	233	673	0	623	1493	674
Arrive On Green	0.09	0.09	0.00	0.05	0.05	0.00	0.14	0.20	0.00	0.37	0.43	0.00
Sat Flow, veh/h	1533	3565	1468	2895	1603	1524	1616	3385	0	1691	3438	1553
Grp Volume(v), veh/h	95	191	0	357	203	0	202	45	0	171	653	0
Grp Sat Flow(s),veh/h/ln	1533	1782	1468	1448	1603	1524	1616	1649	0	1691	1719	1553
Q Serve(g_s), s	6.0	5.2	0.0	12.2	12.5	0.0	12.2	1.1	0.0	7.1	13.3	0.0
Cycle Q Clear(g_c), s	6.0	5.2	0.0	12.2	12.5	0.0	12.2	1.1	0.0	7.1	13.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	133	308	127	475	263	250	233	673	0	623	1493	674
V/C Ratio(X)	0.72	0.62	0.00	0.75	0.77	0.00	0.87	0.07	0.00	0.27	0.44	0.00
Avail Cap(c_a), veh/h	184	428	176	651	361	343	339	937	0	623	1493	674
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.89	0.89	0.00	1.00	1.00	0.00	0.95	0.95	0.00
Uniform Delay (d), s/veh	44.5	44.1	0.0	45.3	45.4	0.0	41.9	32.1	0.0	22.2	19.8	0.0
Incr Delay (d2), s/veh	3.7	0.8	0.0	2.9	6.1	0.0	10.9	0.0	0.0	0.1	0.9	0.0
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(95%),veh/ln	4.9	4.6	0.0	8.5	9.8	0.0	10.2	0.9	0.0	6.0	10.5	0.0
LnGrp Delay(d),s/veh	48.2	44.9	0.0	48.2	51.5	0.0	52.8	32.1	0.0	22.3	20.6	0.0
LnGrp LOS	D	D		D	D		D	C		C	C	
Approach Vol, veh/h		286			560			247			824	
Approach Delay, s/veh		46.0			49.4			49.0			21.0	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.4	48.0		12.6	41.4	25.0		20.9
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	21.0	27.4		12.0	20.0	* 28		22.5
Max Q Clear Time (g_c+I1), s	14.2	15.3		8.0	9.1	3.1		14.5
Green Ext Time (p_c), s	0.2	4.1		0.4	3.9	0.1		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	36.6
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	234	378	37	123	30	396	449	401	18	108	211
Future Volume (veh/h)	74	234	378	37	123	30	396	449	401	18	108	211
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.89
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	1532	1739	1652	1667	1332	1900	1727	1834	1900	1900	1845	1520
Adj Flow Rate, veh/h	78	360	322	39	129	32	417	473	0	19	114	222
Adj No. of Lanes	1	1	1	1	1	0	2	2	0	1	1	1
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, %	24	7	15	14	49	49	10	5	5	0	3	25
Cap, veh/h	95	417	326	60	218	54	1136	1241	0	353	360	224
Arrive On Green	0.02	0.08	0.08	0.04	0.21	0.21	0.36	0.36	0.00	0.19	0.19	0.19
Sat Flow, veh/h	1459	1739	1358	1587	1024	254	3191	3577	0	1810	1845	1151
Grp Volume(v), veh/h	78	360	322	39	0	161	417	473	0	19	114	222
Grp Sat Flow(s),veh/h/ln	1459	1739	1358	1587	0	1278	1596	1743	0	1810	1845	1151
Q Serve(g_s), s	5.3	20.5	23.7	2.4	0.0	11.3	9.7	10.1	0.0	0.9	5.3	19.2
Cycle Q Clear(g_c), s	5.3	20.5	23.7	2.4	0.0	11.3	9.7	10.1	0.0	0.9	5.3	19.2
Prop In Lane	1.00		1.00	1.00		0.20	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	95	417	326	60	0	272	1136	1241	0	353	360	224
V/C Ratio(X)	0.82	0.86	0.99	0.65	0.00	0.59	0.37	0.38	0.00	0.05	0.32	0.99
Avail Cap(c_a), veh/h	161	417	326	127	0	272	1136	1241	0	353	360	224
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	1.00	0.00	1.00	0.69	0.69	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	44.4	45.9	47.4	0.0	35.5	23.8	24.0	0.0	32.7	34.5	40.1
Incr Delay (d2), s/veh	5.9	15.1	44.1	4.3	0.0	2.4	0.6	0.6	0.0	0.0	0.2	56.7
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(95%),veh/ln	4.2	16.9	18.5	2.0	0.0	7.6	7.2	8.0	0.0	0.8	4.9	14.7
LnGrp Delay(d),s/veh	54.2	59.6	90.0	51.7	0.0	37.8	24.5	24.6	0.0	32.8	34.7	96.9
LnGrp LOS	D	E	F	D		D	C	C		C	C	F
Approach Vol, veh/h		760			200			890			355	
Approach Delay, s/veh		71.9			40.5			24.5			73.5	
Approach LOS		E			D			C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.8	28.0		40.2	10.5	25.3		24.0
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	3.8	24.0		31.4	11.0	21.0		19.5
Max Q Clear Time (g_c+I1), s	7.4	25.7		12.1	7.3	13.3		21.2
Green Ext Time (p_c), s	0.0	0.0		3.1	0.0	0.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	50.2
HCM 2010 LOS	D

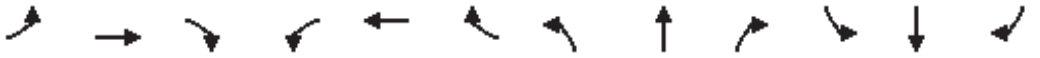
Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1052	18	566	19	8	16	163	232	14	22	404	108
Future Volume (vph)	1052	18	566	19	8	16	163	232	14	22	404	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.99	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1649	1658	2694		1775	1592	1597	3236		1805	3374	1131
Flt Permitted	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1649	1658	2694		1775	1592	1597	3236		1805	3374	1131
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1131	19	609	20	9	17	175	249	15	24	434	116
RTOR Reduction (vph)	0	0	362	0	0	17	0	5	0	0	0	91
Lane Group Flow (vph)	577	573	247	0	29	0	175	259	0	24	434	25
Confl. Peds. (#/hr)	3		3	3		3			3	3		3
Confl. Bikes (#/hr)									13			
Heavy Vehicles (%)	4%	0%	3%	5%	0%	0%	13%	11%	0%	0%	7%	39%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	29.4	29.4	29.4		1.8	1.8	10.7	24.8		2.0	16.1	16.1
Effective Green, g (s)	29.4	29.4	29.4		1.8	1.8	10.7	24.8		2.0	16.1	16.1
Actuated g/C Ratio	0.39	0.39	0.39		0.02	0.02	0.14	0.33		0.03	0.21	0.21
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	646	649	1056		42	38	227	1070		48	724	242
v/s Ratio Prot	c0.35	0.35			c0.02		c0.11	0.08		0.01	c0.13	
v/s Ratio Perm			0.09			0.00						0.02
v/c Ratio	0.89	0.88	0.23		0.69	0.01	0.77	0.24		0.50	0.60	0.10
Uniform Delay, d1	21.3	21.2	15.3		36.3	35.7	31.0	18.3		36.0	26.5	23.7
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.4	13.1	0.0		32.7	0.0	14.9	0.5		3.0	3.6	0.9
Delay (s)	35.7	34.3	15.3		69.0	35.8	45.8	18.8		39.0	30.2	24.5
Level of Service	D	C	B		E	D	D	B		D	C	C
Approach Delay (s)		28.2			56.7			29.6			29.4	
Approach LOS		C			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	10	200	1	95	14	289	829	567	416	13
Future Volume (vph)	25	0	10	200	1	95	14	289	829	567	416	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.91	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1805	1464	1417	1424	1244	1805	3343	1509	3367	3392	
Flt Permitted		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1805	1464	1417	1424	1244	1805	3343	1509	3367	3392	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	27	0	11	215	1	102	15	311	891	610	447	14
RTOR Reduction (vph)	0	0	11	0	0	87	0	0	377	0	1	0
Lane Group Flow (vph)	0	27	0	107	109	15	15	311	514	610	460	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)									15			21
Heavy Vehicles (%)	0%	0%	0%	21%	0%	27%	0%	8%	3%	4%	6%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		3.6	3.6	14.6	14.6	14.6	2.6	38.5	38.5	27.3	63.2	
Effective Green, g (s)		3.6	3.6	14.6	14.6	14.6	2.6	38.5	38.5	27.3	63.2	
Actuated g/C Ratio		0.04	0.04	0.15	0.15	0.15	0.03	0.38	0.38	0.27	0.63	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		64	52	206	207	181	46	1287	580	919	2143	
v/s Ratio Prot		c0.01		0.08	c0.08		0.01	0.09		c0.18	0.14	
v/s Ratio Perm			0.00			0.01			c0.34			
v/c Ratio		0.42	0.01	0.52	0.53	0.08	0.33	0.24	0.89	0.66	0.21	
Uniform Delay, d1		47.2	46.5	39.5	39.5	36.9	47.8	20.9	28.7	32.3	7.8	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.6	0.0	0.9	1.1	0.1	1.5	0.0	14.7	3.8	0.2	
Delay (s)		48.8	46.5	40.4	40.6	37.0	49.3	20.9	43.4	36.0	8.1	
Level of Service		D	D	D	D	D	D	C	D	D	A	
Approach Delay (s)		48.1			39.4			37.7			24.0	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL2	WBT	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations										
Traffic Volume (vph)	281	63	52	1658	911	0	83	0	123	64
Future Volume (vph)	281	63	52	1658	911	0	83	0	123	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.0	4.0	4.0		4.5	4.5
Lane Util. Factor	0.91		1.00	0.91	0.91	0.91	1.00		*1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Frt	0.97		1.00	1.00	1.00	1.00	0.85		1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (prot)	4504		1805	5187	3189	1595	1515		3551	1583
Flt Permitted	1.00		0.95	1.00	0.95	0.95	1.00		1.00	1.00
Satd. Flow (perm)	4504		1805	5187	3189	1595	1515		3551	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	305	68	57	1802	990	0	90	0	134	70
RTOR Reduction (vph)	0	0	0	0	0	0	64	0	0	0
Lane Group Flow (vph)	373	0	57	1802	663	327	26	0	134	70
Confl. Peds. (#/hr)							2			
Confl. Bikes (#/hr)		2					2			2
Heavy Vehicles (%)	11%	15%	0%	0%	3%	0%	5%	0%	7%	2%
Turn Type	NA		Prot	NA	Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3	4	4			3	3
Permitted Phases							4	3 6		
Actuated Green, G (s)	26.7		6.5	62.7	28.8	28.8	28.8		21.0	21.0
Effective Green, g (s)	26.7		6.5	62.7	28.8	28.8	28.8		21.0	21.0
Actuated g/C Ratio	0.27		0.06	0.63	0.29	0.29	0.29		0.21	0.21
Clearance Time (s)	4.5		4.0		4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0		2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	1202		117	3252	918	459	436		745	332
v/s Ratio Prot	0.08		0.03	c0.35	c0.21	0.21			0.04	0.04
v/s Ratio Perm							0.02			
v/c Ratio	0.31		0.49	0.55	0.72	0.71	0.06		0.18	0.21
Uniform Delay, d1	29.3		45.1	10.7	32.0	31.9	25.8		32.4	32.7
Progression Factor	0.55		1.18	1.16	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7		0.9	0.1	2.4	4.3	0.0		0.0	0.1
Delay (s)	16.9		54.1	12.5	34.4	36.2	25.8		32.5	32.8
Level of Service	B		D	B	C	D	C		C	C
Approach Delay (s)	16.9			13.8		34.2				
Approach LOS	B			B		C				

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	64	69	695	287	273	64	487	119	143	391	112
Future Volume (vph)	160	64	69	695	287	273	64	487	119	143	391	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	0.91	0.91	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1577	1513		2694	1660	1338	1624	2875	1411	1449	2935	1328
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1577	1513		2694	1660	1338	1624	2875	1411	1449	2935	1328
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	167	67	72	724	299	284	67	507	124	149	407	117
RTOR Reduction (vph)	0	40	0	0	0	199	0	0	0	0	0	94
Lane Group Flow (vph)	167	99	0	724	299	85	67	507	124	134	422	23
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA	pt+ov	Split	NA	Perm
Protected Phases	8	8		7	7		6	6	6 7	2	2	
Permitted Phases						7						2
Actuated Green, G (s)	14.0	14.0		29.8	29.8	29.8	19.5	19.5	49.3	19.7	19.7	19.7
Effective Green, g (s)	14.0	14.0		29.8	29.8	29.8	19.5	19.5	49.3	19.7	19.7	19.7
Actuated g/C Ratio	0.14	0.14		0.30	0.30	0.30	0.20	0.20	0.49	0.20	0.20	0.20
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	220	211		802	494	398	316	560	695	285	578	261
v/s Ratio Prot	c0.11	0.07		c0.27	0.18		0.04	c0.18	0.09	0.09	c0.14	
v/s Ratio Perm						0.06						0.02
v/c Ratio	0.76	0.47		0.90	0.61	0.21	0.21	0.91	0.18	0.47	0.73	0.09
Uniform Delay, d1	41.4	39.6		33.7	30.1	26.3	33.8	39.3	14.1	35.5	37.7	32.8
Progression Factor	1.00	1.00		0.93	0.92	0.77	1.00	1.00	1.00	0.98	0.97	1.16
Incremental Delay, d2	13.3	1.2		13.4	2.1	0.3	0.2	18.1	0.1	5.2	7.6	0.6
Delay (s)	54.7	40.8		44.7	29.7	20.6	34.0	57.5	14.2	39.9	44.2	38.7
Level of Service	D	D		D	C	C	C	E	B	D	D	D
Approach Delay (s)		48.4			36.0			47.5			42.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	44	282	1714	68	21	75
Future Volume (vph)	44	282	1714	68	21	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.91	0.91		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.92
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1805	5085	4824		1805	1488
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1805	5085	4824		1805	1488
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	46	294	1785	71	22	78
RTOR Reduction (vph)	0	0	0	0	0	74
Lane Group Flow (vph)	46	294	1856	0	22	4
Confl. Peds. (#/hr)	23			23	9	9
Confl. Bikes (#/hr)				20		4
Heavy Vehicles (%)	0%	2%	7%	0%	0%	0%
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	5	2	6		3	
Permitted Phases						3
Actuated Green, G (s)	5.0	86.8	77.8		5.2	5.2
Effective Green, g (s)	5.0	86.8	77.8		5.2	5.2
Actuated g/C Ratio	0.05	0.87	0.78		0.05	0.05
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	90	4413	3753		93	77
v/s Ratio Prot	c0.03	0.06	c0.38		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.51	0.07	0.49		0.24	0.05
Uniform Delay, d1	46.3	0.9	4.0		45.5	45.1
Progression Factor	1.12	1.27	0.64		1.00	1.00
Incremental Delay, d2	2.0	0.0	0.4		0.5	0.1
Delay (s)	53.9	1.2	3.0		46.0	45.2
Level of Service	D	A	A		D	D
Approach Delay (s)		8.3	3.0		45.3	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	280	23	12	1503	280	192
Future Volume (veh/h)	280	23	12	1503	280	192
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.97	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1769	1900	1520	1863	1881	1681
Adj Flow Rate, veh/h	304	25	13	1634	304	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	25	2	1	13
Cap, veh/h	3089	249	13	3703	344	482
Arrive On Green	1.00	1.00	0.02	1.00	0.19	0.00
Sat Flow, veh/h	4705	367	1448	5253	1792	2515
Grp Volume(v), veh/h	214	115	13	1634	304	0
Grp Sat Flow(s),veh/h/ln	1610	1693	1448	1695	1792	1258
Q Serve(g_s), s	0.0	0.0	0.9	0.0	16.5	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.9	0.0	16.5	0.0
Prop In Lane		0.22	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2188	1151	13	3703	344	482
V/C Ratio(X)	0.10	0.10	1.03	0.44	0.88	0.00
Avail Cap(c_a), veh/h	2188	1151	87	3703	717	1006
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.72	0.72	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	49.1	0.0	39.3	0.0
Incr Delay (d2), s/veh	0.1	0.2	69.5	0.3	3.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.4	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.1	1.1	0.2	13.3	0.0
LnGrp Delay(d),s/veh	0.1	0.2	119.1	0.3	42.4	0.0
LnGrp LOS	A	A	F	A	D	
Approach Vol, veh/h	329			1647	304	
Approach Delay, s/veh	0.1			1.2	42.4	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	4.9	72.0				76.8		23.2
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	6.0	42.0				52.0		40.0
Max Q Clear Time (g_c+I1), s	2.9	2.0				2.0		18.5
Green Ext Time (p_c), s	0.0	13.5				14.1		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	6.5
HCM 2010 LOS	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	297	91	428	1226	287	55	103	104	89	376	234
Future Volume (veh/h)	84	297	91	428	1226	287	55	103	104	89	376	234
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		1.00
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	1683	1976	1863	1863	1976	1712	1674	1900	1727	1877	1900
Adj Flow Rate, veh/h	89	316	97	455	1304	305	59	110	0	95	400	0
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	15	15	2	2	2	11	9	9	10	2	2
Cap, veh/h	115	1147	332	478	2187	511	75	431	0	172	673	0
Arrive On Green	0.02	0.11	0.11	0.54	1.00	1.00	0.05	0.14	0.00	0.10	0.19	0.00
Sat Flow, veh/h	1810	3516	1018	1774	4094	957	1630	3264	0	1645	3660	0
Grp Volume(v), veh/h	89	273	140	455	1080	529	59	110	0	95	400	0
Grp Sat Flow(s),veh/h/ln	1810	1532	1470	1774	1695	1661	1630	1590	0	1645	1783	0
Q Serve(g_s), s	4.9	8.2	8.8	24.3	0.0	0.0	3.6	3.1	0.0	5.5	10.2	0.0
Cycle Q Clear(g_c), s	4.9	8.2	8.8	24.3	0.0	0.0	3.6	3.1	0.0	5.5	10.2	0.0
Prop In Lane	1.00		0.69	1.00		0.58	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	115	1000	480	478	1811	887	75	431	0	172	673	0
V/C Ratio(X)	0.78	0.27	0.29	0.95	0.60	0.60	0.79	0.25	0.00	0.55	0.59	0.00
Avail Cap(c_a), veh/h	181	1000	480	564	1811	887	147	731	0	197	906	0
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	0.37	0.37	0.37	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	48.2	33.7	34.0	22.5	0.0	0.0	47.2	38.7	0.0	42.5	37.1	0.0
Incr Delay (d2), s/veh	4.1	0.7	1.5	11.7	0.5	1.1	6.9	0.1	0.0	1.0	0.3	0.0
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(95%),veh/ln	4.7	6.4	6.8	16.8	0.2	0.5	3.2	2.5	0.0	4.6	8.8	0.0
LnGrp Delay(d),s/veh	52.4	34.4	35.5	34.1	0.5	1.1	54.1	38.8	0.0	43.6	37.4	0.0
LnGrp LOS	D	C	D	C	A	A	D	D		D	D	
Approach Vol, veh/h		502			2064			169			495	
Approach Delay, s/veh		37.9			8.1			44.1			38.6	
Approach LOS		D			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.1	36.8	8.6	23.5	10.3	57.6	14.5	17.6
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax), s	* 28	* 17	9.0	25.4	10.0	* 39	12.0	23.0
Max Q Clear Time (g_c+I1), s	26.3	10.8	5.6	12.2	6.9	2.0	7.5	5.1
Green Ext Time (p_c), s	0.6	4.4	0.1	1.3	0.0	13.0	0.1	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	19.3
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	267	77	142	1419	13	182	60	27	30	156	340
Future Volume (veh/h)	140	267	77	142	1419	13	182	60	27	30	156	340
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.95	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	1667	1652	1900	1776	1880	1900	1827	1613	1557	1545	1809	1863
Adj Flow Rate, veh/h	146	278	80	148	1478	14	126	152	28	31	306	258
Adj No. of Lanes	2	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	14	13	13	7	1	1	4	32	22	23	7	2
Cap, veh/h	202	805	227	296	1628	15	205	190	148	285	350	297
Arrive On Green	0.13	0.67	0.67	0.17	0.45	0.45	0.12	0.12	0.12	0.19	0.19	0.19
Sat Flow, veh/h	3079	2409	679	1691	3624	34	1740	1613	1262	1471	1809	1533
Grp Volume(v), veh/h	146	179	179	148	728	764	126	152	28	31	306	258
Grp Sat Flow(s),veh/h/ln	1540	1569	1518	1691	1786	1872	1740	1613	1262	1471	1809	1533
Q Serve(g_s), s	4.5	4.9	5.1	7.9	37.9	38.0	6.9	9.2	2.0	1.7	16.4	16.3
Cycle Q Clear(g_c), s	4.5	4.9	5.1	7.9	37.9	38.0	6.9	9.2	2.0	1.7	16.4	16.3
Prop In Lane	1.00		0.45	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	202	524	507	296	802	841	205	190	148	285	350	297
V/C Ratio(X)	0.72	0.34	0.35	0.50	0.91	0.91	0.62	0.80	0.19	0.11	0.87	0.87
Avail Cap(c_a), veh/h	216	524	507	296	802	841	240	223	174	315	387	328
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.5	11.9	11.9	37.3	25.6	25.6	42.0	43.0	39.8	33.2	39.1	39.1
Incr Delay (d2), s/veh	10.0	1.7	1.8	0.5	15.9	15.5	1.8	13.8	0.2	0.1	16.9	18.7
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(95%),veh/ln	3.9	4.2	4.2	6.7	29.9	31.0	6.2	8.4	1.3	1.3	14.9	13.2
LnGrp Delay(d),s/veh	52.6	13.6	13.7	37.8	41.5	41.1	43.7	56.8	40.0	33.3	56.0	57.8
LnGrp LOS	D	B	B	D	D	D	D	E	D	C	E	E
Approach Vol, veh/h		504			1640			306			595	
Approach Delay, s/veh		24.9			41.0			49.9			55.6	
Approach LOS		C			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	10.6	49.5		24.0	22.1	38.0		16.0
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	7.0	40.4		21.4	14.0	* 33		13.8
Max Q Clear Time (g_c+I1), s	6.5	40.0		18.4	9.9	7.1		11.2
Green Ext Time (p_c), s	0.0	0.4		0.7	3.1	1.3		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	42.1
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	289	48	511	1426	4	50	1	72	1	22	22
Future Volume (veh/h)	3	289	48	511	1426	4	50	1	72	1	22	22
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	0.98		0.96	0.99		0.98
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	1634	1900	1827	1863	1900	1900	1641	1900	1900	1900	1900
Adj Flow Rate, veh/h	3	307	51	544	1517	4	53	1	77	1	23	23
Adj No. of Lanes	1	2	0	1	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	18	18	4	2	2	0	0	0	0	0	0
Cap, veh/h	3	598	98	917	2736	7	102	12	91	38	103	100
Arrive On Green	0.00	0.22	0.22	0.53	0.76	0.76	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1810	2658	436	1740	3621	10	434	106	770	10	878	851
Grp Volume(v), veh/h	3	178	180	544	741	780	131	0	0	47	0	0
Grp Sat Flow(s),veh/h/ln	1810	1552	1541	1740	1770	1861	1310	0	0	1739	0	0
Q Serve(g_s), s	0.2	10.0	10.3	21.5	17.6	17.6	7.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	10.0	10.3	21.5	17.6	17.6	9.7	0.0	0.0	2.5	0.0	0.0
Prop In Lane	1.00		0.28	1.00		0.01	0.40		0.59	0.02		0.49
Lane Grp Cap(c), veh/h	3	349	347	917	1337	1406	205	0	0	241	0	0
V/C Ratio(X)	0.96	0.51	0.52	0.59	0.55	0.55	0.64	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	54	349	347	917	1337	1406	233	0	0	280	0	0
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.9	33.9	34.0	16.3	5.1	5.1	43.1	0.0	0.0	40.0	0.0	0.0
Incr Delay (d2), s/veh	131.6	5.2	5.5	0.7	1.7	1.6	3.0	0.0	0.0	0.1	0.0	0.0
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(95%),veh/ln	0.4	8.4	8.5	15.8	14.0	14.6	6.7	0.0	0.0	2.1	0.0	0.0
LnGrp Delay(d),s/veh	181.6	39.1	39.5	17.0	6.8	6.7	46.1	0.0	0.0	40.2	0.0	0.0
LnGrp LOS	F	D	D	B	A	A	D			D		
Approach Vol, veh/h		361			2065			131			47	
Approach Delay, s/veh		40.5			9.5			46.1			40.2	
Approach LOS		D			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.2	27.0		15.8	4.2	80.1		15.8
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	5.6	* 23		14.0	3.0	70.5		14.0
Max Q Clear Time (g_c+I2), s	23.5	12.3		4.5	2.2	19.6		11.7
Green Ext Time (p_c), s	9.7	0.9		0.4	0.0	10.9		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	16.2
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	56	300	1759	51	1	168
Future Vol, veh/h	56	300	1759	51	1	168
Conflicting Peds, #/hr	2	0	0	2	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	70	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	5	22	3	2	0	4
Mvmt Flow	63	337	1976	57	1	189

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	2036	0	-	0	2303	1021
Stage 1	-	-	-	-	2007	-
Stage 2	-	-	-	-	296	-
Critical Hdwy	4.2	-	-	-	6.8	6.98
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.25	-	-	-	3.5	3.34
Pot Cap-1 Maneuver	263	-	-	-	33	230
Stage 1	-	-	-	-	92	-
Stage 2	-	-	-	-	735	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	263	-	-	-	25	229
Mov Cap-2 Maneuver	-	-	-	-	77	-
Stage 1	-	-	-	-	92	-
Stage 2	-	-	-	-	558	-

Approach	EB	WB	SB
HCM Control Delay, s	3.6	0	67.2
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	263	-	-	-	229
HCM Lane V/C Ratio	0.239	-	-	-	0.824
HCM Control Delay (s)	22.9	-	-	-	67.2
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.9	-	-	-	6.3

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	64	115	3	519	687	8
Future Volume (veh/h)	64	115	3	519	687	8
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1583	1900	1810	1762	1900
Adj Flow Rate, veh/h	70	125	3	564	755	0
Adj No. of Lanes	1	1	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	20	5	5	7	0
Cap, veh/h	758	568	115	764	1042	501
Arrive On Green	0.42	0.42	0.42	0.42	0.31	0.00
Sat Flow, veh/h	1792	1344	2	1806	3357	1615
Grp Volume(v), veh/h	70	125	567	0	755	0
Grp Sat Flow(s),veh/h/ln	1792	1344	1809	0	1678	1615
Q Serve(g_s), s	0.7	1.9	0.0	0.0	6.4	0.0
Cycle Q Clear(g_c), s	0.7	1.9	8.4	0.0	6.4	0.0
Prop In Lane		1.00	0.01		1.00	1.00
Lane Grp Cap(c), veh/h	758	568	878	0	1042	501
V/C Ratio(X)	0.09	0.22	0.65	0.00	0.72	0.00
Avail Cap(c_a), veh/h	2250	1687	2380	0	2739	1318
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	5.5	5.9	7.7	0.0	9.8	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.3	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.7	1.3	7.5	0.0	5.4	0.0
LnGrp Delay(d),s/veh	5.5	5.9	8.0	0.0	10.1	0.0
LnGrp LOS	A	A	A		B	
Approach Vol, veh/h	195			567	755	
Approach Delay, s/veh	5.8			8.0	10.1	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		18.0		13.9		18.0		
Change Period (Y+Rc), s		4.5		4.0		4.5		
Max Green Setting (Gmax), s		40.0		26.0		40.0		
Max Q Clear Time (g_c+I1), s		3.9		8.4		10.4		
Green Ext Time (p_c), s		3.1		1.5		3.1		

Intersection Summary	
HCM 2010 Ctrl Delay	8.8
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	0	10	49	449	0	0
Future Vol, veh/h	0	10	49	449	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	4	2	2
Mvmt Flow	0	11	53	488	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	271	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.9	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.3	-	-
Pot Cap-1 Maneuver	0	733	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	733	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NE
HCM Control Delay, s	10	0
HCM LOS	B	

Minor Lane/Major Mvmt	NET	NER	WBLn1
Capacity (veh/h)	-	-	733
HCM Lane V/C Ratio	-	-	0.015
HCM Control Delay (s)	-	-	10
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	149	142	208	910	226	373	101	29	221	129	898	99
Future Volume (veh/h)	149	142	208	910	226	373	101	29	221	129	898	99
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1863	1739	1759	1845	1782	1863	1439	1775	1900	1863	1863	1810
Adj Flow Rate, veh/h	166	126	0	929	231	0	103	30	0	132	916	0
Adj No. of Lanes	2	1	1	2	1	1	1	2	0	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	12	8	3	14	2	32	0	0	2	2	5
Cap, veh/h	329	161	139	1039	527	468	122	227	0	651	1244	541
Arrive On Green	0.09	0.09	0.00	0.10	0.10	0.00	0.09	0.07	0.00	0.37	0.35	0.00
Sat Flow, veh/h	3548	1739	1495	3514	1782	1583	1371	3461	0	1774	3539	1538
Grp Volume(v), veh/h	166	126	0	929	231	0	103	30	0	132	916	0
Grp Sat Flow(s),veh/h/ln	1774	1739	1495	1757	1782	1583	1371	1686	0	1774	1770	1538
Q Serve(g_s), s	4.5	7.1	0.0	26.1	12.2	0.0	7.4	0.8	0.0	5.1	22.6	0.0
Cycle Q Clear(g_c), s	4.5	7.1	0.0	26.1	12.2	0.0	7.4	0.8	0.0	5.1	22.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	329	161	139	1039	527	468	122	227	0	651	1244	541
V/C Ratio(X)	0.50	0.78	0.00	0.89	0.44	0.00	0.85	0.13	0.00	0.20	0.74	0.00
Avail Cap(c_a), veh/h	355	174	150	1072	543	483	151	897	0	651	1244	541
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.31	0.31	0.00	1.00	1.00	0.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	43.2	44.4	0.0	43.6	37.3	0.0	44.9	43.9	0.0	21.6	28.4	0.0
Incr Delay (d2), s/veh	0.4	16.7	0.0	3.4	0.2	0.0	24.8	0.1	0.0	0.0	3.2	0.0
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(95%),veh/ln	4.0	7.5	0.0	16.5	8.3	0.0	6.6	0.7	0.0	4.5	16.7	0.0
LnGrp Delay(d),s/veh	43.6	61.1	0.0	46.9	37.5	0.0	69.7	44.0	0.0	21.7	31.6	0.0
LnGrp LOS	D	E		D	D		E	D		C	C	
Approach Vol, veh/h		292			1160			133			1048	
Approach Delay, s/veh		51.1			45.1			63.9			30.4	
Approach LOS		D			D			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.9	39.8		13.3	41.3	11.3		34.1
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	11.0	31.4		10.0	15.8	* 27		30.5
Max Q Clear Time (g_c+I1), s	9.4	24.6		9.1	7.1	2.8		28.1
Green Ext Time (p_c), s	0.0	3.7		0.1	4.5	0.1		1.4

Intersection Summary	
HCM 2010 Ctrl Delay	40.8
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	55	402	100	449	13	469	191	46	9	260	591
Future Volume (veh/h)	35	55	402	100	449	13	469	191	46	9	260	591
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		1.00	1.00		0.94
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	1508	1775	1845	1863	1792	1900	1845	1718	1900	1712	1863	1863
Adj Flow Rate, veh/h	37	0	462	105	473	14	494	201	0	9	274	622
Adj No. of Lanes	1	0	2	1	1	0	2	2	0	1	1	1
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, %	26	20	3	2	6	6	3	10	10	11	2	2
Cap, veh/h	55	0	553	243	484	14	734	703	0	481	550	437
Arrive On Green	0.01	0.00	0.06	0.14	0.28	0.28	0.22	0.22	0.00	0.29	0.29	0.29
Sat Flow, veh/h	1436	0	3046	1774	1730	51	3408	3351	0	1630	1863	1481
Grp Volume(v), veh/h	37	0	462	105	0	487	494	201	0	9	274	622
Grp Sat Flow(s),veh/h/ln	1436	0	1523	1774	0	1781	1704	1632	0	1630	1863	1481
Q Serve(g_s), s	2.6	0.0	15.0	5.4	0.0	27.1	13.3	5.1	0.0	0.4	12.2	29.5
Cycle Q Clear(g_c), s	2.6	0.0	15.0	5.4	0.0	27.1	13.3	5.1	0.0	0.4	12.2	29.5
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	55	0	553	243	0	499	734	703	0	481	550	437
V/C Ratio(X)	0.67	0.00	0.84	0.43	0.00	0.98	0.67	0.29	0.00	0.02	0.50	1.42
Avail Cap(c_a), veh/h	86	0	670	243	0	499	734	703	0	481	550	437
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.00	0.86	1.00	0.00	1.00	0.93	0.93	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.7	0.0	45.5	39.6	0.0	35.7	36.0	32.8	0.0	25.0	29.1	35.3
Incr Delay (d2), s/veh	4.4	0.0	6.3	0.5	0.0	34.0	4.5	0.9	0.0	0.0	0.3	203.8
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(95%),veh/ln	2.0	0.0	10.8	4.8	0.0	24.9	10.8	4.3	0.0	0.3	10.4	66.2
LnGrp Delay(d),s/veh	53.1	0.0	51.8	40.0	0.0	69.7	40.5	33.7	0.0	25.0	29.4	239.0
LnGrp LOS	D		D	D		E	D	C		C	C	F
Approach Vol, veh/h		499			592			695			905	
Approach Delay, s/veh		51.9			64.4			38.6			173.4	
Approach LOS		D			E			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.7	22.2		26.1	7.9	32.0		34.0
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	12.6	22.0		19.4	6.0	28.0		29.5
Max Q Clear Time (g_c+I1), s	7.4	17.0		15.3	4.6	29.1		31.5
Green Ext Time (p_c), s	1.0	1.0		1.0	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	92.1
HCM 2010 LOS	F

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	393	10	163	28	15	12	311	355	16	41	556	178
Future Volume (vph)	393	10	163	28	15	12	311	355	16	41	556	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.97	1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1618	1623	2733		1806	1570	1805	3388		1805	3539	1512
Flt Permitted	0.95	0.95	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1618	1623	2733		1806	1570	1805	3388		1805	3539	1512
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	409	10	170	29	16	12	324	370	17	43	579	185
RTOR Reduction (vph)	0	0	141	0	0	13	0	4	0	0	0	121
Lane Group Flow (vph)	209	210	29	0	45	0	324	383	0	43	579	64
Confl. Peds. (#/hr)				11		11				2		2
Confl. Bikes (#/hr)						1			4			12
Heavy Vehicles (%)	6%	9%	4%	3%	0%	0%	0%	6%	0%	0%	2%	3%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	12.8	12.8	12.8		2.4	2.4	17.0	39.2		3.6	25.8	25.8
Effective Green, g (s)	12.8	12.8	12.8		2.4	2.4	17.0	39.2		3.6	25.8	25.8
Actuated g/C Ratio	0.17	0.17	0.17		0.03	0.03	0.23	0.52		0.05	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	276	276	466		57	50	409	1770		86	1217	520
v/s Ratio Prot	0.13	c0.13			c0.02		c0.18	0.11		0.02	c0.16	
v/s Ratio Perm			0.01			0.00						0.04
v/c Ratio	0.76	0.76	0.06		0.79	0.01	0.79	0.22		0.50	0.48	0.12
Uniform Delay, d1	29.6	29.6	26.1		36.0	35.1	27.3	9.6		34.8	19.3	16.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.1	10.6	0.0		47.4	0.0	10.1	0.3		1.7	1.3	0.5
Delay (s)	39.7	40.2	26.1		83.4	35.2	37.4	9.9		36.5	20.6	17.3
Level of Service	D	D	C		F	D	D	A		D	C	B
Approach Delay (s)		36.0			72.6			22.4			20.7	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	3	18	1013	3	208	18	449	166	100	627	13
Future Volume (vph)	25	3	18	1013	3	208	18	449	166	100	627	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.87	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1818	1406	1665	1670	1546	1805	3471	1335	3242	3520	
Flt Permitted		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1818	1406	1665	1670	1546	1805	3471	1335	3242	3520	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	3	19	1066	3	219	19	473	175	105	660	14
RTOR Reduction (vph)	0	0	18	0	0	120	0	0	142	0	1	0
Lane Group Flow (vph)	0	29	1	533	536	99	19	473	33	105	673	0
Confl. Peds. (#/hr)	12		12	12		12	14		14	14		14
Confl. Bikes (#/hr)									4			13
Heavy Vehicles (%)	0%	0%	0%	3%	0%	2%	0%	4%	16%	8%	2%	8%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		3.0	3.0	37.9	37.9	37.9	2.1	18.6	18.6	24.5	41.0	
Effective Green, g (s)		3.0	3.0	37.9	37.9	37.9	2.1	18.6	18.6	24.5	41.0	
Actuated g/C Ratio		0.03	0.03	0.38	0.38	0.38	0.02	0.19	0.19	0.24	0.41	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		54	42	631	632	585	37	645	248	794	1443	
v/s Ratio Prot		c0.02		0.32	c0.32		0.01	c0.14		0.03	c0.19	
v/s Ratio Perm			0.00			0.06			0.02			
v/c Ratio		0.54	0.01	0.84	0.85	0.17	0.51	0.73	0.13	0.13	0.47	
Uniform Delay, d1		47.8	47.1	28.4	28.4	20.6	48.4	38.4	34.0	29.5	21.5	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		5.1	0.0	9.7	9.9	0.0	4.9	3.7	0.1	0.3	1.1	
Delay (s)		52.9	47.1	38.1	38.3	20.6	53.4	42.1	34.0	29.8	22.6	
Level of Service		D	D	D	D	C	D	D	C	C	C	
Approach Delay (s)		50.6			35.2			40.3			23.6	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

6. Traffic Signal Warrants
Caltrans Peak Hour Warrant 3
Existing plus Project

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: JGA
Date: 9/27/2018
Intersection: Grand Avenue and Allerton Avenue
Scenario: Existing + Phase 1 AM

Input Assumptions	
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

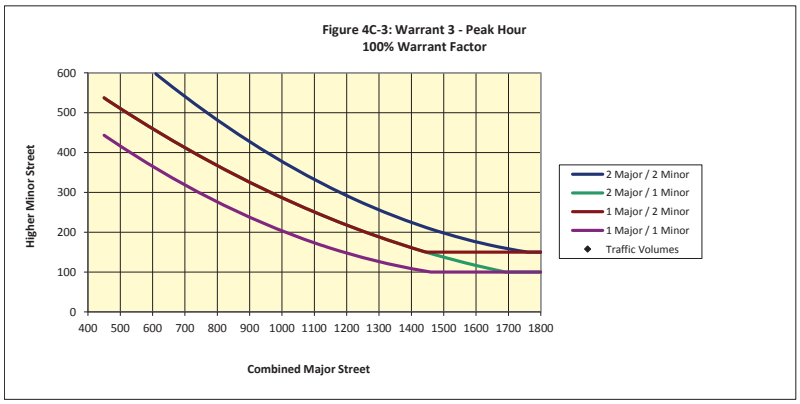
Analysis Volumes	
Major Street	
EB	2038
WB	355
Minor Street	
NB	0
SB	80

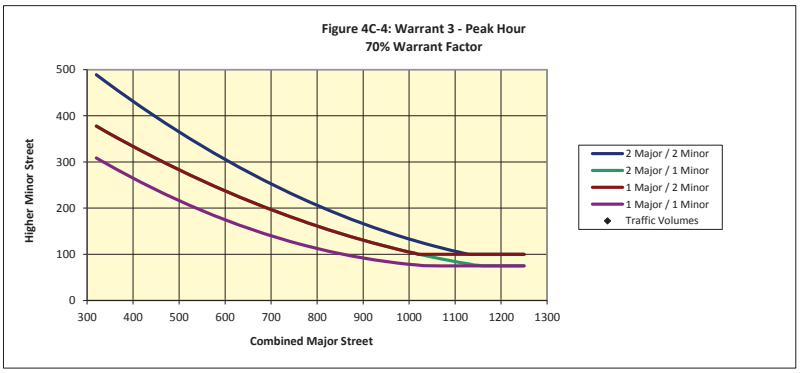
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		NB	SB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	10.2
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.23
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	80
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	2473	
	Number of Approaches to Intersection	3	
	Satisfied	**Yes**	

PART B **SATISFIED** No





File: C:\Users\maronson\Projects\2017\21673 South SF 201 Haskins\Analysis\04 - Signal Warrant\[21673_Signal Warrant_Exist+Ph1 AM_Grand at Allerton.xlsm]SummaryPeak

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: JGA
Date: 5/15/2018
Intersection: Grand Avenue and Allerton Avenue
Scenario: Existing + Phase 1 PM

Input Assumptions	
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

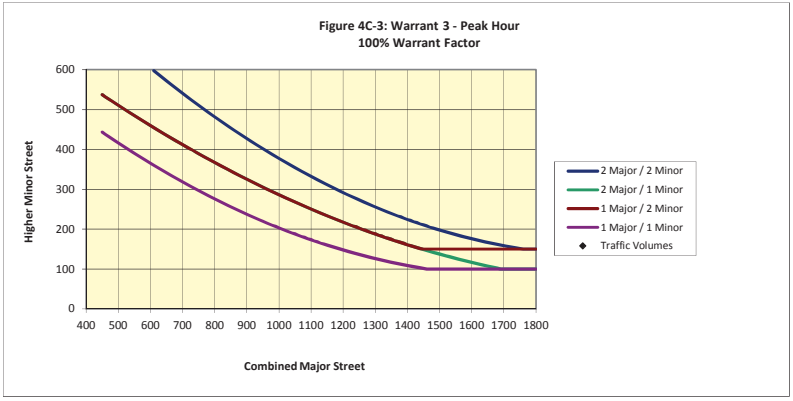
Analysis Volumes	
Major Street	
EB	320
WB	1600
Minor Street	
NB	0
SB	169

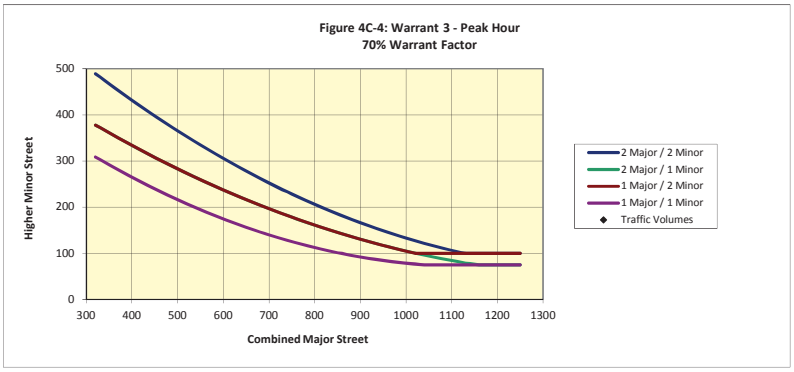
WARRANT 3 - Peak Hour **SATISFIED** Yes*

PART A **SATISFIED** Yes

		NB	SB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	1297.5
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	60.91
	Satisfied	**No**	**Yes**
2	Volume on Minor Street Approach During Same Hour	0	169
	Satisfied	**No**	**Yes**
3	Total Entering Volume On All Approaches During Same Hour	2089	
	Number of Approaches to Intersection	3	
	Satisfied	**Yes**	

PART B **SATISFIED** Yes





File: K:\H_Projects\21\21673 - SSF 201 Haskins Way Rezoning Initial Study\analysis\05 - Signal Warrant\[21673_Signal Warrant_PM_Grand at Allerton.xlsm]Data Input

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: Existing+Phase 1 AM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

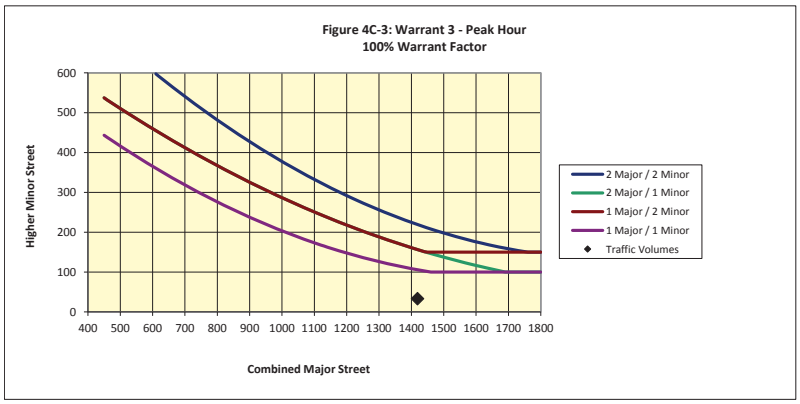
Analysis Volumes	
Major Street	
NB	1419
SB	0
Minor Street	
EB	0
WB	33

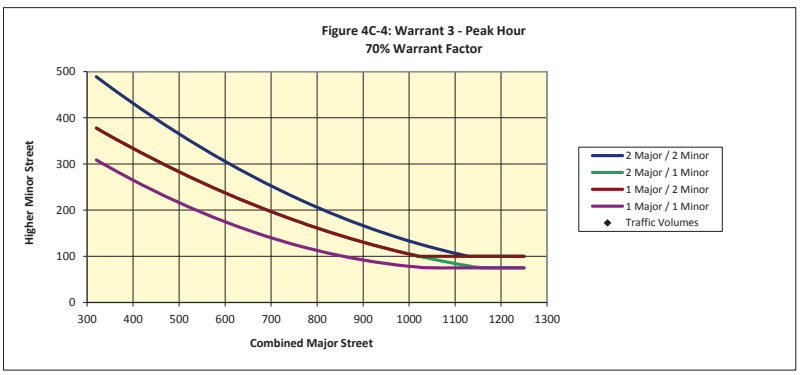
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	16.6
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.15
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	33
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	1452	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





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MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: Existing+Phase 1 PM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

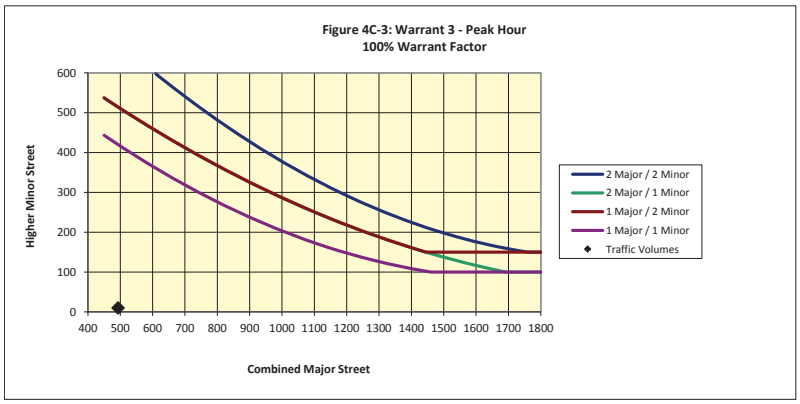
Analysis Volumes	
Major Street	
NB	493
SB	0
Minor Street	
EB	0
WB	10

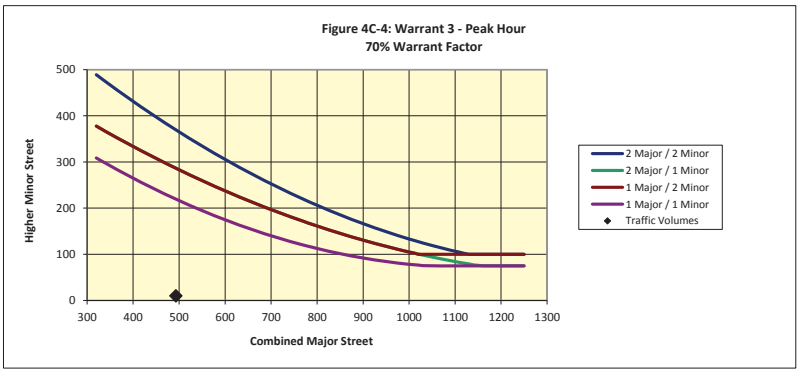
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	10.0
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.03
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	10
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	503	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





File: C:\Users\maronson\Projects\2017\21673 South SF 201 Haskins\Analysis\04 - Signal Warrant\[21673_Signal Warrant_Exist+Ph1 PM_US101_EGrand.xlsm]SummaryPeak

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: JGA
Date: 9/27/2018
Intersection: Grand Avenue and Allerton Avenue
Scenario: Existing + Phase 1+2 AM

Input Assumptions	
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

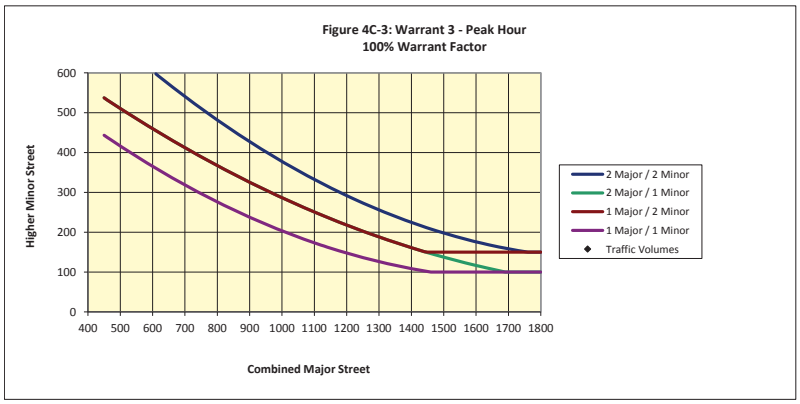
Analysis Volumes	
Major Street	
EB	2202
WB	366
Minor Street	
NB	0
SB	80

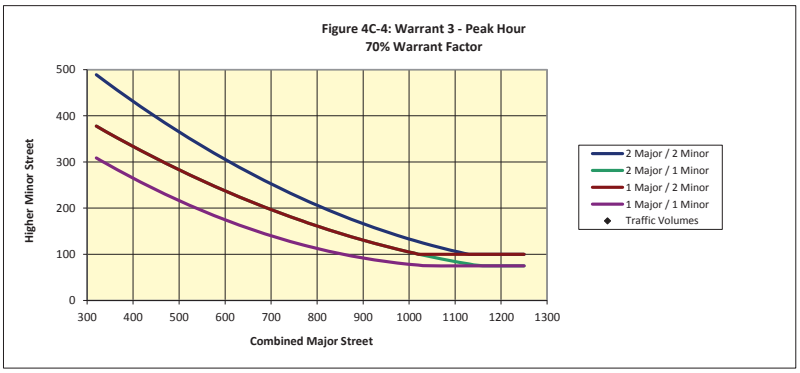
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		NB	SB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	10.3
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.23
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	80
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	2648	
	Number of Approaches to Intersection	3	
	Satisfied	**Yes**	

PART B **SATISFIED** No





File: C:\Users\maronson\Projects\2017\21673 South SF 201 Haskins\Analysis\04 - Signal Warrant\[21673_Signal Warrant_Exist+Ph1+2 AM_Grand at Allerton.xlsm]SummaryPeak

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: Existing+Phase 1+2 AM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

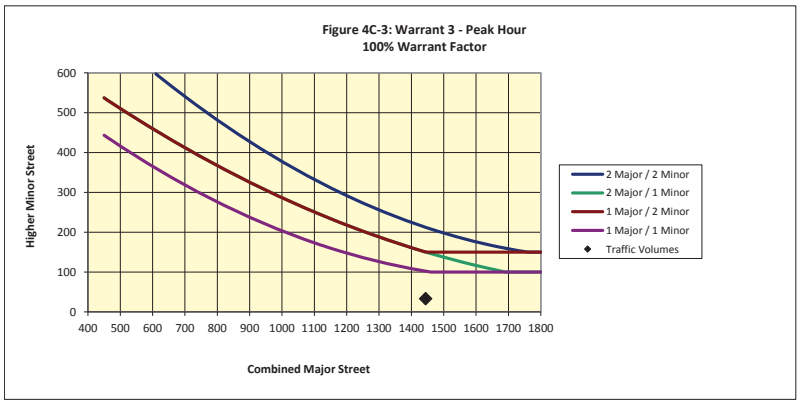
Analysis Volumes	
Major Street	
NB	1444
SB	0
Minor Street	
EB	0
WB	33

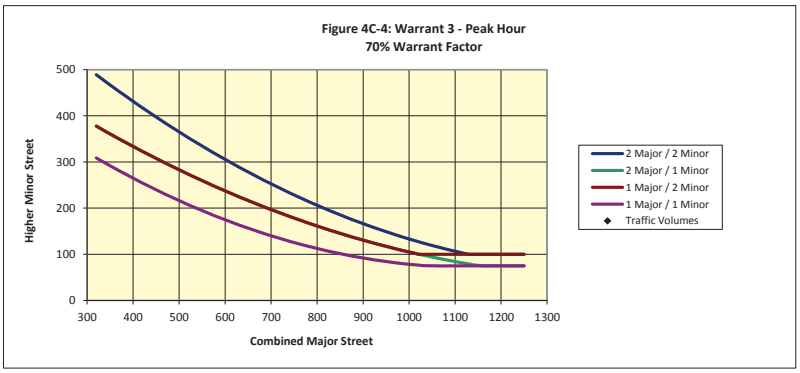
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	16.8
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.15
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	33
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	1477	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





File: C:\Users\maronson\Projects\2017\21673 South SF 201 Haskins\Analysis\04 - Signal Warrant\[21673_Signal Warrant_Exist+Ph1+2 AM_US101_EGrand.xlsm]SummaryPeak

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: Existing+Phase 1+2 PM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

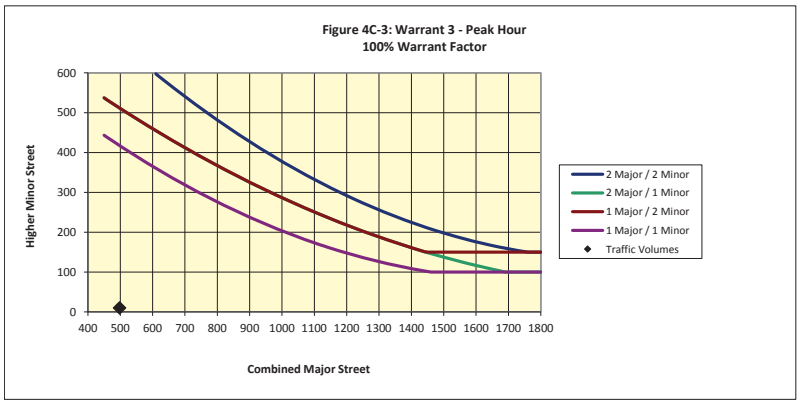
Analysis Volumes	
Major Street	
NB	498
SB	0
Minor Street	
EB	0
WB	10

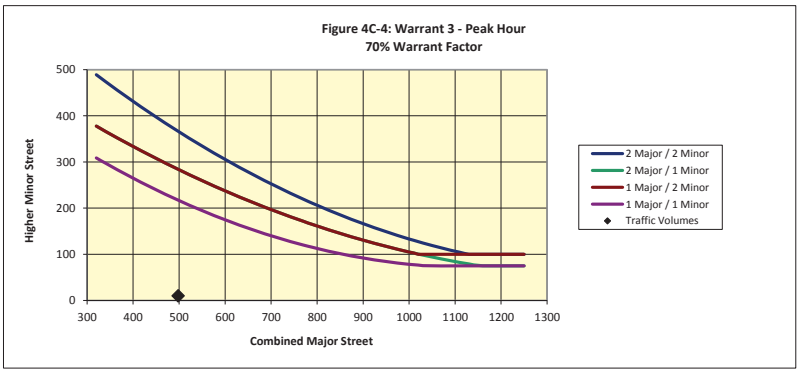
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	10.0
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.03
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	10
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	508	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





File: C:\Users\maronson\Projects\2017\21673 South SF 201 Haskins\Analysis\04 - Signal Warrant\[21673_Signal Warrant_Exist+Ph1+2 PM_US101_EGrand.xlsm]SummaryPeak

7. Freeway Level of Service Calculations
Highway Capacity Software (HCS)
Existing plus Project

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8037*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2191*	pc/h/ln
S	*56.1*	mph
D = v_p / S	*39.0*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7743*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2111*	pc/h/ln
S	*57.8*	mph
D = v_p / S	*36.5*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*11026*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2004*	pc/h/ln
S	*59.8*	mph
D = v_p / S	*33.5*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7572*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1376*	pc/h/ln
S	*65.0*	mph
D = v_p / S	*21.2*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7746*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2112*	pc/h/ln
S	*57.8*	mph
D = v_p / S	*36.5*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6870*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1873*	pc/h/ln
S	*61.8*	mph
D = v_p / S	*30.3*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7945*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1733*	pc/h/ln
S	*63.4*	mph
D = v_p / S	*27.3*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8747*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1908*	pc/h/ln
S	*61.3*	mph
D = v_p / S	*31.1*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8043*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2193*	pc/h/ln
S	*56.1*	mph
D = v_p / S	*39.1*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7803*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2127*	pc/h/ln
S	*57.5*	mph
D = v_p / S	*37.0*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*11081*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2014*	pc/h/ln
S	*59.7*	mph
D = v_p / S	*33.8*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7581*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1378*	pc/h/ln
S	*65.0*	mph
D = v_p / S	*21.2*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7786*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2123*	pc/h/ln
S	*57.6*	mph
D = v_p / S	*36.9*	pc/mi/ln
LOS	*E*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*6878*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1875*	pc/h/ln
S	*61.8*	mph
D = v_p / S	*30.3*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*7949*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1734*	pc/h/ln
S	*63.4*	mph
D = v_p / S	*27.3*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Existing Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8803*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1920*	pc/h/ln
S	*61.2*	mph
D = v_p / S	*31.4*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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8. Intersection Level of Service Calculations
Synchro Software
2040 Cumulative without Project

Movement	EBT	EBR	WBL2	WBT	WBR	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations											
Traffic Volume (vph)	1996	784	43	772	10	507	11	147	90	1727	567
Future Volume (vph)	1996	784	43	772	10	507	11	147	90	1727	567
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5		4.0	4.0	4.0	4.5	4.5	4.5
Lane Util. Factor	0.86		1.00	0.91		0.91	0.91	1.00	1.00	*1.00	1.00
Frpb, ped/bikes	0.99		1.00	1.00		1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00		1.00	1.00	0.85	0.86	1.00	0.85
Flt Protected	1.00		0.95	1.00		0.95	0.96	1.00	1.00	1.00	1.00
Satd. Flow (prot)	6087		1641	4395		2857	1448	1415	1644	3762	1553
Flt Permitted	1.00		0.95	1.00		0.95	0.96	1.00	1.00	1.00	1.00
Satd. Flow (perm)	6087		1641	4395		2857	1448	1415	1644	3762	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	2037	800	44	788	10	517	11	150	92	1762	579
RTOR Reduction (vph)	0	0	0	1	0	0	0	89	24	0	0
Lane Group Flow (vph)	2837	0	44	797	0	352	176	61	68	1762	579
Confl. Peds. (#/hr)								4			
Confl. Bikes (#/hr)		11			2			4			6
Heavy Vehicles (%)	2%	3%	10%	18%	0%	15%	0%	11%	0%	1%	4%
Turn Type	NA		Prot	NA		Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3		4	4			3	3
Permitted Phases								4	3 6		
Actuated Green, G (s)	39.3		3.2	90.5		11.0	11.0	11.0	78.8	39.5	39.5
Effective Green, g (s)	39.3		3.2	90.5		11.0	11.0	11.0	78.8	39.5	39.5
Actuated g/C Ratio	0.36		0.03	0.82		0.10	0.10	0.10	0.72	0.36	0.36
Clearance Time (s)	4.5		4.0			4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0			2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	2174		47	3615		285	144	141	1177	1350	557
v/s Ratio Prot	c0.47		c0.03	0.18		c0.12	0.12			c0.47	0.37
v/s Ratio Perm								0.04	0.04		
v/c Ratio	1.38dr		0.94	0.22		1.24	1.22	0.43	0.06	1.31	1.04
Uniform Delay, d1	35.4		53.3	2.1		49.5	49.5	46.6	4.6	35.2	35.2
Progression Factor	0.93		1.39	1.06		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	137.6		103.2	0.0		132.3	146.8	0.8	0.0	142.8	48.8
Delay (s)	170.4		177.4	2.2		181.8	196.3	47.3	4.6	178.1	84.0
Level of Service	F		F	A		F	F	D	A	F	F
Approach Delay (s)	170.4			11.4			155.8				
Approach LOS	F			B			F				

Intersection Summary			
HCM 2000 Control Delay	141.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	123.8%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	360	161	286	145	68	54	425	464	1326	480	102
Future Volume (vph)	157	360	161	286	145	68	54	425	464	1326	480	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5	4.0	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1577	1577		2694	1660	1315	1624	2875	1387	3090	3065	1367
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1577	1577		2694	1660	1315	1624	2875	1387	3090	3065	1367
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	160	367	164	292	148	69	55	434	473	1353	490	104
RTOR Reduction (vph)	0	14	0	0	0	62	0	0	0	0	0	63
Lane Group Flow (vph)	160	517	0	292	148	7	55	434	473	1353	490	41
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA	Free	Split	NA	Perm
Protected Phases	8	8		7	7		6	6		2	2	
Permitted Phases						7			Free			2
Actuated Green, G (s)	23.0	23.0		11.0	11.0	11.0	15.5	15.5	110.0	43.5	43.5	43.5
Effective Green, g (s)	23.0	23.0		11.0	11.0	11.0	15.5	15.5	110.0	43.5	43.5	43.5
Actuated g/C Ratio	0.21	0.21		0.10	0.10	0.10	0.14	0.14	1.00	0.40	0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	329	329		269	166	131	228	405	1387	1221	1212	540
v/s Ratio Prot	0.10	c0.33		c0.11	0.09		0.03	c0.15		c0.44	0.16	
v/s Ratio Perm						0.01			0.34			0.03
v/c Ratio	0.49	1.57		1.09	0.89	0.05	0.24	1.07	0.34	1.11	0.40	0.08
Uniform Delay, d1	38.3	43.5		49.5	48.9	44.8	42.0	47.2	0.0	33.2	23.9	20.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	271.1		79.6	40.3	0.2	0.4	65.1	0.7	60.7	1.0	0.3
Delay (s)	39.1	314.6		129.1	89.2	45.0	42.4	112.4	0.7	94.0	24.9	21.0
Level of Service	D	F		F	F	D	D	F	A	F	C	C
Approach Delay (s)		250.8			106.1			53.5			72.7	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	102.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	102	2048	787	33	26	50
Future Volume (veh/h)	102	2048	787	33	26	50
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1634	1900	1900	1900
Adj Flow Rate, veh/h	104	2090	803	34	27	51
Adj No. of Lanes	1	3	3	0	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	17	17	0	0
Cap, veh/h	1111	4486	961	41	82	73
Arrive On Green	0.21	0.29	0.44	0.44	0.05	0.05
Sat Flow, veh/h	1774	5253	4527	185	1810	1615
Grp Volume(v), veh/h	104	2090	544	293	27	51
Grp Sat Flow(s),veh/h/ln	1774	1695	1487	1591	1810	1615
Q Serve(g_s), s	5.2	37.1	17.8	18.0	1.6	3.4
Cycle Q Clear(g_c), s	5.2	37.1	17.8	18.0	1.6	3.4
Prop In Lane	1.00			0.12	1.00	1.00
Lane Grp Cap(c), veh/h	1111	4486	652	349	82	73
V/C Ratio(X)	0.09	0.47	0.83	0.84	0.33	0.70
Avail Cap(c_a), veh/h	1111	4486	1811	969	197	176
HCM Platoon Ratio	0.33	0.33	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.97	0.97	1.00	1.00
Uniform Delay (d), s/veh	18.4	17.7	29.1	29.1	50.9	51.8
Incr Delay (d2), s/veh	0.0	0.3	11.7	20.3	0.9	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.6	24.5	13.0	14.8	1.5	2.9
LnGrp Delay(d),s/veh	18.4	18.1	40.8	49.5	51.8	56.3
LnGrp LOS	B	B	D	D	D	E
Approach Vol, veh/h		2194	837		78	
Approach Delay, s/veh		18.1	43.8		54.7	
Approach LOS		B	D		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		101.0			72.9	28.1		9.0
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0
Max Green Setting (Gmax), s		90.0			19.0	67.0		12.0
Max Q Clear Time (g_c+I1), s		39.1			7.2	20.0		5.4
Green Ext Time (p_c), s		18.4			8.3	4.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.9
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1944	130	11	670	150	671
Future Volume (veh/h)	1944	130	11	670	150	671
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.96	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1865	1900	1727	1570	1810	1810
Adj Flow Rate, veh/h	2090	140	12	720	161	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	10	21	5	5
Cap, veh/h	2105	140	569	3495	193	303
Arrive On Green	0.87	0.87	0.69	1.00	0.11	0.00
Sat Flow, veh/h	5031	323	1645	4428	1723	2707
Grp Volume(v), veh/h	1454	776	12	720	161	0
Grp Sat Flow(s),veh/h/ln	1697	1792	1645	1429	1723	1354
Q Serve(g_s), s	44.2	47.6	0.3	0.0	10.1	0.0
Cycle Q Clear(g_c), s	44.2	47.6	0.3	0.0	10.1	0.0
Prop In Lane		0.18	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1469	776	569	3495	193	303
V/C Ratio(X)	0.99	1.00	0.02	0.21	0.83	0.00
Avail Cap(c_a), veh/h	1821	961	569	3495	580	911
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.93	0.93	1.00	0.00
Uniform Delay (d), s/veh	7.2	7.4	11.1	0.0	47.8	0.0
Incr Delay (d2), s/veh	19.8	30.6	0.0	0.1	3.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	29.5	49.1	0.2	0.1	8.6	0.0
LnGrp Delay(d),s/veh	27.0	38.0	11.1	0.1	51.5	0.0
LnGrp LOS	C	F	B	A	D	
Approach Vol, veh/h	2230			732	161	
Approach Delay, s/veh	30.8			0.3	51.5	
Approach LOS	C			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	37.6	56.1				93.7		16.3
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	2.6	59.0				65.0		37.0
Max Q Clear Time (g_c+I1), s	12.3	49.6				2.0		12.1
Green Ext Time (p_c), s	0.0	6.9				4.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	24.7
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	2200	255	350	461	101	105	159	740	249	251	115
Future Volume (veh/h)	160	2200	255	350	461	101	105	159	740	249	251	115
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
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	1810	1810	1882	1545	1540	1976	1583	1776	1792	1810	1810	1900
Adj Flow Rate, veh/h	163	2245	158	357	470	77	107	162	0	254	256	0
Adj No. of Lanes	1	3	1	2	3	0	1	1	1	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	5	5	5	23	25	25	20	7	6	5	5	0
Cap, veh/h	189	2553	808	280	1848	296	160	225	193	188	428	201
Arrive On Green	0.22	1.00	1.00	0.20	1.00	1.00	0.11	0.13	0.00	0.11	0.12	0.00
Sat Flow, veh/h	1723	4940	1563	2854	3644	584	1508	1776	1524	1723	3438	1615
Grp Volume(v), veh/h	163	2245	158	357	359	188	107	162	0	254	256	0
Grp Sat Flow(s),veh/h/ln	1723	1647	1563	1427	1401	1426	1508	1776	1524	1723	1719	1615
Q Serve(g_s), s	10.0	0.0	0.0	10.8	0.0	0.0	7.5	9.6	0.0	12.0	7.7	0.0
Cycle Q Clear(g_c), s	10.0	0.0	0.0	10.8	0.0	0.0	7.5	9.6	0.0	12.0	7.7	0.0
Prop In Lane	1.00		1.00	1.00		0.41	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	189	2553	808	280	1421	723	160	225	193	188	428	201
V/C Ratio(X)	0.86	0.88	0.20	1.27	0.25	0.26	0.67	0.72	0.00	1.35	0.60	0.00
Avail Cap(c_a), veh/h	282	2553	808	280	1421	723	165	468	402	188	888	417
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.56	0.56	0.56	0.89	0.89	0.89	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.1	0.0	0.0	44.2	0.0	0.0	47.3	46.2	0.0	49.0	45.6	0.0
Incr Delay (d2), s/veh	6.7	2.8	0.3	145.8	0.4	0.8	7.7	1.6	0.0	188.8	0.5	0.0
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(95%),veh/ln	7.8	1.2	0.1	17.8	0.1	0.3	6.2	8.4	0.0	28.0	6.7	0.0
LnGrp Delay(d),s/veh	48.8	2.8	0.3	190.0	0.4	0.8	55.0	47.8	0.0	237.8	46.1	0.0
LnGrp LOS	D	A	A	F	A	A	E	D		F	D	
Approach Vol, veh/h		2566			904			269			510	
Approach Delay, s/veh		5.5			75.4			50.7			141.6	
Approach LOS		A			E			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	61.1	15.7	18.3	16.1	60.0	16.0	17.9
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax), s	* 11	* 42	12.0	28.4	18.0	* 35	12.0	29.0
Max Q Clear Time (g_c+I1), s	12.0	2.0	9.5	9.7	12.0	2.0	14.0	11.6
Green Ext Time (p_c), s	0.0	24.9	0.2	0.9	0.2	22.0	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	39.6
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	408	2600	170	34	518	19	145	416	181	210	75	249
Future Volume (veh/h)	408	2600	170	34	518	19	145	416	181	210	75	249
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	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	1845	1845	1681	1338	1551	1900	1429	1776	1792	1610	1532	1652
Adj Flow Rate, veh/h	421	2680	123	35	534	20	149	429	89	216	300	61
Adj No. of Lanes	2	3	1	2	3	0	1	2	1	1	1	2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97
Percent Heavy Veh, %	3	3	13	42	23	23	33	7	6	18	24	15
Cap, veh/h	496	2472	688	490	2300	86	168	417	184	321	320	502
Arrive On Green	0.19	0.65	0.65	0.20	0.55	0.55	0.12	0.12	0.12	0.21	0.21	0.21
Sat Flow, veh/h	3408	5036	1401	2472	4189	156	1361	3374	1490	1533	1532	2402
Grp Volume(v), veh/h	421	2680	123	35	359	195	149	429	89	216	300	61
Grp Sat Flow(s),veh/h/ln	1704	1679	1401	1236	1411	1523	1361	1687	1490	1533	1532	1201
Q Serve(g_s), s	13.1	54.0	3.8	1.3	7.2	7.3	11.9	13.6	6.1	14.3	21.2	2.3
Cycle Q Clear(g_c), s	13.1	54.0	3.8	1.3	7.2	7.3	11.9	13.6	6.1	14.3	21.2	2.3
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	496	2472	688	490	1550	836	168	417	184	321	320	502
V/C Ratio(X)	0.85	1.08	0.18	0.07	0.23	0.23	0.89	1.03	0.48	0.67	0.94	0.12
Avail Cap(c_a), veh/h	620	2472	688	490	1550	836	168	417	184	321	320	502
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.2	19.1	10.4	35.9	12.8	12.8	47.4	48.2	44.9	40.0	42.8	35.3
Incr Delay (d2), s/veh	0.9	38.7	0.1	0.0	0.3	0.7	37.8	51.5	0.7	4.5	33.6	0.0
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(95%),veh/ln	7.5	58.7	2.0	0.8	5.2	5.7	10.3	16.7	4.6	10.6	17.6	1.4
LnGrp Delay(d),s/veh	44.1	57.7	10.4	35.9	13.2	13.5	85.2	99.7	45.7	44.5	76.4	35.3
LnGrp LOS	D	F	B	D	B	B	F	F	D	D	E	D
Approach Vol, veh/h		3224			589			667			577	
Approach Delay, s/veh		54.2			14.6			89.3			60.1	
Approach LOS		D			B			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.0	65.6		27.6	27.0	58.6		17.8
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	20.0	36.0		23.0	2.0	* 54		13.6
Max Q Clear Time (g_c+I1), s	15.1	9.3		23.2	3.3	56.0		15.6
Green Ext Time (p_c), s	0.9	3.8		0.0	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	54.9
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	2020	53	89	357	7	46	25	737	6	6	6
Future Volume (veh/h)	16	2020	53	89	357	7	46	25	737	6	6	6
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		0.99	1.00		0.99
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	1776	1810	1900	1407	1526	1900	1900	1849	1863	1900	1900	1900
Adj Flow Rate, veh/h	17	2126	55	94	376	6	0	0	636	6	6	2
Adj No. of Lanes	1	2	0	1	2	0	0	1	2	0	1	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, %	7	5	5	35	25	25	0	0	2	0	0	0
Cap, veh/h	19	2139	55	288	2434	39	0	370	625	139	130	36
Arrive On Green	0.01	0.63	0.63	0.22	0.83	0.83	0.00	0.00	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1691	3423	88	1340	2920	47	0	1849	3127	438	648	181
Grp Volume(v), veh/h	17	1063	1118	94	186	196	0	0	636	14	0	0
Grp Sat Flow(s),veh/h/ln	1691	1719	1791	1340	1449	1517	0	1849	1564	1267	0	0
Q Serve(g_s), s	1.0	60.7	62.3	5.9	2.5	2.5	0.0	0.0	20.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.0	60.7	62.3	5.9	2.5	2.5	0.0	0.0	20.0	0.6	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.03	0.00		1.00	0.43		0.14
Lane Grp Cap(c), veh/h	19	1075	1120	288	1208	1265	0	370	625	305	0	0
V/C Ratio(X)	0.89	0.99	1.00	0.33	0.15	0.15	0.00	0.00	1.02	0.05	0.00	0.00
Avail Cap(c_a), veh/h	51	1075	1120	288	1208	1265	0	370	625	305	0	0
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	1.00	1.00	0.89	0.89	0.89	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.4	18.4	18.7	33.1	1.6	1.6	0.0	0.0	40.0	32.2	0.0	0.0
Incr Delay (d2), s/veh	35.4	24.9	26.6	0.2	0.2	0.2	0.0	0.0	40.3	0.0	0.0	0.0
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(95%),veh/ln	1.2	45.6	48.9	4.0	1.9	2.0	0.0	0.0	21.8	0.6	0.0	0.0
LnGrp Delay(d),s/veh	84.8	43.3	45.4	33.3	1.8	1.8	0.0	0.0	80.3	32.3	0.0	0.0
LnGrp LOS	F	D	D	C	A	A			F	C		
Approach Vol, veh/h		2198			476			636			14	
Approach Delay, s/veh		44.7			8.0			80.3			32.3	
Approach LOS		D			A			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	26.5	67.0		24.0	5.1	88.4		24.0
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	5.6	* 63		20.0	3.0	64.5		20.0
Max Q Clear Time (g_c+I1), s	7.9	64.3		2.6	3.0	4.5		22.0
Green Ext Time (p_c), s	0.0	0.0		1.6	0.0	1.7		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	46.2
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	555	2179	0	0	367	18	5	0	8	7	0	81
Future Volume (veh/h)	555	2179	0	0	367	18	5	0	8	7	0	81
Number	7	4	14	3	8	18	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		1.00	1.00		1.00	1.00		1.00	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	1845	1827	1900	0	1484	1900	1900	1863	1900	1900	1597	1900
Adj Flow Rate, veh/h	584	2294	0	0	386	16	5	0	9	7	0	6
Adj No. of Lanes	1	2	0	0	2	0	0	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.95	0.92	0.95
Percent Heavy Veh, %	3	4	4	0	28	28	2	2	2	0	2	2
Cap, veh/h	623	2478	0	0	876	36	32	0	58	193	0	141
Arrive On Green	0.35	0.71	0.00	0.00	0.32	0.32	0.05	0.00	0.05	0.11	0.00	0.11
Sat Flow, veh/h	1757	3563	0	0	2833	114	588	0	1058	1810	0	1321
Grp Volume(v), veh/h	584	2294	0	0	197	205	14	0	0	7	0	6
Grp Sat Flow(s),veh/h/ln	1757	1736	0	0	1410	1463	1647	0	0	1810	0	1321
Q Serve(g_s), s	34.7	60.2	0.0	0.0	12.0	12.0	0.9	0.0	0.0	0.4	0.0	0.4
Cycle Q Clear(g_c), s	34.7	60.2	0.0	0.0	12.0	12.0	0.9	0.0	0.0	0.4	0.0	0.4
Prop In Lane	1.00		0.00	0.00		0.08	0.36		0.64	1.00		1.00
Lane Grp Cap(c), veh/h	623	2478	0	0	447	465	90	0	0	193	0	141
V/C Ratio(X)	0.94	0.93	0.00	0.00	0.44	0.44	0.16	0.00	0.00	0.04	0.00	0.04
Avail Cap(c_a), veh/h	773	2555	0	0	447	465	90	0	0	193	0	141
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)	0.09	0.09	0.00	0.00	0.87	0.87	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.7	13.0	0.0	0.0	29.2	29.3	48.7	0.0	0.0	43.3	0.0	43.3
Incr Delay (d2), s/veh	2.2	0.7	0.0	0.0	0.6	0.6	3.6	0.0	0.0	0.4	0.0	0.6
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(95%),veh/ln	9.1	31.2	0.0	0.0	8.0	8.3	0.9	0.0	0.0	0.4	0.0	0.3
LnGrp Delay(d),s/veh	35.9	13.7	0.0	0.0	29.8	29.8	52.3	0.0	0.0	43.6	0.0	43.9
LnGrp LOS	D	B			C	C	D			D		D
Approach Vol, veh/h		2878			402			14			13	
Approach Delay, s/veh		18.2			29.8			52.3			43.7	
Approach LOS		B			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6	7	8
Phs Duration (G+Y+Rc), s		10.4		81.6		16.0	42.8	38.8
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		4.0		79.5		11.5	47.5	27.5
Max Q Clear Time (g_c+I1), s		2.9		62.2		2.4	36.7	14.0
Green Ext Time (p_c), s		0.0		14.9		0.0	1.6	12.6

Intersection Summary		
HCM 2010 Ctrl Delay		19.9
HCM 2010 LOS		B



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	1039	300	6	120	154	14
Future Volume (veh/h)	1039	300	6	120	154	14
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	1267	366	7	146	204	0
Adj No. of Lanes	1	1	0	1	2	1
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	0
Cap, veh/h	1416	1203	80	1213	345	157
Arrive On Green	0.76	0.76	0.76	0.76	0.10	0.00
Sat Flow, veh/h	1863	1583	23	1595	3548	1615
Grp Volume(v), veh/h	1267	366	153	0	204	0
Grp Sat Flow(s),veh/h/ln	1863	1583	1618	0	1774	1615
Q Serve(g_s), s	30.4	4.3	0.4	0.0	3.3	0.0
Cycle Q Clear(g_c), s	30.4	4.3	30.8	0.0	3.3	0.0
Prop In Lane		1.00	0.05		1.00	1.00
Lane Grp Cap(c), veh/h	1416	1203	1293	0	345	157
V/C Ratio(X)	0.89	0.30	0.12	0.00	0.59	0.00
Avail Cap(c_a), veh/h	1986	1688	1756	0	1072	488
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	5.4	2.2	2.0	0.0	25.7	0.0
Incr Delay (d2), s/veh	3.4	0.1	0.0	0.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	22.7	3.3	1.2	0.0	3.0	0.0
LnGrp Delay(d),s/veh	8.7	2.3	2.0	0.0	26.3	0.0
LnGrp LOS	A	A	A		C	
Approach Vol, veh/h	1633			153	204	
Approach Delay, s/veh	7.3			2.0	26.3	
Approach LOS	A			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		49.8		9.8		49.8		
Change Period (Y+Rc), s		4.5		4.0		4.5		
Max Green Setting (Gmax), s		63.5		18.0		63.5		
Max Q Clear Time (g_c+I1), s		32.4		5.3		32.8		
Green Ext Time (p_c), s		12.6		0.3		12.5		

Intersection Summary	
HCM 2010 Ctrl Delay	8.8
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	0	34	540	846	0	0
Future Volume (Veh/h)	0	34	540	846	0	0
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	37	587	920	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	587	294			1507	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	587	294			1507	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	445	709			440	

Direction, Lane #	WB 1	NE 1	NE 2	NE 3
Volume Total	37	391	502	613
Volume Left	0	0	0	0
Volume Right	37	0	307	613
cSH	709	1700	1700	1700
Volume to Capacity	0.05	0.23	0.30	0.36
Queue Length 95th (ft)	4	0	0	0
Control Delay (s)	10.4	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.4	0.0		
Approach LOS	B			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	288	209	886	258	272	195	62	440	185	785	160
Future Volume (veh/h)	105	288	209	886	258	272	195	62	440	185	785	160
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1610	1785	1727	1520	1681	1792	1696	1570	1759	1776	1810	1827
Adj Flow Rate, veh/h	109	300	0	923	269	0	203	65	0	193	818	0
Adj No. of Lanes	1	2	1	3	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	18	6	10	25	13	6	12	21	8	7	5	4
Cap, veh/h	160	373	153	1043	430	389	230	350	176	612	1176	531
Arrive On Green	0.10	0.10	0.00	0.26	0.26	0.00	0.14	0.12	0.00	0.36	0.34	0.00
Sat Flow, veh/h	1533	3571	1468	4082	1681	1524	1616	2983	1495	1691	3438	1553
Grp Volume(v), veh/h	109	300	0	923	269	0	203	65	0	193	818	0
Grp Sat Flow(s),veh/h/ln	1533	1785	1468	1361	1681	1524	1616	1492	1495	1691	1719	1553
Q Serve(g_s), s	7.5	9.0	0.0	23.9	15.6	0.0	13.6	2.2	0.0	9.0	22.6	0.0
Cycle Q Clear(g_c), s	7.5	9.0	0.0	23.9	15.6	0.0	13.6	2.2	0.0	9.0	22.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	160	373	153	1043	430	389	230	350	176	612	1176	531
V/C Ratio(X)	0.68	0.80	0.00	0.88	0.63	0.00	0.88	0.19	0.00	0.32	0.70	0.00
Avail Cap(c_a), veh/h	181	422	174	1095	451	409	279	852	427	612	1176	531
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	1.00	0.00	0.73	0.73	0.00	1.00	1.00	0.00	0.83	0.83	0.00
Uniform Delay (d), s/veh	47.5	48.1	0.0	39.4	36.3	0.0	46.3	43.8	0.0	25.3	31.2	0.0
Incr Delay (d2), s/veh	6.1	8.5	0.0	6.5	1.9	0.0	20.9	0.1	0.0	0.1	2.8	0.0
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(95%),veh/ln	6.3	8.5	0.0	13.9	11.3	0.0	11.8	1.6	0.0	7.3	16.1	0.0
LnGrp Delay(d),s/veh	53.6	56.6	0.0	45.9	38.1	0.0	67.2	43.9	0.0	25.4	34.1	0.0
LnGrp LOS	D	E		D	D		E	D		C	C	
Approach Vol, veh/h		409			1192			268			1011	
Approach Delay, s/veh		55.8			44.1			61.5			32.4	
Approach LOS		E			D			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.7	42.2		15.5	44.4	17.5		32.6
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	9.6	31.4		13.0	19.0	* 31		29.5
Max Q Clear Time (g_c+I1), s	15.6	24.6		11.0	11.0	4.2		25.9
Green Ext Time (p_c), s	0.1	3.5		0.3	3.9	0.2		2.2

Intersection Summary	
HCM 2010 Ctrl Delay	43.3
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	340	433	43	425	31	451	1105	960	19	109	540
Future Volume (veh/h)	140	340	433	43	425	31	451	1105	960	19	109	540
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.97	1.00		1.00	1.00		0.84
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	1532	1776	1652	1667	1275	1624	1727	1810	1863	1900	1845	1520
Adj Flow Rate, veh/h	147	358	102	45	447	6	475	1163	0	20	115	155
Adj No. of Lanes	2	1	2	1	3	1	2	2	1	1	1	2
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, %	24	7	15	14	49	17	10	5	2	0	3	25
Cap, veh/h	154	355	464	65	648	249	1544	1663	766	217	222	229
Arrive On Green	0.09	0.33	0.33	0.04	0.19	0.19	0.16	0.16	0.00	0.12	0.12	0.12
Sat Flow, veh/h	2831	1776	2318	1587	3481	1336	3191	3438	1583	1810	1845	1904
Grp Volume(v), veh/h	147	358	102	45	447	6	475	1163	0	20	115	155
Grp Sat Flow(s),veh/h/ln	1416	1776	1159	1587	1160	1336	1596	1719	1583	1810	1845	952
Q Serve(g_s), s	5.7	22.0	3.5	3.1	13.2	0.4	14.5	35.2	0.0	1.1	6.4	8.6
Cycle Q Clear(g_c), s	5.7	22.0	3.5	3.1	13.2	0.4	14.5	35.2	0.0	1.1	6.4	8.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	154	355	464	65	648	249	1544	1663	766	217	222	229
V/C Ratio(X)	0.95	1.01	0.22	0.70	0.69	0.02	0.31	0.70	0.00	0.09	0.52	0.68
Avail Cap(c_a), veh/h	154	355	464	87	696	267	1544	1663	766	362	369	381
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	0.61	0.61	0.61	1.00	1.00	1.00	0.09	0.09	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.8	36.6	30.5	52.1	41.8	36.6	29.9	38.7	0.0	43.1	45.4	46.4
Incr Delay (d2), s/veh	43.1	39.4	0.1	7.1	2.1	0.0	0.0	0.2	0.0	0.1	0.7	1.3
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(95%),veh/ln	5.4	26.2	2.0	2.7	7.8	0.3	7.7	18.8	0.0	1.0	6.0	4.1
LnGrp Delay(d),s/veh	92.9	76.0	30.6	59.1	43.9	36.6	30.0	38.9	0.0	43.1	46.1	47.7
LnGrp LOS	F	F	C	E	D	D	C	D		D	D	D
Approach Vol, veh/h		607			498			1638			290	
Approach Delay, s/veh		72.5			45.2			36.3			46.7	
Approach LOS		E			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.5	26.0		57.8	10.0	24.5		17.7
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	6.0	22.0		42.9	6.0	22.0		22.0
Max Q Clear Time (g_c+I1), s	5.1	24.0		37.2	7.7	15.2		10.6
Green Ext Time (p_c), s	0.3	0.0		3.4	0.0	1.4		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	46.0
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2330	80	570	69	60	23	395	233	15	67	420	109
Future Volume (vph)	2330	80	570	69	60	23	395	233	15	67	420	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1649	1662	2697		1802	1588	1597	3233		1805	3374	1122
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1649	1662	2697		1802	1588	1597	3233		1805	3374	1122
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	2402	82	588	71	62	24	407	240	15	69	433	112
RTOR Reduction (vph)	0	0	109	0	0	23	0	4	0	0	0	101
Lane Group Flow (vph)	1249	1235	479	0	133	1	407	251	0	69	433	11
Confl. Peds. (#/hr)	3		3	3		3			3	3		3
Confl. Bikes (#/hr)									13			
Heavy Vehicles (%)	4%	0%	3%	5%	0%	0%	13%	11%	0%	0%	7%	39%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	62.0	62.0	62.0		6.0	6.0	14.0	22.0		3.0	11.0	11.0
Effective Green, g (s)	62.0	62.0	62.0		6.0	6.0	14.0	22.0		3.0	11.0	11.0
Actuated g/C Ratio	0.56	0.56	0.56		0.05	0.05	0.13	0.20		0.03	0.10	0.10
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	929	936	1520		98	86	203	646		49	337	112
v/s Ratio Prot	c0.76	0.74			c0.07		c0.25	0.08		0.04	c0.13	
v/s Ratio Perm			0.18			0.00						0.01
v/c Ratio	1.34	1.32	0.32		1.36	0.02	2.00	0.39		1.41	1.28	0.10
Uniform Delay, d1	24.0	24.0	12.7		52.0	49.2	48.0	38.2		53.5	49.5	45.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.79	0.84		0.87	1.12	2.06
Incremental Delay, d2	162.2	151.3	0.0		213.3	0.0	468.5	1.7		263.3	147.1	1.6
Delay (s)	186.2	175.3	12.8		265.3	49.2	506.3	33.6		309.7	202.6	94.1
Level of Service	F	F	B		F	D	F	C		F	F	F
Approach Delay (s)		148.6			232.3			324.2			194.9	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	183.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.44		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	117.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1	11	505	2	165	15	452	1390	570	490	14
Future Volume (vph)	26	1	11	505	2	165	15	452	1390	570	490	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.83	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1812	1334	1417	1423	1239	1805	3343	1517	3367	3393	
Flt Permitted		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1812	1334	1417	1423	1239	1805	3343	1517	3367	3393	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	28	1	12	543	2	177	16	486	1495	613	527	15
RTOR Reduction (vph)	0	0	12	0	0	142	0	0	334	0	2	0
Lane Group Flow (vph)	0	29	0	271	274	35	16	486	1161	613	540	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)									15			21
Heavy Vehicles (%)	0%	0%	0%	21%	0%	27%	0%	8%	3%	4%	6%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		2.0	2.0	22.0	22.0	22.0	1.2	55.0	55.0	15.0	68.8	
Effective Green, g (s)		2.0	2.0	22.0	22.0	22.0	1.2	55.0	55.0	15.0	68.8	
Actuated g/C Ratio		0.02	0.02	0.20	0.20	0.20	0.01	0.50	0.50	0.14	0.63	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		32	24	283	284	247	19	1671	758	459	2122	
v/s Ratio Prot		c0.02		0.19	c0.19		0.01	0.15		c0.18	0.16	
v/s Ratio Perm			0.00			0.03			c0.77			
v/c Ratio		0.91	0.01	0.96	0.96	0.14	0.84	0.29	1.53	1.34	0.25	
Uniform Delay, d1		53.9	53.0	43.5	43.6	36.2	54.3	16.1	27.5	47.5	9.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.48	2.52	
Incremental Delay, d2		117.7	0.1	41.3	43.2	0.1	128.3	0.0	245.9	160.4	0.2	
Delay (s)		171.6	53.1	84.8	86.8	36.3	182.6	16.1	273.4	230.7	23.3	
Level of Service		F	D	F	F	D	F	B	F	F	C	
Approach Delay (s)		136.9			73.7			210.1			133.4	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	161.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL2	WBT	WBR	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations											
Traffic Volume (vph)	754	259	160	3316	10	1693	6	100	484	375	145
Future Volume (vph)	754	259	160	3316	10	1693	6	100	484	375	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5		4.0	4.0	4.0	4.5	4.5	4.5
Lane Util. Factor	0.86		1.00	0.91		0.91	0.91	1.00	1.00	*1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00		1.00	1.00	0.85	0.86	1.00	0.85
Flt Protected	1.00		0.95	1.00		0.95	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	6124		1641	4396		2857	1435	1428	1644	3762	1553
Flt Permitted	1.00		0.95	1.00		0.95	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	6124		1641	4396		2857	1435	1428	1644	3762	1553
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.96
Adj. Flow (vph)	785	270	167	3454	10	1764	7	104	504	391	151
RTOR Reduction (vph)	0	0	0	0	0	0	0	69	27	0	0
Lane Group Flow (vph)	1055	0	167	3464	0	1182	589	35	477	391	151
Confl. Peds. (#/hr)								4			
Confl. Bikes (#/hr)		2			2			2			2
Heavy Vehicles (%)	2%	3%	10%	18%	0%	15%	0%	11%	0%	1%	4%
Turn Type	NA		Prot	NA		Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3		4	4			3	3
Permitted Phases								4	3 6		
Actuated Green, G (s)	22.0		10.0	68.5		33.0	33.0	33.0	50.0	28.0	28.0
Effective Green, g (s)	22.0		10.0	68.5		33.0	33.0	33.0	50.0	28.0	28.0
Actuated g/C Ratio	0.20		0.09	0.62		0.30	0.30	0.30	0.45	0.25	0.25
Clearance Time (s)	4.5		4.0			4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0			2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	1224		149	2737		857	430	428	747	957	395
v/s Ratio Prot	0.17		0.10	c0.79		c0.41	0.41			0.10	0.10
v/s Ratio Perm								0.02	0.29		
v/c Ratio	0.86		1.12	1.27		1.38	1.37	0.08	0.64	0.41	0.38
Uniform Delay, d1	42.5		50.0	20.8		38.5	38.5	27.6	23.1	34.1	33.9
Progression Factor	1.25		1.11	0.87		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1		63.1	119.7		178.0	180.7	0.0	1.3	0.1	0.2
Delay (s)	58.1		118.5	137.8		216.5	219.2	27.7	24.4	34.2	34.1
Level of Service	E		F	F		F	F	C	C	C	C
Approach Delay (s)	58.1			136.9			206.9				
Approach LOS	E			F			F				

Intersection Summary			
HCM 2000 Control Delay	128.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	137.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	171	151	1213	552	708	65	488	134	645	461	155
Future Volume (vph)	161	171	151	1213	552	708	65	488	134	645	461	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1577	1528		2694	1660	1332	1624	4029		3090	3065	1338
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1577	1528		2694	1660	1332	1624	4029		3090	3065	1338
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	168	178	157	1264	575	738	68	508	140	672	480	161
RTOR Reduction (vph)	0	29	0	0	0	331	0	0	0	0	0	130
Lane Group Flow (vph)	168	306	0	1264	575	407	68	648	0	672	480	31
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	8	8		7	7		6	6		2	2	
Permitted Phases						7						2
Actuated Green, G (s)	16.0	16.0		42.0	42.0	42.0	13.5	13.5		21.5	21.5	21.5
Effective Green, g (s)	16.0	16.0		42.0	42.0	42.0	13.5	13.5		21.5	21.5	21.5
Actuated g/C Ratio	0.15	0.15		0.38	0.38	0.38	0.12	0.12		0.20	0.20	0.20
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	229	222		1028	633	508	199	494		603	599	261
v/s Ratio Prot	0.11	c0.20		c0.47	0.35		0.04	c0.16		c0.22	0.16	
v/s Ratio Perm						0.31						0.02
v/c Ratio	0.73	1.38		1.23	0.91	0.80	0.34	1.31		1.11	0.80	0.12
Uniform Delay, d1	45.0	47.0		34.0	32.2	30.3	44.2	48.2		44.2	42.2	36.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.04	1.02		1.00	1.00	1.00
Incremental Delay, d2	10.9	195.8		112.0	16.8	8.8	0.6	151.8		72.2	10.8	0.9
Delay (s)	55.8	242.8		146.0	49.0	39.1	46.7	201.1		116.5	53.0	37.4
Level of Service	E	F		F	D	D	D	F		F	D	D
Approach Delay (s)		180.4			93.7			186.4			83.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	112.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	888	3511	192	22	160
Future Volume (veh/h)	62	888	3511	192	22	160
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1636	1900	1900	1900
Adj Flow Rate, veh/h	63	906	3583	196	22	35
Adj No. of Lanes	1	3	3	0	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	17	17	0	0
Cap, veh/h	200	4549	3230	173	59	53
Arrive On Green	0.04	0.30	1.00	1.00	0.03	0.03
Sat Flow, veh/h	1774	5253	4481	232	1810	1615
Grp Volume(v), veh/h	63	906	2439	1340	22	35
Grp Sat Flow(s),veh/h/ln	1774	1695	1489	1588	1810	1615
Q Serve(g_s), s	3.8	14.7	82.0	80.5	1.3	2.4
Cycle Q Clear(g_c), s	3.8	14.7	82.0	80.5	1.3	2.4
Prop In Lane	1.00			0.15	1.00	1.00
Lane Grp Cap(c), veh/h	200	4549	2220	1184	59	53
V/C Ratio(X)	0.31	0.20	1.10	1.13	0.37	0.66
Avail Cap(c_a), veh/h	200	4549	2220	1184	66	59
HCM Platoon Ratio	0.33	0.33	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.09	0.09	1.00	1.00
Uniform Delay (d), s/veh	48.8	9.3	0.0	0.0	52.1	52.6
Incr Delay (d2), s/veh	0.3	0.1	45.2	60.6	1.4	15.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.4	11.3	25.1	35.6	1.2	2.3
LnGrp Delay(d),s/veh	49.1	9.4	45.2	60.6	53.5	68.3
LnGrp LOS	D	A	F	F	D	E
Approach Vol, veh/h		969	3779		57	
Approach Delay, s/veh		11.9	50.7		62.6	
Approach LOS		B	D		E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		102.4			16.4	86.0		7.6
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0
Max Green Setting (Gmax), s		98.0			12.0	82.0		4.0
Max Q Clear Time (g_c+I1), s		16.7			5.8	84.0		4.4
Green Ext Time (p_c), s		4.9			2.4	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	43.0
HCM 2010 LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	770	140	13	3373	330	331
Future Volume (veh/h)	770	140	13	3373	330	331
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1868	1900	1727	1570	1810	1810
Adj Flow Rate, veh/h	828	140	14	3627	355	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	10	21	5	5
Cap, veh/h	3306	555	15	3429	219	345
Arrive On Green	1.00	1.00	0.01	0.80	0.13	0.00
Sat Flow, veh/h	4550	736	1645	4428	1723	2707
Grp Volume(v), veh/h	641	327	14	3627	355	0
Grp Sat Flow(s),veh/h/ln	1700	1717	1645	1429	1723	1354
Q Serve(g_s), s	0.0	0.0	0.9	88.0	14.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.9	88.0	14.0	0.0
Prop In Lane		0.43	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2565	1295	15	3429	219	345
V/C Ratio(X)	0.25	0.25	0.92	1.06	1.62	0.00
Avail Cap(c_a), veh/h	2565	1295	60	3429	219	345
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.09	0.09	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	54.4	11.0	48.0	0.0
Incr Delay (d2), s/veh	0.2	0.5	7.7	26.8	298.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.3	0.8	73.8	44.7	0.0
LnGrp Delay(d),s/veh	0.2	0.5	62.2	37.8	346.4	0.0
LnGrp LOS	A	A	E	F	F	
Approach Vol, veh/h	968			3641	355	
Approach Delay, s/veh	0.3			37.9	346.4	
Approach LOS	A			D	F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.0	87.0				92.0		18.0
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	1.0	80.0				88.0		14.0
Max Q Clear Time (g_c+I1), s	2.9	2.0				90.0		16.0
Green Ext Time (p_c), s	0.0	73.1				0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	52.6
HCM 2010 LOS	D



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	146	788	167	824	1683	498	605	201	275	90	377	1098
Future Volume (veh/h)	146	788	167	824	1683	498	605	201	275	90	377	1098
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98	1.00		1.00	1.00		1.00
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	1810	1810	1882	1545	1545	1976	1583	1776	1792	1810	1810	1900
Adj Flow Rate, veh/h	151	812	95	849	1735	482	624	207	0	93	389	0
Adj No. of Lanes	1	3	1	2	3	0	1	1	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	23	25	25	20	7	6	5	5	0
Cap, veh/h	94	1147	358	909	1640	444	302	264	227	261	325	153
Arrive On Green	0.02	0.08	0.08	0.42	0.66	0.66	0.20	0.15	0.00	0.15	0.09	0.00
Sat Flow, veh/h	1723	4940	1541	2854	3292	891	1508	1776	1524	1723	3438	1615
Grp Volume(v), veh/h	151	812	95	849	1475	742	624	207	0	93	389	0
Grp Sat Flow(s),veh/h/ln	1723	1647	1541	1427	1406	1371	1508	1776	1524	1723	1719	1615
Q Serve(g_s), s	6.0	17.7	4.1	31.2	54.8	54.8	22.0	12.4	0.0	5.3	10.4	0.0
Cycle Q Clear(g_c), s	6.0	17.7	4.1	31.2	54.8	54.8	22.0	12.4	0.0	5.3	10.4	0.0
Prop In Lane	1.00		1.00	1.00		0.65	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	94	1147	358	909	1401	683	302	264	227	261	325	153
V/C Ratio(X)	1.61	0.71	0.27	0.93	1.05	1.09	2.07	0.78	0.00	0.36	1.20	0.00
Avail Cap(c_a), veh/h	94	1147	358	1033	1401	683	302	387	332	261	325	153
HCM Platoon Ratio	0.33	0.33	0.33	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	0.95	0.09	0.09	0.09	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.0	47.1	17.3	30.6	18.6	18.6	44.0	45.1	0.0	41.9	49.8	0.0
Incr Delay (d2), s/veh	314.7	3.5	1.7	1.6	25.9	41.5	492.4	3.4	0.0	0.3	114.6	0.0
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(95%),veh/ln	19.9	13.1	3.5	14.1	45.9	49.8	90.7	10.4	0.0	4.6	18.2	0.0
LnGrp Delay(d),s/veh	368.7	50.7	19.0	32.2	44.5	60.1	536.4	48.5	0.0	42.2	164.4	0.0
LnGrp LOS	F	D	B	C	F	F	F	D		D	F	
Approach Vol, veh/h		1058			3066			831			482	
Approach Delay, s/veh		93.2			44.9			414.8			140.8	
Approach LOS		F			D			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.2	29.8	26.0	15.0	10.0	59.0	20.6	20.4
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax), s	* 16	* 21	22.0	10.4	6.0	* 55	9.0	24.0
Max Q Clear Time (g_c+I1), s	33.2	19.7	24.0	12.4	8.0	56.8	7.3	14.4
Green Ext Time (p_c), s	1.9	1.1	0.0	0.0	0.0	0.0	0.5	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	119.3
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	282	727	136	299	2413	14	250	61	45	38	244	342
Future Volume (veh/h)	282	727	136	299	2413	14	250	61	45	38	244	342
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	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	1845	1845	1681	1338	1546	1900	1429	1776	1792	1610	1532	1652
Adj Flow Rate, veh/h	291	749	88	308	2488	14	258	63	31	39	976	147
Adj No. of Lanes	2	3	1	2	3	0	1	2	1	1	1	2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97
Percent Heavy Veh, %	3	3	13	42	23	23	33	7	6	18	24	15
Cap, veh/h	186	1483	411	505	1947	11	96	239	105	410	410	643
Arrive On Green	0.05	0.29	0.29	0.20	0.45	0.45	0.07	0.07	0.07	0.27	0.27	0.27
Sat Flow, veh/h	3408	5036	1394	2472	4330	24	1361	3374	1479	1533	1532	2406
Grp Volume(v), veh/h	291	749	88	308	1616	886	258	63	31	39	976	147
Grp Sat Flow(s),veh/h/ln	1704	1679	1394	1236	1407	1541	1361	1687	1479	1533	1532	1203
Q Serve(g_s), s	6.0	13.6	5.2	12.5	49.5	49.5	7.8	1.9	2.2	2.1	29.4	5.2
Cycle Q Clear(g_c), s	6.0	13.6	5.2	12.5	49.5	49.5	7.8	1.9	2.2	2.1	29.4	5.2
Prop In Lane	1.00		1.00	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	186	1483	411	505	1265	693	96	239	105	410	410	643
V/C Ratio(X)	1.57	0.50	0.21	0.61	1.28	1.28	2.67	0.26	0.30	0.10	2.38	0.23
Avail Cap(c_a), veh/h	186	1483	411	517	1265	693	96	239	105	410	410	643
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)	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.0	32.2	29.2	39.8	30.3	30.3	51.1	48.4	48.5	30.3	40.3	31.5
Incr Delay (d2), s/veh	271.3	0.8	0.8	1.4	131.1	136.6	782.1	0.2	0.6	0.0	629.9	0.1
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(95%),veh/ln	7.7	9.7	3.8	7.7	75.9	85.1	43.0	1.7	1.6	1.6	151.3	3.2
LnGrp Delay(d),s/veh	323.3	33.0	30.0	41.2	161.3	166.9	833.2	48.6	49.1	30.3	670.2	31.5
LnGrp LOS	F	C	C	D	F	F	F	D	D	C	F	C
Approach Vol, veh/h		1128			2810			352			1162	
Approach Delay, s/veh		107.6			149.9			623.7			568.0	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	54.1		34.0	27.1	37.0		12.0
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	6.0	49.4		29.4	23.0	* 32		7.8
Max Q Clear Time (g_c+I1), s	8.0	51.5		31.4	14.5	15.6		9.8
Green Ext Time (p_c), s	0.0	0.0		0.0	7.9	3.2		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	260.9
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	551	49	756	1846	5	77	9	71	10	24	23
Future Volume (veh/h)	4	551	49	756	1846	5	77	9	71	10	24	23
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00	0.99		0.99	0.99		0.99
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	1776	1811	1900	1407	1521	1900	1900	1752	1863	1900	1900	1900
Adj Flow Rate, veh/h	4	580	52	796	1943	5	81	9	22	11	25	3
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	0	1	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, %	7	5	5	35	25	25	0	0	2	0	0	0
Cap, veh/h	4	684	61	717	2226	6	169	15	187	56	99	9
Arrive On Green	0.00	0.22	0.22	1.00	1.00	1.00	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1691	3182	285	1340	2957	8	837	125	1564	84	824	76
Grp Volume(v), veh/h	4	313	319	796	949	999	90	0	22	39	0	0
Grp Sat Flow(s),veh/h/ln	1691	1720	1746	1340	1445	1519	962	0	1564	984	0	0
Q Serve(g_s), s	0.2	17.5	17.6	0.0	0.0	0.0	0.0	0.0	1.3	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.2	17.5	17.6	0.0	0.0	0.0	9.9	0.0	1.3	10.0	0.0	0.0
Prop In Lane	1.00		0.16	1.00		0.01	0.90		1.00	0.28		0.08
Lane Grp Cap(c), veh/h	4	370	375	717	1088	1144	184	0	187	164	0	0
V/C Ratio(X)	1.01	0.85	0.85	1.11	0.87	0.87	0.49	0.00	0.12	0.24	0.00	0.00
Avail Cap(c_a), veh/h	34	370	375	717	1088	1144	237	0	250	232	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.9	37.7	37.7	0.0	0.0	0.0	43.0	0.0	39.3	39.7	0.0	0.0
Incr Delay (d2), s/veh	129.7	20.6	20.8	51.5	1.0	1.0	0.8	0.0	0.1	0.3	0.0	0.0
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(95%),veh/ln	0.5	15.7	15.9	18.5	0.5	0.5	4.4	0.0	1.0	1.8	0.0	0.0
LnGrp Delay(d),s/veh	179.6	58.3	58.5	51.5	1.0	1.0	43.7	0.0	39.4	40.0	0.0	0.0
LnGrp LOS	F	E	E	F	A	A	D		D	D		
Approach Vol, veh/h		636			2744			112			39	
Approach Delay, s/veh		59.1			15.6			42.9			40.0	
Approach LOS		E			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.0	26.0		16.0	4.2	79.8		16.0
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	3.6	* 22		16.0	2.0	69.5		16.0
Max Q Clear Time (g_c+I1), s	2.0	19.6		12.0	2.2	2.0		11.9
Green Ext Time (p_c), s	23.3	0.5		0.1	0.0	26.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	24.6
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	479	0	0	2029	52	2	0	1	2	0	561
Future Volume (veh/h)	131	479	0	0	2029	52	2	0	1	2	0	561
Number	7	4	14	3	8	18	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		1.00	1.00		1.00	1.00		1.00	1.00		0.98
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	1845	1827	1900	0	1484	1900	1900	1863	1900	1900	1597	1900
Adj Flow Rate, veh/h	139	510	0	0	2159	55	2	0	1	2	0	501
Adj No. of Lanes	1	2	0	0	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.92	0.92	0.94	0.94	0.92	0.92	0.92	0.94	0.92	0.94
Percent Heavy Veh, %	3	4	4	0	28	28	2	2	2	2	2	2
Cap, veh/h	97	2551	0	0	1784	45	121	12	36	36	1	232
Arrive On Green	0.05	0.74	0.00	0.00	0.63	0.63	0.17	0.00	0.17	0.17	0.00	0.17
Sat Flow, veh/h	1757	3563	0	0	2884	71	348	67	207	1	4	1325
Grp Volume(v), veh/h	139	510	0	0	1079	1135	3	0	0	503	0	0
Grp Sat Flow(s),veh/h/ln	1757	1736	0	0	1410	1471	622	0	0	1330	0	0
Q Serve(g_s), s	5.5	4.6	0.0	0.0	63.5	63.5	0.0	0.0	0.0	4.3	0.0	0.0
Cycle Q Clear(g_c), s	5.5	4.6	0.0	0.0	63.5	63.5	0.1	0.0	0.0	17.5	0.0	0.0
Prop In Lane	1.00		0.00	0.00		0.05	0.67		0.33	0.00		1.00
Lane Grp Cap(c), veh/h	97	2551	0	0	895	934	169	0	0	269	0	0
V/C Ratio(X)	1.44	0.20	0.00	0.00	1.20	1.22	0.02	0.00	0.00	1.87	0.00	0.00
Avail Cap(c_a), veh/h	97	2551	0	0	895	934	169	0	0	269	0	0
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)	0.69	0.69	0.00	0.00	0.09	0.09	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	47.3	4.1	0.0	0.0	18.3	18.3	34.1	0.0	0.0	42.4	0.0	0.0
Incr Delay (d2), s/veh	233.0	0.0	0.0	0.0	93.2	97.8	0.2	0.0	0.0	405.6	0.0	0.0
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(95%),veh/ln	6.0	3.8	0.0	0.0	82.9	88.4	0.1	0.0	0.0	67.9	0.0	0.0
LnGrp Delay(d),s/veh	280.2	4.1	0.0	0.0	111.5	116.0	34.3	0.0	0.0	448.1	0.0	0.0
LnGrp LOS	F	A			F	F	C			F		
Approach Vol, veh/h		649			2214			3			503	
Approach Delay, s/veh		63.3			113.8			34.3			448.1	
Approach LOS		E			F			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6	7	8
Phs Duration (G+Y+Rc), s		22.0		78.0		22.0	10.0	68.0
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		17.5		73.5		17.5	5.5	63.5
Max Q Clear Time (g_c+I1), s		2.1		6.6		19.5	7.5	65.5
Green Ext Time (p_c), s		3.3		53.6		0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	153.9
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	286	57	4	975	295	10
Future Volume (veh/h)	286	57	4	975	295	10
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	311	62	4	1060	331	0
Adj No. of Lanes	1	1	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	0
Cap, veh/h	1235	1050	83	1233	512	233
Arrive On Green	0.66	0.66	0.66	0.66	0.14	0.00
Sat Flow, veh/h	1863	1583	1	1860	3548	1615
Grp Volume(v), veh/h	311	62	1064	0	331	0
Grp Sat Flow(s),veh/h/ln	1863	1583	1862	0	1774	1615
Q Serve(g_s), s	3.0	0.6	0.0	0.0	3.9	0.0
Cycle Q Clear(g_c), s	3.0	0.6	19.8	0.0	3.9	0.0
Prop In Lane		1.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1235	1050	1316	0	512	233
V/C Ratio(X)	0.25	0.06	0.81	0.00	0.65	0.00
Avail Cap(c_a), veh/h	1688	1435	1768	0	2090	951
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	3.0	2.6	5.8	0.0	17.8	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.5	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.7	0.5	15.6	0.0	3.5	0.0
LnGrp Delay(d),s/veh	3.0	2.6	7.4	0.0	18.3	0.0
LnGrp LOS	A	A	A		B	
Approach Vol, veh/h	373			1064	331	
Approach Delay, s/veh	3.0			7.4	18.3	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		33.8		10.4		33.8		
Change Period (Y+Rc), s		4.5		4.0		4.5		
Max Green Setting (Gmax), s		40.0		26.0		40.0		
Max Q Clear Time (g_c+I1), s		5.0		5.9		21.8		
Green Ext Time (p_c), s		9.3		0.6		7.4		

Intersection Summary	
HCM 2010 Ctrl Delay	8.5
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	0	11	80	572	0	0
Future Volume (Veh/h)	0	11	80	572	0	0
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	87	622	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	87	44			709	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87	44			709	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	910	1024			886	

Direction, Lane #	WB 1	NE 1	NE 2	NE 3
Volume Total	12	58	236	415
Volume Left	0	0	0	0
Volume Right	12	0	207	415
cSH	1024	1700	1700	1700
Volume to Capacity	0.01	0.03	0.14	0.24
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	8.6	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	8.6	0.0		
Approach LOS	A			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	235	200	1900	367	510	102	30	319	150	1121	170
Future Volume (veh/h)	169	235	200	1900	367	510	102	30	319	150	1121	170
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1610	1765	1727	1520	1681	1792	1696	1570	1759	1776	1810	1827
Adj Flow Rate, veh/h	140	295	0	1979	382	0	106	31	0	156	1168	0
Adj No. of Lanes	1	2	1	3	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	18	6	10	25	13	6	12	21	8	7	5	4
Cap, veh/h	112	257	107	1948	802	727	59	121	61	420	888	401
Arrive On Green	0.07	0.07	0.00	0.48	0.48	0.00	0.04	0.04	0.00	0.17	0.17	0.00
Sat Flow, veh/h	1533	3530	1468	4082	1681	1524	1616	2983	1495	1691	3438	1553
Grp Volume(v), veh/h	140	295	0	1979	382	0	106	31	0	156	1168	0
Grp Sat Flow(s),veh/h/ln	1533	1765	1468	1361	1681	1524	1616	1492	1495	1691	1719	1553
Q Serve(g_s), s	8.0	8.0	0.0	52.5	16.9	0.0	4.0	1.1	0.0	9.0	28.4	0.0
Cycle Q Clear(g_c), s	8.0	8.0	0.0	52.5	16.9	0.0	4.0	1.1	0.0	9.0	28.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	257	107	1948	802	727	59	121	61	420	888	401
V/C Ratio(X)	1.26	1.15	0.00	1.02	0.48	0.00	1.80	0.26	0.00	0.37	1.32	0.00
Avail Cap(c_a), veh/h	112	257	107	1948	802	727	59	526	264	420	888	401
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	0.00	0.09	0.09	0.00	1.00	1.00	0.00	0.58	0.58	0.00
Uniform Delay (d), s/veh	51.0	51.0	0.0	28.8	19.4	0.0	53.0	51.2	0.0	38.2	45.5	0.0
Incr Delay (d2), s/veh	168.9	102.5	0.0	10.6	0.0	0.0	421.0	0.4	0.0	0.1	146.8	0.0
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(95%),veh/ln	15.5	13.6	0.0	38.4	9.2	0.0	15.6	0.8	0.0	6.8	56.8	0.0
LnGrp Delay(d),s/veh	219.9	153.5	0.0	39.4	19.5	0.0	474.0	51.6	0.0	38.3	192.3	0.0
LnGrp LOS	F	F		F	B		F	D		D	F	
Approach Vol, veh/h		435			2361			137			1324	
Approach Delay, s/veh		174.8			36.2			378.4			174.2	
Approach LOS		F			D			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.0	33.0		12.0	31.9	9.1		57.0
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	4.0	28.4		8.0	13.0	* 19		52.5
Max Q Clear Time (g_c+I1), s	6.0	30.4		10.0	11.0	3.1		54.5
Green Ext Time (p_c), s	0.0	0.0		0.0	1.5	0.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	104.3
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	135	470	101	1045	14	481	690	220	12	262	1251
Future Volume (veh/h)	99	135	470	101	1045	14	481	690	220	12	262	1251
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	1.00		0.97	1.00		1.00	1.00		0.93
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	1532	1776	1652	1667	1275	1624	1727	1810	1863	1900	1845	1520
Adj Flow Rate, veh/h	104	142	106	106	1100	15	506	726	0	13	276	1001
Adj No. of Lanes	2	1	2	1	3	1	2	2	1	1	1	2
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, %	24	7	15	14	49	17	10	5	2	0	3	25
Cap, veh/h	148	216	274	280	854	330	599	645	297	650	662	760
Arrive On Green	0.02	0.04	0.04	0.18	0.25	0.25	0.19	0.19	0.00	0.36	0.36	0.36
Sat Flow, veh/h	2831	1776	2252	1587	3481	1343	3191	3438	1583	1810	1845	2117
Grp Volume(v), veh/h	104	142	106	106	1100	15	506	726	0	13	276	1001
Grp Sat Flow(s),veh/h/ln	1416	1776	1126	1587	1160	1343	1596	1719	1583	1810	1845	1059
Q Serve(g_s), s	4.0	8.7	5.0	6.5	27.0	0.9	16.8	20.6	0.0	0.5	12.4	39.5
Cycle Q Clear(g_c), s	4.0	8.7	5.0	6.5	27.0	0.9	16.8	20.6	0.0	0.5	12.4	39.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	148	216	274	280	854	330	599	645	297	650	662	760
V/C Ratio(X)	0.70	0.66	0.39	0.38	1.29	0.05	0.85	1.13	0.00	0.02	0.42	1.32
Avail Cap(c_a), veh/h	154	387	491	280	854	330	599	645	297	650	662	760
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.36	0.36	0.36	1.00	1.00	1.00	0.47	0.47	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.2	50.5	48.8	40.0	41.5	31.7	43.1	44.7	0.0	22.8	26.6	35.3
Incr Delay (d2), s/veh	4.0	0.9	0.2	0.3	138.1	0.0	7.0	66.5	0.0	0.0	0.2	151.7
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(95%),veh/ln	2.9	6.4	2.8	5.2	35.2	0.6	11.2	28.3	0.0	0.5	10.4	49.5
LnGrp Delay(d),s/veh	57.2	51.5	49.0	40.3	179.6	31.7	50.1	111.2	0.0	22.8	26.7	186.9
LnGrp LOS	E	D	D	D	F	C	D	F		C	C	F
Approach Vol, veh/h		352			1221			1232			1290	
Approach Delay, s/veh		52.4			165.7			86.1			151.0	
Approach LOS		D			F			F			F	

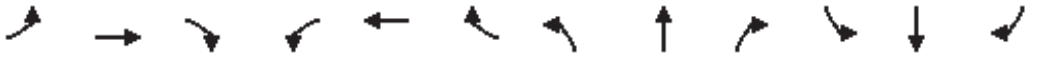
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.4	17.4		25.2	9.8	31.0		44.0
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	9.0	24.0		20.4	6.0	27.0		39.5
Max Q Clear Time (g_c+I1), s	8.5	10.7		22.6	6.0	29.0		41.5
Green Ext Time (p_c), s	0.3	0.9		0.0	0.0	0.0		0.0

Intersection Summary		
HCM 2010 Ctrl Delay	127.4	
HCM 2010 LOS	F	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1069	98	213	66	92	26	631	356	17	103	557	193
Future Volume (vph)	1069	98	213	66	92	26	631	356	17	103	557	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1649	1677	2692		1823	1584	1597	3240		1805	3374	1098
Flt Permitted	0.95	0.96	1.00		0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1649	1677	2692		1823	1584	1597	3240		1805	3374	1098
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1149	105	229	71	99	28	678	383	18	111	599	208
RTOR Reduction (vph)	0	0	104	0	0	26	0	4	0	0	0	143
Lane Group Flow (vph)	620	634	125	0	170	2	678	397	0	111	599	65
Confl. Peds. (#/hr)	3		3	3		3			3	3		3
Confl. Bikes (#/hr)						1			4			12
Heavy Vehicles (%)	4%	0%	3%	5%	0%	0%	13%	11%	0%	0%	7%	39%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	32.0	32.0	32.0		6.0	6.0	28.0	39.0		6.0	17.0	17.0
Effective Green, g (s)	32.0	32.0	32.0		6.0	6.0	28.0	39.0		6.0	17.0	17.0
Actuated g/C Ratio	0.32	0.32	0.32		0.06	0.06	0.28	0.39		0.06	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	527	536	861		109	95	447	1263		108	573	186
v/s Ratio Prot	0.38	c0.38			c0.09		c0.42	0.12		0.06	c0.18	
v/s Ratio Perm			0.05			0.00						0.06
v/c Ratio	1.18	1.18	0.15		1.56	0.02	1.52	0.31		1.03	1.05	0.35
Uniform Delay, d1	34.0	34.0	24.2		47.0	44.2	36.0	21.2		47.0	41.5	36.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.51	0.40		1.00	1.00	1.00
Incremental Delay, d2	97.9	100.1	0.0		291.6	0.0	236.6	0.2		94.3	50.0	5.1
Delay (s)	131.9	134.1	24.3		338.6	44.3	291.0	8.6		141.3	91.5	41.8
Level of Service	F	F	C		F	D	F	A		F	F	D
Approach Delay (s)		116.2			297.0			186.1			86.2	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	139.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	4	19	1695	10	345	19	633	265	170	581	76
Future Volume (vph)	26	4	19	1695	10	345	19	633	265	170	581	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.87	1.00	1.00	0.98	1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1820	1398	1417	1424	1244	1805	3343	1514	3367	3347	
Flt Permitted		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1820	1398	1417	1424	1244	1805	3343	1514	3367	3347	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	28	4	20	1823	11	371	20	681	285	183	625	82
RTOR Reduction (vph)	0	0	20	0	0	100	0	0	178	0	10	0
Lane Group Flow (vph)	0	32	0	911	923	271	20	681	107	183	697	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)									4			13
Heavy Vehicles (%)	0%	0%	0%	21%	0%	27%	0%	8%	3%	4%	6%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		2.4	2.4	52.2	52.2	52.2	2.0	17.0	17.0	12.4	27.4	
Effective Green, g (s)		2.4	2.4	52.2	52.2	52.2	2.0	17.0	17.0	12.4	27.4	
Actuated g/C Ratio		0.02	0.02	0.52	0.52	0.52	0.02	0.17	0.17	0.12	0.27	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		43	33	739	743	649	36	568	257	417	917	
v/s Ratio Prot		c0.02		0.64	c0.65		0.01	c0.20		0.05	c0.21	
v/s Ratio Perm			0.00			0.22			0.07			
v/c Ratio		0.74	0.01	1.23	1.24	0.42	0.56	1.20	0.42	0.44	0.76	
Uniform Delay, d1		48.5	47.6	23.9	23.9	14.6	48.6	41.5	37.1	40.6	33.3	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.66	1.85	
Incremental Delay, d2		45.4	0.1	116.3	120.3	0.2	10.1	105.7	0.4	1.5	2.7	
Delay (s)		93.9	47.7	140.2	144.2	14.8	58.7	147.2	37.5	69.0	64.2	
Level of Service		F	D	F	F	B	E	F	D	E	E	
Approach Delay (s)		76.1			120.8			113.7			65.2	
Approach LOS		E			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	106.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

9. Traffic Signal Warrants
Caltrans Peak Hour Warrant 3
2040 Cumulative without Project

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: 2040 Cumulative AM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

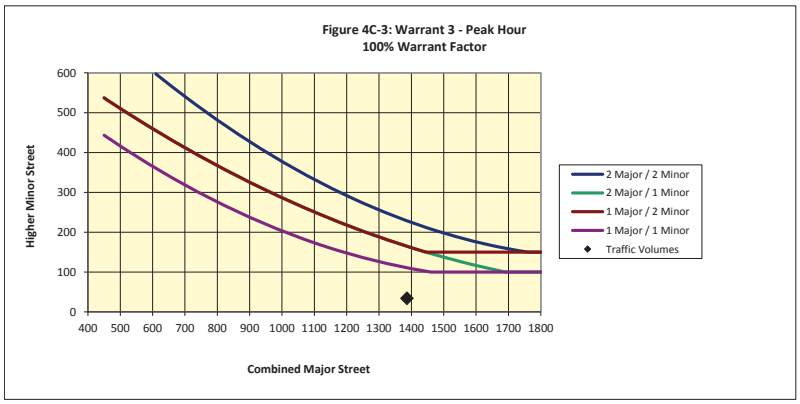
Analysis Volumes	
Major Street	
NB	1386
SB	0
Minor Street	
EB	0
WB	34

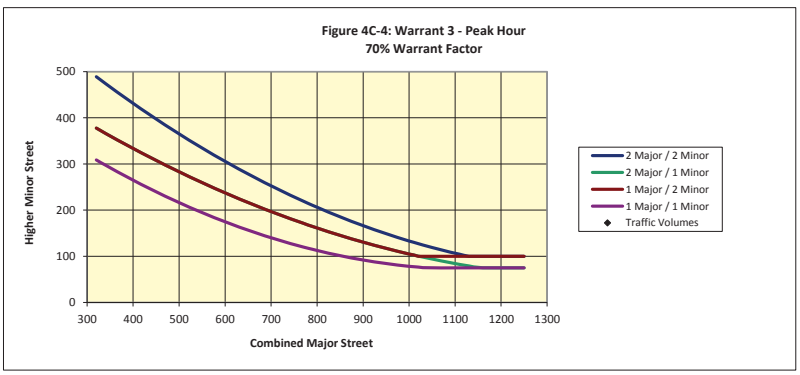
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	10.4
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.10
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	34
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	1420	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





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MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: 2040 Cumulative+Phase 1 PM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

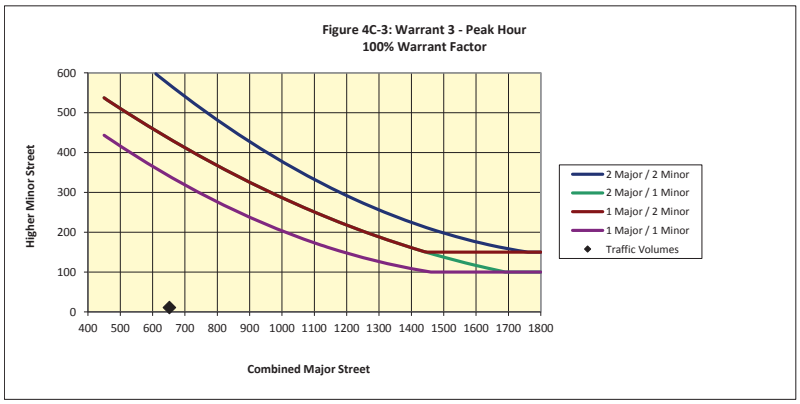
Analysis Volumes	
Major Street	
NB	652
SB	0
Minor Street	
EB	0
WB	11

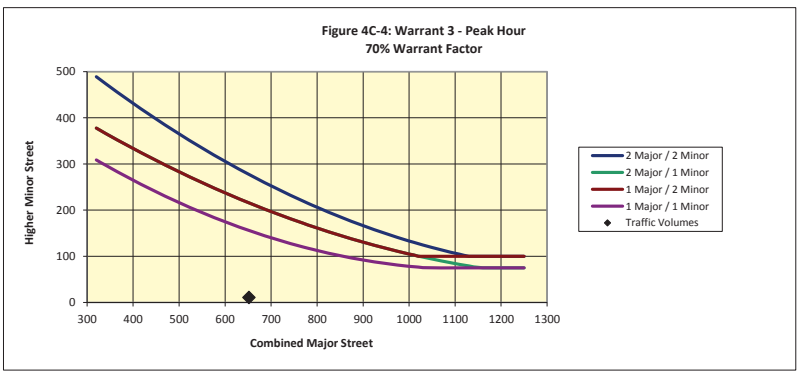
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	8.6
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.03
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	11
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	663	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





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10. Freeway Level of Service Calculations
Highway Capacity Software (HCS)
2040 Cumulative without Project

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*10176*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2774*	pc/h/ln
S	*38.2*	mph
D = v_p / S	*72.6*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*12897*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*3516*	pc/h/ln
S	*1.5*	mph
D = v_p / S	*2329.0*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
LOS - Level of service
S - Speed
D - Density
FFS - Free-flow speed
BFFS - Base free-flow speed
DDHV - Directional design hour volume

Factor Location

E_R - Exhibits 11-10, 11-12
E_T - Exhibits 11-10, 11-11, 11-13
f_p - Page 11-18
LOS, S, FFS, v_p - Exhibits 11-2, 11-3
f_{LW} - Exhibit 11-8
f_{LC} - Exhibit 11-9
TRD - Page 11-11

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*13349*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2426*	pc/h/ln
S	*50.1*	mph
D = v_p / S	*48.4*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*9974*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1813*	pc/h/ln
S	*62.6*	mph
D = v_p / S	*29.0*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*9651*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2631*	pc/h/ln
S	*43.5*	mph
D = v_p / S	*60.5*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8676*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2365*	pc/h/ln
S	*51.8*	mph
D = v_p / S	*45.7*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8656*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1888*	pc/h/ln
S	*61.6*	mph
D = v_p / S	*30.6*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*11351*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2475*	pc/h/ln
S	*48.6*	mph
D = v_p / S	*50.9*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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11. Intersection Level of Service Calculations
Synchro Software
2040 Cumulative plus Project

Movement	EBT	EBR	WBL2	WBT	WBR	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations											
Traffic Volume (vph)	1996	810	43	772	10	508	11	147	90	1727	567
Future Volume (vph)	1996	810	43	772	10	508	11	147	90	1727	567
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5		4.0	4.0	4.0	4.5	4.5	4.5
Lane Util. Factor	0.86		1.00	0.91		0.91	0.91	1.00	1.00	*1.00	1.00
Frpb, ped/bikes	0.99		1.00	1.00		1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00		1.00	1.00	0.85	0.86	1.00	0.85
Flt Protected	1.00		0.95	1.00		0.95	0.96	1.00	1.00	1.00	1.00
Satd. Flow (prot)	6080		1641	4395		2857	1448	1415	1644	3762	1553
Flt Permitted	1.00		0.95	1.00		0.95	0.96	1.00	1.00	1.00	1.00
Satd. Flow (perm)	6080		1641	4395		2857	1448	1415	1644	3762	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	2037	827	44	788	10	518	11	150	92	1762	579
RTOR Reduction (vph)	0	0	0	1	0	0	0	89	24	0	0
Lane Group Flow (vph)	2864	0	44	797	0	352	177	61	68	1762	579
Confl. Peds. (#/hr)								4			
Confl. Bikes (#/hr)		11			2			4			6
Heavy Vehicles (%)	2%	3%	10%	18%	0%	15%	0%	11%	0%	1%	4%
Turn Type	NA		Prot	NA		Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3		4	4			3	3
Permitted Phases								4	3 6		
Actuated Green, G (s)	39.3		3.2	90.5		11.0	11.0	11.0	78.8	39.5	39.5
Effective Green, g (s)	39.3		3.2	90.5		11.0	11.0	11.0	78.8	39.5	39.5
Actuated g/C Ratio	0.36		0.03	0.82		0.10	0.10	0.10	0.72	0.36	0.36
Clearance Time (s)	4.5		4.0			4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0			2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	2172		47	3615		285	144	141	1177	1350	557
v/s Ratio Prot	c0.47		c0.03	0.18		c0.12	0.12			c0.47	0.37
v/s Ratio Perm								0.04	0.04		
v/c Ratio	1.43dr		0.94	0.22		1.24	1.23	0.43	0.06	1.31	1.04
Uniform Delay, d1	35.4		53.3	2.1		49.5	49.5	46.6	4.6	35.2	35.2
Progression Factor	0.93		1.39	1.06		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	143.7		103.2	0.0		132.3	149.4	0.8	0.0	142.8	48.8
Delay (s)	176.6		177.4	2.2		181.8	198.9	47.3	4.6	178.1	84.0
Level of Service	F		F	A		F	F	D	A	F	F
Approach Delay (s)	176.6			11.4			156.6				
Approach LOS	F			B			F				

Intersection Summary			
HCM 2000 Control Delay	144.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	124.3%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	367	161	287	146	69	54	425	470	1386	480	102
Future Volume (vph)	157	367	161	287	146	69	54	425	470	1386	480	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5	4.0	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1577	1578		2694	1660	1315	1624	2875	1387	3090	3065	1367
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1577	1578		2694	1660	1315	1624	2875	1387	3090	3065	1367
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	160	374	164	293	149	70	55	434	480	1414	490	104
RTOR Reduction (vph)	0	14	0	0	0	63	0	0	0	0	0	63
Lane Group Flow (vph)	160	524	0	293	149	7	55	434	480	1414	490	41
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA	Free	Split	NA	Perm
Protected Phases	8	8		7	7		6	6		2	2	
Permitted Phases						7			Free			2
Actuated Green, G (s)	23.0	23.0		11.0	11.0	11.0	15.5	15.5	110.0	43.5	43.5	43.5
Effective Green, g (s)	23.0	23.0		11.0	11.0	11.0	15.5	15.5	110.0	43.5	43.5	43.5
Actuated g/C Ratio	0.21	0.21		0.10	0.10	0.10	0.14	0.14	1.00	0.40	0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	329	329		269	166	131	228	405	1387	1221	1212	540
v/s Ratio Prot	0.10	c0.33		c0.11	0.09		0.03	c0.15		c0.46	0.16	
v/s Ratio Perm						0.01			0.35			0.03
v/c Ratio	0.49	1.59		1.09	0.90	0.05	0.24	1.07	0.35	1.16	0.40	0.08
Uniform Delay, d1	38.3	43.5		49.5	48.9	44.8	42.0	47.2	0.0	33.2	23.9	20.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	280.4		80.8	41.3	0.2	0.4	65.1	0.7	80.7	1.0	0.3
Delay (s)	39.1	323.9		130.3	90.2	45.0	42.4	112.4	0.7	113.9	24.9	21.0
Level of Service	D	F		F	F	D	D	F	A	F	C	C
Approach Delay (s)		258.6			107.0			53.1			87.4	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	110.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	114.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	102	2122	803	33	26	50
Future Volume (veh/h)	102	2122	803	33	26	50
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1633	1900	1900	1900
Adj Flow Rate, veh/h	104	2165	819	34	27	51
Adj No. of Lanes	1	3	3	0	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	17	17	0	0
Cap, veh/h	1105	4486	977	40	82	73
Arrive On Green	0.21	0.29	0.45	0.45	0.05	0.05
Sat Flow, veh/h	1774	5253	4530	181	1810	1615
Grp Volume(v), veh/h	104	2165	555	298	27	51
Grp Sat Flow(s),veh/h/ln	1774	1695	1486	1592	1810	1615
Q Serve(g_s), s	5.2	38.6	18.1	18.3	1.6	3.4
Cycle Q Clear(g_c), s	5.2	38.6	18.1	18.3	1.6	3.4
Prop In Lane	1.00			0.11	1.00	1.00
Lane Grp Cap(c), veh/h	1105	4486	663	355	82	73
V/C Ratio(X)	0.09	0.48	0.84	0.84	0.33	0.70
Avail Cap(c_a), veh/h	1105	4486	1811	970	197	176
HCM Platoon Ratio	0.33	0.33	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.97	0.97	1.00	1.00
Uniform Delay (d), s/veh	18.6	18.3	28.7	28.7	50.9	51.8
Incr Delay (d2), s/veh	0.0	0.4	11.6	20.2	0.9	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.6	25.4	13.2	15.0	1.5	2.9
LnGrp Delay(d),s/veh	18.6	18.7	40.4	48.9	51.8	56.3
LnGrp LOS	B	B	D	D	D	E
Approach Vol, veh/h		2269	853		78	
Approach Delay, s/veh		18.7	43.4		54.7	
Approach LOS		B	D		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		101.0			72.5	28.5		9.0
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0
Max Green Setting (Gmax), s		90.0			19.0	67.0		12.0
Max Q Clear Time (g_c+I1), s		40.6			7.2	20.3		5.4
Green Ext Time (p_c), s		19.5			8.5	4.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	26.1
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	2018	130	11	686	150	706
Future Volume (veh/h)	2018	130	11	686	150	706
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.96	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1865	1900	1727	1570	1810	1810
Adj Flow Rate, veh/h	2170	140	12	738	161	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	10	21	5	5
Cap, veh/h	2046	131	591	3495	193	303
Arrive On Green	0.84	0.84	0.72	1.00	0.11	0.00
Sat Flow, veh/h	5044	312	1645	4428	1723	2707
Grp Volume(v), veh/h	1504	806	12	738	161	0
Grp Sat Flow(s),veh/h/ln	1697	1794	1645	1429	1723	1354
Q Serve(g_s), s	46.2	46.2	0.2	0.0	10.1	0.0
Cycle Q Clear(g_c), s	46.2	46.2	0.2	0.0	10.1	0.0
Prop In Lane		0.17	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1424	753	591	3495	193	303
V/C Ratio(X)	1.06	1.07	0.02	0.21	0.83	0.00
Avail Cap(c_a), veh/h	1821	962	591	3495	580	911
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.93	0.93	1.00	0.00
Uniform Delay (d), s/veh	8.8	8.8	9.9	0.0	47.8	0.0
Incr Delay (d2), s/veh	38.9	51.3	0.0	0.1	3.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	48.7	56.1	0.2	0.1	8.6	0.0
LnGrp Delay(d),s/veh	47.7	60.1	9.9	0.1	51.5	0.0
LnGrp LOS	F	F	A	A	D	
Approach Vol, veh/h	2310			750	161	
Approach Delay, s/veh	52.0			0.3	51.5	
Approach LOS	D			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	38.6	55.1				93.7		16.3
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	2.6	59.0				65.0		37.0
Max Q Clear Time (g_c+I1), s	12.3	48.2				2.0		12.1
Green Ext Time (p_c), s	0.0	8.0				4.1		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	40.0
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	2309	255	359	477	102	105	159	779	249	251	115
Future Volume (veh/h)	160	2309	255	359	477	102	105	159	779	249	251	115
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
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	1810	1810	1882	1545	1540	1976	1583	1776	1792	1810	1810	1900
Adj Flow Rate, veh/h	163	2356	158	366	487	78	107	162	0	254	256	0
Adj No. of Lanes	1	3	1	2	3	0	1	1	1	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	5	5	5	23	25	25	20	7	6	5	5	0
Cap, veh/h	189	2553	808	280	1853	291	160	225	193	188	428	201
Arrive On Green	0.22	1.00	1.00	0.20	1.00	1.00	0.11	0.13	0.00	0.11	0.12	0.00
Sat Flow, veh/h	1723	4940	1563	2854	3656	573	1508	1776	1524	1723	3438	1615
Grp Volume(v), veh/h	163	2356	158	366	371	194	107	162	0	254	256	0
Grp Sat Flow(s),veh/h/ln	1723	1647	1563	1427	1401	1427	1508	1776	1524	1723	1719	1615
Q Serve(g_s), s	10.0	0.0	0.0	10.8	0.0	0.0	7.5	9.6	0.0	12.0	7.7	0.0
Cycle Q Clear(g_c), s	10.0	0.0	0.0	10.8	0.0	0.0	7.5	9.6	0.0	12.0	7.7	0.0
Prop In Lane	1.00		1.00	1.00		0.40	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	189	2553	808	280	1420	724	160	225	193	188	428	201
V/C Ratio(X)	0.86	0.92	0.20	1.31	0.26	0.27	0.67	0.72	0.00	1.35	0.60	0.00
Avail Cap(c_a), veh/h	282	2553	808	280	1420	724	165	468	402	188	888	417
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.51	0.51	0.51	0.89	0.89	0.89	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.1	0.0	0.0	44.2	0.0	0.0	47.3	46.2	0.0	49.0	45.6	0.0
Incr Delay (d2), s/veh	6.1	3.9	0.3	158.8	0.4	0.8	7.7	1.6	0.0	188.8	0.5	0.0
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(95%),veh/ln	7.6	1.6	0.1	18.7	0.1	0.3	6.2	8.4	0.0	28.0	6.7	0.0
LnGrp Delay(d),s/veh	48.2	3.9	0.3	203.0	0.4	0.8	55.0	47.8	0.0	237.8	46.1	0.0
LnGrp LOS	D	A	A	F	A	A	E	D		F	D	
Approach Vol, veh/h		2677			931			269			510	
Approach Delay, s/veh		6.3			80.1			50.7			141.6	
Approach LOS		A			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	61.1	15.7	18.3	16.1	60.0	16.0	17.9
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax)	11 s	* 42	12.0	28.4	18.0	* 35	12.0	29.0
Max Q Clear Time (g_c+I1),	12.8 s	2.0	9.5	9.7	12.0	2.0	14.0	11.6
Green Ext Time (p_c), s	0.0	26.5	0.2	0.9	0.2	23.2	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	40.4
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	408	2748	170	34	544	19	145	416	183	236	75	249
Future Volume (veh/h)	408	2748	170	34	544	19	145	416	183	236	75	249
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	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	1845	1845	1681	1338	1550	1900	1429	1776	1792	1610	1532	1652
Adj Flow Rate, veh/h	421	2833	123	35	561	20	149	429	91	243	300	61
Adj No. of Lanes	2	3	1	2	3	0	1	2	1	1	1	2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97
Percent Heavy Veh, %	3	3	13	42	23	23	33	7	6	18	24	15
Cap, veh/h	496	2472	688	490	2304	82	168	417	184	321	320	502
Arrive On Green	0.19	0.65	0.65	0.20	0.55	0.55	0.12	0.12	0.12	0.21	0.21	0.21
Sat Flow, veh/h	3408	5036	1401	2472	4196	149	1361	3374	1490	1533	1532	2402
Grp Volume(v), veh/h	421	2833	123	35	376	205	149	429	91	243	300	61
Grp Sat Flow(s),veh/h/ln	1704	1679	1401	1236	1411	1524	1361	1687	1490	1533	1532	1201
Q Serve(g_s), s	13.1	54.0	3.8	1.3	7.6	7.7	11.9	13.6	6.3	16.4	21.2	2.3
Cycle Q Clear(g_c), s	13.1	54.0	3.8	1.3	7.6	7.7	11.9	13.6	6.3	16.4	21.2	2.3
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	496	2472	688	490	1550	837	168	417	184	321	320	502
V/C Ratio(X)	0.85	1.15	0.18	0.07	0.24	0.24	0.89	1.03	0.49	0.76	0.94	0.12
Avail Cap(c_a), veh/h	620	2472	688	490	1550	837	168	417	184	321	320	502
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.2	19.1	10.4	35.9	12.9	12.9	47.4	48.2	45.0	40.9	42.8	35.3
Incr Delay (d2), s/veh	0.9	66.2	0.1	0.0	0.4	0.7	37.8	51.5	0.8	9.0	33.6	0.0
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(95%),veh/ln	7.5	69.5	2.0	0.8	5.5	6.1	10.3	16.7	4.7	12.3	17.6	1.4
LnGrp Delay(d),s/veh	44.1	85.3	10.4	35.9	13.3	13.6	85.2	99.7	45.8	49.9	76.4	35.3
LnGrp LOS	D	F	B	D	B	B	F	F	D	D	E	D
Approach Vol, veh/h		3377			616			669			604	
Approach Delay, s/veh		77.4			14.7			89.2			61.6	
Approach LOS		E			B			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.0	65.6		27.6	27.0	58.6		17.8
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	20.0	36.0		23.0	2.0	* 54		13.6
Max Q Clear Time (g_c+I1), s	15.1	9.7		23.2	3.3	56.0		15.6
Green Ext Time (p_c), s	0.9	4.0		0.0	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	69.8
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	2197	53	91	384	7	46	25	784	7	6	6
Future Volume (veh/h)	16	2197	53	91	384	7	46	25	784	7	6	6
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		0.99	1.00		0.99
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	1776	1810	1900	1407	1525	1900	1900	1849	1863	1900	1900	1900
Adj Flow Rate, veh/h	17	2313	55	96	404	6	0	0	685	7	6	2
Adj No. of Lanes	1	2	0	1	2	0	0	1	2	0	1	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, %	7	5	5	35	25	25	0	0	2	0	0	0
Cap, veh/h	19	2144	51	288	2437	36	0	370	625	144	115	32
Arrive On Green	0.01	0.63	0.63	0.22	0.83	0.83	0.00	0.00	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1691	3431	81	1340	2923	43	0	1849	3127	458	576	159
Grp Volume(v), veh/h	17	1154	1214	96	200	210	0	0	685	15	0	0
Grp Sat Flow(s),veh/h/ln	1691	1719	1793	1340	1449	1517	0	1849	1564	1193	0	0
Q Serve(g_s), s	1.0	62.5	62.5	6.1	2.7	2.7	0.0	0.0	20.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.0	62.5	62.5	6.1	2.7	2.7	0.0	0.0	20.0	0.7	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.03	0.00		1.00	0.47		0.13
Lane Grp Cap(c), veh/h	19	1075	1121	288	1208	1265	0	370	625	291	0	0
V/C Ratio(X)	0.89	1.07	1.08	0.33	0.17	0.17	0.00	0.00	1.10	0.05	0.00	0.00
Avail Cap(c_a), veh/h	51	1075	1121	288	1208	1265	0	370	625	291	0	0
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	1.00	1.00	0.86	0.86	0.86	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.4	18.8	18.8	33.2	1.6	1.6	0.0	0.0	40.0	32.3	0.0	0.0
Incr Delay (d2), s/veh	35.4	49.4	52.6	0.2	0.3	0.2	0.0	0.0	64.8	0.0	0.0	0.0
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(95%),veh/ln	1.2	79.2	84.4	4.1	2.1	2.1	0.0	0.0	25.6	0.6	0.0	0.0
LnGrp Delay(d),s/veh	84.8	68.2	71.3	33.4	1.9	1.8	0.0	0.0	104.8	32.3	0.0	0.0
LnGrp LOS	F	F	F	C	A	A			F	C		
Approach Vol, veh/h		2385			506			685			15	
Approach Delay, s/veh		69.9			7.8			104.8			32.3	
Approach LOS		E			A			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.5	67.0		24.0	5.1	88.4		24.0
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	5.0	* 63		20.0	3.0	64.5		20.0
Max Q Clear Time (g_c+I1), s	3.1	64.5		2.7	3.0	4.7		22.0
Green Ext Time (p_c), s	0.0	0.0		1.7	0.0	1.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	67.7
HCM 2010 LOS	E

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	555	2404	0	0	396	18	5	0	8	7	0	81
Future Volume (veh/h)	555	2404	0	0	396	18	5	0	8	7	0	81
Number	7	4	14	3	8	18	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		1.00	1.00		1.00	1.00		1.00	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	1845	1827	1900	0	1484	1900	1900	1863	1900	1900	1597	1900
Adj Flow Rate, veh/h	584	2531	0	0	417	16	5	0	9	7	0	6
Adj No. of Lanes	1	2	0	0	2	0	0	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.95	0.92	0.95
Percent Heavy Veh, %	3	4	4	0	28	28	2	2	2	0	2	2
Cap, veh/h	623	2553	0	0	939	36	101	0	182	193	0	141
Arrive On Green	0.35	0.74	0.00	0.00	0.34	0.34	0.17	0.00	0.17	0.11	0.00	0.11
Sat Flow, veh/h	1757	3563	0	0	2843	106	588	0	1058	1810	0	1321
Grp Volume(v), veh/h	584	2531	0	0	212	221	14	0	0	7	0	6
Grp Sat Flow(s),veh/h/ln	1757	1736	0	0	1410	1465	1647	0	0	1810	0	1321
Q Serve(g_s), s	34.7	76.9	0.0	0.0	12.6	12.7	0.8	0.0	0.0	0.4	0.0	0.4
Cycle Q Clear(g_c), s	34.7	76.9	0.0	0.0	12.6	12.7	0.8	0.0	0.0	0.4	0.0	0.4
Prop In Lane	1.00		0.00	0.00		0.07	0.36		0.64	1.00		1.00
Lane Grp Cap(c), veh/h	623	2553	0	0	478	497	283	0	0	193	0	141
V/C Ratio(X)	0.94	0.99	0.00	0.00	0.44	0.45	0.05	0.00	0.00	0.04	0.00	0.04
Avail Cap(c_a), veh/h	773	2555	0	0	478	497	283	0	0	193	0	141
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)	0.09	0.09	0.00	0.00	0.87	0.87	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.7	14.0	0.0	0.0	27.8	27.8	37.3	0.0	0.0	43.3	0.0	43.3
Incr Delay (d2), s/veh	2.2	3.7	0.0	0.0	0.6	0.5	0.3	0.0	0.0	0.4	0.0	0.6
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(95%),veh/ln	9.1	40.2	0.0	0.0	8.4	8.7	0.7	0.0	0.0	0.4	0.0	0.3
LnGrp Delay(d),s/veh	35.9	17.7	0.0	0.0	28.3	28.3	37.7	0.0	0.0	43.6	0.0	43.9
LnGrp LOS	D	B			C	C	D			D		D
Approach Vol, veh/h		3115			433			14			13	
Approach Delay, s/veh		21.1			28.3			37.7			43.7	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6	7	8
Phs Duration (G+Y+Rc), s		23.5		83.9		16.0	42.8	41.1
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		4.0		79.5		11.5	47.5	27.5
Max Q Clear Time (g_c+I1), s		2.8		78.9		2.4	36.7	14.7
Green Ext Time (p_c), s		0.0		0.5		0.0	1.6	12.3

Intersection Summary		
HCM 2010 Ctrl Delay		22.1
HCM 2010 LOS		C



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	1039	527	6	120	184	14
Future Volume (veh/h)	1039	527	6	120	184	14
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	1267	643	7	146	240	0
Adj No. of Lanes	1	1	0	1	2	1
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	0
Cap, veh/h	1420	1207	77	1183	360	164
Arrive On Green	0.76	0.76	0.76	0.76	0.10	0.00
Sat Flow, veh/h	1863	1583	22	1552	3548	1615
Grp Volume(v), veh/h	1267	643	153	0	240	0
Grp Sat Flow(s),veh/h/ln	1863	1583	1574	0	1774	1615
Q Serve(g_s), s	31.5	10.1	0.4	0.0	4.1	0.0
Cycle Q Clear(g_c), s	31.5	10.1	31.9	0.0	4.1	0.0
Prop In Lane		1.00	0.05		1.00	1.00
Lane Grp Cap(c), veh/h	1420	1207	1260	0	360	164
V/C Ratio(X)	0.89	0.53	0.12	0.00	0.67	0.00
Avail Cap(c_a), veh/h	1900	1615	1625	0	1026	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	5.5	3.0	2.0	0.0	27.0	0.0
Incr Delay (d2), s/veh	3.8	0.1	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	23.7	7.7	1.2	0.0	3.6	0.0
LnGrp Delay(d),s/veh	9.3	3.1	2.0	0.0	27.8	0.0
LnGrp LOS	A	A	A		C	
Approach Vol, veh/h	1910			153	240	
Approach Delay, s/veh	7.2			2.0	27.8	
Approach LOS	A			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		51.9		10.3		51.9		
Change Period (Y+Rc), s		4.5		4.0		4.5		
Max Green Setting (Gmax), s		63.5		18.0		63.5		
Max Q Clear Time (g_c+I1), s		33.5		6.1		33.9		
Green Ext Time (p_c), s		13.6		0.3		13.5		

Intersection Summary	
HCM 2010 Ctrl Delay	9.0
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	0	34	540	881	0	0
Future Volume (Veh/h)	0	34	540	881	0	0
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	37	587	958	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	587	294			1545	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	587	294			1545	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	445	709			426	

Direction, Lane #	WB 1	NE 1	NE 2	NE 3
Volume Total	37	391	515	639
Volume Left	0	0	0	0
Volume Right	37	0	319	639
cSH	709	1700	1700	1700
Volume to Capacity	0.05	0.23	0.30	0.38
Queue Length 95th (ft)	4	0	0	0
Control Delay (s)	10.4	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.4	0.0		
Approach LOS	B			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	289	209	895	258	272	195	62	441	185	785	160
Future Volume (veh/h)	105	289	209	895	258	272	195	62	441	185	785	160
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1610	1785	1727	1520	1681	1792	1696	1570	1759	1776	1810	1827
Adj Flow Rate, veh/h	109	301	0	932	269	0	203	65	0	193	818	0
Adj No. of Lanes	1	2	1	3	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	18	6	10	25	13	6	12	21	8	7	5	4
Cap, veh/h	161	374	154	1048	432	391	230	346	173	612	1171	529
Arrive On Green	0.10	0.10	0.00	0.26	0.26	0.00	0.14	0.12	0.00	0.36	0.34	0.00
Sat Flow, veh/h	1533	3571	1468	4082	1681	1524	1616	2983	1495	1691	3438	1553
Grp Volume(v), veh/h	109	301	0	932	269	0	203	65	0	193	818	0
Grp Sat Flow(s),veh/h/ln	1533	1785	1468	1361	1681	1524	1616	1492	1495	1691	1719	1553
Q Serve(g_s), s	7.5	9.1	0.0	24.2	15.6	0.0	13.6	2.2	0.0	9.0	22.6	0.0
Cycle Q Clear(g_c), s	7.5	9.1	0.0	24.2	15.6	0.0	13.6	2.2	0.0	9.0	22.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	161	374	154	1048	432	391	230	346	173	612	1171	529
V/C Ratio(X)	0.68	0.80	0.00	0.89	0.62	0.00	0.88	0.19	0.00	0.32	0.70	0.00
Avail Cap(c_a), veh/h	181	422	174	1095	451	409	279	852	427	612	1171	529
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	1.00	0.00	0.72	0.72	0.00	1.00	1.00	0.00	0.83	0.83	0.00
Uniform Delay (d), s/veh	47.5	48.1	0.0	39.4	36.2	0.0	46.3	43.9	0.0	25.3	31.4	0.0
Incr Delay (d2), s/veh	6.1	8.5	0.0	6.7	1.8	0.0	20.9	0.1	0.0	0.1	2.9	0.0
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(95%),veh/ln	6.2	8.6	0.0	14.0	11.3	0.0	11.8	1.6	0.0	7.3	16.1	0.0
LnGrp Delay(d),s/veh	53.5	56.7	0.0	46.1	38.0	0.0	67.2	44.0	0.0	25.4	34.3	0.0
LnGrp LOS	D	E		D	D		E	D		C	C	
Approach Vol, veh/h		410			1201			268			1011	
Approach Delay, s/veh		55.8			44.3			61.6			32.6	
Approach LOS		E			D			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.7	42.1		15.5	44.4	17.4		32.7
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	9.6	31.4		13.0	19.0	* 31		29.5
Max Q Clear Time (g_c+I1), s	11.6	24.6		11.1	11.0	4.2		26.2
Green Ext Time (p_c), s	0.1	3.5		0.3	3.9	0.2		2.1

Intersection Summary	
HCM 2010 Ctrl Delay	43.4
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	342	433	43	425	31	451	1144	960	19	109	549
Future Volume (veh/h)	140	342	433	43	425	31	451	1144	960	19	109	549
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.97	1.00		1.00	1.00		0.84
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	1532	1776	1652	1667	1275	1624	1727	1810	1863	1900	1845	1520
Adj Flow Rate, veh/h	147	360	102	45	447	6	475	1204	0	20	115	165
Adj No. of Lanes	2	1	2	1	3	1	2	2	1	1	1	2
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, %	24	7	15	14	49	17	10	5	2	0	3	25
Cap, veh/h	154	355	464	65	648	249	1531	1649	760	225	229	237
Arrive On Green	0.09	0.33	0.33	0.04	0.19	0.19	0.16	0.16	0.00	0.12	0.12	0.12
Sat Flow, veh/h	2831	1776	2318	1587	3481	1336	3191	3438	1583	1810	1845	1914
Grp Volume(v), veh/h	147	360	102	45	447	6	475	1204	0	20	115	165
Grp Sat Flow(s),veh/h/ln	1416	1776	1159	1587	1160	1336	1596	1719	1583	1810	1845	957
Q Serve(g_s), s	5.7	22.0	3.5	3.1	13.2	0.4	14.5	36.7	0.0	1.1	6.4	9.1
Cycle Q Clear(g_c), s	5.7	22.0	3.5	3.1	13.2	0.4	14.5	36.7	0.0	1.1	6.4	9.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	154	355	464	65	648	249	1531	1649	760	225	229	237
V/C Ratio(X)	0.95	1.01	0.22	0.70	0.69	0.02	0.31	0.73	0.00	0.09	0.50	0.69
Avail Cap(c_a), veh/h	154	355	464	87	696	267	1531	1649	760	362	369	383
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	0.61	0.61	0.61	1.00	1.00	1.00	0.09	0.09	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.8	36.6	30.5	52.1	41.8	36.6	30.2	39.5	0.0	42.7	45.0	46.2
Incr Delay (d2), s/veh	43.0	40.8	0.1	7.1	2.1	0.0	0.0	0.3	0.0	0.1	0.6	1.4
Initial Q Delay(d3),s/veh	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.4	26.5	2.0	2.7	7.8	0.3	7.7	19.6	0.0	1.0	5.9	4.4
LnGrp Delay(d),s/veh	92.8	77.5	30.6	59.1	43.9	36.6	30.2	39.8	0.0	42.7	45.6	47.5
LnGrp LOS	F	F	C	E	D	D	C	D		D	D	D
Approach Vol, veh/h		609			498			1679			300	
Approach Delay, s/veh		73.3			45.2			37.1			46.5	
Approach LOS		E			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.5	26.0		57.4	10.0	24.5		18.1
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	6.0	22.0		42.9	6.0	22.0		22.0
Max Q Clear Time (g_c+I1), s	5.1	24.0		38.7	7.7	15.2		11.1
Green Ext Time (p_c), s	0.3	0.0		2.7	0.0	1.4		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	46.4
HCM 2010 LOS	D

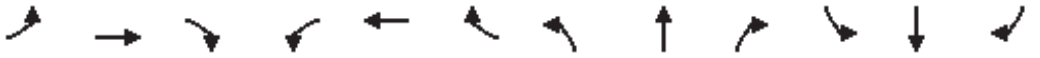
Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2369	80	571	69	60	23	395	233	15	67	420	109
Future Volume (vph)	2369	80	571	69	60	23	395	233	15	67	420	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1649	1662	2697		1802	1588	1597	3233		1805	3374	1122
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1649	1662	2697		1802	1588	1597	3233		1805	3374	1122
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	2442	82	589	71	62	24	407	240	15	69	433	112
RTOR Reduction (vph)	0	0	108	0	0	23	0	4	0	0	0	101
Lane Group Flow (vph)	1270	1254	481	0	133	1	407	251	0	69	433	11
Confl. Peds. (#/hr)	3		3	3		3			3	3		3
Confl. Bikes (#/hr)									13			
Heavy Vehicles (%)	4%	0%	3%	5%	0%	0%	13%	11%	0%	0%	7%	39%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	62.0	62.0	62.0		6.0	6.0	14.0	22.0		3.0	11.0	11.0
Effective Green, g (s)	62.0	62.0	62.0		6.0	6.0	14.0	22.0		3.0	11.0	11.0
Actuated g/C Ratio	0.56	0.56	0.56		0.05	0.05	0.13	0.20		0.03	0.10	0.10
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	929	936	1520		98	86	203	646		49	337	112
v/s Ratio Prot	c0.77	0.75			c0.07		c0.25	0.08		0.04	c0.13	
v/s Ratio Perm			0.18			0.00						0.01
v/c Ratio	1.37	1.34	0.32		1.36	0.02	2.00	0.39		1.41	1.28	0.10
Uniform Delay, d1	24.0	24.0	12.7		52.0	49.2	48.0	38.2		53.5	49.5	45.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.79	0.84		0.87	1.12	2.05
Incremental Delay, d2	172.1	160.1	0.0		213.3	0.0	468.5	1.7		263.2	147.1	1.6
Delay (s)	196.1	184.1	12.8		265.3	49.2	506.3	33.6		309.6	202.6	93.8
Level of Service	F	F	B		F	D	F	C		F	F	F
Approach Delay (s)		156.6			232.3			324.2			194.8	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	188.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.45		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	118.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1	11	507	2	165	15	452	1435	571	490	14
Future Volume (vph)	26	1	11	507	2	165	15	452	1435	571	490	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.83	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1812	1334	1417	1423	1239	1805	3343	1517	3367	3393	
Flt Permitted		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1812	1334	1417	1423	1239	1805	3343	1517	3367	3393	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	28	1	12	545	2	177	16	486	1543	614	527	15
RTOR Reduction (vph)	0	0	12	0	0	142	0	0	334	0	2	0
Lane Group Flow (vph)	0	29	0	272	275	35	16	486	1209	614	540	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)									15			21
Heavy Vehicles (%)	0%	0%	0%	21%	0%	27%	0%	8%	3%	4%	6%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		2.0	2.0	22.0	22.0	22.0	1.2	55.0	55.0	15.0	68.8	
Effective Green, g (s)		2.0	2.0	22.0	22.0	22.0	1.2	55.0	55.0	15.0	68.8	
Actuated g/C Ratio		0.02	0.02	0.20	0.20	0.20	0.01	0.50	0.50	0.14	0.63	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		32	24	283	284	247	19	1671	758	459	2122	
v/s Ratio Prot		c0.02		0.19	c0.19		0.01	0.15		c0.18	0.16	
v/s Ratio Perm			0.00			0.03			c0.80			
v/c Ratio		0.91	0.01	0.96	0.97	0.14	0.84	0.29	1.59	1.34	0.25	
Uniform Delay, d1		53.9	53.0	43.6	43.7	36.2	54.3	16.1	27.5	47.5	9.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.48	2.52	
Incremental Delay, d2		117.7	0.1	42.5	44.0	0.1	128.3	0.0	274.0	161.4	0.2	
Delay (s)		171.6	53.1	86.1	87.6	36.3	182.6	16.1	301.5	231.6	23.3	
Level of Service		F	D	F	F	D	F	B	F	F	C	
Approach Delay (s)		136.9			74.5			232.7			133.9	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	174.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL2	WBT	WBR	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations											
Traffic Volume (vph)	754	262	160	3316	10	1720	6	100	484	375	145
Future Volume (vph)	754	262	160	3316	10	1720	6	100	484	375	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5		4.0	4.0	4.0	4.5	4.5	4.5
Lane Util. Factor	0.86		1.00	0.91		0.91	0.91	1.00	1.00	*1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00		1.00	1.00	0.85	0.86	1.00	0.85
Flt Protected	1.00		0.95	1.00		0.95	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	6122		1641	4396		2857	1435	1428	1644	3762	1553
Flt Permitted	1.00		0.95	1.00		0.95	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	6122		1641	4396		2857	1435	1428	1644	3762	1553
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.96
Adj. Flow (vph)	785	273	167	3454	10	1792	7	104	504	391	151
RTOR Reduction (vph)	0	0	0	0	0	0	0	69	27	0	0
Lane Group Flow (vph)	1058	0	167	3464	0	1201	598	35	477	391	151
Confl. Peds. (#/hr)								4			
Confl. Bikes (#/hr)		2			2			2			2
Heavy Vehicles (%)	2%	3%	10%	18%	0%	15%	0%	11%	0%	1%	4%
Turn Type	NA		Prot	NA		Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3		4	4			3	3
Permitted Phases								4	3 6		
Actuated Green, G (s)	22.0		10.0	68.5		33.0	33.0	33.0	50.0	28.0	28.0
Effective Green, g (s)	22.0		10.0	68.5		33.0	33.0	33.0	50.0	28.0	28.0
Actuated g/C Ratio	0.20		0.09	0.62		0.30	0.30	0.30	0.45	0.25	0.25
Clearance Time (s)	4.5		4.0			4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0			2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	1224		149	2737		857	430	428	747	957	395
v/s Ratio Prot	0.17		0.10	c0.79		c0.42	0.42			0.10	0.10
v/s Ratio Perm								0.02	0.29		
v/c Ratio	0.86		1.12	1.27		1.40	1.39	0.08	0.64	0.41	0.38
Uniform Delay, d1	42.6		50.0	20.8		38.5	38.5	27.6	23.1	34.1	33.9
Progression Factor	1.25		1.11	0.87		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2		63.1	119.7		187.7	189.6	0.0	1.3	0.1	0.2
Delay (s)	58.2		118.5	137.8		226.2	228.1	27.7	24.4	34.2	34.1
Level of Service	E		F	F		F	F	C	C	C	C
Approach Delay (s)	58.2			136.9			215.9				
Approach LOS	E			F			F				

Intersection Summary			
HCM 2000 Control Delay	131.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	137.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	172	151	1221	559	718	65	488	135	663	461	155
Future Volume (vph)	161	172	151	1221	559	718	65	488	135	663	461	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1577	1528		2694	1660	1332	1624	4029		3090	3065	1338
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1577	1528		2694	1660	1332	1624	4029		3090	3065	1338
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	168	179	157	1272	582	748	68	508	141	691	480	161
RTOR Reduction (vph)	0	29	0	0	0	331	0	0	0	0	0	130
Lane Group Flow (vph)	168	307	0	1272	582	417	68	649	0	691	480	31
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	8	8		7	7		6	6		2	2	
Permitted Phases						7						2
Actuated Green, G (s)	16.0	16.0		42.0	42.0	42.0	13.5	13.5		21.5	21.5	21.5
Effective Green, g (s)	16.0	16.0		42.0	42.0	42.0	13.5	13.5		21.5	21.5	21.5
Actuated g/C Ratio	0.15	0.15		0.38	0.38	0.38	0.12	0.12		0.20	0.20	0.20
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	229	222		1028	633	508	199	494		603	599	261
v/s Ratio Prot	0.11	c0.20		c0.47	0.35		0.04	c0.16		c0.22	0.16	
v/s Ratio Perm						0.31						0.02
v/c Ratio	0.73	1.38		1.24	0.92	0.82	0.34	1.31		1.15	0.80	0.12
Uniform Delay, d1	45.0	47.0		34.0	32.4	30.6	44.2	48.2		44.2	42.2	36.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.04	1.02		1.00	1.00	1.00
Incremental Delay, d2	10.9	197.7		115.3	18.4	10.2	0.6	152.7		84.0	10.8	0.9
Delay (s)	55.8	244.7		149.3	50.8	40.8	46.5	202.0		128.2	53.0	37.4
Level of Service	E	F		F	D	D	D	F		F	D	D
Approach Delay (s)		181.7			96.1			187.2			90.2	
Approach LOS		F			F			F			F	

Intersection Summary					
HCM 2000 Control Delay	115.6	HCM 2000 Level of Service	F		
HCM 2000 Volume to Capacity ratio	1.25				
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0		
Intersection Capacity Utilization	108.8%	ICU Level of Service	G		
Analysis Period (min)	15				
c Critical Lane Group					



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	908	3611	192	22	160
Future Volume (veh/h)	62	908	3611	192	22	160
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1636	1900	1900	1900
Adj Flow Rate, veh/h	63	927	3685	196	22	35
Adj No. of Lanes	1	3	3	0	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	17	17	0	0
Cap, veh/h	200	4549	3235	169	59	53
Arrive On Green	0.04	0.30	1.00	1.00	0.03	0.03
Sat Flow, veh/h	1774	5253	4487	226	1810	1615
Grp Volume(v), veh/h	63	927	2505	1376	22	35
Grp Sat Flow(s),veh/h/ln	1774	1695	1489	1589	1810	1615
Q Serve(g_s), s	3.8	15.0	82.0	78.5	1.3	2.4
Cycle Q Clear(g_c), s	3.8	15.0	82.0	78.5	1.3	2.4
Prop In Lane	1.00			0.14	1.00	1.00
Lane Grp Cap(c), veh/h	200	4549	2220	1184	59	53
V/C Ratio(X)	0.31	0.20	1.13	1.16	0.37	0.66
Avail Cap(c_a), veh/h	200	4549	2220	1184	66	59
HCM Platoon Ratio	0.33	0.33	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.09	0.09	1.00	1.00
Uniform Delay (d), s/veh	48.8	9.4	0.0	0.0	52.1	52.6
Incr Delay (d2), s/veh	0.3	0.1	58.5	73.9	1.4	15.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.4	11.5	32.3	43.1	1.2	2.3
LnGrp Delay(d),s/veh	49.1	9.5	58.5	73.9	53.5	68.3
LnGrp LOS	D	A	F	F	D	E
Approach Vol, veh/h		990	3881		57	
Approach Delay, s/veh		12.0	63.9		62.6	
Approach LOS		B	E		E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		102.4			16.4	86.0		7.6
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0
Max Green Setting (Gmax), s		98.0			12.0	82.0		4.0
Max Q Clear Time (g_c+I1), s		17.0			5.8	84.0		4.4
Green Ext Time (p_c), s		5.1			2.5	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	53.5
HCM 2010 LOS	D



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	790	140	13	3474	330	343
Future Volume (veh/h)	790	140	13	3474	330	343
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1868	1900	1727	1570	1810	1810
Adj Flow Rate, veh/h	849	140	14	3735	355	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	10	21	5	5
Cap, veh/h	3319	544	15	3429	219	345
Arrive On Green	1.00	1.00	0.01	0.80	0.13	0.00
Sat Flow, veh/h	4568	721	1645	4428	1723	2707
Grp Volume(v), veh/h	655	334	14	3735	355	0
Grp Sat Flow(s),veh/h/ln	1700	1720	1645	1429	1723	1354
Q Serve(g_s), s	0.0	0.0	0.9	88.0	14.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.9	88.0	14.0	0.0
Prop In Lane		0.42	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2565	1297	15	3429	219	345
V/C Ratio(X)	0.26	0.26	0.92	1.09	1.62	0.00
Avail Cap(c_a), veh/h	2565	1297	60	3429	219	345
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.09	0.09	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	54.4	11.0	48.0	0.0
Incr Delay (d2), s/veh	0.2	0.5	7.7	40.7	298.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.3	0.8	81.4	44.7	0.0
LnGrp Delay(d),s/veh	0.2	0.5	62.2	51.7	346.4	0.0
LnGrp LOS	A	A	E	F	F	
Approach Vol, veh/h	989			3749	355	
Approach Delay, s/veh	0.3			51.7	346.4	
Approach LOS	A			D	F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.0	87.0				92.0		18.0
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	1.0	80.0				88.0		14.0
Max Q Clear Time (g_c+I1), s	2.9	2.0				90.0		16.0
Green Ext Time (p_c), s	0.0	74.2				0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	62.3
HCM 2010 LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	146	820	167	881	1784	527	605	201	285	90	377	1098
Future Volume (veh/h)	146	820	167	881	1784	527	605	201	285	90	377	1098
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98	1.00		1.00	1.00		1.00
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	1810	1810	1882	1545	1545	1976	1583	1776	1792	1810	1810	1900
Adj Flow Rate, veh/h	151	845	172	908	1839	543	624	207	0	93	389	0
Adj No. of Lanes	1	3	1	2	3	0	1	1	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	23	25	25	20	7	6	5	5	0
Cap, veh/h	94	1060	330	960	1622	459	302	264	227	261	325	153
Arrive On Green	0.02	0.07	0.07	0.45	0.66	0.66	0.20	0.15	0.00	0.15	0.09	0.00
Sat Flow, veh/h	1723	4940	1538	2854	3255	922	1508	1776	1524	1723	3438	1615
Grp Volume(v), veh/h	151	845	172	908	1579	803	624	207	0	93	389	0
Grp Sat Flow(s),veh/h/ln	1723	1647	1538	1427	1406	1364	1508	1776	1524	1723	1719	1615
Q Serve(g_s), s	6.0	18.5	7.7	33.5	54.8	54.8	22.0	12.4	0.0	5.3	10.4	0.0
Cycle Q Clear(g_c), s	6.0	18.5	7.7	33.5	54.8	54.8	22.0	12.4	0.0	5.3	10.4	0.0
Prop In Lane	1.00		1.00	1.00		0.68	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	94	1060	330	960	1401	680	302	264	227	261	325	153
V/C Ratio(X)	1.61	0.80	0.52	0.95	1.13	1.18	2.07	0.78	0.00	0.36	1.20	0.00
Avail Cap(c_a), veh/h	94	1060	330	1033	1401	680	302	387	332	261	325	153
HCM Platoon Ratio	0.33	0.33	0.33	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	0.95	0.09	0.09	0.09	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.0	48.8	19.3	29.4	18.6	18.6	44.0	45.1	0.0	41.9	49.8	0.0
Incr Delay (d2), s/veh	314.6	6.0	5.5	2.1	58.0	83.4	492.4	3.4	0.0	0.3	114.6	0.0
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(95%),veh/ln	19.9	13.8	6.8	15.1	56.6	63.1	90.7	10.4	0.0	4.6	18.2	0.0
LnGrp Delay(d),s/veh	368.6	54.7	24.8	31.5	76.5	101.9	536.4	48.5	0.0	42.2	164.4	0.0
LnGrp LOS	F	D	C	C	F	F	F	D		D	F	
Approach Vol, veh/h		1168			3290			831			482	
Approach Delay, s/veh		90.9			70.3			414.8			140.8	
Approach LOS		F			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	41.2	27.8	26.0	15.0	10.0	59.0	20.6	20.4
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax), s	* 46	* 21	22.0	10.4	6.0	* 55	9.0	24.0
Max Q Clear Time (g_c+I1), s	35.5	20.5	24.0	12.4	8.0	56.8	7.3	14.4
Green Ext Time (p_c), s	1.5	0.3	0.0	0.0	0.0	0.0	0.5	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	130.0
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	282	769	136	313	2600	14	250	61	45	41	244	342
Future Volume (veh/h)	282	769	136	313	2600	14	250	61	45	41	244	342
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	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	1845	1845	1681	1338	1546	1900	1429	1776	1792	1610	1532	1652
Adj Flow Rate, veh/h	291	793	140	323	2680	14	258	63	46	42	976	353
Adj No. of Lanes	2	3	1	2	3	0	1	2	1	1	1	2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97
Percent Heavy Veh, %	3	3	13	42	23	23	33	7	6	18	24	15
Cap, veh/h	186	1483	411	520	1974	10	96	239	105	410	410	643
Arrive On Green	0.07	0.39	0.39	0.21	0.46	0.46	0.07	0.07	0.07	0.27	0.27	0.27
Sat Flow, veh/h	3408	5036	1394	2472	4332	23	1361	3374	1479	1533	1532	2406
Grp Volume(v), veh/h	291	793	140	323	1739	955	258	63	46	42	976	353
Grp Sat Flow(s),veh/h/ln	1704	1679	1394	1236	1406	1541	1361	1687	1479	1533	1532	1203
Q Serve(g_s), s	6.0	13.3	7.8	13.1	50.1	50.1	7.8	1.9	3.3	2.3	29.4	13.9
Cycle Q Clear(g_c), s	6.0	13.3	7.8	13.1	50.1	50.1	7.8	1.9	3.3	2.3	29.4	13.9
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	186	1483	411	520	1282	702	96	239	105	410	410	643
V/C Ratio(X)	1.57	0.53	0.34	0.62	1.36	1.36	2.67	0.26	0.44	0.10	2.38	0.55
Avail Cap(c_a), veh/h	186	1483	411	520	1282	702	96	239	105	410	410	643
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.59	0.59	0.59	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.0	27.7	26.0	39.5	29.9	29.9	51.1	48.4	49.0	30.4	40.3	34.6
Incr Delay (d2), s/veh	269.4	0.8	1.3	1.7	165.7	170.9	782.1	0.2	1.1	0.0	629.9	0.6
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(95%),veh/ln	7.6	9.4	5.4	8.1	88.0	98.3	43.0	1.7	2.5	1.7	151.3	8.2
LnGrp Delay(d),s/veh	320.4	28.5	27.3	41.2	195.7	200.8	833.2	48.6	50.1	30.4	670.2	35.2
LnGrp LOS	F	C	C	D	F	F	F	D	D	C	F	D
Approach Vol, veh/h		1224			3017			367			1371	
Approach Delay, s/veh		97.7			180.7			600.4			487.1	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	54.7		34.0	27.7	37.0		12.0
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	6.0	49.4		29.4	23.0	* 32		7.8
Max Q Clear Time (g_c+I1), s	8.0	52.1		31.4	15.1	15.3		9.8
Green Ext Time (p_c), s	0.0	0.0		0.0	7.4	3.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	259.8
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	597	49	797	2048	6	77	9	72	11	24	23
Future Volume (veh/h)	4	597	49	797	2048	6	77	9	72	11	24	23
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00	0.99		0.99	0.99		0.99
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	1776	1811	1900	1407	1521	1900	1900	1752	1863	1900	1900	1900
Adj Flow Rate, veh/h	4	628	52	839	2156	6	81	9	23	12	25	3
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	0	1	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, %	7	5	5	35	25	25	0	0	2	0	0	0
Cap, veh/h	4	689	57	722	2235	6	169	15	182	58	93	8
Arrive On Green	0.00	0.22	0.22	0.72	1.00	1.00	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1691	3206	265	1340	2956	8	863	129	1563	93	800	72
Grp Volume(v), veh/h	4	337	343	839	1053	1109	90	0	23	40	0	0
Grp Sat Flow(s),veh/h/ln	1691	1720	1750	1340	1445	1519	992	0	1563	965	0	0
Q Serve(g_s), s	0.2	19.1	19.2	53.8	0.0	0.0	0.0	0.0	1.3	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.2	19.1	19.2	53.8	0.0	0.0	9.5	0.0	1.3	9.7	0.0	0.0
Prop In Lane	1.00		0.15	1.00		0.01	0.90		1.00	0.30		0.07
Lane Grp Cap(c), veh/h	4	370	376	722	1092	1149	184	0	182	159	0	0
V/C Ratio(X)	1.01	0.91	0.91	1.16	0.96	0.97	0.49	0.00	0.13	0.25	0.00	0.00
Avail Cap(c_a), veh/h	34	370	376	722	1092	1149	241	0	250	233	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.9	38.3	38.3	14.2	0.0	0.0	43.1	0.0	39.6	40.0	0.0	0.0
Incr Delay (d2), s/veh	129.7	28.8	28.8	74.7	3.3	3.2	0.7	0.0	0.1	0.3	0.0	0.0
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(95%),veh/ln	0.5	17.7	18.0	60.1	1.5	1.5	4.4	0.0	1.0	1.8	0.0	0.0
LnGrp Delay(d),s/veh	179.6	67.1	67.2	88.9	3.3	3.2	43.9	0.0	39.7	40.3	0.0	0.0
LnGrp LOS	F	E	E	F	A	A	D		D	D		
Approach Vol, veh/h		684			3001			113			40	
Approach Delay, s/veh		67.8			27.2			43.0			40.3	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.8.3	26.0		15.7	4.2	80.1		15.7
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	50.6	* 22		16.0	2.0	69.5		16.0
Max Q Clear Time (g_c+I1), s	55.8	21.2		11.7	2.2	2.0		11.5
Green Ext Time (p_c), s	0.0	0.1		0.2	0.0	33.6		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	35.0
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	528	0	0	2273	52	2	0	1	2	0	561
Future Volume (veh/h)	131	528	0	0	2273	52	2	0	1	2	0	561
Number	7	4	14	3	8	18	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		1.00	1.00		0.98	1.00		1.00	1.00		0.98
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	1845	1827	1900	0	1484	1900	1900	1863	1900	1900	1597	1900
Adj Flow Rate, veh/h	139	562	0	0	2418	55	2	0	1	2	0	501
Adj No. of Lanes	1	2	0	0	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.92	0.92	0.94	0.94	0.92	0.92	0.92	0.94	0.92	0.94
Percent Heavy Veh, %	3	4	4	0	28	28	2	2	2	2	2	2
Cap, veh/h	97	2551	0	0	1789	41	121	12	36	36	1	232
Arrive On Green	0.05	0.74	0.00	0.00	0.63	0.63	0.17	0.00	0.17	0.17	0.00	0.17
Sat Flow, veh/h	1757	3563	0	0	2891	64	348	67	207	1	4	1325
Grp Volume(v), veh/h	139	562	0	0	1205	1268	3	0	0	503	0	0
Grp Sat Flow(s),veh/h/ln	1757	1736	0	0	1410	1471	622	0	0	1330	0	0
Q Serve(g_s), s	5.5	5.1	0.0	0.0	63.5	63.5	0.0	0.0	0.0	4.3	0.0	0.0
Cycle Q Clear(g_c), s	5.5	5.1	0.0	0.0	63.5	63.5	0.1	0.0	0.0	17.5	0.0	0.0
Prop In Lane	1.00		0.00	0.00		0.04	0.67		0.33	0.00		1.00
Lane Grp Cap(c), veh/h	97	2551	0	0	895	934	169	0	0	269	0	0
V/C Ratio(X)	1.44	0.22	0.00	0.00	1.35	1.36	0.02	0.00	0.00	1.87	0.00	0.00
Avail Cap(c_a), veh/h	97	2551	0	0	895	934	169	0	0	269	0	0
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)	0.62	0.62	0.00	0.00	0.09	0.09	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	47.3	4.2	0.0	0.0	18.3	18.3	34.1	0.0	0.0	42.4	0.0	0.0
Incr Delay (d2), s/veh	229.9	0.0	0.0	0.0	156.3	161.6	0.2	0.0	0.0	405.6	0.0	0.0
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(95%),veh/ln	5.9	4.4	0.0	0.0	109.5	116.5	0.1	0.0	0.0	67.9	0.0	0.0
LnGrp Delay(d),s/veh	277.1	4.2	0.0	0.0	174.5	179.9	34.3	0.0	0.0	448.1	0.0	0.0
LnGrp LOS	F	A			F	F	C			F		
Approach Vol, veh/h		701			2473			3			503	
Approach Delay, s/veh		58.3			177.3			34.3			448.1	
Approach LOS		E			F			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6	7	8
Phs Duration (G+Y+Rc), s		22.0		78.0		22.0	10.0	68.0
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		17.5		73.5		17.5	5.5	63.5
Max Q Clear Time (g_c+I1), s		2.1		7.1		19.5	7.5	65.5
Green Ext Time (p_c), s		3.3		59.7		0.0	0.0	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		191.5
HCM 2010 LOS		F

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	286	106	4	975	544	10
Future Volume (veh/h)	286	106	4	975	544	10
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	311	115	4	1060	601	0
Adj No. of Lanes	1	1	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	0
Cap, veh/h	1174	998	66	1172	767	349
Arrive On Green	0.63	0.63	0.63	0.63	0.22	0.00
Sat Flow, veh/h	1863	1583	1	1860	3548	1615
Grp Volume(v), veh/h	311	115	1064	0	601	0
Grp Sat Flow(s),veh/h/ln	1863	1583	1861	0	1774	1615
Q Serve(g_s), s	4.1	1.6	0.0	0.0	8.8	0.0
Cycle Q Clear(g_c), s	4.1	1.6	27.3	0.0	8.8	0.0
Prop In Lane		1.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1174	998	1238	0	767	349
V/C Ratio(X)	0.26	0.12	0.86	0.00	0.78	0.00
Avail Cap(c_a), veh/h	1346	1144	1410	0	1667	759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	4.5	4.1	8.8	0.0	20.5	0.0
Incr Delay (d2), s/veh	0.0	0.0	4.5	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.8	1.3	21.5	0.0	7.9	0.0
LnGrp Delay(d),s/veh	4.6	4.1	13.4	0.0	21.1	0.0
LnGrp LOS	A	A	B		C	
Approach Vol, veh/h	426			1064	601	
Approach Delay, s/veh	4.5			13.4	21.1	
Approach LOS	A			B	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		39.4		16.0		39.4		
Change Period (Y+Rc), s		4.5		4.0		4.5		
Max Green Setting (Gmax), s		40.0		26.0		40.0		
Max Q Clear Time (g_c+I1), s		6.1		10.8		29.3		
Green Ext Time (p_c), s		9.4		1.1		5.6		

Intersection Summary	
HCM 2010 Ctrl Delay	13.8
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	0	11	80	584	0	0
Future Volume (Veh/h)	0	11	80	584	0	0
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	87	635	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	87	44			722	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87	44			722	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	910	1024			876	

Direction, Lane #	WB 1	NE 1	NE 2	NE 3
Volume Total	12	58	241	423
Volume Left	0	0	0	0
Volume Right	12	0	212	423
cSH	1024	1700	1700	1700
Volume to Capacity	0.01	0.03	0.14	0.25
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	8.6	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	8.6	0.0		
Approach LOS	A			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	236	200	1969	368	510	102	30	319	150	1121	170
Future Volume (veh/h)	169	236	200	1969	368	510	102	30	319	150	1121	170
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1610	1765	1727	1520	1681	1792	1696	1570	1759	1776	1810	1827
Adj Flow Rate, veh/h	141	295	0	2051	383	0	106	31	0	156	1168	0
Adj No. of Lanes	1	2	1	3	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	18	6	10	25	13	6	12	21	8	7	5	4
Cap, veh/h	112	257	107	1948	802	727	59	121	61	420	888	401
Arrive On Green	0.07	0.07	0.00	0.48	0.48	0.00	0.04	0.04	0.00	0.17	0.17	0.00
Sat Flow, veh/h	1533	3530	1468	4082	1681	1524	1616	2983	1495	1691	3438	1553
Grp Volume(v), veh/h	141	295	0	2051	383	0	106	31	0	156	1168	0
Grp Sat Flow(s),veh/h/ln	1533	1765	1468	1361	1681	1524	1616	1492	1495	1691	1719	1553
Q Serve(g_s), s	8.0	8.0	0.0	52.5	17.0	0.0	4.0	1.1	0.0	9.0	28.4	0.0
Cycle Q Clear(g_c), s	8.0	8.0	0.0	52.5	17.0	0.0	4.0	1.1	0.0	9.0	28.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	257	107	1948	802	727	59	121	61	420	888	401
V/C Ratio(X)	1.26	1.15	0.00	1.05	0.48	0.00	1.80	0.26	0.00	0.37	1.32	0.00
Avail Cap(c_a), veh/h	112	257	107	1948	802	727	59	526	264	420	888	401
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	0.00	0.09	0.09	0.00	1.00	1.00	0.00	0.58	0.58	0.00
Uniform Delay (d), s/veh	51.0	51.0	0.0	28.8	19.5	0.0	53.0	51.2	0.0	38.2	45.5	0.0
Incr Delay (d2), s/veh	172.2	102.4	0.0	25.3	0.0	0.0	421.0	0.4	0.0	0.1	146.8	0.0
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(95%),veh/ln	15.7	13.6	0.0	43.0	9.3	0.0	15.6	0.8	0.0	6.8	56.8	0.0
LnGrp Delay(d),s/veh	223.2	153.4	0.0	54.0	19.5	0.0	474.0	51.6	0.0	38.3	192.3	0.0
LnGrp LOS	F	F		F	B		F	D		D	F	
Approach Vol, veh/h		436			2434			137			1324	
Approach Delay, s/veh		176.0			48.6			378.4			174.2	
Approach LOS		F			D			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.0	33.0		12.0	31.9	9.1		57.0
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	4.0	28.4		8.0	13.0	* 19		52.5
Max Q Clear Time (g_c+I1), s	6.0	30.4		10.0	11.0	3.1		54.5
Green Ext Time (p_c), s	0.0	0.0		0.0	1.5	0.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	110.2
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	135	470	101	1058	14	481	699	220	12	262	1308
Future Volume (veh/h)	100	135	470	101	1058	14	481	699	220	12	262	1308
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	1.00		0.97	1.00		1.00	1.00		0.93
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	1532	1776	1652	1667	1275	1624	1727	1810	1863	1900	1845	1520
Adj Flow Rate, veh/h	105	142	106	106	1114	15	506	736	0	13	276	1061
Adj No. of Lanes	2	1	2	1	3	1	2	2	1	1	1	2
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, %	24	7	15	14	49	17	10	5	2	0	3	25
Cap, veh/h	150	216	274	281	854	330	597	643	296	650	662	760
Arrive On Green	0.02	0.04	0.04	0.18	0.25	0.25	0.19	0.19	0.00	0.36	0.36	0.36
Sat Flow, veh/h	2831	1776	2252	1587	3481	1343	3191	3438	1583	1810	1845	2117
Grp Volume(v), veh/h	105	142	106	106	1114	15	506	736	0	13	276	1061
Grp Sat Flow(s),veh/h/ln	1416	1776	1126	1587	1160	1343	1596	1719	1583	1810	1845	1059
Q Serve(g_s), s	4.1	8.7	5.0	6.5	27.0	0.9	16.8	20.6	0.0	0.5	12.4	39.5
Cycle Q Clear(g_c), s	4.1	8.7	5.0	6.5	27.0	0.9	16.8	20.6	0.0	0.5	12.4	39.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	150	216	274	281	854	330	597	643	296	650	662	760
V/C Ratio(X)	0.70	0.66	0.39	0.38	1.30	0.05	0.85	1.14	0.00	0.02	0.42	1.40
Avail Cap(c_a), veh/h	154	387	491	281	854	330	597	643	296	650	662	760
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.36	0.36	0.36	1.00	1.00	1.00	0.45	0.45	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.2	50.5	48.8	39.9	41.5	31.7	43.2	44.7	0.0	22.8	26.6	35.3
Incr Delay (d2), s/veh	4.0	0.9	0.2	0.3	145.2	0.0	6.8	73.6	0.0	0.0	0.2	185.9
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(95%),veh/ln	2.9	6.4	2.8	5.2	36.2	0.6	11.1	29.4	0.0	0.5	10.4	56.0
LnGrp Delay(d),s/veh	57.2	51.4	49.0	40.3	186.7	31.7	50.0	118.3	0.0	22.8	26.7	221.2
LnGrp LOS	E	D	D	D	F	C	D	F		C	C	F
Approach Vol, veh/h		353			1235			1242			1350	
Approach Delay, s/veh		52.4			172.2			90.5			179.5	
Approach LOS		D			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.4	17.4		25.2	9.8	31.0		44.0
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	9.6	24.0		20.4	6.0	27.0		39.5
Max Q Clear Time (g_c+I1), s	8.5	10.7		22.6	6.1	29.0		41.5
Green Ext Time (p_c), s	0.4	0.9		0.0	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	140.2
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1078	98	213	66	92	26	631	356	17	103	557	193
Future Volume (vph)	1078	98	213	66	92	26	631	356	17	103	557	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1649	1677	2692		1823	1584	1597	3240		1805	3374	1098
Flt Permitted	0.95	0.96	1.00		0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1649	1677	2692		1823	1584	1597	3240		1805	3374	1098
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1159	105	229	71	99	28	678	383	18	111	599	208
RTOR Reduction (vph)	0	0	104	0	0	26	0	4	0	0	0	143
Lane Group Flow (vph)	626	638	125	0	170	2	678	397	0	111	599	65
Confl. Peds. (#/hr)	3		3	3		3			3	3		3
Confl. Bikes (#/hr)						1			4			12
Heavy Vehicles (%)	4%	0%	3%	5%	0%	0%	13%	11%	0%	0%	7%	39%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	32.0	32.0	32.0		6.0	6.0	28.0	39.0		6.0	17.0	17.0
Effective Green, g (s)	32.0	32.0	32.0		6.0	6.0	28.0	39.0		6.0	17.0	17.0
Actuated g/C Ratio	0.32	0.32	0.32		0.06	0.06	0.28	0.39		0.06	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	527	536	861		109	95	447	1263		108	573	186
v/s Ratio Prot	0.38	c0.38			c0.09		c0.42	0.12		0.06	c0.18	
v/s Ratio Perm			0.05			0.00						0.06
v/c Ratio	1.19	1.19	0.15		1.56	0.02	1.52	0.31		1.03	1.05	0.35
Uniform Delay, d1	34.0	34.0	24.2		47.0	44.2	36.0	21.2		47.0	41.5	36.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.51	0.40		1.00	1.00	1.00
Incremental Delay, d2	102.4	103.1	0.0		291.6	0.0	236.6	0.2		94.3	50.0	5.1
Delay (s)	136.4	137.1	24.3		338.6	44.3	291.0	8.7		141.3	91.5	41.8
Level of Service	F	F	C		F	D	F	A		F	F	D
Approach Delay (s)		119.5			297.0			186.0			86.2	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	140.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	4	19	1736	10	345	19	633	266	170	581	76
Future Volume (vph)	26	4	19	1736	10	345	19	633	266	170	581	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.87	1.00	1.00	0.98	1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1820	1398	1417	1424	1244	1805	3343	1514	3367	3347	
Flt Permitted		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1820	1398	1417	1424	1244	1805	3343	1514	3367	3347	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	28	4	20	1867	11	371	20	681	286	183	625	82
RTOR Reduction (vph)	0	0	20	0	0	98	0	0	178	0	10	0
Lane Group Flow (vph)	0	32	0	933	945	273	20	681	108	183	697	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)									4			13
Heavy Vehicles (%)	0%	0%	0%	21%	0%	27%	0%	8%	3%	4%	6%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		2.4	2.4	52.2	52.2	52.2	2.0	17.0	17.0	12.4	27.4	
Effective Green, g (s)		2.4	2.4	52.2	52.2	52.2	2.0	17.0	17.0	12.4	27.4	
Actuated g/C Ratio		0.02	0.02	0.52	0.52	0.52	0.02	0.17	0.17	0.12	0.27	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		43	33	739	743	649	36	568	257	417	917	
v/s Ratio Prot		c0.02		0.66	c0.66		0.01	c0.20		0.05	c0.21	
v/s Ratio Perm			0.00			0.22			0.07			
v/c Ratio		0.74	0.01	1.26	1.27	0.42	0.56	1.20	0.42	0.44	0.76	
Uniform Delay, d1		48.5	47.6	23.9	23.9	14.6	48.6	41.5	37.1	40.6	33.3	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.66	1.85	
Incremental Delay, d2		45.4	0.1	128.9	132.8	0.2	10.1	105.7	0.4	1.5	2.7	
Delay (s)		93.9	47.7	152.8	156.7	14.8	58.7	147.2	37.5	69.0	64.2	
Level of Service		F	D	F	F	B	E	F	D	E	E	
Approach Delay (s)		76.1			131.7			113.6			65.2	
Approach LOS		E			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	112.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL2	WBT	WBR	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations											
Traffic Volume (vph)	1996	829	43	772	10	508	11	147	90	1727	567
Future Volume (vph)	1996	829	43	772	10	508	11	147	90	1727	567
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5		4.0	4.0	4.0	4.5	4.5	4.5
Lane Util. Factor	0.86		1.00	0.91		0.91	0.91	1.00	1.00	*1.00	1.00
Frpb, ped/bikes	0.99		1.00	1.00		1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00		1.00	1.00	0.85	0.86	1.00	0.85
Flt Protected	1.00		0.95	1.00		0.95	0.96	1.00	1.00	1.00	1.00
Satd. Flow (prot)	6074		1641	4395		2857	1448	1415	1644	3762	1553
Flt Permitted	1.00		0.95	1.00		0.95	0.96	1.00	1.00	1.00	1.00
Satd. Flow (perm)	6074		1641	4395		2857	1448	1415	1644	3762	1553
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	2037	846	44	788	10	518	11	150	92	1762	579
RTOR Reduction (vph)	0	0	0	1	0	0	0	89	24	0	0
Lane Group Flow (vph)	2883	0	44	797	0	352	177	61	68	1762	579
Confl. Peds. (#/hr)								4			
Confl. Bikes (#/hr)		11			2			4			6
Heavy Vehicles (%)	2%	3%	10%	18%	0%	15%	0%	11%	0%	1%	4%
Turn Type	NA		Prot	NA		Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3		4	4			3	3
Permitted Phases								4	3 6		
Actuated Green, G (s)	39.3		3.2	90.5		11.0	11.0	11.0	78.8	39.5	39.5
Effective Green, g (s)	39.3		3.2	90.5		11.0	11.0	11.0	78.8	39.5	39.5
Actuated g/C Ratio	0.36		0.03	0.82		0.10	0.10	0.10	0.72	0.36	0.36
Clearance Time (s)	4.5		4.0			4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0			2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	2170		47	3615		285	144	141	1177	1350	557
v/s Ratio Prot	c0.47		c0.03	0.18		c0.12	0.12			c0.47	0.37
v/s Ratio Perm								0.04	0.04		
v/c Ratio	1.46dr		0.94	0.22		1.24	1.23	0.43	0.06	1.31	1.04
Uniform Delay, d1	35.4		53.3	2.1		49.5	49.5	46.6	4.6	35.2	35.2
Progression Factor	0.93		1.39	1.06		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	148.2		103.2	0.0		132.3	149.4	0.8	0.0	142.8	48.8
Delay (s)	181.0		177.4	2.2		181.8	198.9	47.3	4.6	178.1	84.0
Level of Service	F		F	A		F	F	D	A	F	F
Approach Delay (s)	181.0			11.4			156.6				
Approach LOS	F			B			F				

Intersection Summary			
HCM 2000 Control Delay	146.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	124.6%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	372	161	287	146	69	54	425	475	1430	480	102
Future Volume (vph)	157	372	161	287	146	69	54	425	475	1430	480	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5	4.0	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.98	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1577	1579		2694	1660	1315	1624	2875	1387	3090	3065	1367
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1577	1579		2694	1660	1315	1624	2875	1387	3090	3065	1367
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	160	380	164	293	149	70	55	434	485	1459	490	104
RTOR Reduction (vph)	0	14	0	0	0	63	0	0	0	0	0	63
Lane Group Flow (vph)	160	530	0	293	149	7	55	434	485	1459	490	41
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA	Free	Split	NA	Perm
Protected Phases	8	8		7	7		6	6		2	2	
Permitted Phases						7			Free			2
Actuated Green, G (s)	23.0	23.0		11.0	11.0	11.0	15.5	15.5	110.0	43.5	43.5	43.5
Effective Green, g (s)	23.0	23.0		11.0	11.0	11.0	15.5	15.5	110.0	43.5	43.5	43.5
Actuated g/C Ratio	0.21	0.21		0.10	0.10	0.10	0.14	0.14	1.00	0.40	0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	329	330		269	166	131	228	405	1387	1221	1212	540
v/s Ratio Prot	0.10	c0.34		c0.11	0.09		0.03	c0.15		c0.47	0.16	
v/s Ratio Perm						0.01			0.35			0.03
v/c Ratio	0.49	1.61		1.09	0.90	0.05	0.24	1.07	0.35	1.19	0.40	0.08
Uniform Delay, d1	38.3	43.5		49.5	48.9	44.8	42.0	47.2	0.0	33.2	23.9	20.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	286.2		80.8	41.3	0.2	0.4	65.1	0.7	96.0	1.0	0.3
Delay (s)	39.1	329.7		130.3	90.2	45.0	42.4	112.4	0.7	129.2	24.9	21.0
Level of Service	D	F		F	F	D	D	F	A	F	C	C
Approach Delay (s)		263.6			107.0			52.8			98.8	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	116.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	116.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	102	2176	809	33	26	50
Future Volume (veh/h)	102	2176	809	33	26	50
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.96	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1633	1900	1900	1900
Adj Flow Rate, veh/h	104	2220	826	34	27	51
Adj No. of Lanes	1	3	3	0	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	17	17	0	0
Cap, veh/h	1102	4486	985	40	82	73
Arrive On Green	0.21	0.29	0.45	0.45	0.05	0.05
Sat Flow, veh/h	1774	5253	4532	180	1810	1615
Grp Volume(v), veh/h	104	2220	559	301	27	51
Grp Sat Flow(s),veh/h/ln	1774	1695	1486	1592	1810	1615
Q Serve(g_s), s	5.2	39.8	18.3	18.4	1.6	3.4
Cycle Q Clear(g_c), s	5.2	39.8	18.3	18.4	1.6	3.4
Prop In Lane	1.00			0.11	1.00	1.00
Lane Grp Cap(c), veh/h	1102	4486	668	358	82	73
V/C Ratio(X)	0.09	0.49	0.84	0.84	0.33	0.70
Avail Cap(c_a), veh/h	1102	4486	1811	970	197	176
HCM Platoon Ratio	0.33	0.33	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.97	0.97	1.00	1.00
Uniform Delay (d), s/veh	18.6	18.7	28.5	28.6	50.9	51.8
Incr Delay (d2), s/veh	0.0	0.4	11.6	20.2	0.9	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.6	26.0	13.1	15.1	1.5	2.9
LnGrp Delay(d),s/veh	18.7	19.1	40.2	48.7	51.8	56.3
LnGrp LOS	B	B	D	D	D	E
Approach Vol, veh/h		2324	860		78	
Approach Delay, s/veh		19.1	43.1		54.7	
Approach LOS		B	D		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		101.0			72.3	28.7		9.0
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0
Max Green Setting (Gmax), s		90.0			19.0	67.0		12.0
Max Q Clear Time (g_c+I1), s		41.8			7.2	20.4		5.4
Green Ext Time (p_c), s		20.2			8.7	4.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	26.3
HCM 2010 LOS	C



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	2072	130	11	692	150	731
Future Volume (veh/h)	2072	130	11	692	150	731
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.96	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1865	1900	1727	1570	1810	1810
Adj Flow Rate, veh/h	2228	140	12	744	161	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	10	21	5	5
Cap, veh/h	2388	149	478	3495	193	303
Arrive On Green	0.98	0.98	0.58	1.00	0.11	0.00
Sat Flow, veh/h	5055	304	1645	4428	1723	2707
Grp Volume(v), veh/h	1541	827	12	744	161	0
Grp Sat Flow(s),veh/h/ln	1697	1797	1645	1429	1723	1354
Q Serve(g_s), s	12.4	14.6	0.3	0.0	10.1	0.0
Cycle Q Clear(g_c), s	12.4	14.6	0.3	0.0	10.1	0.0
Prop In Lane		0.17	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1658	878	478	3495	193	303
V/C Ratio(X)	0.93	0.94	0.03	0.21	0.83	0.00
Avail Cap(c_a), veh/h	1820	964	478	3495	580	911
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.93	0.93	1.00	0.00
Uniform Delay (d), s/veh	0.8	0.8	16.4	0.0	47.8	0.0
Incr Delay (d2), s/veh	9.5	17.4	0.0	0.1	3.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.2	9.8	0.3	0.1	8.6	0.0
LnGrp Delay(d),s/veh	10.3	18.2	16.4	0.1	51.5	0.0
LnGrp LOS	B	B	B	A	D	
Approach Vol, veh/h	2368			756	161	
Approach Delay, s/veh	13.1			0.4	51.5	
Approach LOS	B			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	14.9	48.7				93.7		16.3
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	2.6	59.0				65.0		37.0
Max Q Clear Time (g_c+I1), s	2.3	16.6				2.0		12.1
Green Ext Time (p_c), s	0.0	19.1				4.1		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	12.0
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	2388	255	363	483	102	105	159	807	249	251	115
Future Volume (veh/h)	160	2388	255	363	483	102	105	159	807	249	251	115
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		1.00
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	1810	1810	1882	1545	1539	1976	1583	1776	1792	1810	1810	1900
Adj Flow Rate, veh/h	163	2437	158	370	493	78	107	162	0	254	256	0
Adj No. of Lanes	1	3	1	2	3	0	1	1	1	1	2	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	5	5	5	23	25	25	20	7	6	5	5	0
Cap, veh/h	189	2553	808	280	1857	288	160	225	193	188	428	201
Arrive On Green	0.22	1.00	1.00	0.20	1.00	1.00	0.11	0.13	0.00	0.11	0.12	0.00
Sat Flow, veh/h	1723	4940	1563	2854	3662	568	1508	1776	1524	1723	3438	1615
Grp Volume(v), veh/h	163	2437	158	370	375	196	107	162	0	254	256	0
Grp Sat Flow(s),veh/h/ln	1723	1647	1563	1427	1401	1428	1508	1776	1524	1723	1719	1615
Q Serve(g_s), s	10.0	0.0	0.0	10.8	0.0	0.0	7.5	9.6	0.0	12.0	7.7	0.0
Cycle Q Clear(g_c), s	10.0	0.0	0.0	10.8	0.0	0.0	7.5	9.6	0.0	12.0	7.7	0.0
Prop In Lane	1.00		1.00	1.00		0.40	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	189	2553	808	280	1420	724	160	225	193	188	428	201
V/C Ratio(X)	0.86	0.95	0.20	1.32	0.26	0.27	0.67	0.72	0.00	1.35	0.60	0.00
Avail Cap(c_a), veh/h	282	2553	808	280	1420	724	165	468	402	188	888	417
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.47	0.47	0.47	0.88	0.88	0.88	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.1	0.0	0.0	44.2	0.0	0.0	47.3	46.2	0.0	49.0	45.6	0.0
Incr Delay (d2), s/veh	5.6	5.4	0.3	164.7	0.4	0.8	7.7	1.6	0.0	188.8	0.5	0.0
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(95%),veh/ln	7.5	2.3	0.1	19.1	0.1	0.3	6.2	8.4	0.0	28.0	6.7	0.0
LnGrp Delay(d),s/veh	47.7	5.4	0.3	208.9	0.4	0.8	55.0	47.8	0.0	237.8	46.1	0.0
LnGrp LOS	D	A	A	F	A	A	E	D		F	D	
Approach Vol, veh/h		2758			941			269			510	
Approach Delay, s/veh		7.6			82.5			50.7			141.6	
Approach LOS		A			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	61.1	15.7	18.3	16.1	60.0	16.0	17.9
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax), s	* 11	* 42	12.0	28.4	18.0	* 35	12.0	29.0
Max Q Clear Time (g_c+I1), s	12.0	2.0	9.5	9.7	12.0	2.0	14.0	11.6
Green Ext Time (p_c), s	0.0	27.6	0.2	0.9	0.2	24.1	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	41.2
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	408	2856	170	34	554	19	145	416	185	255	75	249
Future Volume (veh/h)	408	2856	170	34	554	19	145	416	185	255	75	249
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.98	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	1845	1845	1681	1338	1550	1900	1429	1776	1792	1610	1532	1652
Adj Flow Rate, veh/h	421	2944	123	35	571	20	149	429	93	263	300	61
Adj No. of Lanes	2	3	1	2	3	0	1	2	1	1	1	2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97
Percent Heavy Veh, %	3	3	13	42	23	23	33	7	6	18	24	15
Cap, veh/h	499	2472	688	490	2302	80	168	417	184	321	320	502
Arrive On Green	0.15	0.49	0.49	0.20	0.55	0.55	0.12	0.12	0.12	0.21	0.21	0.21
Sat Flow, veh/h	3408	5036	1401	2472	4199	146	1361	3374	1490	1533	1532	2402
Grp Volume(v), veh/h	421	2944	123	35	383	208	149	429	93	263	300	61
Grp Sat Flow(s),veh/h/ln	1704	1679	1401	1236	1411	1524	1361	1687	1490	1533	1532	1201
Q Serve(g_s), s	13.2	54.0	5.4	1.3	7.8	7.9	11.9	13.6	6.4	18.0	21.2	2.3
Cycle Q Clear(g_c), s	13.2	54.0	5.4	1.3	7.8	7.9	11.9	13.6	6.4	18.0	21.2	2.3
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	499	2472	688	490	1547	835	168	417	184	321	320	502
V/C Ratio(X)	0.84	1.19	0.18	0.07	0.25	0.25	0.89	1.03	0.50	0.82	0.94	0.12
Avail Cap(c_a), veh/h	620	2472	688	490	1547	835	168	417	184	321	320	502
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)	0.09	0.09	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	28.0	15.6	35.9	13.0	13.0	47.4	48.2	45.1	41.5	42.8	35.3
Incr Delay (d2), s/veh	0.9	86.3	0.1	0.0	0.4	0.7	37.8	51.5	0.9	14.5	33.6	0.0
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(95%),veh/ln	7.6	77.9	2.8	0.8	5.6	6.2	10.3	16.7	4.8	13.8	17.6	1.4
LnGrp Delay(d),s/veh	46.6	114.3	15.7	35.9	13.4	13.7	85.2	99.7	45.9	56.1	76.4	35.3
LnGrp LOS	D	F	B	D	B	B	F	F	D	E	E	D
Approach Vol, veh/h		3488			626			671			624	
Approach Delay, s/veh		102.6			14.7			89.1			63.8	
Approach LOS		F			B			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	20.1	65.5		27.6	27.0	58.6		17.8
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	20.0	36.0		23.0	2.0	* 54		13.6
Max Q Clear Time (g_c+I1), s	15.2	9.9		23.2	3.3	56.0		15.6
Green Ext Time (p_c), s	0.9	4.1		0.0	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	86.3
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	2326	53	92	395	7	46	25	819	8	6	6
Future Volume (veh/h)	16	2326	53	92	395	7	46	25	819	8	6	6
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00	1.00		0.99	1.00		0.99
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	1776	1810	1900	1407	1525	1900	1900	1850	1863	1900	1900	1900
Adj Flow Rate, veh/h	17	2448	55	97	416	6	0	0	722	8	6	2
Adj No. of Lanes	1	2	0	1	2	0	0	1	2	0	1	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, %	7	5	5	35	25	25	0	0	2	0	0	0
Cap, veh/h	19	2148	48	288	2438	35	0	370	625	149	103	28
Arrive On Green	0.01	0.63	0.63	0.22	0.83	0.83	0.00	0.00	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1691	3436	77	1340	2924	42	0	1850	3127	473	517	142
Grp Volume(v), veh/h	17	1219	1284	97	206	216	0	0	722	16	0	0
Grp Sat Flow(s),veh/h/ln	1691	1719	1794	1340	1449	1518	0	1850	1564	1132	0	0
Q Serve(g_s), s	1.0	62.5	62.5	6.1	2.8	2.8	0.0	0.0	20.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	1.0	62.5	62.5	6.1	2.8	2.8	0.0	0.0	20.0	0.7	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.03	0.00		1.00	0.50		0.12
Lane Grp Cap(c), veh/h	19	1075	1121	288	1208	1265	0	370	625	280	0	0
V/C Ratio(X)	0.89	1.13	1.14	0.34	0.17	0.17	0.00	0.00	1.15	0.06	0.00	0.00
Avail Cap(c_a), veh/h	51	1075	1121	288	1208	1265	0	370	625	280	0	0
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	1.00	1.00	0.85	0.85	0.85	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.4	18.8	18.8	33.2	1.6	1.6	0.0	0.0	40.0	32.3	0.0	0.0
Incr Delay (d2), s/veh	35.4	72.4	76.1	0.2	0.3	0.2	0.0	0.0	86.7	0.0	0.0	0.0
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(95%),veh/ln	1.2	91.6	97.6	4.1	2.1	2.2	0.0	0.0	29.0	0.6	0.0	0.0
LnGrp Delay(d),s/veh	84.8	91.2	94.8	33.4	1.9	1.9	0.0	0.0	126.7	32.3	0.0	0.0
LnGrp LOS	F	F	F	C	A	A			F	C		
Approach Vol, veh/h		2520			519			722			16	
Approach Delay, s/veh		93.0			7.8			126.7			32.3	
Approach LOS		F			A			F			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.5	67.0		24.0	5.1	88.4		24.0
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	5.0	* 63		20.0	3.0	64.5		20.0
Max Q Clear Time (g_c+I1), s	3.1	64.5		2.7	3.0	4.8		22.0
Green Ext Time (p_c), s	0.0	0.0		1.8	0.0	1.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	87.5
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	555	2568	0	0	407	18	5	0	8	7	0	81
Future Volume (veh/h)	555	2568	0	0	407	18	5	0	8	7	0	81
Number	7	4	14	3	8	18	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		1.00	1.00		1.00	1.00		1.00	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	1845	1827	1900	0	1484	1900	1900	1863	1900	1900	1597	1900
Adj Flow Rate, veh/h	584	2703	0	0	428	16	5	0	9	7	0	6
Adj No. of Lanes	1	2	0	0	2	0	0	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.95	0.92	0.95
Percent Heavy Veh, %	3	4	4	0	28	28	2	2	2	0	2	2
Cap, veh/h	623	2555	0	0	941	35	114	0	206	193	0	141
Arrive On Green	0.35	0.74	0.00	0.00	0.34	0.34	0.19	0.00	0.19	0.11	0.00	0.11
Sat Flow, veh/h	1757	3563	0	0	2846	103	588	0	1058	1810	0	1321
Grp Volume(v), veh/h	584	2703	0	0	217	227	14	0	0	7	0	6
Grp Sat Flow(s),veh/h/ln	1757	1736	0	0	1410	1465	1647	0	0	1810	0	1321
Q Serve(g_s), s	34.7	79.5	0.0	0.0	13.0	13.1	0.7	0.0	0.0	0.4	0.0	0.4
Cycle Q Clear(g_c), s	34.7	79.5	0.0	0.0	13.0	13.1	0.7	0.0	0.0	0.4	0.0	0.4
Prop In Lane	1.00		0.00	0.00		0.07	0.36		0.64	1.00		1.00
Lane Grp Cap(c), veh/h	623	2555	0	0	479	498	320	0	0	193	0	141
V/C Ratio(X)	0.94	1.06	0.00	0.00	0.45	0.46	0.04	0.00	0.00	0.04	0.00	0.04
Avail Cap(c_a), veh/h	773	2555	0	0	479	498	320	0	0	193	0	141
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)	0.09	0.09	0.00	0.00	0.87	0.87	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.7	14.3	0.0	0.0	27.8	27.9	35.3	0.0	0.0	43.3	0.0	43.3
Incr Delay (d2), s/veh	2.2	27.1	0.0	0.0	0.6	0.6	0.3	0.0	0.0	0.4	0.0	0.6
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(95%),veh/ln	9.1	81.9	0.0	0.0	8.6	8.9	0.7	0.0	0.0	0.4	0.0	0.3
LnGrp Delay(d),s/veh	35.9	41.4	0.0	0.0	28.4	28.4	35.6	0.0	0.0	43.6	0.0	43.9
LnGrp LOS	D	F			C	C	D			D		D
Approach Vol, veh/h		3287			444			14			13	
Approach Delay, s/veh		40.4			28.4			35.6			43.7	
Approach LOS		D			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6	7	8
Phs Duration (G+Y+Rc), s		26.0		84.0		16.0	42.8	41.2
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		4.0		79.5		11.5	47.5	27.5
Max Q Clear Time (g_c+I1), s		2.7		81.5		2.4	36.7	15.1
Green Ext Time (p_c), s		0.0		0.0		0.0	1.6	12.1

Intersection Summary		
HCM 2010 Ctrl Delay		39.0
HCM 2010 LOS		D



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	1039	693	6	120	196	14
Future Volume (veh/h)	1039	693	6	120	196	14
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	1267	845	7	146	255	0
Adj No. of Lanes	1	1	0	1	2	1
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	0
Cap, veh/h	1423	1209	74	1156	372	169
Arrive On Green	0.76	0.76	0.76	0.76	0.10	0.00
Sat Flow, veh/h	1863	1583	21	1513	3548	1615
Grp Volume(v), veh/h	1267	845	153	0	255	0
Grp Sat Flow(s),veh/h/ln	1863	1583	1534	0	1774	1615
Q Serve(g_s), s	32.5	17.5	0.5	0.0	4.5	0.0
Cycle Q Clear(g_c), s	32.5	17.5	33.0	0.0	4.5	0.0
Prop In Lane		1.00	0.05		1.00	1.00
Lane Grp Cap(c), veh/h	1423	1209	1230	0	372	169
V/C Ratio(X)	0.89	0.70	0.12	0.00	0.69	0.00
Avail Cap(c_a), veh/h	1829	1554	1520	0	987	449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	5.6	3.9	2.1	0.0	27.9	0.0
Incr Delay (d2), s/veh	4.1	0.6	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	24.3	11.9	1.2	0.0	4.0	0.0
LnGrp Delay(d),s/veh	9.8	4.4	2.1	0.0	28.8	0.0
LnGrp LOS	A	A	A		C	
Approach Vol, veh/h	2112			153	255	
Approach Delay, s/veh	7.6			2.1	28.8	
Approach LOS	A			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		53.9		10.8		53.9		
Change Period (Y+Rc), s		4.5		4.0		4.5		
Max Green Setting (Gmax), s		63.5		18.0		63.5		
Max Q Clear Time (g_c+I1), s		34.5		6.5		35.0		
Green Ext Time (p_c), s		14.5		0.4		14.4		

Intersection Summary	
HCM 2010 Ctrl Delay	9.4
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	0	34	540	906	0	0
Future Volume (Veh/h)	0	34	540	906	0	0
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	37	587	985	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	587	294			1572	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	587	294			1572	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	445	709			415	

Direction, Lane #	WB 1	NE 1	NE 2	NE 3
Volume Total	37	391	524	657
Volume Left	0	0	0	0
Volume Right	37	0	328	657
cSH	709	1700	1700	1700
Volume to Capacity	0.05	0.23	0.31	0.39
Queue Length 95th (ft)	4	0	0	0
Control Delay (s)	10.4	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.4	0.0		
Approach LOS	B			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	290	209	899	258	272	195	62	442	185	785	160
Future Volume (veh/h)	105	290	209	899	258	272	195	62	442	185	785	160
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1610	1785	1727	1520	1681	1792	1696	1570	1759	1776	1810	1827
Adj Flow Rate, veh/h	109	302	0	936	269	0	203	65	0	193	818	0
Adj No. of Lanes	1	2	1	3	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	18	6	10	25	13	6	12	21	8	7	5	4
Cap, veh/h	161	375	154	1050	433	392	230	344	172	612	1169	528
Arrive On Green	0.10	0.10	0.00	0.26	0.26	0.00	0.14	0.12	0.00	0.36	0.34	0.00
Sat Flow, veh/h	1533	3571	1468	4082	1681	1524	1616	2983	1495	1691	3438	1553
Grp Volume(v), veh/h	109	302	0	936	269	0	203	65	0	193	818	0
Grp Sat Flow(s),veh/h/ln	1533	1785	1468	1361	1681	1524	1616	1492	1495	1691	1719	1553
Q Serve(g_s), s	7.5	9.1	0.0	24.3	15.6	0.0	13.6	2.2	0.0	9.0	22.7	0.0
Cycle Q Clear(g_c), s	7.5	9.1	0.0	24.3	15.6	0.0	13.6	2.2	0.0	9.0	22.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	161	375	154	1050	433	392	230	344	172	612	1169	528
V/C Ratio(X)	0.68	0.81	0.00	0.89	0.62	0.00	0.88	0.19	0.00	0.32	0.70	0.00
Avail Cap(c_a), veh/h	181	422	174	1095	451	409	279	852	427	612	1169	528
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	1.00	0.00	0.72	0.72	0.00	1.00	1.00	0.00	0.83	0.83	0.00
Uniform Delay (d), s/veh	47.4	48.1	0.0	39.4	36.1	0.0	46.3	44.0	0.0	25.3	31.4	0.0
Incr Delay (d2), s/veh	6.0	8.6	0.0	6.8	1.8	0.0	20.9	0.1	0.0	0.1	2.9	0.0
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(95%),veh/ln	6.2	8.6	0.0	14.1	11.3	0.0	11.8	1.6	0.0	7.3	16.3	0.0
LnGrp Delay(d),s/veh	53.4	56.8	0.0	46.2	37.9	0.0	67.2	44.1	0.0	25.4	34.4	0.0
LnGrp LOS	D	E		D	D		E	D		C	C	
Approach Vol, veh/h		411			1205			268			1011	
Approach Delay, s/veh		55.9			44.4			61.6			32.6	
Approach LOS		E			D			E			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.7	42.0		15.5	44.4	17.3		32.8
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	9.6	31.4		13.0	19.0	* 31		29.5
Max Q Clear Time (g_c+I1), s	15.6	24.7		11.1	11.0	4.2		26.3
Green Ext Time (p_c), s	0.1	3.5		0.3	3.9	0.2		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	43.5
HCM 2010 LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	343	433	43	425	31	451	1172	960	19	109	553
Future Volume (veh/h)	140	343	433	43	425	31	451	1172	960	19	109	553
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.97	1.00		1.00	1.00		0.84
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	1532	1776	1652	1667	1275	1624	1727	1810	1863	1900	1845	1520
Adj Flow Rate, veh/h	147	361	102	45	447	6	475	1234	0	20	115	169
Adj No. of Lanes	2	1	2	1	3	1	2	2	1	1	1	2
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, %	24	7	15	14	49	17	10	5	2	0	3	25
Cap, veh/h	154	355	464	65	648	249	1526	1644	757	227	232	241
Arrive On Green	0.09	0.33	0.33	0.04	0.19	0.19	0.16	0.16	0.00	0.13	0.13	0.13
Sat Flow, veh/h	2831	1776	2318	1587	3481	1336	3191	3438	1583	1810	1845	1918
Grp Volume(v), veh/h	147	361	102	45	447	6	475	1234	0	20	115	169
Grp Sat Flow(s),veh/h/ln	1416	1776	1159	1587	1160	1336	1596	1719	1583	1810	1845	959
Q Serve(g_s), s	5.7	22.0	3.5	3.1	13.2	0.4	14.5	37.7	0.0	1.1	6.4	9.3
Cycle Q Clear(g_c), s	5.7	22.0	3.5	3.1	13.2	0.4	14.5	37.7	0.0	1.1	6.4	9.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	154	355	464	65	648	249	1526	1644	757	227	232	241
V/C Ratio(X)	0.95	1.02	0.22	0.70	0.69	0.02	0.31	0.75	0.00	0.09	0.50	0.70
Avail Cap(c_a), veh/h	154	355	464	87	696	267	1526	1644	757	362	369	384
HCM Platoon Ratio	1.67	1.67	1.67	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	0.61	0.61	0.61	1.00	1.00	1.00	0.09	0.09	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.8	36.6	30.5	52.1	41.8	36.6	30.3	40.1	0.0	42.5	44.8	46.1
Incr Delay (d2), s/veh	43.0	41.5	0.1	7.1	2.1	0.0	0.0	0.3	0.0	0.1	0.6	1.4
Initial Q Delay(d3),s/veh	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.4	26.6	2.0	2.7	7.8	0.3	7.7	20.2	0.0	1.0	5.9	4.5
LnGrp Delay(d),s/veh	92.8	78.2	30.6	59.1	43.9	36.6	30.3	40.4	0.0	42.6	45.5	47.5
LnGrp LOS	F	F	C	E	D	D	C	D		D	D	D
Approach Vol, veh/h		610			498			1709			304	
Approach Delay, s/veh		73.7			45.2			37.6			46.4	
Approach LOS		E			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.5	26.0		57.2	10.0	24.5		18.3
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	6.0	22.0		42.9	6.0	22.0		22.0
Max Q Clear Time (g_c+I1), s	5.1	24.0		39.7	7.7	15.2		11.3
Green Ext Time (p_c), s	0.3	0.0		2.2	0.0	1.4		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	46.7
HCM 2010 LOS	D

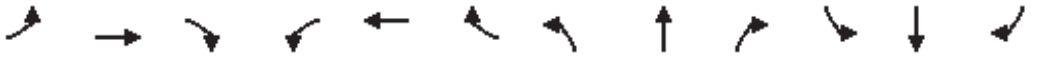
Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2397	80	572	69	60	23	395	233	15	67	420	109
Future Volume (vph)	2397	80	572	69	60	23	395	233	15	67	420	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1649	1662	2697		1802	1588	1597	3233		1805	3374	1122
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1649	1662	2697		1802	1588	1597	3233		1805	3374	1122
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	2471	82	590	71	62	24	407	240	15	69	433	112
RTOR Reduction (vph)	0	0	106	0	0	23	0	4	0	0	0	101
Lane Group Flow (vph)	1285	1268	484	0	133	1	407	251	0	69	433	11
Confl. Peds. (#/hr)	3		3	3		3			3	3		3
Confl. Bikes (#/hr)									13			
Heavy Vehicles (%)	4%	0%	3%	5%	0%	0%	13%	11%	0%	0%	7%	39%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	62.0	62.0	62.0		6.0	6.0	14.0	22.0		3.0	11.0	11.0
Effective Green, g (s)	62.0	62.0	62.0		6.0	6.0	14.0	22.0		3.0	11.0	11.0
Actuated g/C Ratio	0.56	0.56	0.56		0.05	0.05	0.13	0.20		0.03	0.10	0.10
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	929	936	1520		98	86	203	646		49	337	112
v/s Ratio Prot	c0.78	0.76			c0.07		c0.25	0.08		0.04	c0.13	
v/s Ratio Perm			0.18			0.00						0.01
v/c Ratio	1.38	1.35	0.32		1.36	0.02	2.00	0.39		1.41	1.28	0.10
Uniform Delay, d1	24.0	24.0	12.8		52.0	49.2	48.0	38.2		53.5	49.5	45.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	0.79	0.84		0.87	1.12	2.04
Incremental Delay, d2	179.2	166.7	0.0		213.3	0.0	468.5	1.7		263.2	147.1	1.6
Delay (s)	203.2	190.7	12.8		265.3	49.2	506.3	33.6		309.5	202.5	93.4
Level of Service	F	F	B		F	D	F	C		F	F	F
Approach Delay (s)		162.4			232.3			324.2			194.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	192.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	119.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1	11	508	2	165	15	452	1468	572	490	14
Future Volume (vph)	26	1	11	508	2	165	15	452	1468	572	490	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.83	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1812	1334	1417	1423	1239	1805	3343	1517	3367	3393	
Flt Permitted		0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1812	1334	1417	1423	1239	1805	3343	1517	3367	3393	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	28	1	12	546	2	177	16	486	1578	615	527	15
RTOR Reduction (vph)	0	0	12	0	0	142	0	0	334	0	2	0
Lane Group Flow (vph)	0	29	0	273	275	35	16	486	1244	615	540	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)									15			21
Heavy Vehicles (%)	0%	0%	0%	21%	0%	27%	0%	8%	3%	4%	6%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		2.0	2.0	22.0	22.0	22.0	1.2	55.0	55.0	15.0	68.8	
Effective Green, g (s)		2.0	2.0	22.0	22.0	22.0	1.2	55.0	55.0	15.0	68.8	
Actuated g/C Ratio		0.02	0.02	0.20	0.20	0.20	0.01	0.50	0.50	0.14	0.63	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		32	24	283	284	247	19	1671	758	459	2122	
v/s Ratio Prot		c0.02		0.19	c0.19		0.01	0.15		c0.18	0.16	
v/s Ratio Perm			0.00			0.03			c0.82			
v/c Ratio		0.91	0.01	0.96	0.97	0.14	0.84	0.29	1.64	1.34	0.25	
Uniform Delay, d1		53.9	53.0	43.6	43.7	36.2	54.3	16.1	27.5	47.5	9.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.48	2.51	
Incremental Delay, d2		117.7	0.1	43.3	44.0	0.1	128.3	0.0	294.5	162.3	0.2	
Delay (s)		171.6	53.1	86.9	87.6	36.3	182.6	16.1	322.0	232.5	23.2	
Level of Service		F	D	F	F	D	F	B	F	F	C	
Approach Delay (s)		136.9			74.8			249.4			134.5	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	183.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	121.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL2	WBT	WBR	NBL	NBT	NBR	SBR2	NER	NER2
Lane Configurations											
Traffic Volume (vph)	754	263	160	3316	10	1742	6	100	484	375	145
Future Volume (vph)	754	263	160	3316	10	1742	6	100	484	375	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5		4.0	4.0	4.0	4.5	4.5	4.5
Lane Util. Factor	0.86		1.00	0.91		0.91	0.91	1.00	1.00	*1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00		1.00	1.00	0.85	0.86	1.00	0.85
Flt Protected	1.00		0.95	1.00		0.95	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	6121		1641	4396		2857	1435	1428	1644	3762	1553
Flt Permitted	1.00		0.95	1.00		0.95	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	6121		1641	4396		2857	1435	1428	1644	3762	1553
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.96
Adj. Flow (vph)	785	274	167	3454	10	1815	7	104	504	391	151
RTOR Reduction (vph)	0	0	0	0	0	0	0	69	27	0	0
Lane Group Flow (vph)	1059	0	167	3464	0	1216	606	35	477	391	151
Confl. Peds. (#/hr)								4			
Confl. Bikes (#/hr)		2			2			2			2
Heavy Vehicles (%)	2%	3%	10%	18%	0%	15%	0%	11%	0%	1%	4%
Turn Type	NA		Prot	NA		Split	NA	Perm	Perm	Prot	Prot
Protected Phases	6		5	2 3		4	4			3	3
Permitted Phases								4	3 6		
Actuated Green, G (s)	22.0		10.0	68.5		33.0	33.0	33.0	50.0	28.0	28.0
Effective Green, g (s)	22.0		10.0	68.5		33.0	33.0	33.0	50.0	28.0	28.0
Actuated g/C Ratio	0.20		0.09	0.62		0.30	0.30	0.30	0.45	0.25	0.25
Clearance Time (s)	4.5		4.0			4.0	4.0	4.0		4.5	4.5
Vehicle Extension (s)	3.0		2.0			2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	1224		149	2737		857	430	428	747	957	395
v/s Ratio Prot	0.17		0.10	c0.79		c0.43	0.42			0.10	0.10
v/s Ratio Perm								0.02	0.29		
v/c Ratio	0.87		1.12	1.27		1.42	1.41	0.08	0.64	0.41	0.38
Uniform Delay, d1	42.6		50.0	20.8		38.5	38.5	27.6	23.1	34.1	33.9
Progression Factor	1.24		1.11	0.87		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2		63.1	119.7		195.4	197.6	0.0	1.3	0.1	0.2
Delay (s)	58.2		118.5	137.8		233.9	236.1	27.7	24.4	34.2	34.1
Level of Service	E		F	F		F	F	C	C	C	C
Approach Delay (s)	58.2			136.9			223.4				
Approach LOS	E			F			F				

Intersection Summary			
HCM 2000 Control Delay	133.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.44		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	138.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	173	151	1228	565	726	65	488	135	670	461	155
Future Volume (vph)	161	173	151	1228	565	726	65	488	135	670	461	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1577	1529		2694	1660	1332	1624	4029		3090	3065	1338
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1577	1529		2694	1660	1332	1624	4029		3090	3065	1338
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	168	180	157	1279	589	756	68	508	141	698	480	161
RTOR Reduction (vph)	0	28	0	0	0	331	0	0	0	0	0	130
Lane Group Flow (vph)	168	309	0	1279	589	425	68	649	0	698	480	31
Confl. Peds. (#/hr)	9		9	9		9	16		16	16		16
Confl. Bikes (#/hr)			7			3			1			1
Heavy Vehicles (%)	3%	3%	1%	17%	3%	6%	0%	13%	3%	2%	6%	2%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	8	8		7	7		6	6		2	2	
Permitted Phases						7						2
Actuated Green, G (s)	16.0	16.0		42.0	42.0	42.0	13.5	13.5		21.5	21.5	21.5
Effective Green, g (s)	16.0	16.0		42.0	42.0	42.0	13.5	13.5		21.5	21.5	21.5
Actuated g/C Ratio	0.15	0.15		0.38	0.38	0.38	0.12	0.12		0.20	0.20	0.20
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.5	2.5		3.0	3.0	3.0	2.5	2.5		2.0	2.0	2.0
Lane Grp Cap (vph)	229	222		1028	633	508	199	494		603	599	261
v/s Ratio Prot	0.11	c0.20		c0.47	0.35		0.04	c0.16		c0.23	0.16	
v/s Ratio Perm						0.32						0.02
v/c Ratio	0.73	1.39		1.24	0.93	0.84	0.34	1.31		1.16	0.80	0.12
Uniform Delay, d1	45.0	47.0		34.0	32.6	30.9	44.2	48.2		44.2	42.2	36.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.04	1.02		1.00	1.00	1.00
Incremental Delay, d2	10.9	201.2		118.2	20.4	11.4	0.6	152.7		88.5	10.8	0.9
Delay (s)	55.8	248.2		152.2	53.0	42.3	46.7	201.9		132.7	53.0	37.4
Level of Service	E	F		F	D	D	D	F		F	D	D
Approach Delay (s)		184.2			98.3			187.2			92.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	117.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	109.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	916	3692	192	22	160
Future Volume (veh/h)	62	916	3692	192	22	160
Number	5	2	6	16	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1636	1900	1900	1900
Adj Flow Rate, veh/h	63	935	3767	196	22	35
Adj No. of Lanes	1	3	3	0	1	1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	17	17	0	0
Cap, veh/h	200	4549	3239	165	59	53
Arrive On Green	0.04	0.30	1.00	1.00	0.03	0.03
Sat Flow, veh/h	1774	5253	4492	222	1810	1615
Grp Volume(v), veh/h	63	935	2558	1405	22	35
Grp Sat Flow(s),veh/h/ln	1774	1695	1488	1589	1810	1615
Q Serve(g_s), s	3.8	15.2	82.0	79.8	1.3	2.4
Cycle Q Clear(g_c), s	3.8	15.2	82.0	79.8	1.3	2.4
Prop In Lane	1.00			0.14	1.00	1.00
Lane Grp Cap(c), veh/h	200	4549	2219	1185	59	53
V/C Ratio(X)	0.31	0.21	1.15	1.19	0.37	0.66
Avail Cap(c_a), veh/h	200	4549	2219	1185	66	59
HCM Platoon Ratio	0.33	0.33	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.09	0.09	1.00	1.00
Uniform Delay (d), s/veh	48.8	9.4	0.0	0.0	52.1	52.6
Incr Delay (d2), s/veh	0.3	0.1	69.2	84.6	1.4	15.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.4	11.6	38.0	49.2	1.2	2.3
LnGrp Delay(d),s/veh	49.1	9.5	69.2	84.6	53.5	68.3
LnGrp LOS	D	A	F	F	D	E
Approach Vol, veh/h		998	3963		57	
Approach Delay, s/veh		12.0	74.7		62.6	
Approach LOS		B	E		E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		102.4			16.4	86.0		7.6
Change Period (Y+Rc), s		4.0			4.0	4.0		4.0
Max Green Setting (Gmax), s		98.0			12.0	82.0		4.0
Max Q Clear Time (g_c+I1), s		17.2			5.8	84.0		4.4
Green Ext Time (p_c), s		5.1			2.5	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	62.1
HCM 2010 LOS	E



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	798	140	13	3555	330	348
Future Volume (veh/h)	798	140	13	3555	330	348
Number	2	12	1	6	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1868	1900	1727	1570	1810	1810
Adj Flow Rate, veh/h	858	140	14	3823	355	0
Adj No. of Lanes	3	0	1	3	1	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	10	21	5	5
Cap, veh/h	3324	539	15	3429	219	345
Arrive On Green	1.00	1.00	0.01	0.54	0.13	0.00
Sat Flow, veh/h	4575	715	1645	4428	1723	2707
Grp Volume(v), veh/h	661	337	14	3823	355	0
Grp Sat Flow(s),veh/h/ln	1700	1721	1645	1429	1723	1354
Q Serve(g_s), s	0.0	0.0	0.9	88.0	14.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.9	88.0	14.0	0.0
Prop In Lane		0.42	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2565	1298	15	3429	219	345
V/C Ratio(X)	0.26	0.26	0.92	1.11	1.62	0.00
Avail Cap(c_a), veh/h	2565	1298	60	3429	219	345
HCM Platoon Ratio	2.00	2.00	0.67	0.67	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.09	0.09	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	54.6	25.5	48.0	0.0
Incr Delay (d2), s/veh	0.2	0.5	7.7	52.1	298.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.3	0.8	89.0	44.7	0.0
LnGrp Delay(d),s/veh	0.2	0.5	62.3	77.6	346.4	0.0
LnGrp LOS	A	A	E	F	F	
Approach Vol, veh/h	998			3837	355	
Approach Delay, s/veh	0.3			77.6	346.4	
Approach LOS	A			E	F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.0	87.0				92.0		18.0
Change Period (Y+Rc), s	4.0	4.0				4.0		4.0
Max Green Setting (Gmax), s	1.0	80.0				88.0		14.0
Max Q Clear Time (g_c+I1), s	2.9	2.0				90.0		16.0
Green Ext Time (p_c), s	0.0	74.9				0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	81.1
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	146	833	167	927	1865	550	605	201	289	90	377	1098
Future Volume (veh/h)	146	833	167	927	1865	550	605	201	289	90	377	1098
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.98	1.00		1.00	1.00		1.00
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	1810	1810	1882	1545	1545	1976	1583	1776	1792	1810	1810	1900
Adj Flow Rate, veh/h	151	859	172	956	1923	567	624	207	0	93	389	0
Adj No. of Lanes	1	3	1	2	3	0	1	1	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	5	23	25	25	20	7	6	5	5	0
Cap, veh/h	94	994	309	998	1626	456	302	264	227	261	325	153
Arrive On Green	0.02	0.07	0.07	0.47	0.66	0.66	0.20	0.15	0.00	0.15	0.09	0.00
Sat Flow, veh/h	1723	4940	1535	2854	3264	914	1508	1776	1524	1723	3438	1615
Grp Volume(v), veh/h	151	859	172	956	1643	847	624	207	0	93	389	0
Grp Sat Flow(s),veh/h/ln	1723	1647	1535	1427	1406	1366	1508	1776	1524	1723	1719	1615
Q Serve(g_s), s	6.0	18.9	7.8	35.5	54.8	54.8	22.0	12.4	0.0	5.3	10.4	0.0
Cycle Q Clear(g_c), s	6.0	18.9	7.8	35.5	54.8	54.8	22.0	12.4	0.0	5.3	10.4	0.0
Prop In Lane	1.00		1.00	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	94	994	309	998	1401	681	302	264	227	261	325	153
V/C Ratio(X)	1.61	0.86	0.56	0.96	1.17	1.24	2.07	0.78	0.00	0.36	1.20	0.00
Avail Cap(c_a), veh/h	94	994	309	1033	1401	681	302	387	332	261	325	153
HCM Platoon Ratio	0.33	0.33	0.33	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	0.95	0.09	0.09	0.09	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.0	49.9	20.1	28.6	18.6	18.6	44.0	45.1	0.0	41.9	49.8	0.0
Incr Delay (d2), s/veh	314.6	9.5	6.7	2.8	78.5	111.3	492.4	3.4	0.0	0.3	114.6	0.0
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(95%),veh/ln	9.9	14.4	7.0	16.1	63.4	72.1	90.7	10.4	0.0	4.6	18.2	0.0
LnGrp Delay(d),s/veh	368.6	59.3	26.8	31.4	97.0	129.8	536.4	48.5	0.0	42.2	164.4	0.0
LnGrp LOS	F	E	C	C	F	F	F	D		D	F	
Approach Vol, veh/h		1182			3446			831			482	
Approach Delay, s/veh		94.1			86.9			414.8			140.8	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	42.7	26.3	26.0	15.0	10.0	59.0	20.6	20.4
Change Period (Y+Rc), s	* 4.2	* 4.2	4.0	4.6	4.0	* 4.2	4.0	4.0
Max Green Setting (Gmax), s	* 38	* 21	22.0	10.4	6.0	* 55	9.0	24.0
Max Q Clear Time (g_c+I1), s	37.5	20.9	24.0	12.4	8.0	56.8	7.3	14.4
Green Ext Time (p_c), s	0.9	0.0	0.0	0.0	0.0	0.0	0.5	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	138.6
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	282	786	136	324	2750	14	250	61	45	42	244	342
Future Volume (veh/h)	282	786	136	324	2750	14	250	61	45	42	244	342
Number	1	6	16	5	2	12	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.97	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	1845	1845	1681	1338	1546	1900	1429	1776	1792	1610	1532	1652
Adj Flow Rate, veh/h	291	810	140	334	2835	14	258	63	46	43	976	353
Adj No. of Lanes	2	3	1	2	3	0	1	2	1	1	1	2
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97
Percent Heavy Veh, %	3	3	13	42	23	23	33	7	6	18	24	15
Cap, veh/h	186	1483	411	527	1988	10	96	239	105	410	410	643
Arrive On Green	0.07	0.39	0.39	0.21	0.46	0.46	0.07	0.07	0.07	0.27	0.27	0.27
Sat Flow, veh/h	3408	5036	1394	2472	4333	21	1361	3374	1479	1533	1532	2406
Grp Volume(v), veh/h	291	810	140	334	1839	1010	258	63	46	43	976	353
Grp Sat Flow(s),veh/h/ln	1704	1679	1394	1236	1406	1542	1361	1687	1479	1533	1532	1203
Q Serve(g_s), s	6.0	13.7	7.8	13.5	50.5	50.5	7.8	1.9	3.3	2.3	29.4	13.9
Cycle Q Clear(g_c), s	6.0	13.7	7.8	13.5	50.5	50.5	7.8	1.9	3.3	2.3	29.4	13.9
Prop In Lane	1.00		1.00	1.00		0.01	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	186	1483	411	527	1290	707	96	239	105	410	410	643
V/C Ratio(X)	1.57	0.55	0.34	0.63	1.43	1.43	2.67	0.26	0.44	0.10	2.38	0.55
Avail Cap(c_a), veh/h	186	1483	411	527	1290	707	96	239	105	410	410	643
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.53	0.53	0.53	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.0	27.8	26.0	39.4	29.8	29.8	51.1	48.4	49.0	30.4	40.3	34.6
Incr Delay (d2), s/veh	268.0	0.8	1.2	1.9	195.9	200.9	782.1	0.2	1.1	0.0	629.9	0.6
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(95%),veh/ln	17.5	9.5	5.2	8.3	98.4	109.6	43.0	1.7	2.5	1.8	151.3	8.2
LnGrp Delay(d),s/veh	319.0	28.5	27.2	41.3	225.7	230.7	833.2	48.6	50.1	30.4	670.2	35.2
LnGrp LOS	F	C	C	D	F	F	F	D	D	C	F	D
Approach Vol, veh/h		1241			3183			367			1372	
Approach Delay, s/veh		96.5			207.9			600.4			486.8	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	55.1		34.0	28.1	37.0		12.0
Change Period (Y+Rc), s	4.0	4.6		4.6	4.6	* 4.6		4.2
Max Green Setting (Gmax), s	6.0	49.4		29.4	23.0	* 32		7.8
Max Q Clear Time (g_c+I1), s	8.0	52.5		31.4	15.5	15.7		9.8
Green Ext Time (p_c), s	0.0	0.0		0.0	6.9	3.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	270.9
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	616	49	830	2210	7	77	9	73	11	24	23
Future Volume (veh/h)	4	616	49	830	2210	7	77	9	73	11	24	23
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00	0.99		0.99	0.99		0.99
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	1776	1811	1900	1407	1521	1900	1900	1752	1863	1900	1900	1900
Adj Flow Rate, veh/h	4	648	52	874	2326	7	81	9	24	12	25	3
Adj No. of Lanes	1	2	0	1	2	0	0	1	1	0	1	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, %	7	5	5	35	25	25	0	0	2	0	0	0
Cap, veh/h	4	691	55	722	2234	7	169	15	182	58	93	8
Arrive On Green	0.00	0.22	0.22	0.72	1.00	1.00	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1691	3215	258	1340	2955	9	863	129	1563	93	800	72
Grp Volume(v), veh/h	4	346	354	874	1137	1196	90	0	24	40	0	0
Grp Sat Flow(s),veh/h/ln	1691	1720	1752	1340	1445	1519	993	0	1563	965	0	0
Q Serve(g_s), s	0.2	19.8	19.9	53.8	75.6	72.5	0.0	0.0	1.4	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.2	19.8	19.9	53.8	75.6	72.5	9.5	0.0	1.4	9.7	0.0	0.0
Prop In Lane	1.00		0.15	1.00		0.01	0.90		1.00	0.30		0.07
Lane Grp Cap(c), veh/h	4	370	377	722	1092	1149	184	0	182	159	0	0
V/C Ratio(X)	1.01	0.94	0.94	1.21	1.04	1.04	0.49	0.00	0.13	0.25	0.00	0.00
Avail Cap(c_a), veh/h	34	370	377	722	1092	1149	241	0	250	233	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.09	0.09	0.09	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	49.9	38.6	38.6	14.2	0.0	0.0	43.1	0.0	39.6	40.0	0.0	0.0
Incr Delay (d2), s/veh	129.7	33.2	33.2	96.3	21.4	21.7	0.7	0.0	0.1	0.3	0.0	0.0
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(95%),veh/ln	0.5	18.7	19.0	67.4	11.7	12.5	4.4	0.0	1.1	1.8	0.0	0.0
LnGrp Delay(d),s/veh	179.6	71.8	71.8	110.5	21.4	21.7	43.9	0.0	39.7	40.3	0.0	0.0
LnGrp LOS	F	E	E	F	F	F	D		D	D		
Approach Vol, veh/h		704			3207			114			40	
Approach Delay, s/veh		72.4			45.8			43.0			40.3	
Approach LOS		E			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.3	26.0		15.7	4.2	80.1		15.7
Change Period (Y+Rc), s	4.5	* 4.5		4.0	4.0	4.5		4.0
Max Green Setting (Gmax), s	5.0	* 22		16.0	2.0	69.5		16.0
Max Q Clear Time (g_c+I1), s	5.8	21.9		11.7	2.2	77.6		11.5
Green Ext Time (p_c), s	0.0	0.0		0.2	0.0	0.0		0.2

Intersection Summary		
HCM 2010 Ctrl Delay		50.3
HCM 2010 LOS		D

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	548	0	0	2469	52	2	0	1	2	0	561
Future Volume (veh/h)	131	548	0	0	2469	52	2	0	1	2	0	561
Number	7	4	14	3	8	18	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		1.00	1.00		1.00	1.00		1.00	1.00		0.98
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	1845	1827	1900	0	1484	1900	1900	1863	1900	1900	1597	1900
Adj Flow Rate, veh/h	139	583	0	0	2627	55	2	0	1	2	0	501
Adj No. of Lanes	1	2	0	0	2	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.92	0.92	0.94	0.94	0.92	0.92	0.92	0.94	0.92	0.94
Percent Heavy Veh, %	3	4	4	0	28	28	2	2	2	2	2	2
Cap, veh/h	97	2551	0	0	1794	37	121	12	36	36	1	232
Arrive On Green	0.05	0.74	0.00	0.00	0.63	0.63	0.17	0.00	0.17	0.17	0.00	0.17
Sat Flow, veh/h	1757	3563	0	0	2899	59	348	67	207	1	4	1325
Grp Volume(v), veh/h	139	583	0	0	1307	1375	3	0	0	503	0	0
Grp Sat Flow(s),veh/h/ln	1757	1736	0	0	1410	1474	622	0	0	1330	0	0
Q Serve(g_s), s	5.5	5.3	0.0	0.0	63.5	63.5	0.0	0.0	0.0	4.3	0.0	0.0
Cycle Q Clear(g_c), s	5.5	5.3	0.0	0.0	63.5	63.5	0.1	0.0	0.0	17.5	0.0	0.0
Prop In Lane	1.00		0.00	0.00		0.04	0.67		0.33	0.00		1.00
Lane Grp Cap(c), veh/h	97	2551	0	0	895	936	169	0	0	269	0	0
V/C Ratio(X)	1.44	0.23	0.00	0.00	1.46	1.47	0.02	0.00	0.00	1.87	0.00	0.00
Avail Cap(c_a), veh/h	97	2551	0	0	895	936	169	0	0	269	0	0
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)	0.59	0.59	0.00	0.00	0.09	0.09	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	47.3	4.2	0.0	0.0	18.3	18.3	34.1	0.0	0.0	42.4	0.0	0.0
Incr Delay (d2), s/veh	228.4	0.0	0.0	0.0	207.3	211.9	0.2	0.0	0.0	405.6	0.0	0.0
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(95%),veh/ln	5.8	4.5	0.0	0.0	131.0	138.9	0.1	0.0	0.0	67.9	0.0	0.0
LnGrp Delay(d),s/veh	275.7	4.2	0.0	0.0	225.6	230.2	34.3	0.0	0.0	448.1	0.0	0.0
LnGrp LOS	F	A			F	F	C			F		
Approach Vol, veh/h		722			2682			3			503	
Approach Delay, s/veh		56.5			227.9			34.3			448.1	
Approach LOS		E			F			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6	7	8
Phs Duration (G+Y+Rc), s		22.0		78.0		22.0	10.0	68.0
Change Period (Y+Rc), s		4.5		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		17.5		73.5		17.5	5.5	63.5
Max Q Clear Time (g_c+I1), s		2.1		7.3		19.5	7.5	65.5
Green Ext Time (p_c), s		3.3		62.7		0.0	0.0	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		224.4
HCM 2010 LOS		F

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	286	126	4	975	744	10
Future Volume (veh/h)	286	126	4	975	744	10
Number	2	12	1	6	7	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	311	137	4	1060	819	0
Adj No. of Lanes	1	1	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	0
Cap, veh/h	1115	947	56	1113	962	438
Arrive On Green	0.60	0.60	0.60	0.60	0.27	0.00
Sat Flow, veh/h	1863	1583	1	1860	3548	1615
Grp Volume(v), veh/h	311	137	1064	0	819	0
Grp Sat Flow(s),veh/h/ln	1863	1583	1861	0	1774	1615
Q Serve(g_s), s	5.2	2.5	3.8	0.0	14.3	0.0
Cycle Q Clear(g_c), s	5.2	2.5	34.9	0.0	14.3	0.0
Prop In Lane		1.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1115	947	1169	0	962	438
V/C Ratio(X)	0.28	0.14	0.91	0.00	0.85	0.00
Avail Cap(c_a), veh/h	1143	971	1197	0	1415	644
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	6.3	5.8	12.3	0.0	22.5	0.0
Incr Delay (d2), s/veh	0.1	0.0	9.9	0.0	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.8	1.9	28.1	0.0	11.7	0.0
LnGrp Delay(d),s/veh	6.4	5.8	22.2	0.0	24.8	0.0
LnGrp LOS	A	A	C		C	
Approach Vol, veh/h	448			1064	819	
Approach Delay, s/veh	6.2			22.2	24.8	
Approach LOS	A			C	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		
Phs Duration (G+Y+Rc), s		43.5		21.7		43.5		
Change Period (Y+Rc), s		4.5		4.0		4.5		
Max Green Setting (Gmax), s		40.0		26.0		40.0		
Max Q Clear Time (g_c+I1), s		7.2		16.3		36.9		
Green Ext Time (p_c), s		9.3		1.4		2.1		

Intersection Summary	
HCM 2010 Ctrl Delay	20.1
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.



Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	0	11	80	589	0	0
Future Volume (Veh/h)	0	11	80	589	0	0
Sign Control	Yield		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	87	640	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	87	44			727	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87	44			727	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	910	1024			872	

Direction, Lane #	WB 1	NE 1	NE 2	NE 3
Volume Total	12	58	242	427
Volume Left	0	0	0	0
Volume Right	12	0	213	427
cSH	1024	1700	1700	1700
Volume to Capacity	0.01	0.03	0.14	0.25
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	8.6	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	8.6	0.0		
Approach LOS	A			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	236	200	2025	369	510	102	30	319	150	1121	170
Future Volume (veh/h)	169	236	200	2025	369	510	102	30	319	150	1121	170
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
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	1610	1765	1727	1520	1681	1792	1696	1570	1759	1776	1810	1827
Adj Flow Rate, veh/h	141	295	0	2109	384	0	106	31	0	156	1168	0
Adj No. of Lanes	1	2	1	3	1	1	1	2	1	1	2	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	18	6	10	25	13	6	12	21	8	7	5	4
Cap, veh/h	112	257	107	1948	802	727	59	121	61	420	888	401
Arrive On Green	0.07	0.07	0.00	0.48	0.48	0.00	0.04	0.04	0.00	0.17	0.17	0.00
Sat Flow, veh/h	1533	3530	1468	4082	1681	1524	1616	2983	1495	1691	3438	1553
Grp Volume(v), veh/h	141	295	0	2109	384	0	106	31	0	156	1168	0
Grp Sat Flow(s),veh/h/ln	1533	1765	1468	1361	1681	1524	1616	1492	1495	1691	1719	1553
Q Serve(g_s), s	8.0	8.0	0.0	52.5	17.0	0.0	4.0	1.1	0.0	9.0	28.4	0.0
Cycle Q Clear(g_c), s	8.0	8.0	0.0	52.5	17.0	0.0	4.0	1.1	0.0	9.0	28.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	257	107	1948	802	727	59	121	61	420	888	401
V/C Ratio(X)	1.26	1.15	0.00	1.08	0.48	0.00	1.80	0.26	0.00	0.37	1.32	0.00
Avail Cap(c_a), veh/h	112	257	107	1948	802	727	59	526	264	420	888	401
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	1.00	1.00	0.00	0.09	0.09	0.00	1.00	1.00	0.00	0.58	0.58	0.00
Uniform Delay (d), s/veh	51.0	51.0	0.0	28.8	19.5	0.0	53.0	51.2	0.0	38.2	45.5	0.0
Incr Delay (d2), s/veh	172.2	102.4	0.0	38.2	0.0	0.0	421.0	0.4	0.0	0.1	146.8	0.0
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(95%),veh/ln	15.7	13.6	0.0	46.9	9.3	0.0	15.6	0.8	0.0	6.8	56.8	0.0
LnGrp Delay(d),s/veh	223.2	153.4	0.0	66.9	19.5	0.0	474.0	51.6	0.0	38.3	192.3	0.0
LnGrp LOS	F	F		F	B		F	D		D	F	
Approach Vol, veh/h		436			2493			137			1324	
Approach Delay, s/veh		176.0			59.6			378.4			174.2	
Approach LOS		F			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.0	33.0		12.0	31.9	9.1		57.0
Change Period (Y+Rc), s	4.0	4.6		4.0	4.6	* 4.6		4.5
Max Green Setting (Gmax), s	4.0	28.4		8.0	13.0	* 19		52.5
Max Q Clear Time (g_c+I1), s	6.0	30.4		10.0	11.0	3.1		54.5
Green Ext Time (p_c), s	0.0	0.0		0.0	1.5	0.1		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	115.7
HCM 2010 LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	135	470	101	1069	14	481	703	220	12	262	1354
Future Volume (veh/h)	100	135	470	101	1069	14	481	703	220	12	262	1354
Number	5	2	12	1	6	16	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.91	1.00		0.97	1.00		1.00	1.00		0.93
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	1532	1776	1652	1667	1275	1624	1727	1810	1863	1900	1845	1520
Adj Flow Rate, veh/h	105	142	106	106	1125	15	506	740	0	13	276	1109
Adj No. of Lanes	2	1	2	1	3	1	2	2	1	1	1	2
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, %	24	7	15	14	49	17	10	5	2	0	3	25
Cap, veh/h	150	216	274	281	854	330	597	643	296	650	662	760
Arrive On Green	0.02	0.04	0.04	0.18	0.25	0.25	0.19	0.19	0.00	0.36	0.36	0.36
Sat Flow, veh/h	2831	1776	2252	1587	3481	1343	3191	3438	1583	1810	1845	2117
Grp Volume(v), veh/h	105	142	106	106	1125	15	506	740	0	13	276	1109
Grp Sat Flow(s),veh/h/ln	1416	1776	1126	1587	1160	1343	1596	1719	1583	1810	1845	1059
Q Serve(g_s), s	4.1	8.7	5.0	6.5	27.0	0.9	16.8	20.6	0.0	0.5	12.4	39.5
Cycle Q Clear(g_c), s	4.1	8.7	5.0	6.5	27.0	0.9	16.8	20.6	0.0	0.5	12.4	39.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	150	216	274	281	854	330	597	643	296	650	662	760
V/C Ratio(X)	0.70	0.66	0.39	0.38	1.32	0.05	0.85	1.15	0.00	0.02	0.42	1.46
Avail Cap(c_a), veh/h	154	387	491	281	854	330	597	643	296	650	662	760
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.36	0.36	0.36	1.00	1.00	1.00	0.45	0.45	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.2	50.5	48.8	39.9	41.5	31.7	43.2	44.7	0.0	22.8	26.6	35.3
Incr Delay (d2), s/veh	4.0	0.9	0.2	0.3	150.7	0.0	6.8	76.0	0.0	0.0	0.2	213.6
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(95%),veh/ln	2.9	6.4	2.8	5.2	37.0	0.6	11.1	29.8	0.0	0.5	10.4	61.2
LnGrp Delay(d),s/veh	57.2	51.4	49.0	40.3	192.2	31.7	50.0	120.7	0.0	22.8	26.7	248.9
LnGrp LOS	E	D	D	D	F	C	D	F		C	C	F
Approach Vol, veh/h		353			1246			1246			1398	
Approach Delay, s/veh		52.4			177.4			92.0			202.9	
Approach LOS		D			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.4	17.4		25.2	9.8	31.0		44.0
Change Period (Y+Rc), s	4.0	4.0		4.6	4.0	4.0		4.5
Max Green Setting (Gmax), s	9.6	24.0		20.4	6.0	27.0		39.5
Max Q Clear Time (g_c+I1), s	8.5	10.7		22.6	6.1	29.0		41.5
Green Ext Time (p_c), s	0.4	0.9		0.0	0.0	0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	150.3
HCM 2010 LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1082	98	213	66	92	26	631	356	17	103	557	193
Future Volume (vph)	1082	98	213	66	92	26	631	356	17	103	557	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Lane Util. Factor	0.95	0.95	0.88		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1649	1677	2692		1823	1584	1597	3240		1805	3374	1098
Flt Permitted	0.95	0.96	1.00		0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1649	1677	2692		1823	1584	1597	3240		1805	3374	1098
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	1163	105	229	71	99	28	678	383	18	111	599	208
RTOR Reduction (vph)	0	0	104	0	0	26	0	4	0	0	0	143
Lane Group Flow (vph)	628	640	125	0	170	2	678	397	0	111	599	65
Confl. Peds. (#/hr)	3		3	3		3			3	3		3
Confl. Bikes (#/hr)						1			4			12
Heavy Vehicles (%)	4%	0%	3%	5%	0%	0%	13%	11%	0%	0%	7%	39%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases			4			3						2
Actuated Green, G (s)	32.0	32.0	32.0		6.0	6.0	28.0	39.0		6.0	17.0	17.0
Effective Green, g (s)	32.0	32.0	32.0		6.0	6.0	28.0	39.0		6.0	17.0	17.0
Actuated g/C Ratio	0.32	0.32	0.32		0.06	0.06	0.28	0.39		0.06	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0	4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	3.0	3.0		2.0	3.5	3.5
Lane Grp Cap (vph)	527	536	861		109	95	447	1263		108	573	186
v/s Ratio Prot	0.38	c0.38			c0.09		c0.42	0.12		0.06	c0.18	
v/s Ratio Perm			0.05			0.00						0.06
v/c Ratio	1.19	1.19	0.15		1.56	0.02	1.52	0.31		1.03	1.05	0.35
Uniform Delay, d1	34.0	34.0	24.2		47.0	44.2	36.0	21.2		47.0	41.5	36.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.51	0.40		1.00	1.00	1.00
Incremental Delay, d2	103.9	104.6	0.0		291.6	0.0	236.6	0.2		94.3	50.0	5.1
Delay (s)	137.9	138.6	24.3		338.6	44.3	290.9	8.7		141.3	91.5	41.8
Level of Service	F	F	C		F	D	F	A		F	F	D
Approach Delay (s)		120.8			297.0			186.0			86.2	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	140.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	4	19	1769	10	345	19	633	266	170	581	76
Future Volume (vph)	26	4	19	1769	10	345	19	633	266	170	581	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes		1.00	0.87	1.00	1.00	0.98	1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1820	1398	1417	1424	1244	1805	3343	1514	3367	3347	
Flt Permitted		0.96	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1820	1398	1417	1424	1244	1805	3343	1514	3367	3347	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	28	4	20	1902	11	371	20	681	286	183	625	82
RTOR Reduction (vph)	0	0	20	0	0	96	0	0	178	0	10	0
Lane Group Flow (vph)	0	32	0	951	962	275	20	681	108	183	697	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Confl. Bikes (#/hr)									4			13
Heavy Vehicles (%)	0%	0%	0%	21%	0%	27%	0%	8%	3%	4%	6%	0%
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	3	3		4	4		5	2		1	6	
Permitted Phases			3			4			2			
Actuated Green, G (s)		2.4	2.4	52.2	52.2	52.2	2.0	17.0	17.0	12.4	27.4	
Effective Green, g (s)		2.4	2.4	52.2	52.2	52.2	2.0	17.0	17.0	12.4	27.4	
Actuated g/C Ratio		0.02	0.02	0.52	0.52	0.52	0.02	0.17	0.17	0.12	0.27	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	2.0	
Lane Grp Cap (vph)		43	33	739	743	649	36	568	257	417	917	
v/s Ratio Prot		c0.02		0.67	c0.68		0.01	c0.20		0.05	c0.21	
v/s Ratio Perm			0.00			0.22			0.07			
v/c Ratio		0.74	0.01	1.29	1.29	0.42	0.56	1.20	0.42	0.44	0.76	
Uniform Delay, d1		48.5	47.6	23.9	23.9	14.7	48.6	41.5	37.1	40.6	33.3	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.66	1.85	
Incremental Delay, d2		45.4	0.1	139.2	142.5	0.2	10.1	105.7	0.4	1.5	2.7	
Delay (s)		93.9	47.7	163.1	166.4	14.8	58.7	147.2	37.5	69.0	64.2	
Level of Service		F	D	F	F	B	E	F	D	E	E	
Approach Delay (s)		76.1			140.4			113.6			65.2	
Approach LOS		E			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	117.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

12. Traffic Signal Warrants
Caltrans Peak Hour Warrant 3
2040 Cumulative plus Project

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: 2040 Cumulative+Phase 1 AM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

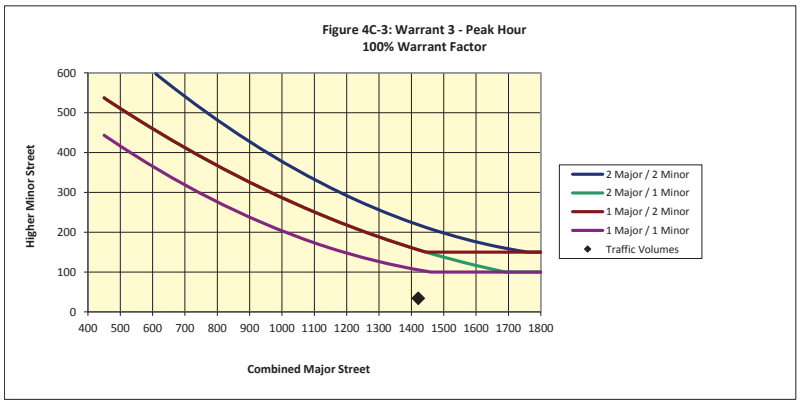
Analysis Volumes	
Major Street	
NB	1421
SB	0
Minor Street	
EB	0
WB	34

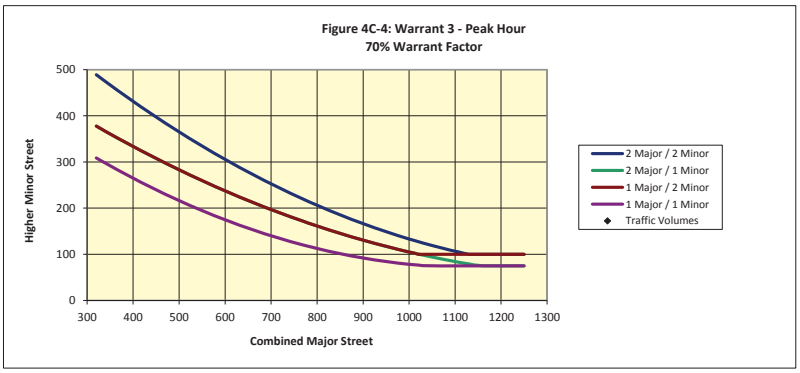
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	10.4
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.10
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	34
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	1455	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





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MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: 2040 Cumulative+Phase 1 PM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

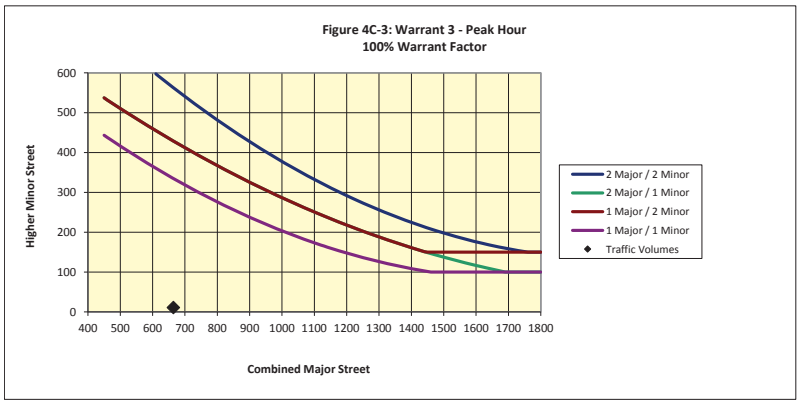
Analysis Volumes	
Major Street	
NB	664
SB	0
Minor Street	
EB	0
WB	11

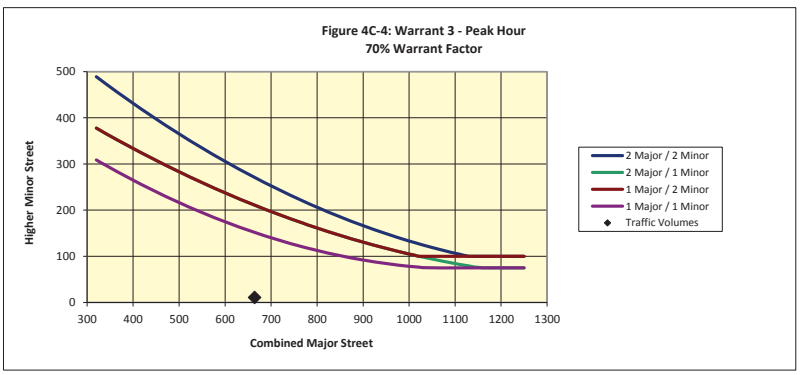
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	8.6
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.03
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	11
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	675	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





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MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: 2040 Cumulative+Phase 1+2 AM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

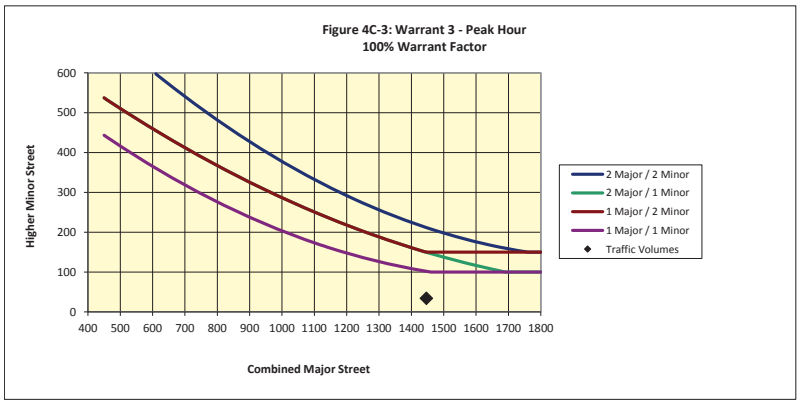
Analysis Volumes	
Major Street	
NB	1446
SB	0
Minor Street	
EB	0
WB	34

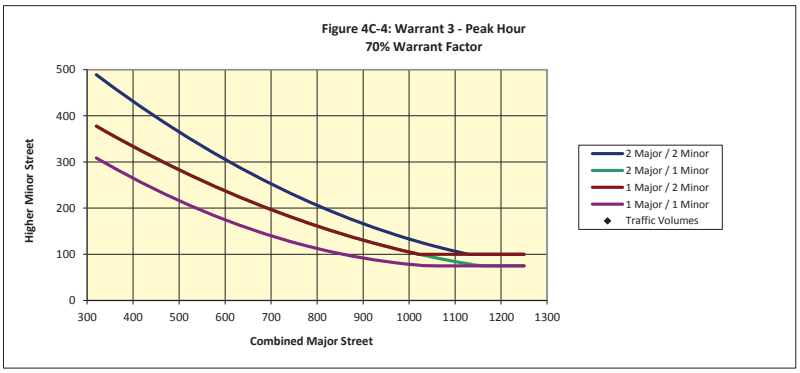
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	10.4
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.10
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	34
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	1480	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





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MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 900
Oakland, CA 94612
Phone: (510) 839-1742

Project #: 21673
Project Name: SSF 201 Haskins Way Rezoning Initial Study
Analyst: MNA
Date: 9/27/2018
Intersection: US 101 NB Off-Ramp/Polleti Way & E. Grand
Scenario: 2040 Cumulative+Phase 1+2 PM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	2
Minor Street Thru Lanes =	1
Speed > 40 mph?	No
Population < 10,000?	No

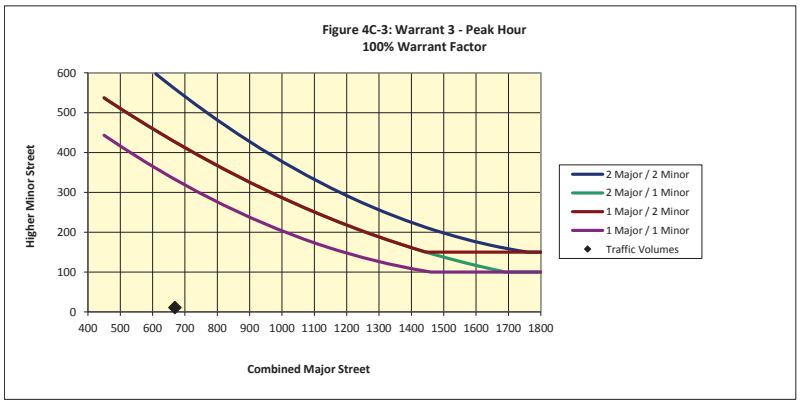
Analysis Volumes	
Major Street	
NB	669
SB	0
Minor Street	
EB	0
WB	11

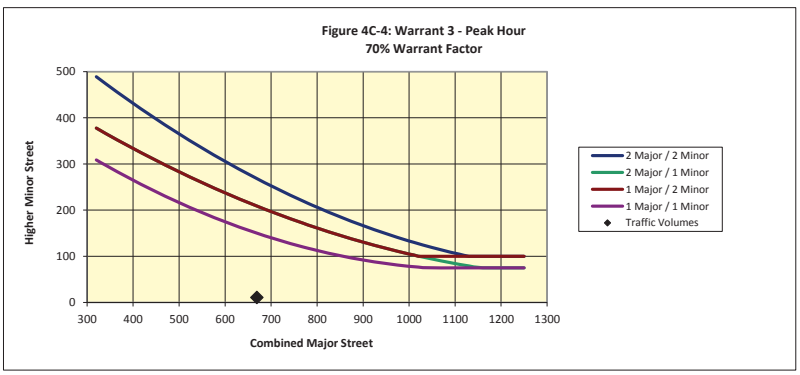
WARRANT 3 - Peak Hour **SATISFIED** No

PART A **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	0.0	8.6
	Number Of Lanes On Minor Street Approach	0	1
	Vehicle-Hours Of Stopped Delay On Minor Approach	0.00	0.03
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	0	11
	Satisfied	**No**	**No**
3	Total Entering Volume On All Approaches During Same Hour	680	
	Number of Approaches to Intersection	2	
	Satisfied	**No**	

PART B **SATISFIED** No





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13. Freeway Level of Service Calculations
Highway Capacity Software (HCS)
2040 Cumulative plus Project

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*10190*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2778*	pc/h/ln
S	*38.1*	mph
D = v_p / S	*73.0*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*12972*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*3536*	pc/h/ln
S	*0.3*	mph
D = v_p / S	*11639.0*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*13424*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2440*	pc/h/ln
S	*49.7*	mph
D = v_p / S	*49.1*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*9995*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1816*	pc/h/ln
S	*62.5*	mph
D = v_p / S	*29.0*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*9705*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2646*	pc/h/ln
S	*43.0*	mph
D = v_p / S	*61.6*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8694*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2370*	pc/h/ln
S	*51.7*	mph
D = v_p / S	*45.9*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8665*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1890*	pc/h/ln
S	*61.6*	mph
D = v_p / S	*30.7*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*11421*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2491*	pc/h/ln
S	*48.1*	mph
D = v_p / S	*51.8*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*10196*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*		E_R	*1.2*
E_T	*1.5*		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2779*	pc/h/ln
S	*38.0*	mph
D = v_p / S	*73.1*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*13032*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*3553*	pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*13479*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2450*	pc/h/ln
S	*49.4*	mph
D = v_p / S	*49.6*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Northbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*10004*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*		E_R	*1.2*
E_T	*1.5*		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*6*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1818*	pc/h/ln
S	*62.5*	mph
D = v_p / S	*29.1*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*9745*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*		E_R	*1.2*
E_T	*1.5*		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2657*	pc/h/ln
S	*42.6*	mph
D = v_p / S	*62.4*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of Oyster Point*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8702*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*		E_R	*1.2*
E_T	*1.5*		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*4*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2372*	pc/h/ln
S	*51.6*	mph
D = v_p / S	*46.0*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*AM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*8669*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*		E_R	*1.2*
E_T	*1.5*		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1891*	pc/h/ln
S	*61.6*	mph
D = v_p / S	*30.7*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*JGA*
Agency or Company	*Kittelson & Associates, Inc.*
Date Performed	*8/16/2018*
Analysis Time Period	*PM Peak Hour*

Site Information

Highway/Direction of Travel	*US 101 Southbound*
From/To	*North of I-380*
Jurisdiction	*South San Francisco*
Analysis Year	*Year 2040 Plus Phase 1 & 2*

Project Description *South San Francisco 201 Haskins Way*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*11477*	veh/h	Peak-Hour Factor, PHF	*0.94*
AADT		veh/day	%Trucks and Buses, P_T	*5*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*		E_R	*1.2*
E_T	*1.5*		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.976*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*5*	
Total Ramp Density, TRD	*3.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*8.1*	mph
FFS	*67.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2503*	pc/h/ln
S	*47.7*	mph
D = v_p / S	*52.4*	pc/mi/ln
LOS	*F*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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APPENDIX C

Land Use Compatibility Analysis

201 HASKINS WAY PROJECT

LAND USE COMPATIBILITY ANALYSIS

OCTOBER 12, 2018

PREPARED FOR

City of South San Francisco

315 Maple Avenue
South San Francisco, CA 94080

PREPARED BY

SWCA Environmental Consultants

201 HASKINS WAY PROJECT
LAND USE COMPATIBILITY ANALYSIS

Prepared for

City of South San Francisco
315 Maple Avenue
South San Francisco, CA 94080

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SWCA Project No. 44270

October 12, 2018

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INTRODUCTION

Overview

This Land Use Compatibility Analysis was prepared to assess the consistency of the 201 Haskins Way Project (herein referred to as the "proposed project") with applicable local and regional land use planning documents. This Land Use Compatibility Analysis includes a description of the existing land use on the proposed project site, the surrounding land uses, and the various adopted policies that may apply to the proposed project's land use.

Project Location

The proposed project encompasses approximately 18 acres on eight parcels of privately owned light industrial and research and development (R&D) area (herein referred to as the "project site") located in the City of South San Francisco (the City). The City is located south of the City of Brisbane and north of the City of San Bruno. The City is built on the San Francisco Bay plain and on the northern foothills of the Coastal range. The City is located along major transportation routes, including U.S. 101, Interstate 380, Interstate 280, and the Union Pacific Railroad.

The project site is within the City's East of 101 Area. This area consists of roughly 1,700 acres of land, and is bounded by San Francisco Bay on the east side, U.S. 101 and railway lines on the west, the City of Brisbane on the north, and San Francisco Bay and San Francisco International Airport (SFO) on the south. The East of 101 Area is mostly developed and has a mix of land uses, including industrial, warehousing, retail, office, hotel, marina, and bioscience R&D facilities.

Existing Setting

The project site is located in a light industrial and R&D area of the City's East of 101 Area. **Figure 1: Existing Project Site** shows the project site location and regional vicinity. The project site is generally bounded by East Grand Avenue to the north, Haskins Way to the west, the San Francisco Bay Trail and shoreline to the south, and adjacent parcels containing a recycling center and portions of the Genentech campus to the east. The project site is served by East Grand Avenue as the primary arterial road, fed by Haskins Way running north to south, and East Jamie Court running east to west.

Surrounding the project site to the west of Haskins Way are several existing light industrial manufacturing and distribution uses, generally containing one- to two-story buildings. To the north and northwest, the land use shifts from industrial uses to biotechnology uses, most predominantly the Genentech campus located north of East Grand Avenue. The Genentech campus creates a shift in land use to three- to- six-story office and R&D buildings, plus additional amenities such as a 5-story parking garage, retail uses, and childcare. To the east of the project site are the South San Francisco Scavenger Company and Blue Line Transfer buildings, which provide waste collection and recycling service uses. To the south, the existing industrial development meets the San Francisco Bay shoreline and the San Francisco Bay Trail.

Figure 1. Existing Project Site

The project site encompasses eight parcels divided into two development phase areas, as follows:

- The Phase 1 area includes two parcels: the vacant 6.45-acre 201 Haskins Way parcel (Assessor's Parcel Number [APN] 015-102-230) on the north side of East Jamie Court, which was previously occupied by a light industrial trucking terminal with a one-story terminal building, and the 6.13-acre 400-450 East Jamie Court parcel (APN 015-102-250), which is currently occupied by two office/R&D buildings.

- The Phase 2 area includes the 400-450 East Jamie Court parcel (APN 015-102-250; also part of the Phase 1 proposed project area), plus six additional parcels 101 and 151 Haskins Way, and 410 and 430 East Grand Avenue (APNs 015-102-210, 015-102-220, 015-102-180, 105-102-160), and 451 East Jamie Court (APNs 015-102-240 and 015-102-290). Five of the six additional parcels each contain one- to two-story light industrial buildings and the sixth contains a parking lot.

Existing General Plan Land Use Designation

The project site is identified in the South San Francisco General Plan (General Plan) as a combined Coastal Commercial / Mixed Industrial (CC/MI) area, with the exception of one parcel in the Phase 2 area (APN 015-102-290) which is designated as Coastal Commercial (CC) only.[1] The combined CC/MI designation allows existing uses to remain consistent with the General Plan under the MI land use designation whereas new R&D uses would be consistent with the CC land use designation. The existing General Plan land use and zoning designations of the project site and surrounding parcels are illustrated in **Figure 2: Existing General Plan Land Use and Zoning Designations**.

The CC land use designation under the General Plan allows a maximum Floor Area Ratio (FAR) of 0.5 for retail, recreation facilities, R&D facilities, marinas, and eating and drinking establishments; 1.0 FAR for offices; and 1.6 FAR for hotels.[2] In addition, CC land uses allow incentive-based FAR bonuses for implementation of a Transportation Demand Management (TDM) program and other specified design standards, allowing up to a total of 1.0 FAR for retail, 1.6 FAR for office, and 2.2 FAR for hotel uses.[3]

The MI land use designation under the General Plan is intended to provide and protect industrial lands for a wide range of manufacturing, industrial processing, general service, warehousing, storage and distribution, and service commercial uses up to 0.4 FAR.[4] For uses with low employment intensity, such as wholesaling, warehousing, and distribution, the maximum permitted FAR can be increased with incentives and bonuses up to 0.6 FAR.[5]

[1] City of South San Francisco, General Plan ("General Plan"). Chapter 2, Figure 2-1 Land Use Diagram, p. 2-6.
[2] General Plan. Chapter 2, p. 2-22.
[3] General Plan. Chapter 2, Table 2.2-2: Standards for Density and Development Intensity, p. 2-13.
[4] General Plan. Chapter 2, p. 2-25.
[5] General Plan. Chapter 2, Table 2.2-2: Standards for Density and Development Intensity, p. 2-13.

Figure 2. Existing General Plan Land Use and Zoning Designations.

Existing East of 101 Area Plan Designations

The East of 101 Area Plan, which amended the General Plan, originally was adopted as the policy document to guide development in the area. Subsequent to adoption of the East of 101 Area Plan, the City adopted a comprehensive General Plan update, including the area contained within the East of 101 Area Plan. The City now interprets the East of 101 Area Plan as a design-level document. Development standards and density determinations, specifically FAR, are established in the subsequently updated General Plan, which guides implementation of the prior adopted East of 101 Area Plan and takes precedence over the Area Plan.

The East of 101 Area Plan designates the entire project site as Light Industrial, except the 400-450 East Jamie Court parcel which is designated as combined Light Industrial/Coastal Commercial.[6] The East of 101 Area Plan provides that mixed land use categories such as the Light Industrial/Coastal Commercial designation here allow for the development of uses consistent with either of the two indicated categories.[7] Although the 201 Haskins Way parcel is designated only Light Industrial on the East of 101 Area Plan, the General Plan classifies the 201 Haskins Way parcel as combined CC/MI designation. Because the General Plan was more recently adopted, the combined CC/MI designation for the 201 Haskins Way parcel takes precedence over the sole Light Industrial designation found in the earlier adopted East of 101 Area Plan.

Existing South San Francisco Redevelopment Plan Designation

The 400-450 East Jamie Court parcel is located in the 1988 Downtown/Central Redevelopment Plan (Redevelopment Plan) area.[8] The Downtown/Central Redevelopment Plan was prepared by the former South San Francisco Redevelopment Agency to provide a process and a basic framework within which specific redevelopment plans could be developed for areas of the city identified as having economic disuse, stagnation, blight, and inadequately served by public utilities and services. As amended, the term of the Redevelopment Plan extends until July 12, 2030, for purposes of land use controls, and until July 12, 2040, for receipt of property taxes and repayment of indebtedness. The Redevelopment Plan provides that permitted land uses in the Plan Area include commercial and industrial uses, and may include any use permitted by the General Plan and City ordinances for that area.[9] Under the Redevelopment Plan, the type, size, and height of buildings in the Plan area are limited by applicable federal, state and local statutes and ordinances.[10] The Redevelopment Plan provides that the Redevelopment Agency was authorized to establish limits on height, land coverage, setbacks, design criteria, traffic, and parking through adoption of subsequent resolutions, but the Redevelopment Plan does not impose additional development standards for the Plan Area.[11]

Existing Zoning Designations

The existing zoning designations of the project site and surrounding parcels are illustrated in **Figure 2**, p. 4. The 101, 151, and 201 Haskins Way parcels; the 410 and 430 East Grand Avenue parcels; the 451 East Jamie Court parcel; and the adjacent parcel (APN 015-102-290) are zoned as MI. The 400-450 East

[6] East of 101 Area Plan, Land Use Map, pp. 53-54.

[7] East of 101 Area Plan, p. 61.

[8] General Plan, Figure 2-7 Specific and Area Plans and Redevelopment Areas, p. 2-37.

[9] City of South San Francisco, Downtown/Central Redevelopment Plan ("Downtown/Central Redevelopment Plan"), Section 402, p. 18.

[10] Downtown/Central Redevelopment Plan, Section 413, p. 21.

[11] Downtown/Central Redevelopment Plan, Section 420, p. 22.

Jamie Court parcel is zoned Business Commercial (BC). The MI and BC districts are two of the City's base employment districts. **Table 1: Existing Land Use and Development Standards by Zoning Designation** outlines the development standards for the MI and BC districts for lot size, building height, minimum setbacks, lot coverage, FAR, and landscaping coverage.[12] Of note, the City's current land use regulations for base employment districts are set forth in Section 20.110.002 of the South San Francisco Municipal Code, which recognizes existing legally approved freight forwarding, customs brokering, wholesale, warehousing, and distribution uses to be legal conforming uses in accordance with General Plan Policy 3.5-I-1 and Resolution 84-97 (see note 10 of Table 20.110.002). However, such existing uses may not expand, convert to, re-convert to, or establish a freight forwarding use. The purposes of the MI and BC zoning districts as defined by the City are described below.

[12] Section 20.110.004 provides additional district-specific regulations regarding outdoor employee eating areas; landscaped setback of parking areas; access locations; limitations on curb cuts and driveways; and locations and screening of truck docks, loading, and service areas.

Table 1: Existing Land Use and Development Standards by Zoning Designation

	Mixed Industrial (MI)	Business Commercial (BC)
Lot Standards		
Minimum Lot Size (sq. ft.)	43,560	
Minimum Lot Width (feet)	50	
Building Form and Location		
Maximum Height	Up to 161 feet above sea level, subject to Federal Aviation Administration (FAA) Part 77[1]	
Minimum Setbacks (feet from lot line)		
Front	20	
Interior Side	10; 0 if along MI district boundary	0; 10 along R district boundary
Street Side	10	
Rear	10; 0 if along MI district boundary	0; 10 along R district boundary
Maximum Lot Coverage (% of lot)	60	50
Maximum Floor Area Ratio (FAR)	0.40/0.60[2]	0.50 / 1.0[3]
Minimum Amount of Landscaping (% of site)	10	15

Notes:

[1] Building heights east of 101 are allowed the maximum height limits permissible under Federal Aviation Regulations Part 77. General Plan Figure 2-2 establishes a 161-foot height limit in the project area, whereas Exhibit IV-13 of the Comprehensive Airport Land Use Plan for the Environs of San Francisco International Airport prepared in 2012 (2012 SFO LUCP) establishes a 163-foot height limit.

[2] Maximum FAR in the MI district is 0.4, but increases may be permitted up to a total of 0.6 for developments that meet specific design and green building standards per the Incentives Program, subject to approval of a conditional use permit as provided in Zoning Ordinance Section 20.110.003(C). TDM Plans are required for nonresidential development expected to generate 100 or more average daily trips, based on the Institute of Traffic Engineers trip generation rates.

[3] Maximum FAR in the BC district is 0.5, but increases may be permitted up to a total of 1.0 for developments that meet specific TDM or design and green building standards per the Incentives Program, subject to approval of a conditional use permit as provided in Zoning Ordinance Section 20.110.003(C). TDM Plans are required for nonresidential development expected to generate 100 or more average daily trips, based on the Institute of Traffic Engineers trip generation rates.

Source: City of South San Francisco Zoning Ordinance, 2017. Table 20.110.003.

The MI zoning district is intended to provide areas for a wide range of manufacturing, industrial processing, general service, warehousing, storage and distribution, and service commercial uses and to protect areas where such uses now exist. Industries that use or produce substantial amounts of hazardous materials or generate noise, odor, or other pollutants are not to be permitted. Conventional residential and/or group residential development are also prohibited, but live-work uses such as artists' studios are allowed in designated areas. Small-scale retail and service uses serving local employees, residents, and visitors may be permitted as secondary uses. This district is consistent with the General Plan's MI designation. The maximum FAR is 0.4 with an increase up to 0.6 FAR for development meeting certain design and green building standards per the Incentives Program, subject to approval of a conditional use permit.[13]

The BC zoning district is intended for business and professional offices, visitor service establishments, and retail uses with an emphasis on larger and regional-serving uses west of U.S. 101. A wide range of nonresidential uses is appropriate including administrative, financial, business, professional, medical and public offices, and visitor-oriented and regional commercial activities such as warehouse clubs and other large-format retail uses. The maximum base FAR is 0.5 but increases may be permitted up to a total FAR of 1.0 for R&D establishments or development that meets specific TDM or design and green building standards, subject to approval of a conditional use permit.[14] The maximum FAR for hotels is 1.2 with increases to a total of 2.0 FAR for development that meets specified criteria consistent with General Plan policies. Section 20.110.004 also provides requirements for BC districts regarding the orientation of the primary building entrance; building transparency and required openings; and building design features including architectural articulation, entries, and materials.

Existing Height Limits

Development of office buildings on the project site and surroundings in the East of 101 area is not restricted by height under the zoning ordinance or General Plan. In general, height limitations or restrictions in the East of 101 Area are defined by the SFO sphere of influence. Whereas "office buildings" are not subject to a height limit other than that by the City/County Association of Governments of San Mateo County (C/CAG) Airport Land Use Commission (ALUC), the East of 101 Area Plan states that retail, flex, and industrial buildings should not exceed 35 feet in height.

Otherwise, development east of U.S. 101 and south of East Grand Avenue is limited to 161 feet in height by elevation according to the Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport prepared in 2012 (2012 SFO ALUCP) and the East of 101 Area Plan, but may be further restricted based on notification and consultation with the Federal Aviation Administration (FAA) under Part 77.9 of the Code of Federal Regulations (CFR).[15] Moreover, the East of 101 Area Plan provides that exceptions may be made if taller building heights are included in an approved Master Plan or if warranted by a specific proposed use.[16]

[13] City of South San Francisco Zoning Ordinance, 2017. Table 20.110.003(C). Applies to MI projects that include high quality, innovative design and product type, and maximum provisions for pedestrian and bicycle use or provision of green building measures over and above the applicable green building compliance threshold requirements pursuant to Municipal Code Title 15.

[14] City of South San Francisco Zoning Ordinance, 2017. Table 20.110.003(C).

[15] General Plan, Figure 2-2, p. 2-10

[16] East of 101 Area Plan, Policy DE-43, p. 135 and Figure 5, p. 66.

PROJECT DESCRIPTION

Under the proposed project, ARE and the City propose a rezoning of eight parcels in the East of 101 Area to allow for new development of office/R&D uses. The parcels are located at 101, 151, and 201 Haskins Way (APNs 015-102-210, 015-102-220, and 015-102-230); 410 and 430 East Grand Avenue (APNs 015-102-160 and 105-102-180); 400-450 and 451 East Jamie Court (APNs 015-102-250 and 015-102-240); and one parcel without an address east of 451 East Jamie Court (APN 105-102-290). The eight parcels encompass a total of approximately 18.2 acres of land. ARE and the City propose to rezone these eight parcels to Business Technology Park (BTP) District. The EIR includes an analysis of the maximum allowable development associated with the proposed rezoning of those affected parcels. The existing General Plan designations of CC/MI would remain unchanged for all eight parcels.

ARE would seek a rezoning of two parcels, 201 Haskins Way and 400-450 East Jamie Court, and is proposing a specific development plan for these parcels (herein referred to as the Phase 1 development). Currently, there is no site-specific development program proposed for the remaining six parcels, and the City would initiate a rezoning of these six parcels. This analysis considers a conceptual Phase 2 development for buildout of these six parcels (herein referred to as the Phase 2 area) and assumes the project would be constructed in two phases (Phase 1 and Phase 2).[17]

Proposed Project Buildout

The proposed project would rezone eight parcels in the East of 101 Area: seven parcels from a MI District to a BTP District (101, 151, and 201 Haskins Way; 410 and 430 East Grand Avenue; and 451 East Jamie Court and the parcel to its east [APN 105-102-290]) and one parcel from a BC District to a BTP District (400-450 East Jamie Court). The proposed newly rezoned BTP parcels would provide new BTP development potential of 0.5 FAR, or up to 1.0 FAR with development and implementation of a TDM Plan, and off-site improvement or design standards, subject to approval of a conditional use permit.

Under the proposed new BTP Districts, ARE also proposes a site-specific development program for Phase 1 of the proposed project, to remove existing light industrial uses and redevelop the parcels to support new BTP uses, as discussed below. Phase 1 development would include approximately 305,765 square feet (sq. ft.) of new BTP use by floor area. Phase 2 development is conceptual at this time as no specific development is proposed, but buildout to a 1.0 FAR of the parcels in the Phase 2 area would add approximately 329,031 sq. ft. of additional new BTP use by floor area, for a total of 634,796 sq. ft. of BTP use by floor area, as shown in **Table 2: Allowable BTP Use under the Proposed Project**.

[17] It is uncertain when or if development in the Phase 2 area would occur, or whether it would occur as a single redevelopment of all parcels or as separate redevelopment of one or more parcels. Therefore, the proposed project could be constructed in more than two development phases. However, this EIR assumes only two phases, Phase 1 and Phase 2.

Table 2: Proposed Business Technology Park Development under the Proposed Project

Parcel Address (APN)	Phase 1 Development (sq. ft)	*Phase 2 Development (sq. ft.)*	Project Buildout (sq. ft)
201 Haskins Way (015-102-230)	280,765	-	280,765
400-450 East Jamie Court (015-102-250)[1]	25,000[2]	*85,000*[2]	110,000[1]
101 Haskins Way (015-102-210)	-	*24,535*	24,535
151 Haskins Way (015-102-220)	-	*28,602*	28,602
410 East Grand Avenue (015-102-180)	-	*40,384*	40,384
430 East Grand Avenue (015-102-160)	-	*72,076*	72,076
451 East Jamie Court (015-102-240)	-	*62,087*	62,087
(015-102-290)[3]	-	*16,347*	16,347
Subtotal	***-***	***329,031***	***329,031***
Total	**305,765**	**329,031**	**634,796**

Notes:
[1] Development activity would occur on 400-450 E. Jamie Court (015-102-250) in both Phase 1 development and Phase 2 development.

[2] A 25,000 sq. ft. building addition is being proposed in the proposed project. Under the Proposed Project, there would be a total of 110,000 sq. ft. of Business Technology Park (BTP) development per City Zoning Ordinance Chapter 20.110, leaving 85,000 sq. ft. remaining for future development for which a specific project is not currently proposed.

[3] APN 015-102-290 has no street address. It is currently used as a parking lot for the 451 East Jamie Court site.

Source: City Zoning Ordinance Table 20.110.003, ARE (2017)

Phase 1 Development

Phase 1 development encompasses the demolition of one one-story, 24,075-gross-sq.-ft. (gsf) former trucking terminal building at the 201 Haskins Way parcel and the development of approximately 336,368 gsf of space at this parcel (one three- and five-story, 311,368-gsf office/R&D building) and at the 400-450 East Jamie Court parcel (one two-story, approximately 25,000-sq.-ft. addition to an existing office/R&D building), as shown in Table 2, above.

201 HASKINS WAY

Under Phase 1 development, the proposed project would include demolition of the existing one-story, 24,075 sq. ft. terminal building at the 201 Haskins Way parcel, including all existing surface parking and truck lots, in order to construct an approximately 280,765 sq. ft., three- and five-story office/R&D building along the southern parcel boundary fronting East Jamie Court.[18] The new building would be comprised of a five-story, 187,500 sq. ft. wing to the west; a three-story, 88,500 sq. ft. wing to the east; and a 10,000 sq. ft. central building connector.

Phase 1 development also includes construction of 903 new parking spaces. A five-level, 700-stall parking structure would be constructed at the northeast corner of the site. Two new surface parking lots would be constructed, one on the northwestern portion of the parcel fronting Haskins Way and a second on the center east side of the parcel, for a total of 203 surface parking stalls. A central plaza would be constructed between the surface parking lots to serve as a pedestrian connector between the parking lots,

[18] Alexandria Real Estate, Inc., 2018. 201 Haskins Way, South San Francisco - Site Plan dated 2/7/18.

the parking garage, and the office building. Vehicle access to the site would be provided by two driveways on Haskins Way and one driveway on East Jamie Court at the southeast corner of the parcel.

New sidewalks would be constructed along the southern parcel boundary at East Jamie Court and a southern portion of Haskins Way adjacent to the western face of the office building.

400-450 EAST JAMIE COURT

The existing use at 400-450 East Jamie Court includes two three-story buildings containing a total of approximately 157,000 sq. ft. of office/R&D use. The existing use was previously permitted up to a FAR of 0.6 with implementation of an existing TDM Plan designed to achieve a 30 percent alternative mode use, although the current BC zoning designation allows for development up to a total of 1.0 FAR with implementation of TDM and pedestrian- and bicycle-serving design standards or other green building measures over and above compliance thresholds of the California Green Building Code in Title 24 of the California Code of Regulations (CALGreen).[19,20] The proposed rezoning of the 400-450 East Jamie Court parcel (BC to BTP) would maintain the maximum FAR of the parcel (1.0), which would require development and implementation of an updated TDM Plan and on-site site design features. Phase 1 development includes construction of a 25,000-sq.-ft., two-story addition to the northern face of the existing west building. Amenities within the addition are conceptual at this time, but it would include a dedicated space that would be used as a café for employees. Dedicated employee-serving retail/amenity space would be excluded from FAR-determined square footage calculations. The 400-450 East Jamie Court parcel is also included in the Phase 2 area, as described below.

Phase 2 Development

At this time, no specific Phase 2 development is proposed and it is uncertain when or if such development would occur. The proposed rezoning of the parcels in the Phase 2 area would allow the existing uses to continue indefinitely, and alternatively would allow redevelopment at 1.0 FAR in accordance with the BTP rezoning. The uses, buildings, and facilities discussed below are conceptual and reflect potential development that could be constructed as a result of rezoning the parcels in the Phase 2 area.

Under the anticipated scope of Phase 2 development, the remaining balance of FAR-defined square footage on the 400-450 East Jamie Court parcel would be developed for office/R&D uses. It is assumed that, under the rezoning proposed by the project, the Phase 2 development on the 400-450 East Jamie Court parcel would result in up to 85,000 sq. ft. of floor area.[21] Development of the remaining BTP use on the 400-450 East Jamie Court parcel is conceptual at this time. Site-specific, project-level design of Phase 2 would be subject to a separate plan review and discretionary approval process.

The proposed project would also involve construction of a second new office/R&D building along East Grand Avenue (referred to as the "East Grand Building"). In the conceptual plan, the East Grand Building would contain approximately 244,031 sq. ft. of office/R&D use by floor area.

[19] City of South San Francisco and Alexandria Real Estate Equities, Inc., 2006. *East Jamie Court Transportation Demand Management Plan*.

[20] Notable features of the existing TDM plan include a 14.4 percent parking reduction from code requirements, shuttles, carpool spaces, showers and bicycle facilities, and commuter incentives including the Guaranteed Ride Home program.

[21] FAR-defined square footage excludes certain areas defined under Sections 20.040.008 and 20.040.009. For example, floor area does not include areas such as mechanical, electrical, and communication equipment rooms; bay windows or other architectural projections; usable open space; and areas used for off-street parking spaces or loading spaces, driveways, or ramps.

400-450 EAST JAMIE COURT

The proposed rezoning would allow for an additional 110,000 sq. ft. of BTP office/R&D use to be constructed on 400-450 East Jamie Court at full buildout of the proposed project. The total floor area of the building addition proposed to be constructed during Phase 1 development on 400-450 East Jamie Court is approximately 25,000 sq. ft. Therefore, for the purposes of plan-level analysis, it is assumed that Phase 2 development would result in 85,000 sq. ft. total floor area of additional BTP use on 400-450 East Jamie Court. When the total floor area of the Phase 1 building addition is determined, the remaining balance of floor area would be applied to the design of the BTP use under Phase 2 development. The Phase 2 development on this parcel is conceptual at this time. Site-specific, project-level design of Phase 2 would be subject to a separate plan review and discretionary approval process.[22]

EAST GRAND BUILDING AND PARKING GARAGE

Five parcels in the Phase 2 area (101 and 151 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court) are currently occupied by a one- to two-story buildings used for light industrial uses, including a kiteboarding equipment distribution warehouse, a packaging manufacturer, a van rental service, audio and visual equipment rental services, and a janitorial equipment supplier. A small surface parking lot serves each building. One parcel (APN 015-102-290) contains only a parking lot. In Phase 2 development, the five existing buildings would be demolished and the existing surface parking areas would be removed.

In the conceptual plan for Phase 2 development, a new, approximately 244,031-sq.-ft. office/R&D building (the East Grand Building) would be constructed. The East Grand Building would have a 3-story, 63-foot-tall wing to the west, a 5-story, 95-foot-tall wing to the east, and a center core building connector. The main building entrance would be on the north side of the center core building, adjacent to the surface parking lot and the Central Plaza. Under the conceptual plan, the center core building would also have a building entrance on the south side, off East Jamie Court.

At completion of project buildout, the project site would contain a total of approximately 1,930 parking stalls to serve Phases 1 and 2 of the project and to the existing office buildings at 400-450 East Jamie Court:[23] 446 new parking stalls in three surface parking lots (a northeast lot, a southeast lot, and a west lot), 1,060 new parking stalls in a new, five-level, parking structure at the northeast corner of the site, and 424 existing parking stalls at 400-450 East Jamie Court (140 stalls in basement garage and 284 stalls in surface parking lot). During Phase 2 development, the parking structure constructed in Phase 1 development would be expanded into parcels to the east to accommodate 360 additional stalls for a total of 1,060 parking garage stalls. In the conceptual plan for Phase 2 development, an additional 243 parking stalls would also be provided in a new surface parking lot on the northeastern portion of the parcel fronting East Grand Avenue and adjacent to the parking structure, and east of the 201 Haskins Way Building, for a total of 446 new surface parking stalls.

At project buildout, a total of six driveways would be removed: three driveways on Haskins Way (one during Phase 1 development and two during Phase 2 development), two driveways on East Grand Avenue

[22] The final gross square footage of BTP use under Phase 2 development would be determined by future design. Future development may also include FAR-excluded accessory uses such as dedicated retail space or child care, to be determined in coordination with the City and upon completion of final design.

[23] Required off-street vehicle parking is calculated at a rate of 1 stall per 350 sq. ft. of office and R&D uses. The Planning Commission may approve a Conditional Use Permit to reduce onsite parking requirements if it finds that special conditions exist that will reduce parking demand at the project site, including: (1) proximity to frequent transit service; (2) transportation characteristics of persons residing, working, or visiting the site; or (3) or because the applicant has undertaken a TDM Plan.

(both during Phase 2 development), and two driveways on East Jamie Court (one during Phase 1 development and one in Phase 2 development). Four new driveways would be constructed at project buildout: two new driveways on Haskins Way (both during Phase 1 development), one new driveway on East Jamie Court (during Phase 1 development), and one new driveway on East Grand Avenue (during Phase 2 development). During Phase 2 development, a porte cochère would be provided on East Grand Avenue serving the East Grand Building. New sidewalks would be constructed along the southern parcel boundary at East Jamie Court, along the length of Haskins Way between East Grand Avenue and East Jamie Court, and on East Grand Avenue fronting the parcels.

Transportation Demand Management Plan

Development of both Phase 1 and Phase 2 would require submittal of a TDM Plan to the Planning Division for review and approval. The proposed TDM Plan may be refined during the planning review process for project entitlements. The proposed TDM Plan would be designed to achieve three basic goals: (1) convert single-occupant vehicle trips to an alternative mode of transportation (e.g., transit, carpools or vanpools, bicycling), (2) provide technological solutions (e.g., compressed natural gas, electric/hybrid vehicles, or other zero emission vehicles), and (3) eliminate trips (e.g., compressed work weeks, telecommute), consistent with the requirements of the zoning ordinance. Efficacy of the TDM Plan is subject to monitoring and enforcement through an annual commuter survey, annual summary report, and a triennial report. If the required alternative mode use is still not achieved after the second triennial report, the City may assess a penalty established by City Council resolution on the basis of the project size and actual percentage alternative mode use as compared to the percent alternative mode use established in the TDM Plan.

CITY OF SOUTH SAN FRANCISCO PLANS AND POLICIES

This Land Use Compatibility Analysis considers the following City planning documents:

- South San Francisco General Plan
- East of 101 Area Plan
- Downtown/Central Redevelopment Plan
- City of South San Francisco Zoning Ordinance, 2017
- Comprehensive Airport Land Use Compatibility Plan – San Francisco International Airport
- Climate Action Plan

General Plan

The General Plan, originally adopted in 1999 and as amended in 2011, provides a vision for the long-range physical and economic development for the City, provides strategies and specific implementing actions, and establishes a basis for judging whether specific development proposals and public projects are consistent with the City's plans and policy standards. The General Plan contains the following chapters:

- Land Use

- Planning Sub-Areas Element
- Transportation
- Parks, Public Facilities, and Services
- Economic Development
- Open Space and Conservation
- Health and Safety
- Noise

The General Plan chapters above cover six of the seven elements required by state law (land use, open space, conservation, housing, circulation, noise, and safety) and optional elements (Planning Sub Areas and Economic Development) that address local concerns and regional requirements. The seventh required element is the Housing Element, which is updated on a more regular basis than the General Plan and published under a separate volume.

The City is largely composed of single-use areas, with industry in the eastern and southeastern portions of the City and single-family homes to the north and west. The General Plan notes that business parks for high-technology R&D are one of the City's highest priority land uses. Limited vacant land in the City precipitates new growth to take the form of redevelopment and intensification.

The General Plan contains a Planning Sub-Area element. Policies in this element complement citywide policies included in the Land Use and other elements. Some of these sub-areas have detailed area plans, specific plans, or redevelopment plans. Where appropriate, the General Plan provides guidance as to how these plans may need to be changed in order to conform to the policy direction provided by the General Plan. The sub-areas, 14 in all, were collectively derived from analysis of land use and urban design patterns and existing and needed planning efforts and activities. The project site is located within the East of 101 Sub-Area.

The General Plan governs the amount and intensity of development within the East of 101 Sub-Area and establishes specific policies and goals for the area, including the project site. The proposed project site is CC/MI and CC districts in the General Plan. As shown in **Figure 2**, p. XX, General Plan land use designations surrounding the project site include MI, BTP, CC, and Park and Recreation on the shore of San Francisco Bay.

Table 3: Existing and Proposed Land Use and Development Standards by Zoning Designation presents the existing and proposed General Plan land use and development standards by corresponding zoning designation on the proposed project parcels.

General Plan Consistency, Proposed Project

Table 4: General Plan Consistency Analysis presents a list of relevant General Plan guiding and implementing policies applicable to the proposed project in the Land Use; East of 101 Sub-Area; Transportation; Parks, Public Facilities, and Services; Economic Development, Open Space and Conservation; Health and Safety; and Noise chapters. Table 4 discusses whether the proposed project would be consistent with the policy, or inconsistent with the policy. As shown, the proposed project would not be inconsistent with most General Plan policies.

However, Policy 4.2-G-13, directs the City to strive to maintain Level of Service (LOS) D or better on arterial and collector streets, at all intersections, and on principal arterials in the Congestion Management

Plan during peak hours. Nonetheless, Policy 4.2-G-14 instructs the City to Accept LOS E or F after finding that: (1) there is no practical and feasible way to mitigate the lower level of service; and (2) the uses resulting in the lower level of service are of clear, overall public benefit.

The EIR prepared for the proposed project identifies all feasible mitigation measures to maintain LOS D or better at all intersections and freeway segments in the Congestion Management Program (CMP) during peak hours that currently are operating at LOS D or better. With feasible mitigation incorporated, LOS D would be maintained at two intersections in the CMP under existing plus project conditions: Littlefield Avenue/East Grand Avenue during the AM peak hour and Gateway Boulevard/South Airport Boulevard/Mitchell Avenue during the PM peak hour) and two intersections under year 2040 plus project conditions (Harbor Way/Forbes Boulevard/East Grand Avenue in the AM peak hour and East Grand Avenue/Grand Avenue Overcrossing in the PM peak hour (see Impact TR-1 and Impact TR-3 for more information).

However, the existing plus project would cause one intersection in the CMP (Allerton Avenue/East Grand Avenue in the PM peak hour) that is currently operating at LOS D to operate at LOS E or F (see Impact TR-2). Under year 2040 conditions, the project would cause four intersections in the CMP that would be operating at LOS D to operate at LOS E or F: Forbes Boulevard/Harbor Way/East Grand Avenue and Littlefield Avenue/East Grand Avenue in the AM peak hour (see Impact C-TR-7 and Impact C-TR-8) and Dubuque Avenue/Grand Avenue Overcrossing and East Grand Avenue/Grand Avenue Overcrossing in the PM peak hour (see Impact C-TR-4 and Impact C-TR-5).

For two intersections, Allerton Avenue/East Grand Avenue in the PM peak hour under existing plus project conditions (Impact TR-2) and Littlefield Avenue/East Grand Avenue in the AM peak hour under year 2040 conditions (Impact C-TR-8), there is no practical and feasible way to mitigate to LOS D at these locations due to right of way constraints and impacts to pedestrian and bicycle facilities. For three intersections under year 2040 conditions (Forbes Boulevard/Harbor Way/East Grand Avenue in the AM peak hour, and Dubuque Avenue/Grand Avenue Overcrossing and East Grand Avenue/Grand Avenue Overcrossing in the PM peak hour), the proposed mitigation measures could reduce the proposed project's contribution to the cumulative traffic impact but these measures are not in the current Traffic Impact Fee and Capital Improvement Program. Because the City has not yet completed the Transportation Impact Fee and Capital Improvement Program updates to include or fund these measures, these impacts would remain significant.

A TDM program would also be required to be prepared and implemented pursuant to South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the Transportation Demand Management program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level and these impacts would be significant and unavoidable. As part of its consideration of the project, the City will consider a statement of overriding considerations that will explain the overriding public benefits of the project. Therefore, the proposed project would generally be consistent with Policies 4.2-G-13 and 4.2-G-14.

Table 3: Existing and Proposed Land Use and Development Standards by Zoning Designation

	Existing		Proposed
	Mixed Industrial (MI)	**Business Commercial (BC)**	**Business Technology Park (BTP)**
Lot Standards			
Minimum Lot Size (sq. ft.)	43,560		
Minimum Lot Width (feet)	50		
Building Form and Location			
Maximum Height	Up to 161 feet above sea level, subject to Federal Aviation Administration (FAA) Part 77[1]		
Minimum Setbacks (feet from lot line)			
Front	20		
Interior Side	10; 0 if along MI district boundary	0; 10 along R district boundary	10
Street Side	10		
Rear	10; 0 if along MI district boundary	0; 10 along R district boundary	0; 10 along R district boundary
Maximum Lot Coverage (% of lot)	60	50	60
Maximum Floor Area Ratio (FAR)	0.40/0.60[2]	0.50 / 1.0[3]	0.50 / 1.0[4]
Minimum Amount of Landscaping (% of site)	10	15	15
Public Improvements			
Sidewalks	Sidewalks shall be provided if none already exist, with features such as landscaping, berming, and/or meandering where appropriate.		
Street Trees	Fifteen-gallon trees shall be planted no more than 30 feet apart.		
Parking			
Required Spaces	1 per 350 sq. ft. for R&D uses[5],1 per 300 sq. ft. for Office uses		
Location	Spaces shall be located on the same lot as the served use. Off-site facilities may be approved with a Conditional Use Permit.[6]		
Landscaping Setback	10 feet from between parking area and right-of way, and 5 feet from on-site buildings		
Transportation Demand Management			
Minimum Alternative Mode Use (% of total trips)	N/A	35 for increased FAR of 1.0	35 for increased FAR of 1.0

Notes:

[1] Height limits of office buildings located in the East of 101 Area are established as the maximum height limits permissible under Federal Aviation Regulations Part 77. General Plan Figure 2-2 establishes a 161-foot height limit in the project area, whereas Exhibit IV-13 of the 2012 Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport (2012 SFO ALUCP) establishes a 163-foot height limit.

[2] The Maximum FAR in the MI district is 0.4 but increases may be permitted up to a total of 0.6 for developments that meet specific design and green building standards per the Incentives Program, subject to approval of a conditional use permit as provided in Zoning Ordinance Section 20.110.003(C). TDM Plans are required for nonresidential development expected to generate 100 or more average daily trips, based on the Institute of Traffic Engineers trip generation rates.

[3] The Maximum FAR in the BC district is 0.5 but increases may be permitted up to a total of 1.0 FAR for developments that meet specific TDM, design and green building standards per the Incentives Program, subject to approval of a conditional use permit as provided in Zoning Ordinance Section 20.110.003(C). TDM Plans are required for nonresidential development expected to generate 100 or more average daily trips, based on the Institute of Traffic Engineers trip generation rates.

[4] The Maximum FAR in the BTP district is 0.5 but increases may be permitted up to a total of 1.0 FAR for developments that meet specific TDM, design and green building standards per the Incentives Program, subject to approval of a conditional use permit as provided in Zoning Ordinance Section 20.110.003(C). TDM Plans are required for nonresidential development expected to generate 100 or more average daily trips, based on the Institute of Traffic Engineers trip generation rates.

[5] The Planning Commission may approve a Conditional Use Permit to reduce onsite parking requirements if it finds that special conditions exist that would reduce parking demand at the project site, including: (1) proximity to frequent transit service; (2) transportation characteristics of persons residing, working, or visiting the site; or (3) or because the applicant has undertaken a TDM Plan.

[6] Off-site parking facilities must (1) be located within 400 feet, along a paved handicap accessible walk, of the principal entrance containing the use(s) for which the parking is required, and (2) have an approved parking agreement as specified in Section 20.330.005 of the Municipal Code.

Source: City of South San Francisco Zoning Ordinance, 2017. Table 20.110.003, Chapter 20.110, 20.300, 20.330, and 20.400.

Table 4: General Plan Consistency Analysis

Policy	Consistency
Chapter 2. Land Use	
Policy 2-G-2. *Maintain a balanced land use program that provides opportunities for continued economic growth, and building intensities that reflect South San Francisco's prominent inner bay location and excellent regional access.*	**Consistent.** The proposed project would involve new office/R&D uses under the existing CC/MI and CC land use designations for allowable development of up to 1.0 FAR through a rezoning, Conditional Use Permit, and implementation of a TDM Plan and incorporation of off-site improvements, or design standards per the Municipal Code FAR-Bonus Incentives Program. The proposed project is consistent with previous and ongoing expansion of R&D uses in the East of 101 Area, including the Genentech Master Plan area as well as other biotechnology campus sites.
Policy 2-G-4. *Provide for continued operation of older industrial and service commercial businesses at specific locations.*	**Consistent.** The proposed project would involve removal of an existing trucking terminal use at 201 Haskins Way, and existing light industrial uses on 101 and 151 Haskins Way, and 410 and 430 East Grand Avenue, and 451 East Jamie Court. The project site is not designated for continual operation of older industrial and service commercial uses. The existing light industrial uses on the proposed project site include a trucking terminal, a kiteboarding equipment distribution warehouse, a packaging manufacturer, a van rental service, audio and visual equipment rental services, and a janitorial equipment supplier. These existing uses are relatively small scale, modern industrial uses that do not represent a historic industrial use.
Policy 2-I-4. *Require all new developments seeking an FAR bonus set forth in Table 2.2-2 to achieve a progressively higher alternative mode usage. The requirements of the TDM Program are detailed in the Zoning Ordinance. (Amended by City Council Resolution 98-2001, Adopted September 26, 2001)* *The requirements of the TDM program for projects seeking an FAR bonus are based on the percentage trip reduction that is achieved.*	**Consistent.** The proposed project would seek a FAR bonus to allow development of up to 1.0 FAR. Under the proposed project, the project applicant would develop and implement a TDM Plan and pedestrian- and bicycle-serving design provisions to achieve a 35 percent minimum alternative mode use as required by the Zoning Ordinance. TDM Plan measures and design features would be subject to review and approval by the City Council. The proposed project TDM Plan would be subject to an annual survey and triennial report to monitor and enforce alternative mode use goals.
Policy 2-I-22. *Require that all future development conforms with the relevant height, aircraft noise, and safety policies and compatibility criteria contained in the most recently adopted version of the San Mateo County Comprehensive Airport Land Use* [Compatibility] *Plan for the environs of San Francisco International Airport. (Amended by City Council Resolution 19-2010, Adopted February 10, 2010)*	**Consistent.** The proposed project site is located in the SFO sphere of influence under 14 CFR Part 77. The proposed project site has an existing ground elevation between 12-23 feet above mean sea level. The proposed project site is located within the imaginary horizontal surface contour established at 163 feet above sea level as depicted in the 2012 SFO ALUCP Exhibit IV-4 and the 161-foot height limit illustrated in General Plan Figure 2-2. The proposed project would involve development of up to 99-foot-tall office buildings, up to a total of 122 feet above mean sea level. The proposed project would not involve construction of buildings taller than the horizontal surface. To ensure compatibility, the project sponsor is required to file form 7460-1 Notice of Proposed Construction or Alteration with the FAA to determine whether the project would constitute a hazard to air navigation and must present the project to the C/CAG ALUC for determination of consistency with the 2012 SFO ALUCP. The proposed project is not located within noise or safety compatibility zones designated by the 2012 SFO ALUCP.

Policy	Consistency
Chapter 3. East of 101 Sub-Area	
Policy 3.5-G-3. *Promote campus-style biotechnology, high-technology, and research and development uses.*	**Consistent.** The proposed project would involve development of new office/R&D uses in the East of 101 Sub-Area.
Policy 3.5-I-4. *Unless otherwise stipulated in a specific plan, allow building heights in the East of 101 area to the maximum limits permissible under Federal Aviation Regulations Part 77.*	**Consistent.** The General Plan provides that height limitations or restrictions in the East of 101 Area are the maximum height limits permissible under Federal Aviation Regulations Part 77, which is 161 feet in height by elevation (General Plan, Figure 2-2.). The proposed project would be developed consistent with this building height limit.
Policy 3.5-I-5. *Do not vary permitted maximum development intensities based on lot-size.*	**Consistent.** Development intensity at the proposed project site would occur under the existing CC/MI and CC land use designations. The proposed project would require approval of a rezoning and FAR bonus under a Conditional Use Permit contingent upon on implementation of an approved TDM Plan.
Policy 3.5-I-8. *Encourage the development of employee-serving amenities with restaurants, cafes, support commercial establishments such as dry-cleaners, to meet the needs of the employees in the East of 101 area. Such uses could be located in independent centers or integrated into office parks [o]r technology campuses.*	**Consistent.** The proposed project would involve a rezoning of the subject parcels under the existing General Plan land use designation to construct new R&D office buildings. Amenities within the proposed 25,000 sq. ft. building addition at 400-450 East Jamie Court are conceptual at this time, but would include an employee-serving café space. Additional opportunities for employee-serving amenities to be included in the development program would be determined in coordination with the City.
Policy 3.5-I-11. *Do not permit any new warehousing and distribution north of East Grand Avenue or in areas designated Business Commercial.*	**Consistent.** The proposed project would not construct new warehousing or distribution uses. The proposed project includes one parcel (400-450 East Jamie Court) that is currently designated BC. The proposed project would involve rezoning of the parcel to BTP. The proposed project would remove one trucking distribution facility on the 201 Haskins Way site and five warehousing and distribution buildings at 101 and 151 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court.
Policy 3.5-I-13. *Facilitate waterfront enhancement and accessibility by:* *• Establishment of uses that would bring people to the waterfront (see policies 3.5-I-8 and 3.5-I-9);* *• Establishment of a bayshore design review area as part of the Zoning Ordinance; and* *• Ensuring that the Park Recreation and Open Space Master Plan include specific improvements for shoreline enhancement and accessibility, as spelled out in the East of 101 Area Plan. See policy RE-3 in the plan.*	**Consistent.** The proposed project would intensify office/R&D uses in the East of 101 Area at the subject parcels. One parcel (400-450 East Jamie Court) is adjacent to San Francisco Bay and the San Francisco Bay Trail, and the existing site is designed to provide access to the trail. Amenities within the proposed 25,000 sq. ft. building addition at 400-450 East Jamie Court are conceptual at this time, but would include an employee-serving café space. Additional opportunities for employee-serving amenities such as those that may encourage additional waterfront use would be determined in coordination with the City.
Chapter 4. Transportation	
Policy 4.2-G-1. *Undertake efforts to enhance transportation capacity, especially in growth and emerging employment areas such as in the East of 101 area.*	**Consistent.** The proposed project would intensify office/R&D uses in the East of 101 Area at the subject parcels. The proposed project would construct off-street parking and new sidewalks. The proposed project does not include off-site transportation improvements (such as widening roads or adding travel lanes). The proposed project would comply with payment of a traffic impact fee in accordance with the adopted fee schedule as required by Chapter 20.300 of the zoning ordinance to provide the proposed project's share of funding for new and expanded roadway and intersection improvements.

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	Regional efforts to enhance transportation capacity conducted by the City include the Caltrain Station Improvement project and the Downtown Station Area Specific Plan.
Policy 4.2-G-10. *Make efficient use of existing transportation facilities and, through the arrangement of land uses, improved alternate modes, and enhanced integration of various transportation systems serving South San Francisco, strive to reduce the total vehicle-miles traveled.*	**Consistent.** The proposed project is located on an infill site in an existing transportation network. The proposed new office/R&D uses would be consistent with past and ongoing biotechnology development in the East of 101 Area. The proposed project would require the design and implementation of a TDM Plan and pedestrian- and bicycle-serving amenities to achieve a 35 percent alternative mode use and would be subject to annual and triennial review for compliance.
Policy 4.2-G-13. *Strive to maintain LOS D or better on arterial and collector streets, at all intersections, and on principal arterials in the CMP during peak hours.* ***Policy 4.2-G-14.*** *Accept LOS E or F after finding that:* • *There is no practical and feasible way to mitigate the lower level of service; and* • *The uses resulting in the lower level of service are of clear, overall public benefit*	**Consistent.** The EIR identifies all feasible mitigation measures to maintain LOS D on arterial roads and collector streets, at all intersections, and on principal arterials in the CMP during peak hours that currently are operating at LOS D or better. With feasible mitigation incorporated, LOS D would be maintained on two intersections in the CMP that currently are operating at LOS D or better. With feasible mitigation incorporated, LOS D would be maintained at two intersections in the CMP under existing plus project conditions: Littlefield Avenue/East Grand Avenue during the AM peak hour and Gateway Boulevard/South Airport Boulevard/Mitchell Avenue during the PM peak hour (see Impact TR-1 and Impact TR-3 for further information). However, the project would result in significant and unavoidable traffic impacts to five intersections currently operating at LOS D or better. The existing plus project conditions would cause one intersection in the CMP (Allerton Avenue/East Grand Avenue in the PM peak hour) that is currently operating at LOS D to operate at LOS E or F (see Impact TR-2). Under year 2040 conditions, the project would cause four intersections in the CMP that would be operating at LOS D to operate at LOS E or F: Forbes Boulevard/Harbor Way/East Grand Avenue and Littlefield Avenue/East Grand Avenue in the AM peak hour (see Impact C-TR-7 and Impact C-TR-8) and Dubuque Avenue/Grand Avenue Overcrossing and East Grand Avenue/Grand Avenue Overcrossing in the PM peak hour (see Impact C-TR-4 and Impact C-TR-5). For two of the five intersections, Allerton Avenue/East Grand Avenue in the PM peak hour under existing plus project conditions (Impact TR-2) and Littlefield Avenue/East Grand Avenue in the AM peak hour under year 2040 conditions (Impact C-TR-8), there is no practical and feasible way to mitigate to LOS D at these locations. Implementation of the proposed mitigation measures would result in LOS D or better operations; however, the revisions would remove portions of existing bicycle lanes and thereby disrupt existing bicycle facilities. In order to avoid impacts on these bicycle facilities, additional right-of-way would need to be acquired from the adjacent property owners. The acquisition of property would require removal of parking spaces for properties that do not have alternative locations for replacement parking, such that the associated buildings would not be able to be occupied. Because the City of South San Francisco has determined that acquisition of property for the additional right-of-way to widen East Grand Avenue would economically affect existing businesses that need parking to remain viable, and that funding for the acquisition is not assured, this mitigation measure is considered to be infeasible. Therefore, while the mitigation measure could reduce the traffic impact to a less-than-significant level, the overall impact at this intersection would remain significant.

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	For three of the five intersections under year 2040 conditions (Forbes Boulevard/Harbor Way/East Grand Avenue in the AM peak hour, and Dubuque Avenue/Grand Avenue Overcrossing and East Grand Avenue/Grand Avenue Overcrossing in the PM peak hour). The City is considering including the proposed mitigation measures in the updated Traffic Impact Fee (TIF) and Capital Improvement Program (CIP). The City is in the process of updating its East of 101 Area TIF and CIP. The Phase 1 and Phase 2 project sponsors will pay the applicable TIF in effect at the time the building permit is issued. Until TIF and CIP updates are complete, however, the City does not have a mechanism for funding these mitigation measures. At this time, the City therefore cannot guarantee that these mitigation measures will be implemented. Thus, while the proposed mitigation measure could reduce the traffic impact to a less-than-significant level, the City has not yet completed the TIF and CIP updates to include or fund these mitigation measures, so the overall impact would remain significant. A Transportation Demand Management program would also be required to be prepared and implemented pursuant to South San Francisco Municipal Code Chapter 20.400. However, it cannot be guaranteed that the Transportation Demand Management program would reduce intersection traffic by the amount necessary to reduce the project's contribution to a significant cumulative impact to a less-than-cumulatively considerable level and these impacts would be significant and unavoidable. As part of its consideration of the project, the City will consider a statement of overriding considerations that will explain the overriding public benefits of the project. Therefore, the proposed project would generally be consistent with Policies 4.2-G-13 and 4.2-G-14 if the City makes the requisite findings set forth in Policy 4.2-G-14.
Policy 4.2-I-5. *Establish accessibility requirements for all streets designated as arterial or collector on Figure 4-1. As part of development review of all projects along these streets, ensure that access to individual sites does not impede through traffic flow.*	**Consistent.** The project site is served by East Grand Avenue and Haskins Way. In Figure 4-1, East Grand Avenue is designated as a collector west of the project site, between Grandview Drive and Haskins Way. The portion of East Grand Avenue adjacent to the project is not designated as a collector or arterial. Haskins Way is designated as a collector between Swift Avenue and East Grand Avenue. The project includes the 101 and 151 Haskins Way parcels, which each contain an existing driveway on Haskins Way between Swift Avenue and East Grand Avenue. The project would remove these driveways on Haskins Way between Swift Avenue and East Grand Avenue. Therefore, the proposed project would not create new site access to a designated arterial or collector that would cause impediments to traffic flow.
Policy 4.2-I-7. *Continue to require that new development pays a fair share of the costs of street and other traffic and transportation improvements, based on traffic generated and impacts on service levels. Explore the feasibility of establishing impact fee, especially for improvements required in the Lindenville area. (Amended by City Council Resolution 98-2001, Adopted September 26, 2001)*	**Consistent.** The proposed project would be subject to all applicable cost-sharing measures as established by the City. The proposed project site is not in the Lindenville area. In addition, the proposed project would comply with payment of a traffic impact fee in accordance with the adopted fee schedule as required by Chapter 20.300 of the zoning ordinance to provide the proposed project's share of funding for new and expanded roadway and intersection improvements.
Policy 4.2-I-11. *Implement, to the extent feasible, circulation system improvements illustrated in Figures 4-1, 4-2 and 4-3 prior to deterioration in levels of service below the stated standard.*	**Consistent.** The project site is not located adjacent to circulation system improvements illustrated in Figure 4-2. The proposed project does not include off-site transportation improvements (such as widening roads or adding travel lanes). An EIR is being prepared to identify any mitigation measures necessary to mitigate impact on levels of services.

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	In Figure 4-1, the project site is served by East Grand Avenue and Haskins Way. East Grand Avenue is designated as a collector west of the project site, between Grandview Drive and Haskins Way. The portion of East Grand Avenue adjacent to the project is not designated as a collector or arterial. Haskins Way is designated as a collector between Swift Avenue and East Grand Avenue. The proposed project is not anticipated to include off-site transportation improvements (such as widening roads or adding travel lanes). However, the project includes the 101 and 151 Haskins Way parcels, which each contain an existing driveway from Haskins Way between Swift Avenue and East Grand Avenue. Under the proposed project, the two existing driveways at 101 and 151 Haskins Way would be eliminated, the easternmost driveway on East Grand Avenue would be rebuilt, and the westernmost driveway on East Grand Avenue would be removed. The proposed project would reduce the overall number of driveways and would improve circulation. Figure 4-3 designates each of the road segments adjacent to the project site (East Grand Avenue, Haskins Way, and East Jamie Court) as third priority sidewalk gap segments. The proposed project would construct new sidewalks on East Grand Avenue, Haskins Way, and East Jamie Court.
Policy 4.3-G-1. *Develop a comprehensive and integrated system of bikeways that promote bicycle riding for transportation and recreation.*	**Consistent.** The proposed project would be accessible by bicycle through existing Class I bike lanes on East Grand Avenue. The proposed project would require the design and implementation of a TDM Plan and pedestrian- and bicycle-serving amenities to achieve a 35 percent alternative mode use.
Policy 4.3-G-2. *Provide safe and direct pedestrian routes and bikeways between and through residential neighborhoods, and to transit centers.*	**Consistent.** The proposed project would construct new sidewalks on East Grand Avenue, Haskins Way, and East Jamie Court. The proposed project would be accessible by bicycle through existing Class I bike lanes on East Grand Avenue. The proposed project would require the design and implementation of a TDM Plan and pedestrian- and bicycle-serving amenities to achieve a 35 percent alternative mode use.
Policy 4.3-G-5. *In partnership with employers, continue efforts to expand shuttle operations.*	**Consistent.** The existing R&D use at 400-450 East Jamie Court is served under the Commute.org shuttle program. Under the proposed project, the project sponsor would coordinate with the City and other private landowners to continue and expand the program to serve employees of the new R&D uses. The proposed project would also require the design and implementation of a TDM Plan to achieve a 35 percent alternative mode use. The TDM Plan may include additional measures related to the enhancement of commuter shuttle service serving the proposed project site as determined in coordination with the City.
Policy 4.3-G-6. *In partnership with the local business community, develop a transportation systems management plan with identified trip-reduction goals, while continuing to maintain a positive and supportive business environment.*	**Consistent.** The proposed project would involve new office/R&D uses and would require the design and implementation of a TDM Plan to achieve a 35 percent alternative mode use.
Policy 4.3-I-4. *Require provision of secure covered bicycle parking at all existing and future multifamily residential, commercial, industrial, and office/institutional uses.*	**Consistent.** Under the proposed project, the project applicant would develop and implement a TDM Plan and pedestrian- and bicycle-serving design provisions to achieve a 35 percent minimum alternative mode use as required by the Zoning Ordinance. Design features would include secure covered bicycle parking proportional to development as required by City bicycle parking standards.
Policy 4.3-I-6. *Expand pedestrian facilities in new development, using the PMP for*	**Consistent.** The proposed project would construct new sidewalks on East Grand

Policy	Consistency
pedestrian design guidelines and to identify other improvements that should be considered for projects proposed in areas that are identified in PMP concept plans. (Amended by City Council Resolution 26-2014, Adopted February 26, 2014)	Avenue, Haskins Way, and East Jamie Court. Under the proposed project, the project applicant would develop and implement a TDM Plan and pedestrian- and bicycle-serving design provisions to achieve a 35 percent minimum alternative mode use as required by the Zoning Ordinance.
Policy 4.3-I-11. *As part of any development in Lindenville or East of 101, require project proponents to provide sidewalks and street trees as part of frontage improvements for new development and redevelopment projects.*	**Consistent.** The proposed project would construct new sidewalks and plant street trees on East Grand Avenue, Haskins Way, and East Jamie Court subject to design review pursuant to zoning ordinance Section 20.300.009.
Policy 4.3-I-16. *Favor Transportation Systems Management programs that limit vehicle use over those that extend the commute hour.*	**Consistent.** Under the proposed project, the project applicant would develop and implement a TDM Plan and pedestrian- and bicycle-serving design provisions to achieve a 35 percent minimum alternative mode use as required by the Zoning Ordinance.
Policy 4.3-I-18. *Establish parking standards to support trip reduction goals by:* *• Allowing parking reductions for projects that have agreed to implement trip reduction methods, such as paid parking, and for mixed use development.* *• Requiring projects larger than 25 employees to provide preferential parking for carpools and vanpools.*	**Consistent.** Under the proposed project, the project applicant would develop and implement a TDM Plan and pedestrian- and bicycle-serving design provisions to achieve a 35 percent minimum alternative mode use as required by the Zoning Ordinance, which may include a parking reduction from the standard 1 space per 350 sq. ft. of office use per the zoning ordinance. The proposed project would also include carpool and vanpool amenities.
Policy 4.4-G-1. *Promote local and regional public transit serving South San Francisco.*	**Consistent.** The existing R&D use at 400-450 East Jamie Court is served under the Commute.org shuttle program. Under the proposed project, the project sponsor would coordinate with the City and other private landowners to continue and expand the program to serve employees of the new R&D uses. The proposed project would also require the design and implementation of a TDM Plan to achieve a 35 percent alternative mode use. The TDM Plan may include additional measures to enhance commuter shuttle service serving the proposed project site as determined in coordination with the City.
Policy 4.4-G-2. *Explore mechanisms to integrate various forms of transit.*	**Consistent.** See discussion of Policy 4.4-G-1, above.
Chapter 5. Parks, Public Facilities, and Services.	
Policy 5.1-G-1. *Develop additional parkland in the city, particularly in areas lacking these facilities, to meet the standards of required park acreage for new residents and employees.*	**Consistent.** The proposed project would be subject to the City's parks and recreation impact fee, which requires payment of a parkland acquisition fee and a park construction fee for non-residential developments, subject to the requirements of Chapter 8.67 of the zoning ordinance, which would be used to provide adequate parks and recreational services and facilities to residents of the City.
Policy 5.1-G-2. *Improve bayfront access along its entire length and endorse the prominence of this important natural asset.*	**Consistent.** The proposed project would intensify office/R&D uses in the East of 101 Area at the subject parcels. One parcel (400-450 East Jamie Court) is adjacent to San Francisco Bay and the San Francisco Bay Trail, and the existing site is designed to provide access to the trail.
Policy 5.1-G-3. *Provide a comprehensive and integrated network of parks and open space; improve access to existing facilities where feasible.*	**Consistent.** One parcel (400-450 East Jamie Court) within the proposed project is adjacent to San Francisco Bay and the San Francisco Bay Trail, and the existing site plan is designed to continue to provide access to the trail. The proposed project would also improve access by constructing new sidewalks on East Grand Avenue, Haskins Way, and East Jamie Court, subject to design review.
Policy 5.1-I-2. *Maintain parkland standards of 3.0 acres of community and neighborhood parks per 1,000 new residents, and of 0.5 acres of parkland per 1,000 new employees, to*	**Consistent.** The proposed project would involve new R&D use and would introduce new employees to the area. Although the proposed project would not construct new parkland,

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be located in employment areas.	one parcel (400-450 East Jamie Court) of the proposed project is adjacent to San Francisco Bay and the San Francisco Bay Trail, and the existing site plan is designed to continue to provide access to the trail. The proposed project would also be subject to the City's parks and recreation impact fee, which requires payment of a parkland acquisition fee and a park construction fee for non-residential developments, subject to the requirements of Chapter 8.67 of the zoning ordinance.
Policy 5.1-I-9. *Improve the accessibility and visibility of Sign Hill Park and the bayfront.* *[The General Plan proposes three solutions for increased Bayfront access, including the location of activities on the bayfront, such as a Campus Center and park that will draw people to the shoreline (policies 3.5-I-8, 3.5-I-9)]*	**Consistent.** One parcel (400-450 East Jamie Court) of the proposed project is adjacent to San Francisco Bay and the San Francisco Bay Trail, and the existing site plan is designed to continue to provide access to the trail. The proposed project would involve the potential for buildout of additional office/R&D use to a total of 1.0 FAR on the 400-450 East Jamie Court parcel. Although new uses would likely be sited on the north side of the parcel, design and siting of new uses on the parcel are subject to Bay Conservation and Development Commission (BCDC) review and the City design review process to ensure preservation of views of and access to the bayfront. On other parcels, the proposed project would improve adjacent sidewalks, indirectly improving access to the bayfront. According to Figure 2-4 of the General Plan, the project site is visible from the south face of Sign Hill, the base of San Bruno Mountain, and the east face of Point San Bruno Knoll. However, the project site is located in a low-lying location of the East of 101 Area and views from the project site to Sign Hill Park are background views. Existing visibility of Sign Hill Park is obscured by existing topography, street trees, and industrial and commercial buildings. Development of the proposed project site would not diminish existing views or accessibility of Sign Hill Park.
Policy 5.3-G-1. *Promote the orderly and efficient operation and expansion of the water supply system to meet projected needs.*	**Consistent.** The proposed project site is served by existing water utility service lines and would not require expanded capacity or extension of existing utility lines A water supply assessment is required for commercial office projects greater than 250,000 sq. ft. of floor space, or greater than 1,000 employees, unless the growth is covered under the Urban Water Management Plan. The Water Supply Assessment provided by Cal Water determined that existing water supplies can accommodate the demand generated under the proposed project.
Policy 5.3-G-2. *Encourage water conservation measures for both existing and proposed development.*	**Consistent.** The proposed project would involve new office/R&D uses that would be subject to applicable water conservation measures in CALGreen, including water conserving plumbing and fixture standards (Section 5.303), outdoor water use limitations (Section 5.304), and water reuse systems (Section 5.305).
Policy 5.3-G-3. *Promote the equitable sharing of the costs of associated with providing water service to new development.*	**Consistent.** The proposed project site is served by existing water utility service lines. Nonetheless, the proposed project would be subject to all applicable cost-sharing measures for new developments as established by the City.
Policy 5.3-I-1. *Work with California Water Service Company and Westborough County Water District to ensure coordinated capital improvements with respect to the extent and timing of growth.*	**Consistent.** The proposed project site is served by existing water utility service lines and would not require expanded capacity or extension of existing utility lines. A water supply assessment is required for commercial office projects greater than 250,000 sq. ft. of floor space, or greater than 1,000 employees, unless the growth is covered under the Urban Water Management Plan. The Water Supply Assessment

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	provided by Cal Water determined that existing water supplies can accommodate the demand generated under the proposed project.
Policy 5.3-I-2. *Establish guidelines and standards for water conservation and actively promote the use of water-conserving devices and practices in both new construction and major alterations and additions to existing buildings.*	**Consistent.** The proposed project would involve new office/R&D uses that would be subject to applicable water conservation measures in CALGreen.
Policy 5.3-I-3. *Ensure that future residents and businesses equitably share costs associated with providing water service to new development in South San Francisco.*	**Consistent.** The proposed project site is served by existing water utility service lines and would not require expanded capacity or extension of existing utility lines. A water supply assessment is required for commercial office projects greater than 250,000 sq. ft. of floor space, or greater than 1,000 employees, unless the growth is covered under the Urban Water Management Plan. The Water Supply Assessment provided by Cal Water determined that existing water supplies can accommodate the demand generated under the proposed project.
Policy 5.3-G-4. *Promote the orderly and efficient operation and expansion of the wastewater system to meet projected needs.*	**Consistent.** The proposed project site is served by existing wastewater utility service lines and would not require expanded capacity or extension of existing utility lines.
Policy 5.3-G-5. *Promote the equitable sharing of the costs of associated with providing wastewater service to new development.*	**Consistent.** The proposed project site is served by existing wastewater utility service lines and would not require expanded capacity or extension of existing utility lines.
Policy 5.3-G-6. *Maintain environmentally appropriate wastewater management practices.*	**Consistent.** The proposed project would involve new office/R&D uses that would be subject to applicable water conservation and recycling measures in CALGreen.
Policy 5.3-I-4. *Ensure coordinated capital improvements with respect to the extent and timing of growth.*	**Consistent.** The proposed project site is served by existing utility service lines and would not require expanded capacity or extension of existing utility lines.
Policy 5.3-I-5. *Ensure that future residents and businesses equitably share costs associated with providing wastewater service to new development in South San Francisco.*	**Consistent.** The proposed project site is served by existing wastewater utility service lines and would not require expanded capacity or extension of existing utility lines.
Policy 5.3-I-7. *Encourage new projects in East of 101 area that are likely to generate large quantities of wastewater to lower treatment needs through recycling, pretreatment, or other means as necessary.*	**Consistent.** The proposed project would involve new office/R&D uses that would be subject to applicable water recycling measures in CALGreen.
Chapter 6. Economic Development	
Policy 6-G-5. *Establish land use priorities based on economic criteria and sound fiscal planning; reserve sites for designated uses rather than accepting any development.*	**Consistent.** The proposed project would involve new office/R&D uses through the existing CC/MI and CC land use designations. The proposed project is consistent with previous and ongoing expansion of office/R&D uses in the East of 101 Area.
Policy 6-I-6. *Create a task force of biotech/R&D industry leaders to work toward the creation of a campus environment in the East of 101 area, and to promote the area as a high amenity growth-based industrial activity center.*	**Consistent.** See discussion of Policy 6-G-5, above. The proposed project would expand opportunities for a campus environment in the East of 101 area.
Policy 6-I-7. *Undertake a streetscape and signage improvement program in the East of 101 area to promote a unified, campus-like environment in the area.*	**Consistent.** The proposed project would be subject to design review of signage and streetscape features by the City.
Chapter 7. Open Space and Conservation	
Policy 7.1-G-1. *Protect special status species and supporting habitats within South San*	**Consistent.** The proposed project is located on existing developed industrial and office

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Francisco, including species that are State or federally listed as Endangered, Threatened, or Rare.	sites and would not result in the conversion of special status species-supporting habitat. The proposed project would involve the removal and replanting of on-site and streetscape trees and on-site landscaping. Construction activities would be subject to the Migratory Bird Treaty Act of 1918 to protect nesting birds prior to and during construction.
Policy 7.1-I-1. *Cooperate with State and federal agencies to ensure that development does not substantially affect special status species appearing on any State or federal list for any rare, endangered, or threatened species. Require assessments of biological resources prior to approval of any development on sites with ecologically sensitive habitat, as depicted in Figure 7-1.*	**Consistent.** See discussion of Policy 7.1-G-1, above.
Policy 7.1-G-2. *Protect and, where reasonable and feasible, restore saltmarshes and wetlands.*	**Consistent.** The proposed project is located on existing developed industrial and office sites and would not result in the conversion or disturbance of existing saltmarshes or wetlands.
Policy 7.1-I-3. As part of development approvals on sites that include ecologically sensitive habitat designated in Figure 7-2, require institution of an on-going program to remove and prevent the re-establishment of the invasive species and restore the native species.	**Consistent.** The proposed project is located on existing developed industrial and office sites and would not occur within ecologically sensitive habitat designated in Figure 7-2.
Policy 7.1-I-4. *Require development on the wetlands delineated in Figure 7-1 to complete assessments of biological resources.*	The proposed project is located on existing developed industrial and office sites and would not occur within wetlands delineated in Figure 7-1.
Policy 7.2-G-1. *Comply with the San Francisco Bay RWQCB regulations and standards to maintain and improve the quality of both surface water and groundwater resources.*	**Consistent.** The proposed project would involve the construction and operation of new office/R&D uses. The proposed project would involve ground disturbance activities (excavation, minor grading and resurfacing) of greater than 1 acre in area. Under the proposed project, the project sponsor would be required to obtain coverage under the General Construction Activity Storm Water Permit General Construction Permit) issued by the SWRCB. Coverage under this permit requires preparation of a Stormwater Pollution Prevention Plan (SWPPP) for review and approval by the City, and evidence of approval of the SWPPP by the Regional Water Quality Control Board (RWQCB). At a minimum, the SWPPP must include a description of construction materials, practices, and equipment storage and maintenance; a list of pollutants likely to contact stormwater; a list of provisions to eliminate or reduce discharge of materials to stormwater; best management practices; and an inspection and monitoring program. Per standard procedures, compliance with SWPPP requirements would be verified during the construction permitting process.
Policy 7.2-G-3. *Discourage use of insecticides, herbicides, or toxic chemical substances within the city.*	**Consistent.** The proposed project would adhere to applicable federal, state, and local regulations related to the use of hazardous chemicals and handling procedures to prevent polluted runoff.
Policy 7.2-I-1. *Continue working with the San Francisco Bay RWQCB in the implementation of the NPDES, and continue participation in STOPPP for the protection of surface water and groundwater quality.*	**Consistent.** The proposed project would involve the construction and operation of new office/R&D uses within the existing San Francisco Bay Area Municipal Regional Permit area that serves as the National Pollutant Discharge Elimination System (NPDES) permit for all San Francisco Bay Area municipalities, which includes Provision C.3. The C.3 requirements are intended to protect water quality by minimizing pollutants in runoff, and to prevent downstream erosion by: designing each project site to minimize imperviousness, detain runoff, and infiltrate runoff where feasible; treating runoff prior to discharge from the site; ensuring runoff does not exceed pre-project peaks and durations;

Policy	Consistency
	and maintaining treatment facilities. Application of the NPDES permit requirements are administered by the City Environmental Compliance Program.
Policy 7.3-G-1. *Continue to work toward improving air quality and meeting all national and State ambient air quality standards and by reducing the generation of air pollutants both from stationary and mobile sources, where feasible.*	**Consistent.** The proposed project would involve activities resulting in air quality impacts in two categories: short-term impacts that would occur during construction and long-term impacts due to operation. During construction, the project applicant would demonstrate compliance with all applicable regulations and operating procedures prior to issuance of demolition, building, or grading permits, including implementation of Bay Area Air Quality Management District (BAAQMD) Basic Construction Mitigation Measures. During operation, the proposed project would generate emissions that may include emissions from natural gas consumption for space and water heating, utilities operations (including diesel-powered emergency generators), an increase in toxic air contaminant (TAC) emissions associated with R&D activities (such as fume hoods and chemical storage), new landscaping maintenance activities, and consumer products. The BAAQMD's New Source Review Rule, Regulation 2, Rule 2, requires that new or modified stationary sources of air pollutants constructed and operated undergo permit review for Best Available Control Technology and/or Best Available Control Technology for Toxics where certain thresholds are exceeded. To minimize the emissions of TACs, the BAAQMD also requires laboratory facilities to either demonstrate that the health risk resulting from emissions of TACs is less than one additional cancer risk in one million or follow Responsible Laboratory Management Practices. In addition, the project applicant would develop and implement a TDM Plan to achieve a 35 percent minimum alternative mode use as required by the Zoning Ordinance, which would reduce air emissions generated from single-occupancy vehicles.
Policy 7.3-G-2. *Mitigate the community of South San Francisco's impact on climate change by reducing greenhouse gas emissions consistent with state guidance.*	**Consistent.** The proposed project would involve new office/R&D uses that would be subject to applicable energy conservation measures of CALGreen and the City's Climate Action Plan (CAP). A detailed discussion of the Climate Action Plan is provided below under "Climate Action Plan".
Policy 7.3-G-3. *Reduce energy use in the built environment.*	**Consistent.** The proposed project would involve new office/R&D uses that would be subject to applicable energy conservation measures of CALGreen and the CAP. A detailed discussion of the Climate Action Plan is provided below under "Climate Action Plan".
Policy 7.3-G-4. *Encourage land use and transportation strategies that promote use of alternatives to the automobile for transportation, including bicycling, bus transit, and carpooling.*	**Consistent.** Under the proposed project, the project applicant would develop and implement a TDM Plan and pedestrian- and bicycle-serving design provisions to achieve a 35 percent minimum alternative mode use as required by the Zoning Ordinance. The proposed project would also include carpool and vanpool amenities.
Policy 7.3-G-5. *Promote clean and alternative fuel combustion in mobile equipment and vehicles.*	**Consistent.** The proposed project would include electric vehicle charging stations serving the new office/R&D uses.
Policy 7.3-G-6. *Minimize conflicts between sensitive receptors and emissions generators by distancing them from one another.*	**Consistent.** The proposed project would result in new office/R&D uses in the East of 101 Area. Surrounding uses include light industrial uses and other office/R&D uses. The project site is located within 0.25 mile of two daycare centers, the existing Early Years preschool at 371 Allerton Avenue, and the proposed Genentech Childcare Facility

Policy	Consistency
	at 342 Allerton Avenue currently under construction. The proposed project would involve activities resulting in air quality impacts in two categories: short-term impacts that would occur during construction and long-term impacts due to operation. During construction, the project applicant would demonstrate compliance with all applicable regulations and operating procedures prior to issuance of demolition, building, or grading permits, including implementation of BAAQMD Basic Construction Mitigation Measures. However, the operation of office/R&D uses is comparable to existing land uses in the vicinity of the daycare centers and would not introduce new sources of air emissions from a substantially new land use. The proposed project would comply with all applicable regulations and provisions for the storage, use, and handling of hazardous substances during demolition, site preparation, construction, and operation of office/R&D uses. There are no residential land uses or other sensitive receptors within 1 mile of the project site.
Policy 7.3-I-1. *Cooperate with the Bay Area Air Quality Management District to achieve emissions reductions for nonattainment pollutants and their precursors, including carbon monoxide, ozone, and PM-10, by implementation of air pollution control measures as required by State and federal statutes.*	**Consistent.** See discussion of Policy 7.3-G-1, above.
Policy 7.3-I-2. *Use the City's development review process and the California Environmental Quality Act (CEQA) regulations to evaluate and mitigate the local and cumulative effects of new development on air quality and GHG emissions. (Amended by Resolution 26-2014. Adopted on February 12, 2014.)*	**Consistent.** The proposed project is subject to CEQA regulations in the CEQA Guidelines and the City's review process will include the evaluation of air quality effects and greenhouse gas emissions.
Policy 7.3-I-3. *Adopt the standard construction dust abatement measures included in BAAQMD's CEQA Guidelines.*	**Consistent.** See discussion of Policy 7.3-G-1, above.
Policy 7.3-I-7. *Adopt and implement the City of South San Francisco's CAP, which will identify a GHG emissions reduction target and measures and actions to achieve the reduction target.*	**Consistent.** The proposed project would involve coordination with City staff to review and identify applicable CAP Measures for New Development, or for Additions, Alterations, and Tenant Improvements, to be incorporated into the proposed project as project features, mitigation of environmental effects, or mandatory conditions of approval commensurate with the project's intensity of use and site-specific conditions. A detailed discussion of the CAP is provided below under "Climate Action Plan".
Policy 7.3-I-9. *Promote land uses that facilitate alternative transit use, including high-density housing, mixed uses, and affordable housing served by alternative transit infrastructure.*	**Consistent.** The proposed project would require the design and implementation of a TDM Plan to achieve a 35 percent alternative mode use. The proposed project would not involve housing or mixed use, uses which would generally be incompatible with existing industrial uses west of Haskins Way and recycling center use east of the project site.
Policy 7.3-I-10. *Facilitate energy efficiency in building regulations and streamlined review processes, providing flexibility to achieve specified energy performance levels and requiring energy efficiency measures as appropriate.*	**Consistent.** The proposed project would be subject to applicable energy conservation measures in CALGreen, and design review by the City.
Policy 7.3-I-11. *Coordinate with the business community to encourage energy efficiency in the City's largest energy users while supporting economic growth objectives.*	**Consistent.** The proposed project would be subject to applicable energy conservation measures in CALGreen, and design review by the City.
Policy 7.3-I-13. *Encourage efficient, clean energy and fuel use through collaborative programs, award programs, and incentives, while removing barriers to the expansion of*	**Consistent.** The proposed project would be designed to enhance resources as well as reduce energy consumption. The project would be designed to meet the standards of the

Policy	Consistency
alternative fuel facilities and infrastructure.	City municipal code and CALGreen building requirements. Accordingly, parking spaces with charging facilities would also be provided for electric vehicles.
Policy 7.5-G-1. *Conserve historic, cultural, and archaeological resources for the aesthetic, educational, economic, and scientific contribution they make to South San Francisco's identity and quality of life.*	**Consistent.** The proposed project site does not contain any known historic architectural resources, and the proposed project would not remove or have significant impacts on known historic architectural resources. As discussed in EIR Section 4.4, Cultural Resources, the results of the CHRIS records search indicate the presence of one archaeological site (P-41-000042) which is assumed to be a shell mound. Although the identified shellmound resource (P-41-00042) is poorly documented and is not likely to be accurately mapped, it is possible that excavation activities in the project site at depths below fill may encounter this resource. In addition, previously unknown archaeological resources could be inadvertently unearthed during ground-disturbing activities. Impacts of the proposed project on archaeological resources would be reduced through the implementation of MM-CR-2a: Cultural Resources Worker Environmental Awareness Program), MM-CR-2b: Cultural Resources Monitoring During Ground Disturbing Activities, and MM-CR-2c: Halt Construction Activity, Evaluate Find and Implement Mitigation. Through implementation of these mitigation measures, the educational and scientific contribution of any sensitive archaeological resources encountered would be evaluated and documented.
Policy 7.5-I-3. *Explore mechanisms to incorporate South San Francisco's industrial heritage in historic and cultural preservation..*	**Consistent.** The proposed project site does not contain any known historic architectural resources. The existing on-site light industrial buildings were constructed in the 1980s and are not historic industrial resources.
Policy 7.5-I-4. *Ensure the protection of known archaeological resources in the city by requiring a records review for any development proposed areas of known resources.*	**Consistent.** See discussion of Policy 7.5-G-1, above.
Policy 7.5-I-5. *In accordance with State law, require the preparation of a resource mitigation plan and monitoring program by a qualified archaeologist in the event that archaeological resources are uncovered.*	**Consistent.** See discussion of Policy 7.5-G-1, above.
Chapter 8. Health and Safety	
Policy 8.1-G-1. *Minimize the risk to life and property from seismic activity and geologic hazards in South San Francisco.*	**Consistent.** The proposed project site is not within an Alquist-Priolo Seismic Hazard Zone and does not traverse any known active or potentially active faults. The site is in a seismically active region and could be subject to ground shaking and seismic-related ground failure (liquefaction) and lateral spreading. The project sponsor would prepare a geotechnical report and implement design and construction recommendations based on site soil analysis.
Policy 8.2-G-1. *Minimize the risk to life and property from flooding in South San Francisco.*	**Consistent.** The proposed project site has an existing ground elevation between 12-23 feet above mean sea level. The proposed project site is not located in a Federal Emergency Management Agency-designated 100 year flood zone and would not consist of housing or present a risk for flooding or redirection of flood flows. However, according to San Mateo County Adapting to Rising Tides data, when the effects of a 100-year storm surge are combined with sea level rises of 24 inches (anticipated by 2050) or 66 inches (anticipated by 2100), the southwestern corner of the project site would be partially inundated by 0 to 2 feet and 0 to 6 feet, respectively, as shown in Figure 4.6.1 and Figure 4.6.2 of the EIR.

Policy	Consistency
	The areas that would be inundated under the 24-inch projection in 2050 include landscaping and parking areas on the 400-450 East Jamie Court parcel. No Phase 1 development is planned in this area. Further, it is unlikely that project buildout associated with Phase 2 would occur in the inundation areas, since the majority of that anticipated flooded area either lies within the 10-foot street-facing setback or is located within the access way into the existing building garage. The areas that would be inundated under the 66-inch projection in 2100 include landscaping, parking areas, and the southwestern portion of the existing building at 400 East Jamie Court. The proposed Phase 1 office/R&D uses at the 25,000-square-foot building addition at 400 East Jamie Court would be outside the effects of a 100-year storm surge in combination with projected sea level rise. Similarly, it is unlikely that project buildout associated with Phase 2 would occur in the inundation areas, since the majority of that anticipated flooded area either lies within the 10-foot street-facing setback or is located within the access way into the existing building garage. Future review and approval of site-specific design and sea level rise adaptability at the time when a specific design is proposed would ensure compatibility with the General Plan and with CAP Adaptation Measure 3, Action 2, "During the development review process, consider possible impacts of climate change on the project or plan area" (CAP p. 67).
Policy 8.2-I-2. *Use the City's development review process to ensure that proposed development subject to the 100-year flood provides adequate protection from flood hazards, in areas identified in Figure 8-3.*	**Consistent.** The proposed project site is not located within Federal Emergency Management Agency-designated 100-year flood hazard zones.
Policy 8.3-G-1. *Reduce the generation of solid waste, including hazardous waste, and recycle those materials that are used, to slow the filling of local and regional landfills, in accord with the California Integrated Waste Management Act of 1989.*	**Consistent.** The proposed project would be required to recycle construction debris, where possible, in conformance with CALGreen construction waste reduction, disposal, and recycling requirements. Operation of the proposed project would also be subject to CALGreen occupant recycling standards.
Policy 8.3-G-2. *Minimize the risk to life and property from the generation, storage, and transportation of hazardous materials and waste in South San Francisco. Comply with all applicable regulations and provisions for the storage, use and handling of hazardous substances as established by federal (EPA), State (DTSC, RWQCB, Cal OSHA, Cal EPA), and local (County of San Mateo, City of South San Francisco) regulations.*	**Consistent.** The proposed project would comply with all applicable regulations and provisions for the storage, use, and handling of hazardous substances during demolition, site preparation, construction, and operation of office/R&D uses.
Policy 8.3-I-1. *Continue to work toward reducing solid waste, increasing recycling, and complying with the San Mateo County Integrated Waste Management Plan.*	**Consistent.** The proposed project would be required to recycle construction debris, where possible, in conformance with CALGreen construction waste reduction, disposal, and recycling requirements. Operation of the proposed project would also be subject to CALGreen occupant recycling standards.
Policy 8.4-G-1. *Minimize the risk to life and property from fire hazards in South San Francisco.*	**Consistent.** The proposed project site is not located in or near wildland areas with high or very high fire hazards. The site is served by existing City fire protection services. New office/R&D uses would be subject to fire code review.
Policy 8.4-G-2. *Provide fire protection that is responsive to citizens' needs.*	**Consistent.** The proposed project site is located within areas served by existing City fire protection services. The proposed project would not substantially impact existing service ratios or performance measures.

Policy	Consistency
Policy 8.4-I-4. *Require site design features, fire retardant building materials, and adequate access as conditions for approval of development or improvements to reduce the risk of fire within the City.*	**Consistent.** The proposed project site is not located in or near wildland areas with high or very high fire hazards. The site is served by existing City fire protection services. New office/R&D uses would be subject to fire code review.
Policy 8.5-G-1. *Provide police services that are responsive to citizen's needs to ensure a safe and secure environment for people and property in the community.*	**Consistent.** The proposed project site is located within areas served by existing City police protection services. The proposed project would not substantially impact existing service ratios or performance measures.
Policy 8.5-I-1. *Ensure adequate police staff to provide rapid and timely response to all emergencies and maintain the capability to have minimum average response times.*	**Consistent.** See discussion of Policy 8.5-G-1, above.
Policy 8.6-G-1. *Use the City's Emergency Response Plan as the guide for emergency management in South San Francisco.*	**Consistent.** The proposed project sites would have access to East Grand Avenue and Haskins Way for ingress and egress, which are of adequate width pursuant to City standards. The proposed project sites would not conflict with the City's Emergency Response Plan.
Policy 8.7-G-1. *Minimize the risk of life and property from aircraft accidents in South San Francisco.*	**Consistent.** The proposed project site is located in the SFO sphere of influence under 14 CFR Part 77. The proposed project site has an existing ground elevation between 12-23 feet above mean sea level. The proposed project site is located within the imaginary horizontal surface contour established at 163 feet above sea level as depicted in the 2012 SFO ALUCP Exhibit IV-4 and the 161-foot height limit illustrated in General Plan Figure 2-2. The proposed project would involve development of up to 99-foot-tall office buildings, up to a total of 122 feet above mean sea level. The proposed project would not involve construction of buildings taller than the horizontal surface. To ensure compatibility, the project sponsor is required to file form 7460-1 Notice of Proposed Construction or Alteration with the FAA to determine whether the project would constitute a hazard to air navigation and the City must present the project to the C/CAG ALUC for determination of consistency with the 2012 SFO ALUCP.
Policy 8.7-I-1. *Do not permit land uses that pose potential hazards to air navigation in the vicinity of SFO. These land uses include the following:* *• Any use that would direct a steady or flashing light of white, red, green or amber color towards an aircraft engaged in an initial straight climb following takeoff or toward a landing, other than FAA-approved navigational lights;* *• Any use that would cause sunlight to be reflected toward an aircraft engaged in an initial straight climb following takeoff or toward an aircraft engaged in a straight final approach toward a landing;* *• Any use that would generate smoke or rising columns of air;* *• Any use that would attract large concentrations of birds within approach and climbout areas; and* *• Any use that would engage electrical interference that may interfere with aircraft communications or aircraft instrumentation.*	**Consistent.** See discussion of Policy 8.7-G-1, above.
Chapter 9. Noise	
Policy 9-G-1. *Protect public health and welfare by eliminating or minimizing the effects of existing noise problems, and by preventing increased noise levels in the future.*	**Consistent.** The proposed project site is not within 2012 SFO ALUCP noise safety zones. One parcel (400-450 East Jamie Court) in the proposed project site is adjacent to San Francisco Bay and the San Francisco Bay Trail.

Policy	Consistency
	The project site is located within 0.25 mile of two daycare centers, the existing Early Years preschool at 371 Allerton Avenue, and the proposed Genentech Childcare Facility at 342 Allerton Avenue currently under construction. The proposed project would involve activities resulting in noise impacts in two categories: short-term impacts that would occur during construction and long-term impacts due to operation. The South San Francisco Noise Ordinance (Chapter 8.32 of the Municipal Code, Section 8.32.050) restricts construction activities to the hours of 8:00 AM to 8:00 PM on weekdays, 9:00 AM to 8:00 PM on Saturdays, and 10:00 AM to 6:00 PM on Sundays and holidays. During project operation, noise levels on the 400-450 East Jamie Court site would be similar to existing office/R&D uses. This ordinance also limits noise generation of any individual piece of equipment to 90 dBA at 25 feet or at the property line. Construction activities would comply with the Noise Ordinance. The operation of office/R&D uses is comparable to existing biotechnology land uses in the vicinity of the daycare centers and would not introduce new sources of noise from a substantially new land use. There are no residences or other sensitive receptors within 1 mile of the proposed project sites.
Policy 9-G-2. *Continue efforts to incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.*	**Consistent.** The proposed project would involve new office/R&D uses within the East of 101 Area where several existing light industrial and office/R&D uses are currently operating. The proposed project would be consistent with existing surrounding land use activities, minimizing the effects of noise on other sensitive land uses.
Policy 9-I-8. *Require the control of noise at source through site design, building design, landscaping, hours of operation, and other techniques, for new developments deemed to be noise generators.*	**Consistent.** The proposed project would construct new office/R&D uses and would be subject to design review building permitting by the City. The proposed project would be required to comply with the Noise Ordinance.

Source: City of South San Francisco General Plan (1999, as amended in 2011), ARE (2018)

Note: Policies with “X-G-X” codes are Guiding policies, and policies with “X-I-X” codes are Implementing policies.

East of 101 Area Plan

The East 101 Area Plan sets forth additional and more specific land use policies for the East 101 Area, in addition to those in the General Plan. The East of 101 Area Plan, which was adopted by the City Council in 1994 and most recently amended in 2016,[24] contains a Land Use Element that designates the East of 101 Area as Planned Commercial, Light Industrial, Coastal Commercial, Airport-Related, Mixed-Use Categories, and Planned Industrial.

The City interprets the East of 101 Area Plan as a design-level document. Development standards and density determinations, including FAR, are established in the General Plan, which was updated after the adoption of the East of 101 Area Plan and takes precedence where inconsistent with the Area Plan. Accordingly, where the General Plan and East of 101 Area Plan conflict, land use policies and designations of the General Plan supersede those outlined in the East of 101 Area Plan.

Applicable policies from the Land Use Element are as follows[25]:

> **Policy LU-6c.** Parking structures serving off-site uses may exceed the Floor Area Ratio allowed in the Light Industrial category, provided they meet the following requirements:
>
> - The number of peak hour trips generated by the parking structure must be less than or equal to the minimum number of peak hour trips that would be expected from any other use allowed in the light industrial category.
> - The parking structure shall meet all other applicable City regulations, including all other policies of this plan.
> - The parking structure and its design shall not create traffic safety problems or circulation conflicts on public streets.
>
> **Policy LU-24**. Retail and personal services shall be encouraged throughout the area to serve the employees of the East of 101 Area. In the Light Industrial and Planned Industrial categories, dedicated retail space may be included in a development without being applied to the allowed FAR, provided that such development includes adequate parking and does not exceed 10 percent of the building square footage of a project.
>
> **Policy LU-26.** Child care facilities may be built as part of a commercial or industrial development and shall not be counted as part of the Floor Area Ratio of the project.
>
> **Policy LU-31.** No new above-ground bulk fuel tanks are permitted after July 25 1994. Above-ground fuel tanks which are lawfully existing prior to July 1994 may be maintained but may not be replaced or expanded.

[24] The 2016 amendments to the East of 101 Area Plan primarily relate to ensuring consistency between the General Plan, the zoning ordinance, and the 2015 Downtown Station Area Specific Plan. The project site is not within the Downtown Station Area.
[25] E-mail correspondence from Naree Chan, City Legal Counsel, on June 22, 2018.

Consistency with East of 101 Area Plan, Proposed Project

The proposed project site is designated Light Industrial in the East of 101 Area Plan.[26] The 400-450 East Jamie Court parcel is also designated with a Coastal Commercial district overlay. Because the General Plan was more recently adopted, the development standards and density determinations like FAR guides implementation of the East of 101 Area Plan. Accordingly, the General Plan's land use designations of CC and dual CC/MI designations for the project site take precedence over the sole Coastal Commercial and Light Industrial designation for the parcels found in the earlier adopted East of 101 Area Plan.

Existing light industrial uses remain consistent with the General Plan under the MI land use designation whereas existing and new R&D uses would be consistent with the CC land use designation. The proposed zoning text amendment would amend Table 20.110.002 "Land Use Regulations – Employment Districts" of the South San Francisco Municipal Code to clarify that, for parcels with a dual General Plan designation of Coastal Commercial (CC) and Mixed Industrial (MI), the new BTP development would be considered consistent with, and would be subject to the development standards applicable to, the CC designation. In contract, the continuation of pre-existing freight forwarding, customs brokering, wholesale, warehousing, and distribution uses would be considered consistent with, and would be subject to the development standards applicable to, the MI designation. Therefore, the proposed project would be consistent with the policies of the General Plan with respect to density determinations.

Further, the proposed project would be consistent with the East of 101 Area Plan policies listed above.

The proposed project would construct a parking structure on the 201 Haskins Way parcel during Phase 1 development, which would be expanded east during development of the conceptual Phase 2 site plan at project buildout. In the conceptual Phase 2 development plan, this parking structure would serve as a campus-wide parking resource for the project site (totaling eight parcels), but would not serve off-site uses. The parking structure would be provided to serve office/R&D uses which are typical of other similar developments. At project buildout, with the conceptual Phase 2 development plans, the parking structure would be accessed from driveways on Haskins Way, East Grand Avenue, and East Jamie Court and would not create traffic safety problems or circulation conflicts. A detailed discussion of traffic safety and circulation impacts is provided in Section 4.8, Transportation and Circulation. Therefore, the proposed project would not conflict with Policy LU-6c.

The proposed project would provide employee-serving amenities, such as retail. These uses would not exceed 10 percent of the building square footage of the project, and would not be applied to the allowable FAR. Therefore, the proposed project would not conflict with LU-24.

The proposed uses would not require installation of new underground fuel tanks, which are prohibited under Policy LU-31.

The analysis does not include discussion of Design Element policies, which relate to specific design features related to the project's buildings, parking and circulation features, landscaping, signage, and lighting. Consistency with the Design Element policies would be determined during project design review.

[26] City of South San Francisco, 1994. East of 101 Area Plan, adopted July 1994, pp. 56-61. Available online at: http://www.ssf.net/departments/economic-community-development/planning-division/planning-documents/approved-policy-documents. Accessed September 1, 2017.

Downtown/Central Redevelopment Plan

400-450 East Jamie Court is located in the Downtown/Central Redevelopment Plan ("Redevelopment Plan") area.[27] As amended, the term of the Redevelopment Plan extends until July 12, 2030, for purposes of land use controls, and until July 12, 2040, for receipt of property taxes and repayment of indebtedness. The Redevelopment Plan provides that permitted land uses in the plan area include commercial and industrial uses, and may include any use permitted by the General Plan and City ordinances for that area.[28] Under the Redevelopment Plan, the type, size, and height of buildings in the plan area are limited by applicable federal, state and local statutes and ordinances.[29] The Redevelopment Plan provides that the Redevelopment Agency was authorized to establish limits on height, land coverage, setbacks, design criteria, traffic, and parking through adoption of subsequent resolutions, but the Redevelopment Plan does not impose additional development standards for the plan area.[30]

City of South San Francisco Zoning Ordinance, 2017

The existing zoning designations of the project site and surrounding parcels are illustrated in Figure 2, p. 4. Existing zoning on the parcels is MI with the exception of the 400-450 East Jamie Court parcel, which is zoned BC. The MI and BC districts are two of the City's base employment districts. Table 1, p. 7, outlines the development standards for the MI and BC districts for lot size, building height, minimum setbacks, lot coverage, FAR, and landscaping coverage.

Comprehensive Airport Land Use Compatibility Plan – San Francisco International Airport

State law requires ALUCs to prepare and adopt an Airport Land Use Compatibility Plan (ALUCP) for each public use and military airport within their jurisdiction. Further, they are required to review the plans, regulations, and other actions of local agencies and airport operators. Based on state law and guidance provided in the California Airport Land Use Planning Handbook, the 2012 SFO ALUCP has four primary areas of concern:

- Aircraft Noise Impact Reduction – To reduce the potential number of future airport area residents who could be exposed to noise impacts from airport and aircraft operations.
- Safety of Persons on the Ground and in Aircraft in Flight – To minimize the potential number of future residents and land use occupants exposed to hazards related to aircraft operations and accidents.
- Height Restrictions/Airspace Protection – To protect the navigable airspace around the Airport for the safe and efficient operation of aircraft in flight.

[27] General Plan, Figure 2-7, p. 2-37.
[28] City of South San Francisco, Downtown/Central Redevelopment Plan ("Downtown/Central Redevelopment Plan"), Section 402, p. 18.
[29] Downtown/Central Redevelopment Plan, Section 413, p. 21.
[30] Downtown/Central Redevelopment Plan, Section 420, p. 22.

- Overflight Notification – To establish an area within which aircraft flights to and from the Airport occur frequently enough and at a low enough altitude to be noticeable by sensitive residents. Within this area, real estate disclosure notices shall be required, pursuant to State law.

The 2012 SFO ALUCP contains airport/land use compatibility policies and criteria that apply to all land uses except those considered as existing land uses. Airport land use commissions were given authority to (1) specify how land near airports is to be used, based on safety and noise compatibility considerations; (2) develop height restrictions for new development to protect airspace in the vicinity of the airport; and (3) establish construction standards for new buildings near airports, including sound insulation requirements.

After an ALUC has adopted its ALUCP, affected local governments must update their general plans, specific plans, and land use regulations to be consistent with the ALUCP. Even if the local government has amended its plans to be consistent with the ALUCP, it must still submit proposed new and amended general plans, specific plans, land use ordinances (including rezoning), regulations, and facility master plans to the ALUC for review. The C/CAG ALUC reviews local land use policy actions and administrates consistency review and submits recommendations to the C/CAG Commission.

Code of Federal Regulations Part 77

The 2012 SFO ALUCP incorporates the provisions in Title 14 of CFR Part 77, "Objects Affecting Navigable Airspace," as amended, to establish height restrictions and federal notification requirements related to proposed development within the 14 CFR Part 77 airspace boundaries.[31] The regulations contain three key elements: (1) standards for determining obstructions in the navigable airspace and designation of imaginary surfaces for airspace protection, (2) requirements for project sponsors to provide notice to the FAA of certain proposed construction or alteration of structures that may affect the navigable airspace, and (3) the initiation of aeronautical studies, by the FAA, to determine the potential effect(s), if any, of proposed construction or alterations of structures on the subject airspace.

As identified in the 2012 SFO ALUCP, the project site is located within the Federal Aviation Regulation Part 77 sphere of influence, which is the boundary established to regulate obstructions to airspace navigation, including building heights.[32] The City is located inside the 14 CFR Part 77 horizontal, conical, primary, approach and transitional imaginary surface contour areas. The parcels for the proposed project are located within the horizontal surface contour area.

Proposed Project Consistency with Airport Land Use Compatibility Plan

Because the proposed project would involve a rezoning, the project would be required to refer to the Airport Land Use Commission for a determination of consistency with the relevant policies of the 2012 SFO ALUCP. Based on the existing and ongoing development of office/R&D uses in the East of 101 Area, no substantial inconsistencies with safety policies are anticipated. There are three airport/land use compatibility issues addressed in the 2012 SFO ALUCP that relate to the proposed project: (a) consistency with noise compatibility policies, (b) safety criteria, and (c) airspace compatibility criteria.

[31] Code of Federal Regulations, Title 14, Chapter I, Subchapter E, Part 77.
[32] 2012 SFO ALUCP, Exhibit IV-2, p. IV-5.

NOISE POLICY CONSISTENCY ANALYSIS

The 2012 SFO ALUCP uses the Community Noise Equivalent Level 65 dB noise contour for determining land use compatibility. The proposed project site is located outside of the Community Noise Equivalent Level 65 dB noise contour.[33] Based upon this analysis, the proposed project would be consistent with 2012 SFO ALUCP noise policies.

SAFETY POLICY CONSISTENCY ANALYSIS

The California Airport Land Use Planning Handbook requires ALUCPs to include safety zones for each runway end. The 2012 SFO LUCP includes five safety zones and related land use compatibility criteria. The proposed project site is located outside of all safety zones established for the 2012 SFO LUCP. Therefore, the safety policy is not applicable to the proposed project.

HEIGHT OF STRUCTURES, USE OF AIRSPACE, AND AIRSPACE COMPATIBILITY

The City is located inside the 14 CFR Part 77 horizontal, conical, primary, approach and transitional imaginary surface contours. The parcels for the proposed project are located within the horizontal surface contour. The height for the imaginary surface established for the horizontal surface at the site location is 163.2 feet above mean sea level. The proposed project parcels are located at between 12 and 23 feet above mean sea level. The proposed buildings under the proposed project are designed to be constructed at a maximum building height of 99 feet above ground level. The existing project site is at a ground level between 12 and 23 feet, and maximum structure heights would be approximately 110 to 122 feet above mean sea level. A structure built at a maximum of 122 feet above mean sea level would be well below the imaginary surface height established.

Under federal law, the project sponsor is required to comply with all notifications and other requirements described in 14 CFR Part 77. The project sponsor of the proposed project is required to file Form 7460-1, Notice of Proposed Construction or Alteration, with the FAA to determine whether the project would constitute a hazard to air navigation. Based on the proposed project's maximum height of 122 feet above mean sea level, no additional safety requirements are anticipated. Therefore, the proposed project would be consistent with the airspace policies as established in the adopted 2012 SFO ALUCP.

Climate Action Plan

The purpose of the South San Francisco Climate Action Plan (CAP), adopted in 2014, is to demonstrate the City's continued commitment to reduce greenhouse gas (GHG) emissions while protecting unique resources in the City. The CAP provides goals, policies, and programs to reduce GHG emissions, adapt to climate change, and support the goals of Assembly Bill 32 and Senate Bill 743. Measures and standards identified in the CAP allow the City to simplify the development review process and determine whether projects are eligible for streamlining incentives. The CAP meets the requirements of a Qualified GHG Reduction Strategy and, consistent with the Global Warming Solutions Act of 2006, presents a target reduction of 15 percent below baseline 2005 GHG emissions levels by 2020.

The CAP provides guidance for a scientific and regulatory framework, a GHG emissions inventory, a GHG reduction strategy, adaptation and resiliency, and implementation. In particular, the CAP includes a Development Checklist for City staff to use to identify applicable CAP measures for discretionary projects and required mitigation standards. The Development Checklist serves as the summary of project-

[33] 2012 SFO ALUCP, Exhibit IV-2, p. IV-5.

level standards from the CAP. For discretionary projects seeking to use CEQA streamlining provisions, the City may require CAP measures as mandatory conditions of approval or as mitigation of identified GHG emission impacts. Relevant criteria include, but are not limited to, the following questions:

- Does the project include bicycle facilities (e.g., bicycle lanes, parking, lockers)?
- Will the project support bike sharing/rental programs?
- Will there be a commute shuttle or public transit stop on-site or within 500 feet?
- Will the project provide traffic calming treatments?
- Is the project paying a traffic impact fee to fund bicycle and pedestrian improvements?
- Will the project provide designated parking spaces for electric vehicles, carpool vehicles, or other low-emissions vehicles?
- Will certification of the building be sought under LEED or other green building criteria?
- Will any renewable energy system be installed as part of this project?
- Will any water features exceed CALGreen standards?
- Will the project incorporate low-impact development practices?
- Will any xeriscaping be installed?
- Will captured rainwater or graywater be used for irrigation?

Consistency with Climate Action Plan, Proposed Project

The proposed project would include alternative transportation-related amenities (bicycle facilities, bike sharing, commute shuttle, electric vehicle and carpool vehicle parking spaces); a contribution to the City traffic impact fee; adherence to LEED, City, and NPDES conservation measures (water conservation, low impact development, and landscaping); and photovoltaic solar panels on new office/R&D buildings. A detailed description of the proposed project's design features in relation to each CAP criteria, is discussed below in Table 5, Analysis of Consistency with the CAP.

Table 4.5.4: Analysis of Consistency with the CAP

CAP Measures and Actions	Consistency Analysis
Measure 1.1: Expand active transportation alternatives by providing infrastructure and enhancing connectivity for bicycle and pedestrian access;	The proposed project would involve construction of new sidewalks, walkways, and bicycle amenities (bicycle parking spaces, showers, lockers, etc.). The project sponsor would also contribute to the Commute.org shuttle program and coordinate with other program participants to expand shuttle service.
Measure 1.2: Support expansion of public and private transit programs to reduce employee commutes. Work with businesses to support and expand shuttle connections to transit. Continue to enforce the City's Transportation Demand Management (TDM) program to require employers to demonstrate achieved mode share and to continually adjust their programs to meet the requisite goals. Partner with local businesses to expand private shuttle programs for employee commutes, share local lessons learned, and connect businesses to shuttle resources. Implement programs and encourage employers to provide additional voluntary subsidies or incentives	The proposed project would involve preparation and implementation of a TDM Plan, subject to review by the Chief Planner and approval by the Planning Commission. The TDM Plan would include various measures to promote alternative transportation, including contribution to the Commute.org shuttle program and coordination with other program participants to expand shuttle service.
Measure 1.3: Integrate higher-density development and mixed-use development near transit facilities and community facilities, and reduce dependence on autos through smart parking practices. Revise the existing traffic impact fee for development east of US Route 101 to fund the bicycle and pedestrian improvements for the portions of the city identified in the Bicycle and Pedestrian Master Plans.	The project site is not located near a major transit hub or community facility. However, the proposed project would involve contribution to the Commute.org shuttle program, which provides connectivity to Bay Area Rapid Transit, Caltrain, and ferry services. In addition to paying into the traffic impact fee, the proposed project would involve construction of new sidewalks and bicycle amenities (bicycle parking spaces, showers, lockers, etc.) to encourage pedestrian and bicycle activity.
Measure 2.1: Expand the use of alternative-fuel vehicles. • Revise parking design guidelines to include designated spaces for electric vehicles, carpool vehicles, and other low-emissions vehicles. • Require new large-scale nonresidential developments to provide a conduit for future electric vehicle charging installations, and encourage the installation of conduits or electric vehicle charging stations for all new development.	The proposed project would provide off-street parking spaces, including designated spaces for electric vehicles, carpool, vanpool, and other shared vehicle uses.
Measure 2.2: Reduce emissions from off-road vehicles and equipment. • Work with applicants through the CEQA review process to reduce construction equipment emissions by encouraging the use of alternatively powered or grid-connected equipment.	The proposed project would contribute construction-period emissions from off-road vehicles and equipment during the construction period. As a condition of approval, the City will require the construction contractor to use alternatively powered or electrically-driven construction vehicles and equipment when feasible.
Measure 3.1: Maximize energy efficiency in the built environment through standards and the plan review process. • Encourage the use of CALGreen energy efficiency measures as a preferred mitigation for CAP streamlining.	The proposed project would be designed to enhance resource efficiency and ensure good indoor environmental quality, as well as reduce energy consumption, water consumption, and waste. The project would be designed to meet the standards of the City municipal code and CALGreen building requirements, as well as LEED v4 “Gold” design standards. The project would be designed to meet International WELL and FITWELL Building Institute Standards and may also be certified thereto.
Measure 3.3: Encourage energy efficiency retrofits to the existing nonresidential building stock that reduce operating costs and increase industry competitiveness. • Encourage all nonresidential properties to provide buyers or tenants with the previous year's energy use by documenting use through the EPA's EnergyStar Portfolio Manager. • Require nonresidential alterations or additions of at least 5,000 square feet or greater in size to comply	The proposed project would not involve retrofits to existing nonresidential buildings. However, the proposed project would be designed to enhance resource efficiency and reduce energy consumption per CALGreen building requirements, LEED v4 “Gold” design standards and International WELL Building Institute Standards.

with minimum CALGreen requirements. • Encourage the use of smart grid, energy-efficient, or Energy Star appliances in new development.	
Measure 3.4: Address heat island issues and expand the urban forest. • Encourage the use of high albedo surfaces and technologies as appropriate, as identified in the voluntary CALGreen standards. • Continue to require tree planting in new development in accordance with Chapter 13.30 of the Zoning Code, and encourage tree placement to maximize building shading.	The proposed project would involve planting of approximately 263 new trees, including street trees and on-site landscaping.
Measure 4.1: Promote installation of alternative energy facilities. • Require the construction of any new nonresidential conditioned space 5,000 square feet or more, or the conversion of unconditioned space 5,000 square feet or more, to comply with one of the following standards: • Meet a minimum of 50% of modeled building electricity needs with on-site renewable energy sources. To calculate 50% of building electricity needs for the new conditioned space, the applicant shall calculate building electricity use as part of the Title 24 compliance process. Total electricity use shall include total use for the new conditioned space excluding process energy. • Participate in a power purchase agreement to offset a minimum of 50% of modeled building electricity use. Building electricity use shall be calculated using the method identified above. • Comply with CALGreen Tier 2 energy efficiency requirements to exceed mandatory energy efficiency requirements by 20% or more. For additions to existing development of 5,000 square feet or more, CALGreen Tier 2 shall be calculated as part of the Title 24 compliance process. Existing building space already permitted shall not be subject to CALGreen Tier 2 requirements. • Require all new development to install conduit to accommodate wiring for solar.	The proposed project would be designed to meet the standards of the City municipal code and CALGreen Tier 2 energy efficiency requirements, as well as LEED v4 "Gold" design standards and International WELL Building Institute Standards. This would include construction of rooftop solar photovoltaic panel connectivity located on the parking garage.
Measure 5.1: Develop a waste reduction strategy to increase recycling and reuse of materials to achieve a 75% diversion of landfilled waste by 2020. • Continue to enforce the existing construction and demolition recycling ordinance, requiring 100% of inert waste and 65% of noninert waste to be recycled from all eligible projects.	The proposed project would be designed to reduce waste. The project would be designed to meet the standards of the City municipal code and CALGreen building requirements, as well as LEED v4 "Gold" design standards and International WELL Building Institute Standards. For construction and demolition, 100 percent of all inert solids (building materials) and 65 percent of non-inert solids (all other materials) would be recycled as required by the City under Chapter 15.60 of the Municipal Code. Additionally, the project sponsor would submit a Waste Management Plan.
Measure 6.1: Reduce water demand. • Revitalize implementation and enforcement of the Water Efficient Landscape Ordinance by undertaking the following: ○ Establishing a variable-speed pump exchange for water features. ○ Limiting turf area in commercial and large multi-family projects. ○ Restricting hours of irrigation to occur between 3:00 a.m. and two hours after sunrise. ○ Installing irrigation controllers with rain sensors. ○ Landscaping with native, water-efficient plants. ○ Installing drip irrigation systems. ○ Reducing impervious surfaces.	The proposed project would be designed to reduce water consumption. The project would not involve construction of new on-site turf areas or water features. Landscaping and irrigation would be designed to meet the standards of the City municipal code and CALGreen building requirements, as well as LEED v4 "Gold" design standards. The proposed project would also be designed to conserve resources and protect water quality through the management of stormwater runoff as part of green infrastructure through low-impact development (LID). This approach implements engineered controls to allow stormwater filtering, storage, and flood control.

Measure 6.2: Provide alternative water resources for irrigation. • Create water policies for the stormwater management strategy that seek to capture storm runoff (e.g., bioswale, rainwater collection, and irrigation programs). • Continue to implement the City's Water Efficient Landscape Guidelines.	The proposed project would be designed to conserve water resources including controlled stormwater flows through paved areas into designated bioretention areas or storm drains. Portions of roof areas would also be designed as green roofs that would provide filtration. Stormwater received through all proposed roof areas would be routed to the ground level through downspouts and conveyed to bioretention areas. The proposed new office/R&D uses would adhere to LEED, City, and NPDES conservation measures applicable to water conservation, LID, and landscaping requirements.

The project sponsor, in coordination with City staff, would perform ongoing review and identification of applicable CAP Measures for New Development, or for Additions, Alterations, and Tenant Improvements, to be incorporated into the proposed project as project features, mitigation of environmental effects, or mandatory conditions of approval commensurate with the project's intensity of use and site-specific conditions. Therefore, the proposed project would be consistent with the CAP.

OTHER PLANS AND POLICIES

San Francisco Bay Plan

The San Francisco Bay Conservation and Development Commission (BCDC), created by the McAteer-Petris Act (California Government Code Sections 66600-66682), functions as the State's coastal management agency for San Francisco Bay. The San Francisco Bay Plan (Bay Plan) was prepared by BCDC from 1965 through 1969 and amended through 2007 in accordance with the McAteer-Petris Act. The Bay Plan guides the protection and use of the San Francisco Bay and its shoreline. BCDC has permit jurisdiction for the nine San Francisco Bay Area counties with San Francisco Bay frontage over areas subject to tidal action up to the mean high tide line and including all sloughs, tidelands, submerged lands, and marshlands lying between the mean high tide and 5 feet above mean sea level, and the land lying between the San Francisco Bay shoreline and a line drawn parallel to, and 100 feet from, the San Francisco Bay shoreline, known as the 100-foot shoreline band. Under the McAteer-Petris Act, BCDC has permit authority for the placement of fill, extraction of materials, or substantial changes in use of land, water, or structures within its jurisdiction, and to enforce policies aimed at protecting the San Francisco Bay and its shoreline, as well as maximizing public access to the San Francisco Bay.

One parcel within the project site, the 400-450 East Jamie Court parcel, is adjacent to the San Francisco Bay Trail and is within 100 feet of the San Francisco Bay shoreline. As described above, the parcel is currently developed with existing office/R&D uses. Under the proposed project, additional office/R&D use on this parcel would be allowed through rezoning of the parcel. The remaining project parcels are not within 100 feet of the San Francisco Bay shoreline and are not subject to BCDC jurisdiction. The proposed Phase 1 construction is outside of the 100-foot shoreline band. Site-specific, project-level design of Phase 2 is not currently proposed and would be subject to a separate plan review and discretionary approval process. If Phase 2 development were proposed within the 100-foot shoreline band, that development would be subject to BCDC review and approval.

Appearance, Design, and Scenic View Policies

Several policies of the Bay Plan are aimed at protecting the San Francisco Bay's scenic views, and the appearance and design of the Bayfront and adjacent developments. The Bay Plan policies that are most relevant to the 400-450 East Jamie Court parcel with respect to appearance, design, and scenic views are as follows:

Policy 1. To enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines.

Policy 2. All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay. Maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shore. To this end, planning of waterfront development should include participation by professionals who are knowledgeable of the Commission's concerns, such as landscape architects, urban designers, or architects, in conjunction with engineers and professionals in other fields.

Policy 4. Structures and facilities that do not take advantage of or visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline. However, some small parking areas for fishing access and Bay viewing may be allowed in exposed locations.

Policy 8. Shoreline developments should be built in clusters, leaving areas open around them to permit more frequent views of the Bay. Developments along the shores of tributary waterways should be Bay-related and should be designed to preserve and enhance views along the waterway, so as to provide maximum visual contact with the Bay.

Policy 12. In order to achieve a high level of design quality, the Commission's Design Review Board, composed of design and planning professionals, should review, evaluate, and advise the Commission on the proposed design of developments that affect the appearance of the Bay in accordance with the Bay Plan findings and policies on Public Access; on Appearance, Design, and Scenic Views; and the Public Access Design Guidelines. City, county, regional, state, and federal agencies should be guided in their evaluation of Bayfront projects by the above guidelines.

Policy 14. Views of the Bay from vista points and from roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water. In this regard, particular attention should be given to all waterfront locations, areas below vista points, and areas along roads that provide good views of the Bay for travelers, particularly areas below roads coming over ridges and providing a "first view" of the Bay (shown in Bay Plan Map No. 8, Natural Resources of the Bay).[34]

Consistency with San Francisco Bay Plan, 400-450 East Jamie Court

For the proposed project, BCDC's jurisdiction includes the San Francisco Bay and areas within 100 feet inland of the mean high tide line. A portion of the existing 400-450 East Jamie Court parcel is under BCDC's jurisdiction. Outside the shoreline band, the parcel and contains two existing office/R&D buildings and access to the San Francisco Bay Trail. The proposed Phase 1 development of the parcel also would be outside the shoreline band. Inside the shoreline band, the parcel contains a portion of parking lot, asphalt walking paths, viewing and seating area, concrete plaza, and landscaping.[35] Views of the San

[34] Bay Plan Map No. 8 has been removed from the Bay Plan. Bay Plan Map No. 5 provides current information on scenic and sensitive resources in the Central Bay.

[35] In 2003, BCDC issued a permit (BCDC Permit No. M02-70, originally issued on July 17, 2003, and currently consisting of Corrected Permit No. M02-70 dated October 30, 2003, and Amendment No. Two dated June 26, 2006; as corrected and amended, the "BCDC Permit") regarding the use of certain portions of the 400-450 East Jamie Court parcel for public Bayshore

Francisco Bay from local roads or from the project site may change with additional development of office/R&D uses at 400-450 East Jamie Court, such as new additions to existing buildings, new or taller buildings, or reduced open surface parking area. However, the 400-450 East Jamie Court parcel is not located on a site designated as a vista point, wildlife refuge, or waterfront park under Bay Plan Map 5 (Central Bay). The existing site and surrounding land uses include light industrial uses, office/R&D uses, and a recycling center use. Additional office/R&D use on the 400-450 East Jamie Court parcel would be consistent with the character of these existing uses. Nonetheless, new development or changes to the existing site plan at the 400-450 East Jamie Court parcel under either the proposed project would be designed to maintain compatibility with appearance, design, and scenic view policies established by the Bay Plan and site development would require BCDC review. Any future changes to trail access would be also be designed in consideration of BCDC Public Access Design Guidelines, including site furnishings, signage, and other public access improvements. BCDC would make the final determination of consistency with Bay Plan policies for the portions of the project site that are within its permit jurisdiction.

The BCDC Design Review Board also reviews and makes recommendations to the Commission on the appearance and design of proposed projects, evaluating them in light of the policies for Appearance, Design, and Scenic Views. However, its recommendations are advisory only and are not of themselves grounds for denying a permit. Outside the area of the Commission's jurisdiction where permits for development from the Commission are not required, the McAteer-Petris Act specifies that the provisions of the Bay Plan pertaining to such areas are simply advisory to the applicant.

access. Development of Phase 1 of the proposed project would not impact the portion of the 400-450 East Jamie Court parcel affected by the BCDC Permit. Phase 2 of the proposed project would be reviewed for consistency with the BCDC Permit.

APPENDIX D

Water Supply Assessment

SB 610 Water Supply Assessment
For

201 Haskins Way Rezoning and General Plan Amendment Project

September 6, 2018

Prepared by

California Water Service
341 North Delaware Ave
San Mateo, California 94401

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Introduction and Project Description

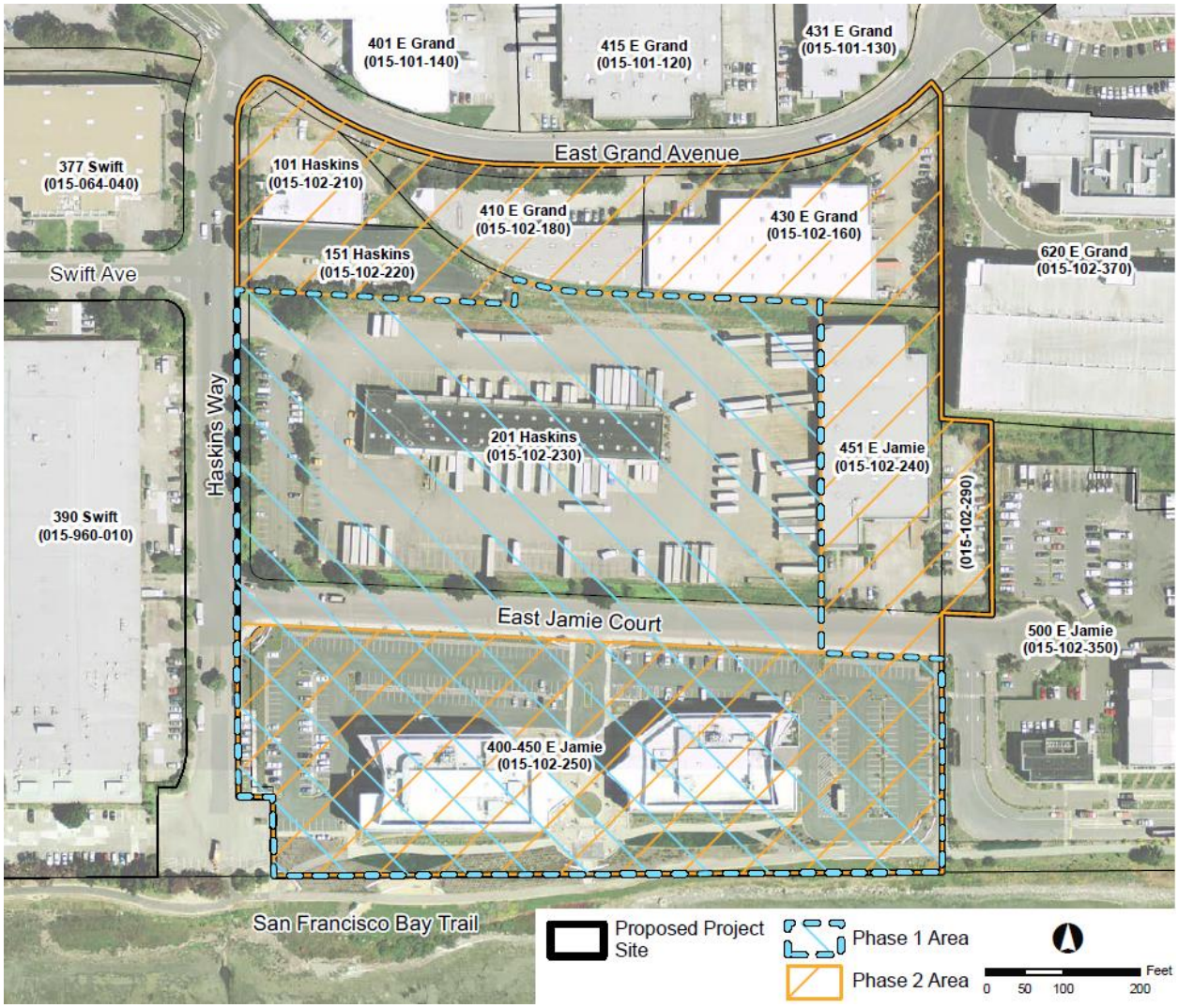
The City of South San Francisco (City) has requested California Water Service (Cal Water) prepare a Water Supply Assessment (WSA) in accordance with California SB 610 requirements for the proposed 201 Haskins Way Project ("Haskins Project"). A summary description of the Haskins Project follows.

The project includes eight parcels in the City in the area east of 101 Area shown on Figure 1, Haskins Project Site. The Haskins Project would rezone the parcels from Mixed Industrial (MI) and Business Commercial (BC) to Business and Technology Park (BTP). The existing City General Plan designations would remain unchanged for all eight parcels. The project, which would result in approximately 677,600 sq ft of new office/R&D space, would be built out in at least two phases. Phase 1 would be completed in 2021. The Haskins Project Environmental Impact Report (EIR) includes analysis of the maximum potential development in Phase 2 associated with the proposed rezoning of those affected parcels; however, there is no site-specific development program proposed for Phase 2 at this time. Nonetheless, in order to provide a conservative (worst case) analysis of impacts for CEQA purposes, it is assumed that Phase 2 construction would commence in 2021 (immediately after completion of Phase 1 construction) and would to be completed in 2023.

Haskins Project Summary

Phase 1:
Existing mixed industrial use to be removed: 24,075 sq ft
New business and technology space: 336,368 sq ft
Phase 2:
Existing mixed industrial use to be removed: 157,995 sq ft
New business and technology space: 341,232 sq ft
Total Phase 1 and 2
Existing mixed industrial use to be removed: 182,070 sq ft
New business and technology space: 677,600 sq ft

Figure 1: Haskins Project Site



Senate Bills 610 (Chapter 643, Statutes of 2001) (SB 610) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and land use development decisions made by cities and counties. SB 610/SB 221 are companion measures that require detailed information regarding water supply availability be provided to local public agency decision-makers prior to approval of development projects that meet or exceed any of the following criteria:

1. A residential development of more than 500 dwelling units.
2. A shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet.
3. A commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
4. A hotel or motel with more than 500 rooms.

5. An industrial, manufacturing or processing plant or industrial park planned to house more than 1,000 persons occupying more than 40 acres of land or having more than 650,000 square feet of floor area.
6. A mixed-used project that includes one or more of the projects specified above.
7. A project that would demand an amount of water equivalent to, or greater than the amount of water required by a 500 dwelling unit project.

Since the proposed Haskins Project exceeds criteria 3, a WSA is required.

If the projected water demand associated with a proposed project was accounted for in the most recently adopted Urban Water Management Plan (UWMP) for the area within which the project is located, then information from that UWMP may be incorporated into the WSA for the project. (Water Code §10910(c)(2).) If projected water demand associated with a project was not accounted for in the most recently adopted UWMP, then the WSA must address the adequacy of the water supply to meet estimated demands of the proposed project over the next 20 years in addition to those of Cal Water's existing customers and other anticipated future users under normal, single dry year and multiple dry year conditions. (Water Code §10910(c)(3).) In this case, SB 610 requires that the information developed to address the adequacy of the water supply question be included in the administrative record that serves as the evidentiary basis for an approval action by the local public agency.

SB 610 recognizes local control and decision-making regarding the availability of water for projects and the approval of projects. Under SB 610, WSAs must be furnished to local governments for inclusion in any required California Environmental Quality Act (CEQA) documents. Water Code 10910 (a) requires that any city or county that determines that a project, as defined in Section 10912, is subject to CEQA shall comply with the requirements of this part of the water code.

Cal Water adopted its current SSF District UWMP in June 2016. This UWMP accounts for the projected water demand associated with the proposed Haskins Project. Per Section 10910(c)(2) of the Water Code, this WSA is based on information contained in the UWMP, updated water demand data for 2016 and other sources cited here.

Following is an estimate of the Haskins Project water demands and a description and assessment of the water supply to meet those and other forecasted demands in the SSF District in accordance with the requirements of SB 610.

Haskins Project Water Demand Estimate

Existing water use is based on 2017 metered readings for the buildings to be replaced by the Haskins Project are shown in Table 1. These readings do not distinguish between types of uses of the existing space which totals 364,140 ft^2. Also, not known is what percent of the existing building space is being utilized. Based on 2017 data, the average use for all existing buildings is 0.0265 gallons/day/ft^2.

Table 1: Existing Haskins Site 2017 Water Use			
	CCF/year	Gallons/day	AFY
Interior Use			
101 Haskins	56		
151 Haskins	298		
201 Haskins	278		
410 East Grand	80		
430 East Grand	112		
451 East Jamie	69		
Total Interior Use	893	1,830	2.05
Irrigation Use			
400 East Jamie	773		
450 East Jamie	742		
Total Irrigation Use	1,515	3,105	3.48
Total Use		4,935	5.53

In the May 23, 2017, request letter from the City of South San Francisco to Cal Water, a water demand calculation for the Genentech 2017 Master Plan Update was provided. Based on metered water use data, it indicated that existing Genentech office water use is 20 gallons/year/ft^2 or 0.0547 gallons/day/ft^2 and laboratory water use is 30 gallons/year/ft^2 or 0.082 gallons/day/ft^2. Since this water use data differentiates water use for office and laboratory facilities similar to those proposed for the Haskins Project, it is used here.

At project build-out, the irrigated landscaped areas will likely be similar to present site conditions; therefore, no additional irrigated water demand is expected.

It is not known if the existing Genentech water use factors for the office and laboratory categories of building uses reflect the last 6 years of progress in water conservation programs focused on water use reduction. It is conservatively assumed to be the case here.

Current city ordinances require all new developments to install water conserving fixtures and appliances. All of these will be incorporated into the Haskins Project. It is likely that since all new construction for offices and laboratories will use water conserving fixtures and appliances, the actual water use rates for the proposed Haskins Project new facilities may be lower than current ones.

The intended use of the Haskins Project is for biotechnology development. For purposes of calculating water demand estimates, it is assumed that 60% of the new space will be for laboratories and 40% will be for offices.

Therefore, the estimated new water demand for the Haskins Project based on the space to be constructed is calculated as follows:

Office: 0.4 x 677,600 ft^2 x 0.0547 gallons/day/ft^2 = 14,826 gallons/day

Laboratories: 0.6 x 677,600 ft^2 x 0.082 gallons/day/ft^2 = 33,338 gallons/day

Total Estimated New Water Use: 48,164 gallons/day.

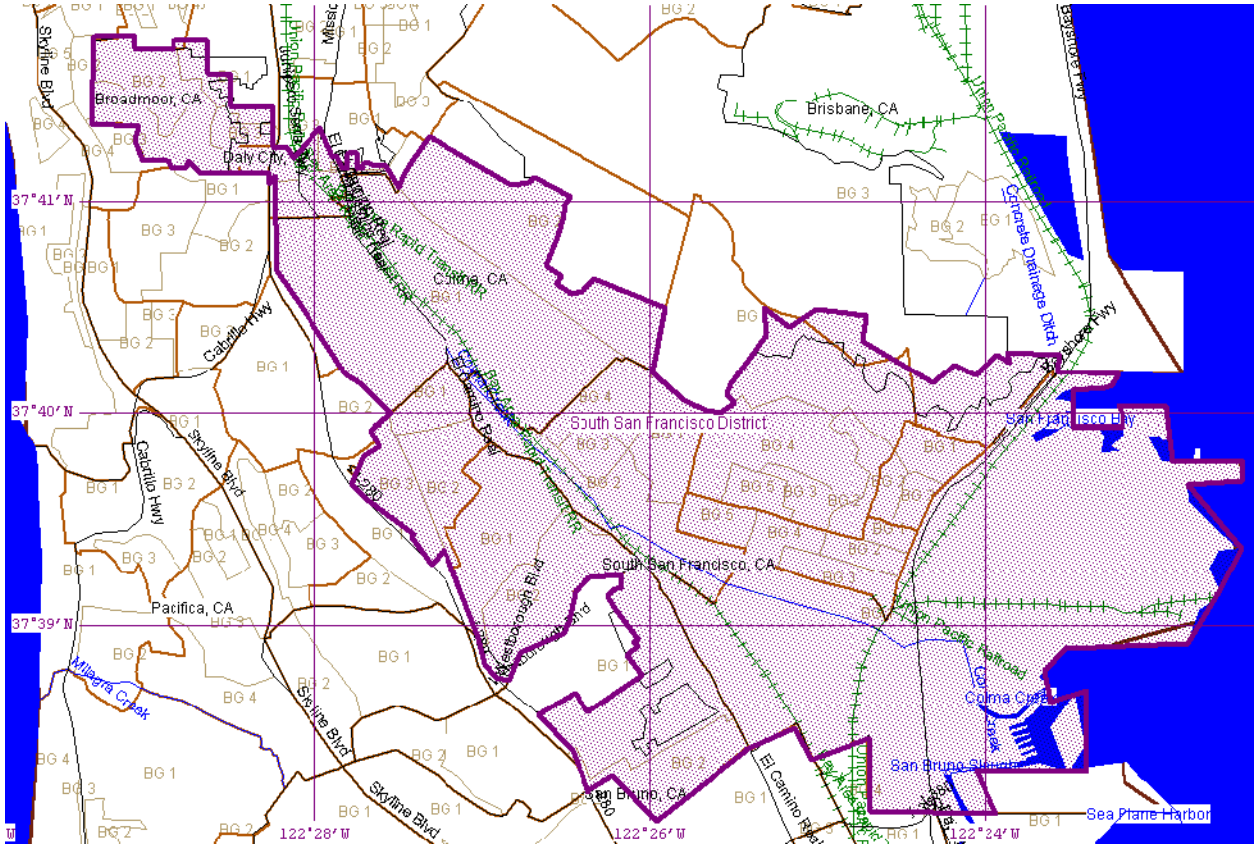
Total NET Estimated New Water Use: 48,164 – 1,830 = 46,334 gallons/day

Since there are only 2 years separating completion of the two phases (Phase 1 in 2021, and Conceptual Phase 2 in 2023), the WSA takes 2023 as the date of overall project completion and beginning of operations of the proposed facilities.

South San Francisco District Background Information

The South San Francisco (SSF) District is located in northern San Mateo County approximately six miles south of the City of San Francisco. The SSF District serves the communities of South San Francisco, Colma, a small portion of Daly City, and an unincorporated area of San Mateo County known as Broadmoor, which lies between Colma and Daly City. The South San Francisco District was formed by Cal Water in 1931 with the purchase of the South San Francisco Water Company from Pacific Water Company. Figure 2 is a map showing the SSF District's service areas.

Figure 2: South San Francisco District



Cal Water designates customer classifications as follows:

- Single Family Residential
- Multifamily Residential
- Commercial
- Industrial
- Government
- Other

A variety of land uses exist in the SSF District service area. Within the City of South San Francisco, 28 percent of the land is residential, 21 percent industrial, 7 percent commercial, 11 percent is vacant and agricultural land and the balance is for public and utility use. In the City of Colma, approximately 77 percent of the land is used for cemeteries. The balance of the land is for residential, commercial, and public use. The Broadmoor area is primarily residential.

South San Francisco District Water Demand

Based on data contained from the SSF District 2016 UWMP, actual water use in the SSF District in 2015 by customer category is shown in Table 2. Total system demand in 2015 was 7,064 acre feet (AF). SSF District water use in 2015 was strongly affected by the Drought Emergency Regulation adopted by the State Water Resources Control Board in May of 2015 (SWRCB Resolution No. 2015-0032). The Drought Emergency Regulation mandated urban retail water suppliers reduce potable water use between June of 2015 and February of 2016 by percentages specified by the State Water Resources Control Board. The South San Francisco District was ordered to reduce potable water use by 8 percent over this period relative to use over the same period in 2013. Between June and December 2015, water use in South San Francisco decreased by 21.7% compared to 2013.

Table 2: SSF District Demands for Potable Water

User Category	2015 Actual (AF)
Single Family	2,404
Multi-Family	348
Commercial	3,212
Industrial	663
Institutional/Governmental	219
Other	16
Losses	201
Total	**7,064**

Residential customers account for approximately 86.6 percent of services and 40 percent of water use in the SSF District, most of which is single-family residential water use. Figure 3

shows the distribution of services in SSF District in 2015. Figure 4 shows historical water sales by customer category.

Figure 3: Distribution of Services in 2015

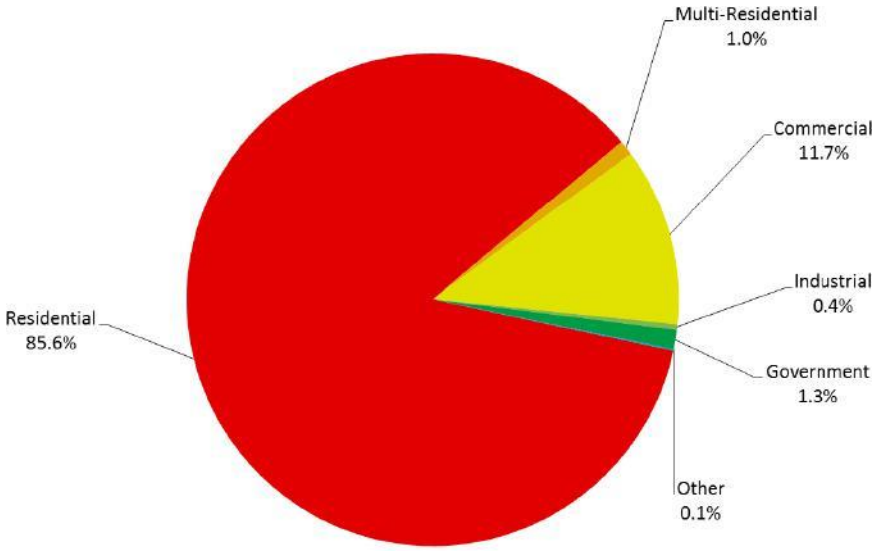
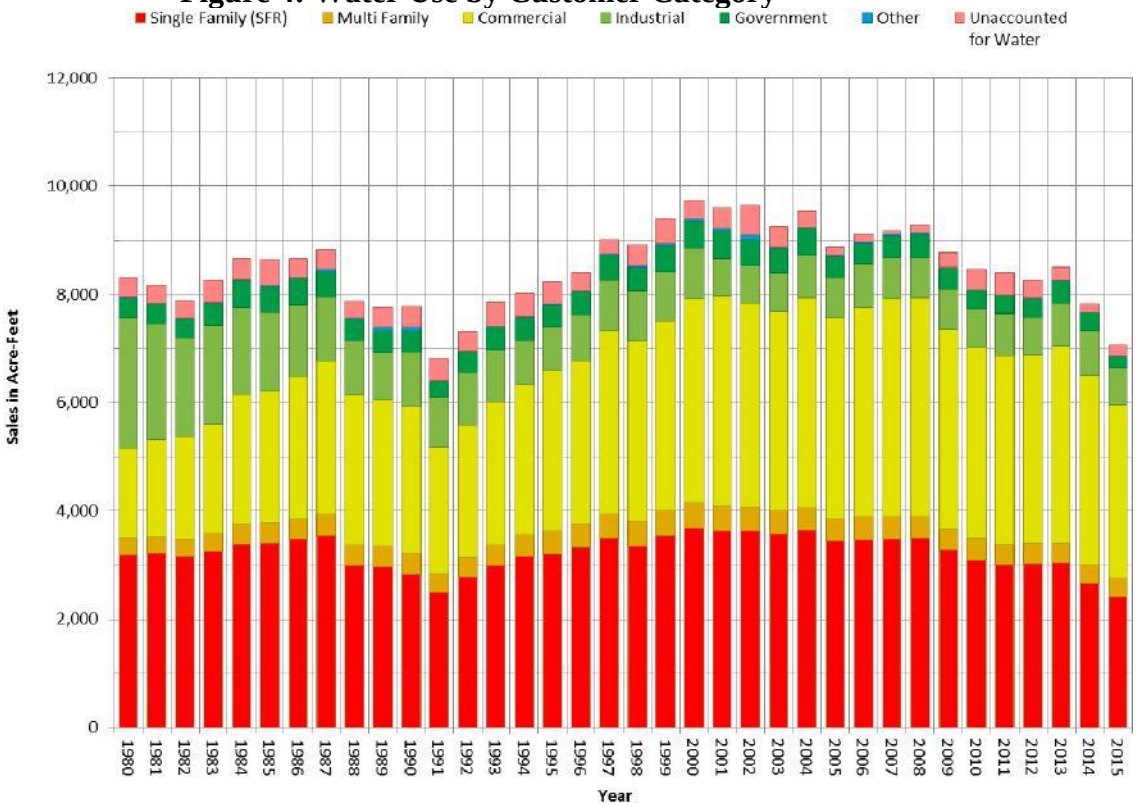


Figure 4: Water Use by Customer Category



Projected Potable Water Demand

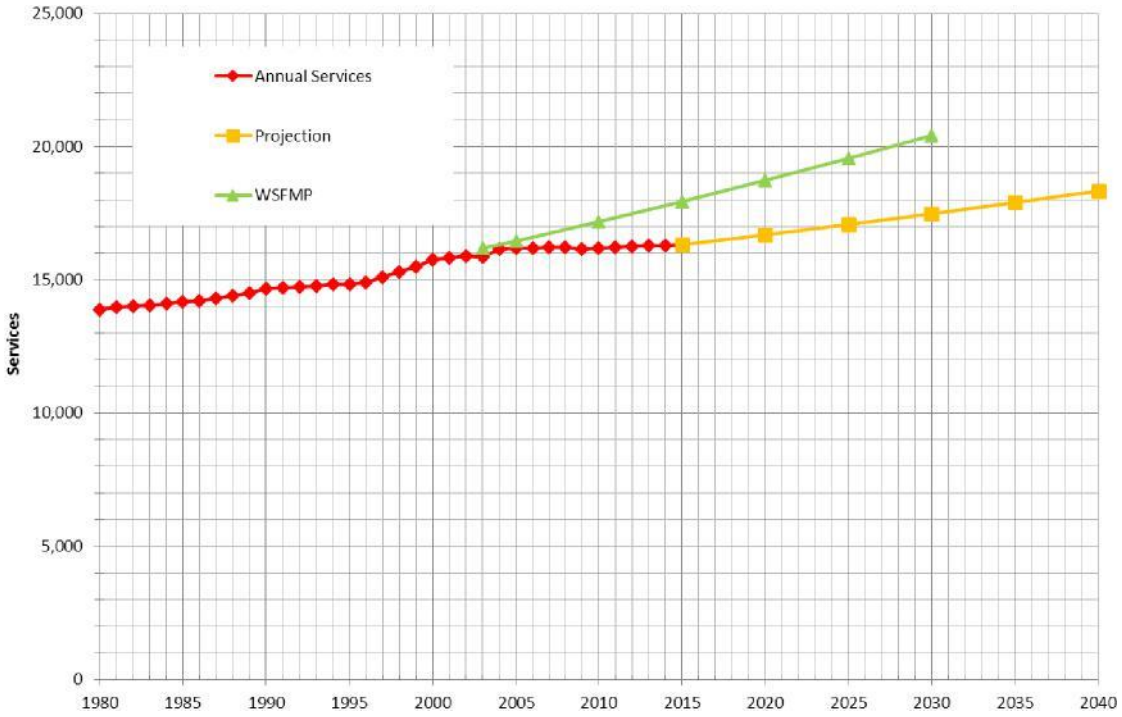
Projected normal year potable water demands by customer categories through 2040 are shown in Table 3. Future demands are estimated as the product of future services and expected water use per service.

Table 3: SSF District Projected Potable Water Demands

Use Category	(AF)				
	2020	2025	2030	2035	2040
Single Family	3,159	3,125	3,124	3,146	3,180
Multi-Family	402	394	396	404	417
Commercial	3,698	3,723	3,764	3,800	3,839
Industrial	695	730	768	807	848
Institutional/Governmental	371	367	363	360	358
Other	15	15	15	15	15
Losses	220	226	232	238	244
Total	**8,560**	**8,580**	**8,662**	**8,770**	**8,901**

Future services are based on use of historical growth rates in the SSF District. Use of these rates has been accurate in forecasts made in previous SSF District UWMPs and is expected to continue to be accurate since growth in the SSF District is largely due to redevelopment. Single-family residential services are projected using the historical growth rate for the last 20 years while multi-family services are projected using the 5-year historical growth rate. Commercial and industrial services are projected using the historical growth rate for the past 15 and 20 years, respectively. The forecast assumes no change in the number of institutional services. The projected average annual growth rate in services across all customer categories is approximately 0.5 percent. Historical and projected services are shown in Figure 5. Also shown in the figure is the services projection from Cal Water's 2009 Water Supply and Facility Master Plan (WSFMP).

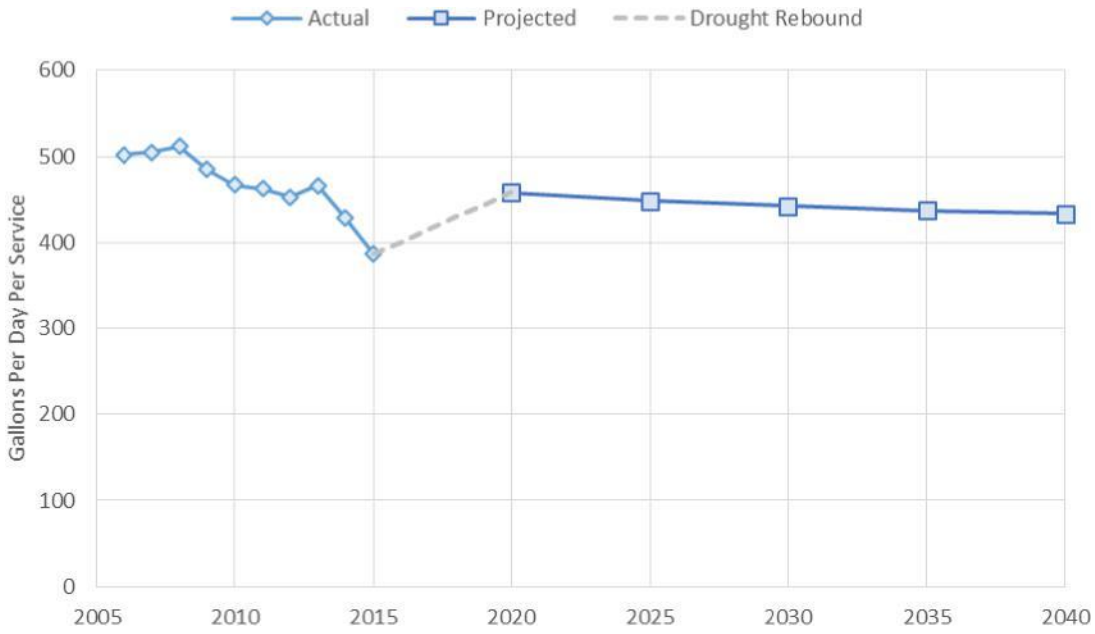
Figure 5: SSF District Historical and Projected Services



Expected water use per service, shown in Figure 6, is based on weather-normalized historical use, adjusted for future expected water savings from plumbing codes and District conservation programs. Weather normalization of historical use was done econometrically using the California Urban Water Conservation Council GPCD Weather Normalization Methodology. Expected water savings from plumbing codes are presented in Section 4.4 of the 2015 UWMP. Expected water savings from District conservation programs and projected compliance with the District's SB X7-7 2020 per capita water use target are discussed in Chapter 9 of the 2015 UWMP. The projected trend in average use per service shown in Figure 6 does not account for possible effects of climate change on future demand. The potential effects of climate change are discussed in Section 4.6 of the UWMP.

Projected water uses in Table 3 and Figure 6 are based on unrestricted demands under normal weather conditions. Demands are assumed to partially rebound by 2020 from 2015 levels due to the State Water Resources Control Board ending its mandatory water use reductions. The difference between actual and projected demands in 2020 will depend in part on how water uses will change without state mandated reductions.

Figure 6: Historical and Projected Average Use per Service in Gallons per Day



Future Water Savings

The projections of future water use in Table 3 include expected water savings from plumbing codes and appliance standards for residential and commercial toilets, urinals, clothes washers, dishwashers, and showerheads. These savings are called *passive water savings* in contrast to savings from water supplier conservation programs, which are called *active water savings*. Active water savings from the South San Francisco District's implementation of demand management measures are discussed in Chapter 9 of the UWMP. Estimates of passive water savings were developed with the Alliance for Water Efficiency's *Water Conservation Tracking Tool* using data on the age, number, and water using characteristics of residences and businesses within South San Francisco District's service area. They are shown in Table 4.

Table 4: Projected SSF District Passive Water Savings

	2015	2020	2025	2030	2035	2040
(AF)	10	163	289	391	475	544

The following codes and standards form the basis for estimated future passive water savings:

- AB 715 enacted in 2007
- U.S. Department of Energy water use standards for residential and commercial clothes washers and dishwashers
- CalGreen Code requirements for maximum indoor water consumption of plumbing fixtures and fittings in new and renovated properties.
- SB 407 mandates that buildings in California come up to current State plumbing fixture standards within this decade. Noncompliant plumbing fixtures include:
    - Toilets manufactured to use more than 1.6 gallons of water per flush
    - Urinals manufactured to use more than one gallon of water per flush

- Showerheads manufactured to have a flow capacity of more than 2.5 gallons per minute
- Interior faucets that discharge more than 2.2 gallons of water per minute.

For single-family residential property, the compliance date is January 1, 2017. For multi-family and commercial property, it is January 1, 2019. In advance of these dates, the law requires effective January 1, 2014 for building alterations and improvements to all residential and commercial property that water-conserving plumbing fixtures replace all noncompliant plumbing fixtures as a condition for issuance of a certificate of final completion and occupancy or final permit approval by the local building department.

SB 407 also requires effective January 1, 2017 that a seller or transferor of single-family residential property disclose to the purchaser or transferee, in writing, the specified requirements for replacing plumbing fixtures and whether the real property includes noncompliant plumbing. Similar disclosure requirements go into effect for multi-family and commercial transactions January 1, 2019. SB 837, passed in 2011, reinforces the disclosure requirement by amending the statutorily required transfer disclosure statement to include disclosure about whether the property is in compliance with SB 407 requirements. If enforced, these two laws will require retrofit of non-compliant plumbing fixtures upon resale or major remodeling for single-family residential properties effective January 1, 2017 and for multi-family and commercial properties effective January 1, 2019.

California has also adopted regulations governing the future use of landscape water use.

- The California Water Commission approved the State's updated Model Water Efficient Landscape Ordinance (MWELO) on July 15, 2015. The updated MWELO supersedes the State's MWELO developed pursuant to AB 1881. Local agencies have until December 1, 2015 to adopt the MWELO or to adopt a Local Ordinance which must be at least as effective in conserving water as MWELO. Local agencies working together to develop a Regional Ordinance have until February 1, 2016 to adopt. The size of landscapes subject to MWELO has been lowered from 2500 sq. ft. to 500 sq. ft. The size threshold applies to residential, commercial, industrial and institutional projects that require a permit, plan check or design review. Additionally, the maximum applied water allowance (MAWA) has been lowered from 70% of the reference evapotranspiration (ETo) to 55% for residential landscape projects, and to 45% of ETo for non-residential projects. This water allowance reduces the landscape area that can be planted with high water use plants such as cool season turf. For typical residential projects, the reduction in the MAWA reduces the percentage of landscape area that can be planted to high water use plants from 33% to 25%. In typical non-residential landscapes, the reduction in MAWA limits the planting of high water use plants to special landscape areas. The revised MWELO allows the irrigation efficiency to be entered for each area of the landscape. The site-wide irrigation efficiency of the previous ordinance (2010) was 0.71; for the purposes of estimating total water use, the revised MWELO defines the irrigation efficiency (IE) of drip irrigation as 0.81 and overhead irrigation and other technologies must meet a minimum IE of 0.75.

- CalGreen requires that automatic irrigation system controllers for new landscaping provided by a builder and installed at the time of final inspection must be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plant water needs as weather or soil conditions change.

The estimates of future water savings in Table 4 do not include potential landscape water savings from implementation of MWELO or CalGreen standards because estimating these savings required data that was not available to Cal Water at the time the 2015 UWMP plan was prepared. Required data include existing and future landscape areas, plant materials, irrigation equipment, enforcement of and compliance with the landscape design and irrigation equipment requirements.

SSF District Population

In the 2015 UWMP, Cal Water updated the baseline period population estimates to incorporate information from the 2010 US Census that was not available at the time the 2010 UWMP was prepared. Updating resulted in a small change in the original population estimates.
Urban retail water suppliers must estimate their service area population consistent with DWR requirements. For water suppliers whose boundaries correspond by 95 percent or more with a city or census designated place, population estimates prepared by the Department of Finance may be used. Where this is not the case, water suppliers may use the DWR Population Tool or estimate their population using other methods, provided these methods comply with Methodology 2 – Service Area Population – of DWR's *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use*.

Cal Water uses a population estimation methodology based on overlaying Census Block data from the 2000 and 2010 Censuses with the District's service area. LandView 5 and MARPLOT software are used with these data to estimate population per dwelling unit for 2000 and 2010. The per dwelling unit population estimates are then combined with Cal Water data on number of dwelling units served to estimate service area population for non-Census years.
Cal Water also estimated service area population using DWR's Population Tool. The estimates prepared using Cal Water's methodology and DWR's Population Tool differed by less than one percent. A comparison of the estimates generated by the two approaches is provided in Appendix I of the 2015 UWMP. Cal Water elected to use the population estimates produced by its methodology in order to maintain consistency with population projections it has prepared in other planning documents and reports.

SSF District Baseline Daily Per Capita Water Use

Baseline daily per capita water use is calculated by converting annual gross water use to gallons per day and dividing by service area population. Daily per capita water use for each baseline year and 2015 are summarized in Table 5.

Table 5: SSF District Gallons Per Capita Per Day (GPCD)				
Baseline Year		Service Area Population	Annual Gross Water Use (AF)	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1995	52,724	8,226	139
Year 2	1996	52,885	8,403	142
Year 3	1997	53,456	9,008	150
Year 4	1998	53,939	8,917	148
Year 5	1999	54,386	9,394	154
Year 6	2000	55,024	9,738	158
Year 7	2001	55,326	9,606	155
Year 8	2002	55,784	9,633	154
Year 9	2003	56,031	9,245	147
Year 10	2004	57,028	9,549	149
10-15 Year Average Baseline GPCD				**150**
5 Year Baseline GPCD				
Baseline Year		Service Area Population	Annual Gross Water Use (AF)	Daily Per Capita Water Use (GPCD)
Year 1	2003	56,031	9,245	147
Year 2	2004	57,028	9,549	149
Year 3	2005	57,398	8,869	138
Year 4	2006	57,646	9,101	141
Year 5	2007	57,920	9,169	141
5 Year Average Baseline GPCD				**143**
2015 Compliance Year GPCD				
2015		61,223	7,064	**103**

SSF District GPCD 2015 and 2020 Targets

Urban retail water suppliers may select from four GPCD target methods (CWC 10608.20).

- Target Method 1: 20% reduction from 10-year baseline GPCD
- Target Method 2: Water use efficiency performance standards
- Target Method 3: 95% of Hydrologic Region Target
- Target Method 4: Savings by water sector, DWR Method 4

Regardless of target method selected, the final target cannot exceed 95 percent of the 5-year baseline period average GPCD (CWC 10608.22).
The South San Francisco District has selected Target Method 3, which sets the 2020 target to either 95 percent of the San Francisco Bay Area Hydrologic Regional Target or 95 percent of the 5-year baseline average GPCD, whichever is less. This results in a 2020 target of 124 GPCD.

The 2015 interim target of 137 GPCD is the midpoint between the 10-year baseline average GPCD and the 2020 target.
The District's GPCD baselines and targets are summarized in Table 6.

Table 6: SSF District Baselines and Targets Summary

Baseline Period	Start Years	End Years	Average GPCD	2015 Interim Target	Confirmed 2020 Target
10-15 year	**1995**	**2004**	**150**	**137**	**124**
5 Year	**2003**	**2007**	**143**		

2015 Compliance with Daily per Capita Water Use

Cal Water is not electing to make any adjustments to the District's compliance daily per capita water use in 2015. The South San Francisco District's 2015 compliance daily per capita water use is 103 gallons compared to its 2015 interim target of 137 gallons. The South San Francisco District is in compliance with its 2015 interim target.

The low per capita water use in 2015 partially reflects the impacts of the Drought Emergency Regulation adopted by the State Water Resources Control Board in May of 2015 (SWRCB Resolution No. 2015-0032). Among other things, the Drought Emergency Regulation mandated urban retail water suppliers reduce potable water use between June of 2015 and February of 2016 by percentage amounts specified by the State Water Resources Control Board. The South San Francisco District was ordered to reduce potable water use by 8 percent over this period relative to use over the same period in 2013.

However, the Drought Emergency Regulation does not explain all of the decline in per capita water use, which has been trending downward since 2000 when it reached its peak of 158 gallons per person per day. By 2014 this had fallen by 27 percent, to 115 gpcd. Between 2014 and the end of 2015, per capita water use had fallen an additional 11 percent, to 103 gpcd.

The following analysis indicates that the forecasted demand of the Haskins Project is well within the SSF District forecasted demand growth.

Actual gross water use demand for the SSF District in 2015 was 7,064 acre-feet/year (AFY) or 6.31 million gallons per day (mgd). The forecasted demand for 2025 is 8,580 AF; so the forecasted increase in average day demand for the 10-year period 2015 to 2025 is 1,516 AFY or 1.35 mgd. The Haskins Project forecasted increase in demand in 2023 is 46,334 gallons/day (gpd) or 0.0463 mgd. After 2023, no further increase in Haskins Project demand is projected.

The 2025 net new water demand for the Haskins Project is only 3.4% (0.0463/1.35) of the projected increase in total water use for the SSF District demand between 2015 and 2025.

Water demand for the SSF District in 2040 is 8,901 AFY or 7.94 mgd so the increase in average day demand from 2015 to 2040 (25 year period) is 1,837 AFY or 1.638 mgd.

With respect to the 25 year forecast, Haskins Project new water demand is a very small percent of the increase in total demand. In 2040, 97.2% (1 - 0.0463/1.638) of increased demand is available for general growth and other development projects.

The 2017 Genentech Master Plan Update WSA (November 2017) estimated increased in water demand by 2027 is 264,400 gallons/day

The Oyster Point Development Project WSA (August 2017) estimated increase in water demand by 2020 is 219,051 gpd.

The SSF Downtown Redevelopment Project WSA (June 2014) estimated increase in water demand by 2035 is 248,000 gpd.

Adding the estimated increases in water demand of these three development projects to that of the Haskins Project demand yields a total increase of 777,785 (46,334 + 264,400 + 219,051 + 248,000) gpd or rounded to 778,000 gpd.

These four projects comprise 47% of the total projected increase in demand between 2015 and 2040 in the SSF District, leaving 53% of that remaining increase in demand for other projects and general growth in the City of South San Francisco.

Therefore, increases in water demand due to the Haskins Project are within the SSF District UWMP increased demand projections.

South San Francisco District Water Supply

Potable water supply for the SSF District is a combination of purchased water and groundwater from Cal Water owned wells. Water is purchased from the San Francisco Public Utilities Commission (SFPUC). Cal Water's annual allocation of SFPUC supply is shared among its three peninsula districts: Bear Gulch, Mid-Peninsula, and South San Francisco. Annual supply from SFPUC to its utility customers varies with precipitation and related hydrologic conditions. Water is allocated among wholesale customers based on an existing agreement with the member agencies of the Bay Area Water Supply and Conservation Agency (BAWSCA). The two stages of allocation are discussed below. In addition, SFPUC supply to the South San Francisco District in any given year varies slightly with availability of a local surface water supply in the Bear Gulch District.

Cal Water, City San Bruno, City of Daly City and SFPUC have participated in an evaluation of the Westside Groundwater Basin to determine the feasibility of entering into a conjunctive use program. Preliminary results indicate that the South San Francisco District would have a drought groundwater supply of 1,535 AFY= the District's planned annual pumping quantity.

Purchased SFPUC potable supply is delivered through a network of pipelines, tunnels and treatment plants shown in Figure 7. This supply is predominantly from the Hetch Hetchy reservoir, but also includes water produced from watersheds, reservoirs and treatment facilities in Alameda and San Mateo Counties.

Purchased Water

The amount of imported water available to SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional factors that allocate the water supply of the Tuolumne River which is downstream of the Hetch Hetchy reservoir. Due to these constraints, SFPUC is very dependent on reservoir storage of its water supplies. Local reservoirs include: Crystal Springs Reservoir, San Andreas Reservoir, Pilarcitos Reservoir, Calaveras Reservoir, and San Antonio Reservoir.

The Raker Act, which authorized the Hetch Hetchy project, prevents a privately owned utility such as Cal Water from receiving water from the Hetch Hetchy system, but allows local sources to be purchased. In addition, Cal Water is subject to the Water Supply Agreement between The City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County.

Supply Guarantee

In July 2009, Cal Water along with 29 other Bay Area water suppliers signed a Water Supply Agreement (SFWSA) between The City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County, which replaced the Settlement Agreement and Master Water Sales Contract (Master Contract) with San Francisco that had been in place since 1984. The SFWSA continues the provision to provide a Supply Guarantee of 184 mgd, expressed on an annual average basis to SFPUC wholesale customers collectively. SFPUC retail customers receive 81 mgd as a supply guarantee. Cal Water's Individual Supply Guarantee (ISG) is 35.68 mgd or 39,967 acre feet per year.

The SFPUC can meet the demands of its retail and wholesale customers in years of average and above average precipitation. The SFWSA allows SFPUC to reduce water deliveries during droughts, emergencies and for scheduled maintenance activities. SFPUC's wholesale customers through their collective organization, the Bay Area Water Supply and Conservation Agency (BAWSCA) during 2010 negotiated the Drought Implementation Plan (DRIP), which replaces the previously adopted Interim Water Shortage Allocation Plan. The SFWSA allocates the required reduction of available water supply between San Francisco's retail and wholesale customers. The SFWSA established that during a called upon 20% drought reduction, collective wholesale customers face up to a 28% reduction in their available supply, while SFPUC retail customers face only a 2% reduction.

The DRIP aggregates the reduction applied to the wholesale customers and allocates it among individual wholesale customers during water shortages of up to 20% of system-wide. The DRIP was formulated was unanimous consensus by a BAWSCA committee of designated representatives from each wholesale customer.

The DRIP uses an allocation process that takes into consideration the wholesale customer's ISG and the seasonal water use pattern of the wholesale customer's service area. Communities that use substantially more water in the summer will face a greater reduction in their allocated drought supply. Health and safety adjustments were provided to increase the drought allocation of several wholesale customers that have extremely low ISG values.

Much like the previously approved Interim Water Supply Allocation Plan, during a called upon 20% drought reduction because of the seasonal water use pattern of its customers and the recent high demand that has reached or exceeded its ISG, Cal Water's customers face a potential 33% reduction in their available supply. By implementing conservation and seeking outside water supplies that can be transferred into Cal Water's service area, the magnitude of the potential reduction can be reduced.

The SFWSA also calls for implementation of an Interim Supply Allocation (ISA) accompanied by an Environmental Enhancement Fee. If the entire SFPUC service area exceeds the collective supply guarantee of 265 mgd (81 mgd to SFPUC retail and 184 mgd to wholesale), then any individual customer that exceeds their ISA will be assessed the yet to be determined Environmental Enhancement Fee. Cal Water's ISA has been set at its ISG of 35.68 mgd. This is intended to be an incentive to implement conservation. In 2010, the collective SFPUC service area used 214.4 mgd; the five year average use is 237.6 mgd.

In addition to hydrologic conditions, supply available to SFPUC's retail and wholesale customers also depends on the status of conveyance and treatment facilities and agreements that allocate water supply.

While the Raker Act prohibits the SFPUC from selling water from the Hetch Hetchy project to privately owned utilities, SFPUC makes available for purchase, water from its other sources to privately owned utilities, i.e. Cal Water.

Cal Water's purchased water supply from the SFPUC is subject to the Water Supply Agreement between the City and County of San Francisco and Wholesale Customers, which was adopted in July 2009. As a means of addressing the aforementioned Raker Act exclusion the Water Supply Agreement contains Article 9.02 A. which identifies Cal Water as an investor owned utility company, and as such, has no claim to co-grantee status under the Act. In addition Article 9.02 B. states that:

> *The total quantity of water delivered by San Francisco to California Water Service Company shall not in any calendar exceed 47,400 acre-feet, which is the estimated average annual production of Local System Water. If San Francisco develops additional Local System Water after the Effective Date, it may (1) increase the maximum delivery amount stated herein; and (2) increase the Supply Assurance, but not necessarily both. San Francisco has no obligation to deliver water to California Water Service Company in excess of the maximum stated herein, except as such maximum may be increased by San Francisco pursuant to this subsection. The maximum annual quantity of Local System Water set forth in this subsection is intended to be a limitation on the total quantity of water that may be allocated to California Water Service Company, and is not an Individual Supply Guarantee for purposes of Section 3.02. The maximum quantity of Local System Water set forth in this subsection is subject to reduction in response to (1) changes in long-term hydrology or (2) environmental water requirements that may be imposed by or negotiated with state and federal resource agencies in order to comply with state or federal law or to secure applicable permits for construction of Regional Water System facilities. San Francisco shall notify California Water Service Company of any anticipated reduction of the quantity of Local System Water set forth in this subsection, along with an explanation of the basis for the reduction.*

Short term changes in hydrologic conditions such as drought and supply emergencies are governed by other provisions of the Water Supply Agreement including the two tiered allocation plan adopted by the BAWSCA membership. This plan is described in Chapter 7 of the 2015 UWMP.

In 1984, Cal Water and 29 other Bay Area water suppliers signed a Settlement Agreement and Master Water Sales Contract (Master Contract) with San Francisco, supplemented by an individual Water Supply Contract. These contracts provided for a 184 mgd (annual average basis) Supply Assurance Allocation (SAA) to the SFPUC's wholesale customers collectively. This allocation was reached through negotiation in the early 1990s between the SFPUC and Bay Area Water Users Association (BAWUA), the predecessor organization to BAWSCA. In 2009 the Master Contract was extended through 2018, keeping the SAA at 184 mgd, but changing its name to the Individual Supply Guarantee (ISG).

Cal Water's ISG for the three districts was 35.39 mgd (39,642 AFY). Additionally, the acquisition of the Los Trancos County Water District in July 2005 allowed the transfer of its 0.11 mgd ISG to Cal Water. In 2009 Cal water acquired the Skyline County Water District, which also transferred its 0.181 mgd ISG to Cal Water. This increased Cal Water's total ISG for the three districts to 35.68 MGD (39,967 AFY).

The Water Supply Agreement allows the SFPUC to reduce water deliveries during droughts, emergencies, and for scheduled maintenance activities. The SFPUC and all wholesale customers adopted an Interim Water Shortage Allocation Plan in 2000 to address the allocation of water between San Francisco, wholesale customers, and individual wholesale customers during water shortages of up to 20 percent of system-wide use. In 2010, the wholesale customers negotiated and subsequently adopted a revised methodology for allocating supplies during shortages. This methodology is discussed in more detail in Chapter 7 of the 2015 UWMP.

Water Supply Improvement Program (WSIP)

Figure 7 is a schematic showing the main projects that comprise the WSIP.

Figure 7: SFPUC Water System Improvement Program (WSIP) Projects



The WSIP goals	**System Performance Objective**
Water Supply – *meet customer water needs in non-drought and drought periods*	• Meet average annual water demand of 265 mgd from the SFPUC watersheds for retail and wholesale customers during non-drought years for system demands through 2018. • Meet dry-year delivery needs through 2018 while limiting rationing to a maximum 20 percent system wide reduction in water service during extended droughts. • Diversify water supply options during non-drought and drought periods. • Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.

The SFPUC historically has met customer demand in all types of water years. Typically, 85 percent of supply comes from the Tuolumne River from the Hetch Hetchy Reservoir and the remaining 15 percent from local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. The WSIP continues to use this mix of water supply sources.

<u>Water Supply – Dry Years</u>

The WSIP includes the following water supply projects to meet dry year demands with no greater than 20 percent system-wide rationing in any one year:

Calaveras Dam Replacement Project

Calaveras Dam is located near a seismically active fault zone and was determined to be seismically vulnerable. To address this vulnerability, the SFPUC is constructing a new

dam of equal height downstream of the existing dam. The Environmental Impact Report was certified by the San Francisco City Planning Commission in 2011, and construction is now ongoing. Construction of the new dam is slated for completion in 2018; the entire project should be completed in 2019.

Alameda Creek Recapture Project
The Alameda Creek Recapture Project will recapture the water system yield lost due to instream flow releases at Calaveras Reservoir or bypassed around the Alameda Creek Diversion Dam and return this yield to the RWS through facilities in the Sunol Valley. Water that naturally infiltrates from Alameda Creek will be recaptured into an existing quarry pond known as SMP (Surface Mining Permit)-24 Pond F2. The project will be designed to allow the recaptured water to be pumped to the Sunol Valley Water Treatment Plant or to San Antonio Reservoir.

Lower Crystal Springs Dam Improvements
The Lower Crystal Springs Dam Improvements were substantially completed in November 2011. While the project has been completed, permitting issues for reservoir operation have become significant. While the reservoir elevation was lowered due to Division of Safety of Dams restrictions, the habitat for the Fountain Thistle, an endangered plant, followed the lowered reservoir elevation. Raising the reservoir elevation now requires that new plant populations be restored incrementally before the reservoir elevation is raised. The result is that it may be several years before the original reservoir elevation can be restored.

Regional Groundwater Storage and Recovery Project
The Groundwater Storage and Recovery Project is a strategic partnership between SFPUC and three San Mateo County agencies: the California Water Service Company (serving South San Francisco and Colma), the City of Daly City, and the City of San Bruno. The project seeks to balance the management of groundwater and surface water resources in a way that safeguards supplies during times of drought. During years of normal or heavy rainfall, the project would provide additional surface water to the partner agencies in San Mateo County, allowing them to reduce the amount of groundwater that they pump from the South Westside Groundwater Basin. Over time, the reduced pumping would allow the aquifer to recharge and result in increased groundwater storage of up to 20 billion gallons.
The project's Final Environmental Impact Report was certified in August 2014, and the project also received Commission approval that month. The well station construction contract Notice to Proceed was issued in April 2015, and construction is expected to be completed in spring 2018.

2 mgd Dry-year Water Transfer
In 2012, the dry-year transfer was proposed between the Modesto Irrigation District and the SFPUC. Negotiations were terminated because an agreement could not be reached. Subsequently, the SFPUC is having ongoing discussions with the Oakdale Irrigation District for a one-year transfer agreement with the SFPUC for 2 mgd (2,240 acre-feet).

In order to achieve its target of meeting at least 80 percent of its customer demand during droughts at 265 mgd, the SFPUC must successfully implement the dry-year water supply projects included in the WSIP.

Furthermore, the permitting obligations for the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements include a combined commitment of 12.8 mgd for instream flows on average. When this is reduced for an assumed Alameda Creek Recapture Project recovery of 9.3 mgd, the net loss of water supply is 3.5 mgd. The SFPUC's participation in regional water supply reliability efforts, such as the Bay Area Regional Desalination Project (BARDP), additional water transfers, and other projects is intended make up for this shortfall.

Groundwater

As described in the UWMP, groundwater has historically supplied ten to fifteen percent of SSF District water demand. It is extracted from the Merced Formation of the Colma Creek Basin, a sub-basin of the Merced Valley Groundwater Basin. Locally this basin is referred to as the Westside Basin.

Basin Description

The Westside Basin is the largest groundwater basin in the San Francisco Bay Hydrologic Region. It is separated from the Lobos Basin to the north by a northwest trending bedrock ridge through the northeastern part of Golden Gate Park. The San Bruno Mountains bound the basin on the east. The San Andreas Fault and Pacific Ocean form its western boundary and its southern limit is defined by bedrock high that separates it from the San Mateo Plain Groundwater Basin. The basin opens to the Pacific Ocean on the northwest and San Francisco Bay on the southeast.
A detailed description of the basin is given in the DWR's Groundwater Bulletin 118 in Appendix G of 2015 SSF District UWMP. There are no plans to adjudicate this basin.

DWR Bulletin 118 provides information on:

- San Francisco Bay Hydrologic Region
- Merced Valley (Westside) Basin
- Santa Clara Sub-basin
- Groundwater Basin Number: 2-35
- Non-adjudicated Status of Basin

According to Bulletin 118, a USGS study covering the period 1987-1992 showed declining water levels for the Westside Basin. This is likely the result of a concurrent drought during this period. Onset of normal precipitation and increased recharge could possibly rectify this occurrence as depleted storage is renewed. (This description of the Westside Basin in Bulletin 118 was last updated in January 2006.)

Groundwater Management

In June 2003, Cal Water entered into an agreement with the SFPUC to implement a pilot conjunctive use program to test its practicality and potential impact on the regional groundwater basin and Lake Merced recovery. This conjunctive use program is an in-lieu replenishment operation where SFPUC delivers surplus surface water to Cal Water in exchange for a reduction in groundwater use. The wells were taken offline while Cal Water participated in the pilot program with the SFPUC. Cal Water resumed pumping groundwater in late 2008. During the pilot program the static depth to groundwater decreased by approximately 35 feet.

The Regional Groundwater Storage and Recovery Project (GSR Project) is a joint effort between SFPUC, Cal Water, and the Cities of Daly City and San Bruno to coordinate groundwater and surface water management in the South Westside Basin. This project would increase water supply reliability during dry years or emergency conditions. Cal Water, Daly City, and San Bruno are BAWSCA members who use groundwater from the South Westside Basin to augment their SFPUC supplies and are referred to as participating pumpers.

The SFPUC will install up to 16 new wells in the Westside Basin. There will be three operational action cycles within the proposed Groundwater Storage and Recovery Program, which are associated with the available SFPUC supply. When the SFPUC determines that there is surplus supply available they can call for a "Put" cycle during which they will deliver some of this surplus water to the program participants in-lieu of groundwater pumping by the participating pumpers, thus putting or leaving the groundwater in storage in the basin.

During normal supply years, SFPUC will deliver the normal quantities of imported supply to the participants who will also pump their Designated Quantity from the groundwater basin. Then when imported supplies are short the participating pumpers will pump their Designated Quantities and receive groundwater produced from the aforementioned SFPUC wells, and an equally reduced quantity of imported water.

The SFPUC wells will only be operated to extract the previously stored or banked supply. The expected groundwater storage gained from this reduced pumping is approximately 61,000 acre-feet. With that amount of additional groundwater available in the basin, the agencies could pump at rate of 7.2 mgd for a 7.5-year dry period.

Project facilities would include wells, disinfection, and distribution pipelines as needed, which will be paid for by the SFPUC. SFPUC will pay all operation costs when the take cycle is authorized. During non-drought emergencies the SFPUC wells would be available to the participating pumpers to provide additional redundant supply capacity. However, the operational cost for such an event would be paid for by the participating pumper.

In January 2015, the SFPUC awarded this $42.9 million construction contract to Ranger Pipelines, Inc. Construction started in spring 2015 and completion is anticipated in spring 2018. The District produces groundwater from an un-adjudicated basin; however, Cal Water has voluntarily limited the annual production of groundwater from the Westside (Merced Valley) Basin to 500 million gallons annually in response to shared concerns raised in a study prepared for the City of Daly City that focused on local groundwater conditions. In 1999 the Westside Basin Partners proposed a Groundwater Management Plan, but that plan was not adopted by Cal Water and the other local jurisdictions. However, the partners implemented many of the Basin Management Objectives from the Plan.

In 2005, SFPUC published a final draft of its North Westside Groundwater Basin Management Plan, which covers the portion of the basin that is located in the City of San Francisco. With SGMA passage in 2014 (see below for a detailed discussion of SGMA), a new effort is underway to update the Groundwater Management Plan into a Groundwater Sustainability Plan for the South Westside Basin. Cal Water is an active participant in this effort. A Letter of Mutual Understanding has been signed in 2016 by all of the agencies.

Sustainable Groundwater Management Act

On September 16, 2014, Governor Brown signed into law Assembly Bill 1739, Senate Bill 1168, and Senate Bill 1319 (AB-1739, SB-1168, and SB-1319). This three-bill legislative package is known collectively as the Sustainable Groundwater Management Act (SGMA). SGMA was amended in the later part of 2015 by Senate Bill 13, Senate Bill 226 and Assembly Bill 1390 to provide clarity to the original law and guidance on groundwater adjudications. This new legislation defines sustainable groundwater management as the "management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results" [Water Code § 10721(u)]. The legislation defines "undesirable results" to be any of the following effects caused by groundwater conditions occurring throughout the basin [Water Code § 10721(w) (1-6)]:

Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply;

Significant and unreasonable reduction of groundwater storage;

Significant and unreasonable seawater intrusion;

Significant and unreasonable degraded water quality;

Significant and unreasonable land subsidence;

Surface water depletions that have significant and unreasonable adverse impacts on beneficial uses of the surface water.
The legislation provides for financial and enforcement tools to carry out effective local sustainable groundwater management through formation of Groundwater Sustainability Agencies (GSA's) consisting of local public agencies, water companies regulated by the CPUC and mutual water companies. The legislation requires that GSA's within High and Medium Priority basins under the California Statewide Groundwater Elevation Monitoring (CASGEM) program subject to critical conditions of overdraft prepare and submit a Groundwater Sustainability Plan (GSP) for the basin by January 31, 2020 [Water Code § 10720.7(a) (1)], and requires GSA's in all other groundwater basins designated as High or Medium Priority basins to prepare and submit a GSP by January 31, 2022 [Water Code § 10720.7 (a) (2)]. Following State approval, the High or Medium Priority basin would thereafter be managed under the GSP. The legislation does not require adjudicated basins to develop GSPs, but they are required to report their water use.

The key intended outcomes and benefits of SGMA are numerous, and include:

- Advancement in understanding and knowledge of the State's groundwater basins and their issues and challenges;

- Establishment of effective local governance to protect and manage groundwater basins;

- Management of regional water resources for regional self-sufficiency and drought resilience;

- Sustainable management of groundwater basins through the actions of GSA's, utilizing State assistance and intervention only when necessary;

- All groundwater basins in California are operated to maintain adequate protection to support the beneficial uses for the resource;

- Surface water and groundwater are managed as "a Single Resource" to sustain their interconnectivity, provide dry season base flow to interconnected streams, and support and promote long-term aquatic ecosystem health and vitality;

- A statewide framework for local groundwater management planning, including development of sustainable groundwater management best management practices and plans;

- Development of comprehensive and uniform water budgets, groundwater models, and engineering tools for effective management of groundwater basins;

- Improved coordination between land use and groundwater planning;

- Enforcement actions as needed by the SWRCB to achieve region-by-region sustainable groundwater management in accordance with the 2014 legislation.

To assist in attaining the above outcomes, the California Department of Water Resources (DWR) will provide GSA's with the technical and financial assistance necessary to sustainably manage their water resources. The benefits of these outcomes include:

- A reliable, safe and sustainable water supply to protect communities, farms, and the environment, and support a stable and growing economy;

- Elimination of long-term groundwater overdraft, an increase in groundwater storage, avoidance or minimization of subsidence, enhancement of water flows in stream systems, and prevention of future groundwater quality degradation.

Cal Water's groundwater basin policy is to work collaboratively with all stakeholders in the basins where it operates and do what is best for managing the basin sustainably including sharing of costs and benefits on an equitable basis. Cal Water recognizes and supports the goals, objectives and intended outcomes of the SGMA and intends to take an active role in local and state-wide management of groundwater resources over the next 5 - 25+ years.
The 2015 UWMP contains many of the elements required by SGMA and thus supports implementation of SGMA and the basin GSP. SGMA's specific requirements for groundwater are addressed in:

- Chapter 4: historic and future customer growth and water demand in the basin.

- Chapter 6: historic and future water supplies in the basin and actions Cal Water will need to take to develop additional water supplies to maintain supply reliability.

- Chapter 6: water quality and necessary actions to protect and maintain water supplies.

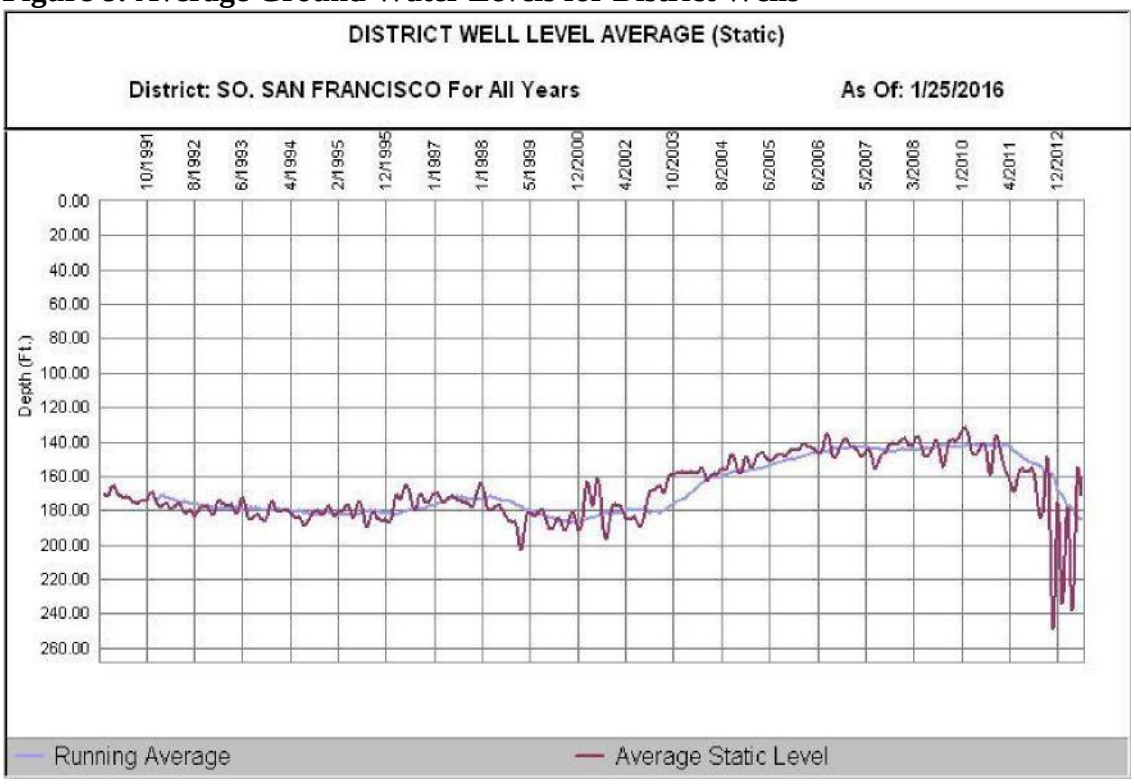
- Chapter 6: supplementing water supplies with recycled water.

- Chapter 7: adequacy of the combined supplies to reliably meet customer demands under normal, single-dry-year and multiple-dry-year conditions.

Westside Basin Storage

Cal Water routinely monitors the groundwater level of its wells in the Westside basin. Figure 8 shows the average ground water level for the South San Francisco District from 1990 to 2013. The groundwater level increased about 35 feet between 2003 and 2007, as Cal Water, San Bruno, and Daly City suspended groundwater pumping while participating in a pilot conjunctive use program with SFPUC. Levels decreased beginning in 2010 due to drought conditions.

Figure 8: Average Ground Water Levels for District Wells



The May 2011, HydroFocus Westside Basin Model (version 3.1) indicates that the sustainable municipal pumping rate is 6.9 mgd. Cal Water, Daly City, and San Bruno intend to coordinate their respective pumping rates so that 6.9 mgd is not exceeded on an annual basis. Cal Water has offered to limit its planned production of groundwater from the Westside Basin to 1.37 mgd (1,535 AFY) which is consistent with current pumping capacity and historical pumping rates.

The amount of groundwater historically pumped is shown in Table 7.

Table 7: SSF District Groundwater Quantity Pumped (AF)						
Groundwater Type	Location or Basin Name	2011	2012	2013	2014	2015
Alluvial Basin	Merced Valley (Westside) Basin	515	606	995	1,028	1,312
Total		**515**	**606**	**995**	**1,028**	**1,312**

Future Possible Water Supplies

Recycled Water

Currently, no municipal or industrial wastewater is processed for non-potable reuse in the SSF District.

Use of recycled water continues to be evaluated by the Cities of South San Francisco and San Bruno, SFPUC, and Cal Water to reduce potable water demands on SFPUC supply and groundwater pumping in the Westside Basin. Focus of use of recycled water has been on non-potable uses – mainly landscape irrigation.

Daly City currently produces 2.77 mgd of recycled water, which is used for irrigation of the San Francisco Golf Club, Olympic Club, Lake Merced Golf Club, Harding Park Golf Club, and several city parks and medians. Daly City and SFPUC are pursuing the Feasibility of Expanded Tertiary Recycled Water Facilities Project, which will provide approximately 3 mgd of additional recycled water irrigation supply to the cemeteries in the Town of Colma and other parks and schoolyards. The goal of the project is to reduce reliance on the groundwater basin and to create a local, drought-proof water supply. This expansion in currently in design; construction is expected to occur in 2018-2019.

Cal Water examined the potential for recycled water use in its SSF District Water Supply and Facilities Master Plan. It was further evaluated in its Integrated Long Term Water Supply Plan for its three Peninsula Districts. These studies found a potential for 0.61 mgd of recycled water demand in the SSF District. Because of the low demand and very high cost to treat and convey recycled water, this supply is not being pursued. Cal Water will reevaluate recycled water use in the future to determine whether it is feasible.

The North San Mateo County Sanitation District (NSMCSD) treats wastewater from Cal Water's South San Francisco service area communities of Broadmoor and portions of Colma. Communities also within the NSMCSD, but not in Cal Water's service area include Westlake, Westborough County Water District, Daly City, and the San Francisco County Jail. Municipal wastewater is generated in the NSMCSD service area by residential, commercial, and limited industrial sources. NSMCSD owns, operates and maintains its sewer system consisting of gravity sewers and pumping stations.

South San Francisco and San Bruno own and operate the South San Francisco Water Quality Control Plant (SSFWQCP). Wastewater from Cal Water's South San Francisco service area communities of South San Francisco and Colma is treated at the SSFWQCP. Wastewater from San Bruno and a small portion of Daly City is also treated at the SSFWQCP, but these areas are not within Cal Water's service area. The sewer system includes gravity lines and force mains that combine both wastewater and storm water runoff.

The quantity of wastewater generated is proportional to the population and water use in the service area. For 2015, it was estimated that 2,382 AFY of wastewater flows from Cal Water's South San Francisco District to the NSMCSD, and 3,500 AFY flows to the SSFWQCP for a total of 5,882 AFY.

Wastewater Treatment in SSF District Area

Wastewater at the North San Mateo Wastewater Treatment Plant (NSMWTP) receives secondary treatment. The NSMWTP cannot provide tertiary treatment. NSMWTP design treatment capacity is 10.3 MGD average daily flow but currently receives 6.8 MGD from the North San Mateo County Sanitation District service area. Effluent is discharged to an outfall at Thornton Beach via pipeline. Secondary non-public contact treated water is currently recycled from this plant for irrigation of landscaped medians in Westlake. Recycled water from the NSMWTP is not available to the SSF District service area. Wastewater from the South San Francisco Water Quality Control Plant (SSFWQCP) receives secondary treatment with chlorination and de-chlorination before being discharged to the San Francisco Bay. The SSFWQCP also provides de-chlorination for chlorinated effluent for Burlingame, Millbrae, and San Francisco International Airport. The SSFWQCP has capacity to treat 13 MGD average daily flow (instantaneous peak wet weather flow capacity of 30 mgd) and currently receives 10 MGD from the SSFWQCP service area. The SSFWQCP does not provide recycled water. An assessment of using recycled water from this plant was made by the firm CDM in preparing the Cal Water's Water Supply and Facilities Master Plan for the SSF District and although it was concluded to not be feasible presently, it was recommended that recycling should be re-evaluated in the future.

Potential for Water Recycled Water

South San Francisco has conducted studies to assess the feasibility of developing a recycled water program and is continuing with further investigations to determine capital and operations and maintenance costs associated with various stages of implementation of a water recycling program as well as environmental, institutional, regulatory, and financial issues that must be addressed.

NSMCWTP staff has worked on upgrading its treatment facilities to meet Title 22 requirements, i.e., tertiary treatment. Some process improvements have been made. Planned uses for recycled water include irrigation of three golf courses adjacent to the treatment plant and irrigation of local median strips and athletic fields. However, theses golf courses currently use groundwater for irrigation. The golf courses and median strips are not within Cal Water's SSF district service area. In addition, Cal Water's service areas in Broadmoor and Colma are residential communities with no current use for recycled water. It is hoped that potential customers will be served with recycled water from the North San Mateo Wastewater Treatment Plant in the future, but none of these potential customers are within Cal Water's service area.

Current projected recycled water demand for Cal Water's service area, which is served by NSMWTP through 2040 is 0 acre-feet per year.

Cal Water will continue to participate in planning for future recycled water project(s) with South San Francisco, San Bruno and SFPUC and consider supporting a joint feasibility study with Daly City to investigate supplying recycled water to Colma cemeteries.

The SSFWQCP is near design capacity. Existing available space will be used to add facilities to increase treatment capacity. Due to these conditions, SSFWQCP does not have plans to provide recycled water in the near future.

Desalinated Water

Cal Water did an initial evaluation of developing desalinated water as a source of potable supply in its 2009 Water Supply and Facilities Master Plan (WSFMP). It was studied in more detail in its 2011 Long Term Water Supply Plan (LTWSP) for its three Peninsula Districts. Other agencies are also investigating a number of potential regional and local desalination projects which could be developed to provide potable water to the Cal Water Peninsula Districts.

The Bay Area Regional Desalination Project (BARDP) has identified one or two desalination plants for producing potable water. Participating agencies would either directly receive desalinated water or exchange other water among them. Participating agencies include Contra Costa Water District (CCWD), East Bay Municipal Utility District (EBMUD), SFPUC, Santa Clara Valley Water District (SCVWD), and Zone 7 Water Agency.

The BARDP evaluation process started in 2003 with the screening of 22 potential sites, narrowing those down to three sites. The 2007 feasibility study screened and ranked combinations of location, operation, and conveyance scenarios according to six issues: environmental, permitting, institutional/legal, cost, public perception, and reliability. The highest performing configuration was a 65 mgd facility in the City of Pittsburg, co-located with the existing Mirant Power Plant. BARDP is currently conducting a Regional Reliability Study.

<u>Potential Local Desalination Projects</u>

The LTWSP indicated that a significant demand to supply gap can be anticipated during drought conditions, which is summarized in Chapter 7 of the 2015 SSF District UWMP.

The LTWSP concluded that most viable alternatives to close this supply gap are through the development of desalination facilities and/or water transfers.

Desalination options involve developing reverse osmosis membrane treatment plants to remove the salts from San Francisco Bay surface water or brackish groundwater beneath the bay. Based on planning level cost estimates, brackish water desalination (with potential yields up to 5 mgd) is the most attractive option for eliminating the supply gap. Use of surface bay water, while more expensive, would provide greater treatment capacity and an opportunity for Cal Water to supply desalinated water to nearby public water utilities which are supplied solely by the SFPUC.

Cal Water intends to conduct more detailed feasibility studies and if results are positive, prepare a preliminary engineering report on the recommended desalination option. Implementing a desalination project will require an additional 7 to 10 years. Several actions are necessary to refine cost estimates including: determining sustainable brackish groundwater yield capacity, determining the best well locations for extracting brackish water, confirming feasibility of brine discharge locations, finding acceptable sites for treatment and finished water storage facilities, and developing a pilot testing program. If a larger capacity desalination plant is warranted based on interest from other water utilities, Cal Water will need to identify potential open water intake sites, treatment and storage locations, and conveyance system facilities and estimate the associated costs for implementing various alternatives.

The estimated cost of a more detailed feasibility study and preparing a preliminary engineering report on the recommended desalination plant is $2.6 million over a 4-5 year period. However, Cal Water must first obtain approval from the CPUC to approve of the cost of the study in its General Rate Case requests, which are made every three years.

Local desalination factors discussed in the LTWSP for the three peninsula districts included:

1. Location: varies from SSF to Redwood City.
2. Intakes: vertical wells for brackish groundwater, slant wells and open intake for seawater
3. Brine disposal: Joint use of a wastewater treatment plant outfall; new outfall; Cargill brine line
4. Small capacity desalination plants: 1 – 10 mgd; subsurface intakes, easier to permit and lower costs and risks
5. Large capacity desalination plant: 10 – 20 mgd: open seawater intake, harder to permit and greater costs and risks
6. Likely Yields from different locations and intakes
7. Operations requirements and constraints
8. Environmental and permitting approval process, time requirements and costs

Water Transfers

The LTWSP examined several water transfer options as a means to augment existing supplies. These include Delta transfers, pre-1914 water rights transfers, "green option" transfers, and transfers of SFPUC water between BAWSCA agencies. Cal Water does not have any plans for exchanges at this time.
The majority of the Delta transfers are between State Water Project (SWP) and Federal Central Valley Project (CVP) contractors. Non SWP and CVP contractors have less access to transfers, lower available supplies and more difficulty in accessing conveyance facilities for moving water. or for groundwater storage. In drought years, this results a low level of certainty on being able to contract for and obtain additional water supplies.

Increasing reliability of long-term transfers generally requires use of groundwater storage or banking. For SWP or CVP contractors and other parties, transfer of supplies from Central Valley sources, groundwater storage has often depended on sites in Kern County. Storage and conveyance of stored water adds to the purchase price of the water which under more extreme drought conditions significantly increases.

Even with contracts for transfer in place, storage would be required due to the seasonal availability of Delta supplies. In addition, these supplies would still need to be transferred from the Delta to the Peninsula Districts. This would most likely occur either through the South Bay Aqueduct (SBA) or Santa Clara Valley Water District (SCVWD) transmission system from San Luis Reservoir. Wheeling agreements would be required with DWR for transfers through the SBA, and additional agreements with either Alameda County Water District (ACWD) or SCVWD. That water would then need to be conveyed through other agency systems to Cal Water District, or ACWD would transfer part of its SFPUC supply to the Cal Water.
Not including conveyance/wheeling charges, the price for Delta transfer supply depends on the source, but currently is around $200/AF from the Sacramento Valley, and $400 to $900/AF for San Joaquin transfers. During dry years these costs increase significantly. These costs do not include wheeling from the Delta to the Bay Area or then to the Peninsula Districts.

Pre-1914 Water Right Transfers

Another potential group of water transfers are pre-1914 water right supplies. These supplies have higher priority than post-1914 and the majority of the SWP and CVP rights. As such, they are not subject to the same environmental and institutional restrictions associated with the Delta supplies. Pre-1914 rights are more reliable during droughts than other rights and have a higher value and cost. One of the key issues is conveyance of that supply to the purchaser. This adds complexity to the transfer arrangements, and increases the costs for wheeling of the supply. Major issues associated with pre-1914 rights are long-term availability, especially during droughts, and cost for purchase of the supply and cost and availability of infrastructure to transfer supplies to Cal Water's Peninsula Districts.

Transfers of "Green Option" Supplies

The conservation offset, or green option, is based on implementation of agricultural water use efficiencies in the Lower Tuolumne River Watershed (LTRW) (i.e. Modesto Irrigation District [MID] and Tuolumne Irrigation District [TID] service areas). The green option reduces irrigation water requirements through implementation of agricultural water efficiency measures, instead of fallowing land which can cause third-party impacts.
The Tuolumne river option has many advantages, including the high level of water quality. If the project is a direct offset for releases to MID and TID this would be equivalent to Hetch Hetchy supply. If this is water released from Don Pedro then additional treatment would be required. In either case, conveyance would be through the SFPUC system, and would not require other wheeling agreements outside of those with SFPUC. However, a concern with this approach is whether the additional Hetch Hetchy supply would not be made available to Cal Water because of the Raker Act.

Transfers between SFPUC wholesale customers

The water supply agreements with SFPUC allow the transfer of supply between wholesale customers without penalty, or additional charges. However, the agreements do not allow carry over from year to year if purchases were less than the interim supply agreement. This transfer mechanism can be used if other wholesale customers have excess supply, either due to their contract capacity, or if Cal Water were to fund other projects within these agencies that may free up SFPUC supply for transfer.

Since it is likely water transfers can be implemented sooner than desalination, Cal Water views these to be the shorter term solution to meet supply requirements.

Summary of Existing and Planned Sources of Water

Table 8 shows 2015 actual total supplies for the three peninsula district.

Table 8: 2015 Peninsula Districts Actual Supplies	AF
SFPUC Purchased Water	28,404
Bear Gulch Surface water	437
SSF District Groundwater	1,312
Total	**30,153**

Table 9 shows the projected supply quantities to 2040. Cal Water's SFPUC supply is shared among all three Peninsula districts in order to provide operational flexibility to distribute the supply as needed depending on the availability of local supplies and demands within each district.

Table 9: Peninsula Districts Projected Water Supply (AF)					
Year	2020	2025	2030	2035	2040
SFPUC Purchased Water	37,430	37,485	37,852	38,354	38,972
SSF District Groundwater	1,535	1,535	1,535	1,535	1,535
Bear Gulch Surface Water	1,260	1,260	1,260	1,260	1,260
Total	**40,225**	**40,280**	**40,647**	**41,149**	**41,767**

Purchased SFPUC supplies and local supplies (groundwater in the SSF District and surface water in the Bear Gulch District) are discussed in the 2015 UWMP. Based on estimated demands for all three districts, total supplies are anticipated to be sufficient to meet combined normal year demands for all three districts through 2040. The supply amounts shown in Table 8 equal the total projected demands for the three districts.

Climate Change Impacts to Supply

In 2016, Cal Water prepared an initial study of climate change impacts for some of its districts, including the South San Francisco District.[1] The districts included in the study account for 85% of Cal Water's total 2014 water production and reflect the diversity of Cal Water districts, including geographic, hydrologic, and climatic conditions and primary and secondary supply sources. The study was undertaken to gain a better understanding of the potential impacts of climate change on the availability of water supplies. While impact projections are uncertain, they are useful for estimating future supply changes and how they might be planned for in order to ensure adequate and reliable supplies.

Changes in climate will affect the availability of local groundwater and surface water supplies, as well as purchased imported supplies. The study addressed the impacts on each of these sources

for each district. It relied on the best available projections of changes in climate (temperature and precipitation) through the end of the century, and then used the climate projections to estimate how surface water flows and groundwater recharge rates may change. Cal Water's study generally relied on studies and data provided by wholesale suppliers.

Climate change is primarily driven by increased concentrations of greenhouse gases (GHGs) in the atmosphere. Future climate change is a function of the rate at which those concentrations increase and how the atmosphere, oceans and land masses respond to increases in global temperatures. While the scientific community overwhelmingly agrees that climate change has, is and continues to occur, projections for localized areas with respect to impacts on temperature, precipitation, runoff, groundwater and related hydrologic conditions are still subject to significant uncertainty.

The projections of temperature and precipitation that underlie Cal Water's study are based on 40 of the latest Global Circulation Models (GCMs) run as part of the Coupled Model Inter comparison Project Phase 5 (CMIP5). This approach is termed an ensemble analysis, for which the downscaled climate projections for any particular Cal Water Service District were based on the median of the 40 downscaled GCM datasets. The GCMs used by the analysis are driven by two GHG emission pathways that bound upper and lower estimates of GHG concentrations.

The climate change study combined the Mid-Peninsula, South San Francisco, and Bear Gulch districts. Supply reductions due to climate change are projected to be between 6% and 15% for these districts by the end of the century.

Climate change impacts will generally increase over time. Anticipated late 21st century impacts are forecast to be higher in some districts than impacts at mid-century. Moreover, during the period that climate change is forecast to reduce supplies, demands are forecast to increase.

Future potential Cal Water actions regarding climate change include:

- Methodological improvements to reduce uncertainties
- Acquiring better and more complete data;
- Developing plans to address climate change reductions on supply.

Water Supply Reliability Assessment

Using available historical information and projections of future water uses, regulatory and legal constraints, and hydrological and environmental conditions, including climate change, Cal Water has assessed the reliability of the SSF District's water supplies.

Water Supply Agreement with SFPUC
In July 2009, the wholesale customers and San Francisco adopted the Water Supply Agreement (WSASFPUC). Key features of that Agreement include:

Individual Supply Guarantee

San Francisco has a continuing commitment (Supply Assurance) to deliver 184 mgd to the 24 permanent wholesale customers collectively. San Jose and Santa Clara are not included in the Supply Assurance commitment and each has temporary and interruptible water supply contracts with San Francisco. The Supply Assurance is allocated among the 24 permanent wholesale customers through Individual Supply Guarantees (ISG), which represent each wholesale customer's allocation of the 184 mgd Supply Assurance. Cal Water's total ISG for the three districts is 35.68 mgd.

2018 Interim Supply Limitation

As part of its adoption of the Water System Improvement Program (WSIP) in October 2008, discussed separately herein, the SFPUC adopted a water supply limitation, the Interim Supply Limitation (ISL), which limits sales from San Francisco Regional Water System (RWS) watersheds to an average annual of 265 mgd through 2018.

All 26 wholesale customers and San Francisco are subject to the ISL. The wholesale customers' collective allocation under the ISL is 184 mgd and the City of San Francisco's is 81 mgd. Although the wholesale customers did not agree to the ISL, the Water Supply Agreement provides a framework for administering the ISL.

Interim Supply Allocations

The Interim Supply Allocations (ISAs) refer to San Francisco's and each individual wholesale customer's share of the Interim Supply Limitation (ISL). On December 14, 2010, the SFPUC established each agency's ISA through 2018. In general, the SFPUC based the wholesale customer allocations on the lesser of the projected fiscal year 2017-18 purchase projections or Individual Supply Guarantees. The ISAs are effective only until December 31, 2018 and do not affect the Supply Assurance or the Individual Supply Guarantees. Cal Water's ISA for its three peninsula districts is 35.68 mgd.

SFPUC's wholesale customers do not concede the legality of the Commission's establishment of the ISAs and Environmental Enhancement Surcharge, and expressly retain the right to legally challenge either or both, if imposed.

Environmental Enhancement Surcharge

As an incentive to keep Regional Water System (RWS) deliveries below the ISL of 265 mgd, the SFPUC adopted an Environmental Enhancement Surcharge for collective deliveries in excess of the ISL effective at the beginning of fiscal year 2011-12. This volume-based surcharge would be unilaterally imposed by the SFPUC on individual wholesale customers and San Francisco retail customers, when an agency's use exceeds their ISA and when sales of water to the wholesale customers and San Francisco retail customers, collectively, exceeds the ISL of 265 mgd. Actual charges would be determined based on each agency's respective amount(s) of excess use over their ISA. To date, no Environmental Enhancement Surcharges have been levied.

2018 SFPUC Decisions

In the Water Supply Agreement, there are three decisions the SFPUC committed to making before 2018 that will affect water supply development:

- Whether or not to make the cities of San Jose and Santa Clara permanent customers,
- Whether or not to supply the additional unmet supply needs of the wholesale customers beyond 2018
- Whether or not to increase the wholesale customer Supply Assurance above 184 mgd.

Additionally, there have been recent changes to in-stream flow requirements and customer demand projections that will affect water supply planning beyond 2018. As a result, the SFPUC has developed a Water Management Action Plan (Water MAP) to provide necessary information to address the 2018 decisions and to begin developing a water supply program for the 2019 to 2035 planning horizon. The water supply program will enable the SFPUC to continue to meet its commitments and responsibilities to wholesale and retail customers, consistent with the priorities of the SFPUC.

The Water MAP was slated for SFPUC Commission discussion in 2016. The discussion resulting from the questions described in the Water MAP will help guide the water supply planning objectives through 2035. While the Water MAP is not a water supply program, it presents pertinent information that will help develop the SFPUC's future water supply planning program. At this time, and for purposes of longer term planning, it is conservatively assumed that deliveries from the Regional Water System to San Francisco's wholesale customers will not be in excess of 184 mgd.

Water Shortage Allocation Plan

The Water Shortage Allocation Plan (WSAP) allocates water from the Regional Water System (RWS) to retail and wholesale customers during system-wide shortages of 20 percent or less (the Tier One Plan). The WSAP has two components:

- The Tier One Plan, which allocates water between San Francisco and the wholesale customers collectively; and
- The Tier Two Plan, which allocates the collective wholesale customer share among the wholesale customers

Tier One Drought Allocation

The Tier One Plan allocates water between San Francisco and the wholesale customers collectively based on the level of shortage. It is summarized in Table 10.

Table 10: SFPUC Tier One Drought Allocation

Level of System-Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customers Share
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The Tier One Plan allows for voluntary transfers of shortage allocations between the SFPUC and any wholesale customer and between wholesale customers. In addition, water "banked" by a wholesale customer, through reductions in use greater than required, may be transferred. The Tier One Plan will expire at the end of the term of the WSA in 2034, unless mutually extended by San Francisco and the wholesale customers.

The Tier One Plan applies only when the SFPUC determines that a system-wide water shortage exists and issues a declaration of a water shortage emergency under California Water Code Section 350. Separate from a declaration of a water shortage emergency, SFPUC may opt to request voluntary cutbacks from San Francisco and the wholesale customers to achieve necessary water use reductions during drought periods. During the most recent drought, SFPUC requested, but did not mandate, a 10 percent system-wide reduction starting January 2014. The SFPUC did not declare a water shortage emergency and implement the Tier One Plan because its customers exceeded the 10 percent voluntary system-wide reduction in conjunction with the state-wide mandatory reductions.

Tier Two Drought Allocation

The wholesale customers have negotiated and adopted the Tier Two Plan, the second component of the WSAP, which allocates the collective wholesale customer share among each of the 26 wholesale customers. This Tier Two allocation is based on a formula that takes into account multiple factors for each wholesale customer including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the wholesale customers collectively will be allocated among them in proportion to each wholesale customer's Allocation Basis, expressed in millions of gallons per day (mgd), which in turn is the weighted average of two components. The first component is the wholesale customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the wholesale customers for all available water supplies. The second component is accorded twice the weight of the first, fixed component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain wholesale customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all wholesale customers' Allocation Bases to determine each wholesale customer's Allocation Factor. The final shortage allocation for each wholesale customer is determined by multiplying the amount of water available to the wholesale customers' collectively under the Tier One Plan, by the wholesale customer's Allocation Factor. The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the wholesale customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each wholesale customer will also change. However, for long-term planning purposes, each wholesale customer shall use as its Allocation Factor, the value identified in the Tier Two Plan when adopted.
The current Tier Two Plan will expire in 2018 unless extended by the wholesale customers.

Reliability by Type of Year

SFPUC modeled wholesale supply availability using its historic record. Unconstrained wholesale supply is 184 mgd. SFPUC defines a single dry year as the first year that storage levels decrease to the point that system-wide water supply rationing is necessary. In 2015, wholesale supply was estimated to be 152.6 mgd. SFPUC's multiple dry year cycle begins with one dry year followed by two additional dry years in which storage levels drop further, such as the 1987-88 through 1989-90 sequence. The wholesale supply in the second and third years is estimated at 129.2 mgd.

For a single dry year, Cal Water assumes SFPUC supply to be 129.2 mgd with the 2015 water conveyance infrastructure and 132.5 mgd in subsequent years resulting from infrastructure improvements. For three consecutive dry years, Cal Water assumes wholesale supply is 129.2 mgd to 2019 and 132.5 mgd in 2020 and thereafter as a result of completion of SFPUC infrastructure improvements.

According to BAWSCA, the Tier 2 allocation of the 129.2 mgd would result in Cal Water being supplied 27.81 mgd through 2019 and 28.52 mgd in 2020 and thereafter.

Cal Water chose 1990 as its single dry year. This is the driest of years in Cal Water's historical precipitation record. The three year dry period is 1990, 1991 and 1992.

Table 11 summarizes Cal Water's expected dry years SFPUC supplies for its three peninsula districts.

Table 11: Cal Water Dry Years SFPUC Supplies

	Year	AF
Single-Dry Year	1990	33,836
Multiple-Dry Years 1st Year	1990	33,836
Multiple-Dry Years 2nd Year	1991	34,223
Multiple-Dry Years 3rd Year	1992	34,223

Normal Water Year

Table 12 shows the projected supply and demand totals for the 3 districts for a normal year. In normal years the full ISG of 35.68 MGD (39,967 AF) is available. Table 12 shows the total of SFPUC, SSF District groundwater and the Bear Gulch District surface supplies meets the combined demands of the three districts.

Table 12: 3 Districts - Normal Year Supply and Demand Comparison (AF)					
	2020	2025	2030	2035	2040
Supply totals	40,225	40,280	40,647	41,149	41,767
Demand totals	40,225	40,280	40,647	41,149	41,767
Difference	0	0	0	0	0

Single Dry Year

Table 13 shows the projected supply and demand totals for the 3 districts for a single dry year. Based on historical records, supply from the Bear Gulch Reservoir provides 351 AF in single dry year. The SSF District's groundwater supply of 1,535 AFY will be unaffected by a single dry year. SFPUC supply is 31,950 AF. Projected shortages exceed 20% by the end of the planning period.

Table 13: 3 Districts - Single Dry Year Supply and Demand Comparison (AF)					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	33,836	33,836	33,836	33,836	33,836
Demand totals	41,984	42,041	42,425	42,947	43,591
Difference	**(8,148)**	**(8,205)**	**(8,589)**	**(9,111)**	**(9,755)**
Percent Shortage	**19%**	**20%**	**20%**	**21%**	**22%**

Multiple Dry Years (3)

Table 14 shows the projected supply and demand for the 3 districts for 3 consecutive dry years. Based on historical records, supply from the Bear Gulch Reservoir provides an average of 609 AFY in 3 successive dry years. The first year is assumed to be 351 AF - the same as the single-dry year of 1990. The subsequent two years based on records are expected to provide 738 AFY. The SSF District's normal groundwater supply of 1,535 AFY is expected to unaffected in dry years 2 and 3. Total supplies in Table 14 include these quantities and a SFPUC supply of 31,950 AF. Shortages up to 22% in the first year are followed by projected second and third year shortages between 14% and 19%.

Table 14: Three Consecutive Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040
First year	Supply totals	33,836	33,836	33,836	33,836	33,836
	Demand totals	41,984	42,041	42,425	42,947	43,591
	Difference	**(8,148)**	**(8,205)**	**(8,589)**	**(9,111)**	**(9,755)**
	% Shortage	**19%**	**20%**	**20%**	**21%**	**22%**
Second year	Supply totals	34,223	34,223	34,223	34,223	34,223
	Demand totals	40,764	40,819	41,192	41,700	42,327
	Difference	**(6,541)**	**(6,596)**	**(6,969)**	**(7,477)**	**(8,104)**
	% Shortage	**16%**	**16%**	**17%**	**18%**	**19%**
Third year	Supply totals	34,223	34,223	34,223	34,223	34,223
	Demand totals	39,758	39,812	40,176	40,671	41,283
	Difference	**(5,535)**	**(5,589)**	**(5,953)**	**(6,448)**	**(7,060)**
	% Shortage	**14%**	**14%**	**15%**	**16%**	**17%**

In summary, the SSF District has a sufficient supply under normal hydrological conditions. However, during one-year or multi-year periods, shortfalls up to 22% are projected. Under such conditions, Cal Water will implement its Water Shortage Contingency Plan, as described in Chapter 8 of the SSF UWMP.

In the 2012 – 2015 drought, SSF District customers were requested to reduce their demand by 8% as specified by the State Board Resources Control Board. The District achieved 20% reductions based on June 2015 to March 2016 data. Cal Water continues to develop plans to increase its water supply portfolio for this District and for the other two peninsula districts (Mid-Peninsula and Bear Gulch).

Regional Supply Reliability

Cal Water coordinates with other water agencies in the region to make best use of regional water supplies. This includes SFPUC, City of San Carlos, City of San Mateo, Silicon Valley Clean Water, and other public and private entities in the Bay area.

Cal Water's continued implementation of its conservation programs in all three peninsula districts has and is expected to continue to reduce per-capita usage and therefore total demands. To ensure that its mix of programs is cost-effective manner possible, Cal Water routinely conducts comprehensive reviews of its conservation program. This is done in tandem with its updating its UWMPs for each district every 5 years. The Conservation Master Plan is the basis for the implementation of measures and policies and expected resultant water savings. Demand

Management Measures (DMMs) are presented in Chapter 9 of the UWMP. A copy of the Conservation Master Plan is provided in Appendix L of the UWMP. Cal Water also monitors and supports the goals of the Bay Area Integrated Regional Water Management Plan (IRWMP). These goals include:

- Promote environmental, economic and social sustainability
- Improve water supply reliability and quality
- Protect and improve watershed health and function and Bay water quality
- Improve regional flood management

Water Supply Projects

Cal Water will continue its annual main replacement program to upgrade and improve the distribution system of the SSF District. Storage facilities and new booster pumps are added as needed to meet the average day and maximum day requirements. Future capital expenditures are planned for drilling and developing new wells to replace aging wells currently in operation, which will increase system reliability and allow Cal Water to pump its full share of sustainable extracted groundwater from the Westside basin. Cal Water's SSF District Water Supply and Facilities Master Plan includes a capital improvements plan and schedule.

Water Demand Management

As previously discussed, effective water conservation reduces water demand which reduces water supply needs. Cal Water's existing conservation programs, including expanded SB7 driven programs have demonstrated that Cal Water can achieve over 22% reduction in demand – the worst case scenario for supply shortfall during a dry year in 2040.

SSF District total demand in 2009 was 8,502 AFY. Even with an increase of 120 services between 2009 and 2016, demand decreased to 6,570 AFY or by 22.7% in 2016.

Continued conservation programs will enable Cal Water to meet its supply obligations for normal, single dry year and multiple dry year conditions.

During severe drought periods such as occurred during the 2012 - 2015 period, there were no shortfalls in supply that necessitated implementation of more extreme demand reduction measures.

Should periods of more severe water supply shortages occur, Cal Water has in place plans and measures for further reducing customer water demand beyond 22%. This includes if necessary mandatory reductions, rationing, and penalties.

As shown in Table 15, Cal Water has a four-stage water demand reduction plan comprised of voluntary and mandatory stages. Approval from the CPUC must be obtained prior to implementation of mandatory restrictions.

Table 15: SSF District Water Demand Reduction Plan			
Supply Shortage	Stage	Demand Reduction Goal	Type of Program
Minimum 5 - 10%	Stage 1	10% reduction	Voluntary
Moderate 10 - 20%	Stage 2	20% reduction	Voluntary or Mandatory*
Severe 20 - 35%	Stage 3	35% reduction	Mandatory*
Critical 35 - 50%	Stage 4	50% reduction	Mandatory*

* Mandatory = Allocations

The following summarizes the actions to be taken during periods when demand reduction is required:

Stage 1

- Public information campaign consisting of distribution of literature, speaking engagements, monthly bill inserts, and conservation messages printed in local newspapers (ongoing)
- Educational programs in area schools (ongoing)

Stage 2

- More aggressive public information and education programs
- Requests to consumers to reduce voluntarily water use by 10 to 20 percent or mandatory reductions will be implemented
- Prior to implementation of mandatory reductions, obtain approval from CPUC
- Lobby for passage of drought ordinances by appropriate governmental agencies

Stage 3

- Implement mandatory reductions after receiving approval from CPUC
- Maintain rigorous public information campaign explaining water shortage conditions.
- Water use restrictions go into effect; prohibited uses explicitly defined
- Limiting landscape irrigation by restricting hours of the day and or days of the week during which water for irrigation can be used
- Monitor production weekly for compliance with necessary reductions
- Installation of flow restrictors on the service lines of customers who consistently violate water use restrictions

Stage 4

- All of steps taken in prior stages intensified.
- Discontinuance of water service for customers consistently violating water use restrictions
- Monitor production daily for compliance with necessary reductions
- More restrictive conditions or a prohibition of landscape irrigation

Section 357 of the Water Code requires that suppliers that are subject to regulation by the CPUC shall secure its approval before imposing water consumption regulations and restrictions required by water shortages.

Design, Construction and Operation of Haskins Project Water Supply Facilities

As planning and design proceed further, Cal Water anticipates working closely with the developer and its engineers, the City of South San Francisco, California Division of Drinking Water (DDW) and any other agencies that may be involved with the approval of required water supply facilities.

Cal Water will prepare design drawings and specifications for compliance with state and Cal Water's standards with respect to pipe sizes, valves, materials, etc. and connection to its existing system.

Cal Water's SSF District, supported by its engineering, water quality and customer service staff in San Jose, will be responsible for providing ongoing local operations and maintenance services of the water system.

SB 610 Section 10910 Paragraph (d)(2) requires identification of existing water supply entitlements, water rights, or water service contracts held by the public water system shall be demonstrated by providing information related to all of the following:

(A) Written contracts or proof of entitlement to an identified water supply.

Proof of entitlement to use of the wells cited as a major supply source to the District is demonstrated by Cal Water's ownership of the property and the wells and its legal right to use the underlying percolated waters.

Proof of entitlement to the use of SFPUC treated water are provided in the contracts cited in this document between Cal Water and SFPUC and are available for review.

(B) Copies of a capital outlay program for financing the delivery of a water supply system that has been adopted by the public water system.

Capital costs for design and construction of the water distribution system within the development site are the responsibility of the developer.

Cal Water's SSF District capital improvement program is separate from and does not include any of the costs associated with the design and construction of the water system for or within the Haskins Project. However, upon legal transfer of the completed water system within the development site to Cal Water by the developer, the water system will be incorporated into Cal Water's capital improvement and maintenance programs.

The SSF District 2009 Water Supply and Facilities Master Plan provides specific recommendations for water system facility and capital improvements to the year 2030. Cal Water plans to update this plan in the 2018 - 2019 period.

(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

For any distribution system improvements, the developer will be required to obtain the necessary building permits from the City of South San Francisco.

Cal Water is highly experienced in preparing applications and obtaining the necessary permits that are needed in order to proceed with design, construction, startup and operation of water distribution facilities. Cal Water is familiar with approvals it must obtain from the City of South San Francisco and DDW.

Summary of Supply and Demand Analysis

Normal Hydrologic Year

For all three Cal Water peninsula districts served by SFPUC, the combination of existing local and purchased supplies are adequate to meet forecasted demands for the Haskins Project, those associated with existing Cal Water customers and all other new developments for the next 20+ years

Single Dry Year

For a single dry year supplies may be less than normal projected demands if SFPUC supplies are reduced, which historically has not occurred. Generally, Cal Water does not expect a reduced supply, but if SFPUC does reduce its supplies, Cal Water will implement additional demand reduction measures. The amount of groundwater that will be pumped will not be reduced. During a single dry year treated surface water from the Bear Gulch Reservoir in the Bear Gulch District will most likely decrease. While a single dry year may trigger increased water demand reduction measures, demand has not been reduced to reflect those measures. Depending on when in the next 20+ years another single dry year occurs, additional supply sources (water transfers and desalination) may have been developed and be available to offset any reductions in existing sources.

Three Consecutive Dry Years

During a 3 years dry period, supplies will be less than normal demand by a range from 14% to 22% in 2040 depending on which dry year it is and the projected future date. Again, Cal Water will assess any supply reduction notifications from SFPUC, the availability of water from its treated surface source in Bear Gulch District and whether it can continue to pump groundwater at its historically normal rate. Westside Basin groundwater supplies would likely continue to be pumped at current rates although that would result in a reduction in basin storage and a lowering of groundwater levels. During years of above normal rainfall, it is expected that groundwater storage would increase as has been the case in past decades.
Depending on when in the next 20+ years successive dry years occur, additional supply sources (water transfers and desalination) may have been developed and be available to offset any reductions in existing supply sources. If not, Cal Water will determine what additional demand reduction measures will be needed to reduce demand to match available supplies. As previously noted, Cal Water exceeded its goal of reducing demands during the most recent (2010 - 2015) severe drought.

If in the first dry year, demand reduction responses do not appear to be sufficient, Cal Water will implement additional conservation measures in the second and third dry years. This is expected to result in an adequate supply for all three Cal Water peninsula districts from 2020 to 2040.

Conclusions

Based on:

1. Current Westside Basin groundwater supplies and Cal Water's current and projected groundwater production rates from its active wells,
2. Generally adequate long-term normal hydrologic supplies provided by the SFPUC, but recent significant proposed reductions in supply during multiple dry year periods,
3. An effective demand reduction program to meet requirements of state laws,
4. Future Cal Water plans to develop additional supply sources including transfers/exchanges of supplies from outside the peninsula area and development of local desalination facilities,
5. The prospect of longer term additional local supplies being obtained from SFPUC's proposed conjunctive use program for the Westside Basin,
6. Possible recycled water projects being developed collaboratively among local wastewater and water utilities in the SSF District area,
7. Cal Water's ability to achieve additional drought driven reductions in demand (15% to 26%) during single dry year and multiple dry year periods through its established in-place water programs,
8. Historical performance which demonstrates Cal Water's ability to both increase supply sources and effectively achieve demand reductions if required,

Cal Water's concludes that for the next 20+ years, its SSF District will be able to provide adequate water supplies to meet existing and projected customer demands, which includes full development of the Haskins Project for normal, single dry year and multiple dry year conditions.

Cal Water will ensure that the required water facilities are designed consistent with the proposed development plan and will coordinate with the developer, its planners and engineers, the City of South San Francisco, and the California Division of Drinking Water in the design, construction and operation of the proposed water distribution system.

End of WSA Document

References

1. California Water Service 2015 Urban Water Management Plan South San Francisco District (Adopted June 2016) 341 North Delaware Ave San Mateo, California 94401
2. California Water Service Company 2010 Urban Water Management Plan South San Francisco District (Adopted June 2011) 341 North Delaware Ave San Mateo, California 94401
3. California Water Service Company, Long Term Water Supply Plan for Three Peninsula Districts (2011), 1720 North First St, San Jose, CA 95112
4. California Water Service Company South San Francisco District Water Supply and Facilities Plan 2009, 1720 North First St, San Jose, CA 95112
5. California Water Service Supply Water Demand and Supply Data 2010 – 2016 (May – June 2017), 1720 North First St, San Jose, CA 95112
6. California Water Service Company, Potential Climate Change Impacts on the Water Supplies of California Water Service January 2016, 1720 North First St, San Jose, CA 95112
7. California Water Service SB 610 Water Supply Assessment For the 2017 Genentech Master Plan Update, November 21, 2017
8. California Water Service SB 610 Water Supply Assessment For Oyster Point Development Project, August 1, 2017
9. California Water Service SB 610 Water Supply Assessment For South San Francisco Downtown Station, June 19, 2014
10. California Water Service SB 610 Water Supply Assessment For 2008 Gateway Business Park, December 1, 2008

APPENDIX E

Noise Technical Memo

RGD ACOUSTICS

Acoustical & Audiovisual Consultants

APPENDIX E: NOISE IMPACT ANALYSIS FOR:

201 HASKINS WAY

SOUTH SAN FRANCISCO, CA

RGD Project #: 18-026

PREPARED FOR:

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DATE:

10 October 2018

1 Introduction

This report analyzes the potential off-site noise impacts associated with the proposed project at 201 Haskins Way in South San Francisco. The project will be constructed in two phases. Phase 1 consists of the demolition of a one-story building located at 201 Haskins Way (Parcel 015-102-230), the development of a three-story and a five-story office building along with a parking lot structure at the same parcel, and construction of an approximately 25,000 square foot addition to an existing office/R&D building located at 400-450 East Jamie Court (APN 015-102-250). Currently there is no site-specific development program proposed for Phase 2. The proposed rezoning of the parcels in the Phase 2 area would allow the existing uses to continue indefinitely and would allow redevelopment at 1.0 FAR in accordance with the proposed Business Technology Park District rezoning. The environmental impact report prepared for the project evaluates the maximum potential development that could occur on those parcels under the proposed rezoning. While final square footage of the conceptual redevelopment of the Phase 2 area is unknown at this time, under the Preliminary Phase 2 Conceptual Development Plan, Phase 2 would include expansion of the Phase 1 parking lot structure, the demolition of five existing light industrial buildings along East Grand Avenue, and the development of a three- and five-story office building along East Grand Avenue.

2 Fundamental Concepts of Environmental Noise

Terminology: Noise can be defined as unwanted sound and is commonly measured with an instrument called a sound level meter. The sound level meter "captures" sound with a microphone and converts it into a number called a sound level. Sound levels are expressed in units of decibels (dB).

To correlate the microphone signal to a level that corresponds to the way humans perceive noise, the A-weighting filter is used. A-weighting de-emphasizes low-frequency and very high-frequency sound in a manner similar to human hearing. The use of A-weighting is required by most local agencies as well as other federal and State noise regulations (e.g. Caltrans, EPA, OSHA and HUD). The abbreviation dBA is often used when the A-weighted sound level is reported.

Because of the time-varying nature of environmental sound, there are many descriptors that are used to quantify the sound level. Although one individual descriptor alone does not fully describe a particular noise environment, taken together, they can more accurately represent the noise environment. Descriptors that are commonly used in environmental studies include L_{max}, L_{eq}, L_{90} and L_{dn} and CNEL.

The maximum instantaneous noise level (L_{max}) is often used to identify the loudness of a single event such as a car pass-by or airplane flyover. To express the average noise level, the L_{eq} (equivalent noise level) is used. The L_{eq} can be measured over any length of time but is typically reported for periods of 15 minutes to one hour. The background noise level (or residual noise level) is the sound level during the quietest moments. It is usually generated by steady sources

such as distant freeway traffic. It can be quantified with a descriptor called the L_{90} which is the sound level exceeded 90 percent of the time.

Type of Noise or Environment	Decibels
Recording studio	20
Soft whisper; quiet bedroom	30
Busy open-plan office	55
Normal conversation	60–65
Automobile *at 20 mph 25 ft. away*	65
Vacuum cleaner *10 ft. away*	70
Dump truck *at 50 mph 50 ft. away*	90
Gas leaf blower *at 25 ft. away*	100
Helicopter *200 ft. away*	100
Train horn *100 ft. away*	105
Claw hammer; jet takeoff *200 ft. away*	120
Shotgun *at shooter's ear*	140

To quantify the noise level over a 24-hour period, the Day/Night Average Sound Level (L_{dn} or DNL) or Community Noise Equivalent Level (CNEL) is used. These descriptors are averages like the L_{eq} except they include, by definition, a ten dBA "penalty" for noises that occur during nighttime hours (10 p.m. to 7 a.m.) to account for people's sensitivity to intrusive noise during these hours. The CNEL also includes a five dBA "penalty" during evening hours (7 p.m. to 10 p.m. to account for peoples' increased sensitivity during these hours (American National Standards Institute, *ANSI S1.1-1994, Acoustical Terminology*, 1994).

Community Response to changes in noise levels: The potential for adverse community response tends to increase as an intrusive noise becomes more noticeable above existing background noise levels. For example, if an intrusive noise has an average level that is comparable to existing average ambient noise levels, then the intrusive sound would tend to blend in with the ambient noise. However, if the intrusive sound is significantly greater than the ambient noise then the intrusive sound would be more noticeable and potentially more annoying as it can interfere with rest, working efficiency, social interaction and general tranquility.

In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB clearly noticeable and a change of 10 dB is perceived as a doubling (or halving) of loudness (Cowen, *Handbook of Environmental Acoustics*, 1994).

3 Regulatory Framework

3.1 City of South San Francisco General Plan

The Noise Element of the South San Francisco General Plan has guidelines for noise and land use compatibility. These guidelines are summarized in Table 9.2-1.

Table 9.2-1: Land Use Criteria for Noise-Impacted Areas

Land Use	CNEL Range	General Land Use Criteria
Residential	Less than 65	Satisfactory; no special insulation requirements
	65 to 70	Development requires analysis of noise reduction requirements and insulation as needed
	Over 70	Development should not be undertaken
Commercial	Less than 70	Satisfactory; no special insulation requirements
	70 to 80	Development requires analysis of noise reduction requirements and noise insulation as needed
	Over 80	Airport-related development only; special noise insulation should be provided
Industrial	Less than 75	Satisfactory; no special insulation requirements
	75 to 85	Development requires analysis of noise reduction requirements and noise insulation as needed
	Over 85	Airport-related development only; special noise insulation should be provided
Open	Less than 75	Satisfactory; no special insulation requirements
	Over 75	Avoid uses involving concentrations of people or animals

Source: City of South San Francisco General Plan Noise Element, SFO Airport Land Use Plan

3.2 City of South San Francisco Municipal Code

Chapter 8.32 of the City's Noise Ordinance specifies maximum permissible sound levels to be generated by any property within the City. The maximum allowable level is determined by the land use category of the receiving property. These levels are summarized in Table 8.32.030. The levels shown in Table 8.32.030 are applicable for noises that occur up to 30 minutes per hour. Higher noise levels are allowed, but for shorter periods of time.

Section 8.32.050 (d) identifies a special provision which allows construction activities with a City permit between the hours of 8 a.m. to 8 p.m. on weekdays, 9 a.m. to 8 p.m. on Saturdays and 10 a.m. to 6 p.m. on Sundays and holidays. Other hours may be authorized by obtaining a permit, provided the construction meets at least one of the following requirements:

1. No individual piece of equipment shall produce a noise level exceeding 90 dB at a distance of 25 feet. If the device is housed within a structure or trailer on the property, the measurement shall be made outside the structure at a distance as close to 25 feet from the equipment as possible.

2. The noise level at any point outside of the property plane[1] of the project shall not exceed 90 dB.

[1] *According to the City's Municipal Code Section 8.32.020, property plane means vertical plane including the property line which determines the property boundaries in space.*

Table 8.32.030: Noise Level Standards

Land Use Category	Time Period	Noise Level (dB)
R-E, R-1 and R-2 zones or any single-family or duplex residential in a specific plan district	10 p.m.—7 a.m. 7 a.m.—10 p.m.	50 60
R-3 and D-C zones or any multiple-family residential or mixed residential/commercial in any specific plan district	10 p.m.—7 a.m. 7 a.m.—10 p.m.	55 60
C-1, P-C, Gateway and Oyster Point Marina specific plan districts or any commercial use in any specific plan district	10 p.m.—7 a.m. 7 a.m.—10 p.m.	60 65
M-1, P-1	Anytime	70

3.3 Airport Land Use Compatibility Plan

The 2012 Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport has guidelines for noise and land use compatibility. These guidelines are summarized in Table IV-1.

The project site is located outside the CNEL 65 dB aircraft noise contour and within "Airport Influence Area B". Since the project site is exposed to a CNEL of less than 65 dBA from aircraft, the project would be compatible with the aircraft noise environment according to ALUC Policy NP-2 which sets forth the noise/land use compatibility criteria utilized to determine the compatibility of proposed land uses located in the Airport noise compatibility zones. Office and business professional uses are compatible with CNEL levels through 75 dBA and over, and may be permitted without any special requirements related to the attenuation of aircraft noise.

Table IV-1 Noise/Land Use Compatibility Criteria

	COMMUNITY NOISE EQUIVALENT LEVEL (CNEL)			
LAND USE	**BELOW 65 dB**	**65-70 dB**	**70-75 dB**	**75 dB AND OVER**
Residential				
Residential, single family detached	Y	C	N *(a)*	N
Residential, multi-family and single family attached	Y	C	N *(a)*	N
Transient lodgings	Y	C	C	N
Public/Institutional				
Public and Private Schools	Y	C	N	N
Hospitals and nursing homes	Y	C	N	N
Places of public assembly, including places of worship	Y	C	N	N
Auditoriums, and concert halls	Y	C	C	N
Libraries	Y	C	C	N
Outdoor music shells, amphitheaters	Y	N	N	N
Recreational				
Outdoor sports arenas and spectator sports	Y	Y	Y	N
Nature exhibits and zoos	Y	Y	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N
Golf courses, riding stables, and water recreation	Y	Y	Y	Y
Commercial				
Offices, business and professional, general retail	Y	Y	Y	Y
Wholesale; retail building materials, hardware, farm equipment	Y	Y	Y	Y
Industrial and Production				
Manufacturing	Y	Y	Y	Y
Utilities	Y	Y	Y	Y
Agriculture and forestry	Y	Y *(b)*	Y *(c)*	Y *(c)*
Mining and fishing, resource production and extraction	Y	Y	Y	Y

Notes:

CNEL = Community Noise Equivalent Level, in A-weighted decibels.

Y (Yes) = Land use and related structures compatible without restrictions.

C (conditionally compatible) = Land use and related structures are permitted, provided that sound insulation is provided to reduce interior noise levels from exterior sources to CNEL 45 dB or lower and that an avigation easement is granted to the City and County of San Francisco as operator of SFO. See Policy NP-3.

N (No) = Land use and related structures are not compatible..

(a) Use is conditionally compatible only on an existing lot of record zoned only for residential use as of the effective date of the ALUCP. Use must be sound-insulated to achieve an indoor noise level of CNEL 45 dB or less from exterior sources. The property owners shall grant an avigation easement to the City and County of San Francisco prior to issuance of a building permit for the proposed building or structure. If the proposed development is not built, then, upon notice by the local permitting authority, SFO shall record a notice of termination of the avigation easement.

(b) Residential buildings must be sound-insulated to achieve an indoor noise level of CNEL 45 dB or less from exterior sources.

(c) Accessory dwelling units are not compatible.

3.4 CEQA Guidelines

In accordance with Section XI of Appendix G of the *CEQA Guidelines*, a proposed project could have a significant environmental impact if it would result in:

a. exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;
b. exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
c. a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
d. a substantial temporary or periodic increase in ambient noise levels in the project above levels existing without the project;
e. exposure of people residing or working in the project area to excessive noise levels if the project is located within an area covered by an airport land use plan, or where such plan has not been adopted, within two miles of a public airport or public use airport; or
f. exposure of people residing or working in the project area to excessive noise levels if the project is located in the vicinity of a private airstrip.

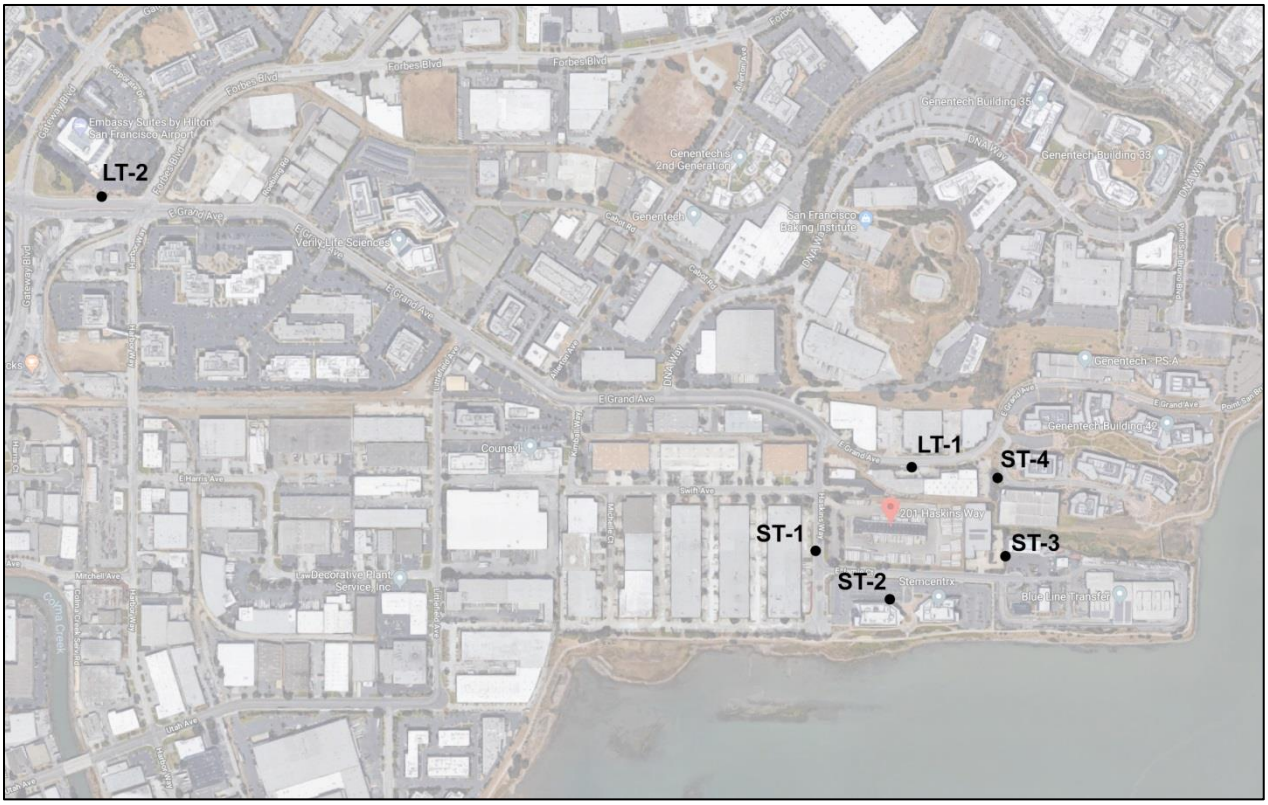
4 Existing Noise Environment

The project site is located at the southeast corner of East Grand Avenue and Haskins Way with East Grand Avenue serving as the primary arterial road. The major noise sources affecting the study area are vehicular traffic, aircraft, and commercial/industrial activities. Land uses in South San Francisco east of the 101 are mostly limited to offices, commercial and light industrial. Noise sensitive land uses are typically defined as residences, schools, place of worship, and hospitals. There are childcare centers and a preschool along Gateway Boulevard and Allerton Avenue. The nearest child care center/pre-school to the project site is the Genentech Childcare facility currently under construction at 342 Allerton Avenue. This facility is more than 1,200 feet from the project site. There are also hotels along Gateway Boulevard, Forbes Boulevard, Grand Avenue, Mitchell Avenue, Airport Boulevard, and South Airport Boulevard. These hotels are located more than 4,000 feet from the project site.

Surrounding land uses include one- to two-story industrial buildings to the west, industrial warehouses (zoned “Business Technology Park”) to the north, the Genentech campus buildings to the northeast, the South San Francisco Scavenger Company and Blue Line Transfer buildings to the east, and existing industrial buildings and the Bay Trail to the south.

Noise measurements were conducted from May 16-18, 2018 to quantify the existing noise environment. These included long-term, 48-hour, measurements at two locations (Location LT-1 and LT-2) and short-term, 15 minute, measurements at four locations (Location ST-1 to ST-4). The noise measurement locations are shown in Figure 1.

Figure 1: Noise Measurement and Receiver Locations



Source: Map data © 2018 Google

The long-term noise measurements were made at two locations on the project's primary roadway on East Grand Avenue. At these locations, monitoring was done using a Larson Davis Sound Level Meter Model 820. Calibrations were checked with a Larson Davis Cal200 calibrator. Generally, the major noise source at each monitor was traffic on East Grand Avenue. Aircraft flyovers were also clearly noticeable and contributed to the overall noise level.

The long-term measurement at Location LT-1 was made on a utility pole near the north edge of the project site at 410 East Grand Avenue. The microphone was located approximately 12 feet above ground. At Location LT-1, in addition to noise associated with local traffic and aircraft flyovers, noise from construction at the nearby Genentech building as well as occasional idling trucks around the monitor also contributed to the noise levels. The measured average noise level was a CNEL of 70 dBA.

The long-term measurement at Location LT-2 was made on a light pole on East Grand Avenue between Gateway Boulevard and Forbes Boulevard. The purpose of the measurement at Location LT-2 was to give additional information on noise from traffic on East Grand Avenue and be located further from construction activities at the Genentech facility near the project site. The microphone was located approximately 7 feet from the edge of the roadway and 12 feet above ground. The measured average noise level was a CNEL of 75 dBA.

The long-term noise measurement results are summarized in Table 1. Graphs showing the hourly noise levels at each monitoring location are shown in Figure 2 and Figure 3.

Table 1: Long-term Noise Measurement Summary

Location	Weekday CNEL	Average Noisiest Weekday Hour	
		Time	L_{eq}
LT-1	70	8:00 AM – 9:00 AM	68
LT-2	75	3:00 PM – 4:00 PM	73

Figure 2: Long-term Noise Measurement Results at Location LT-1

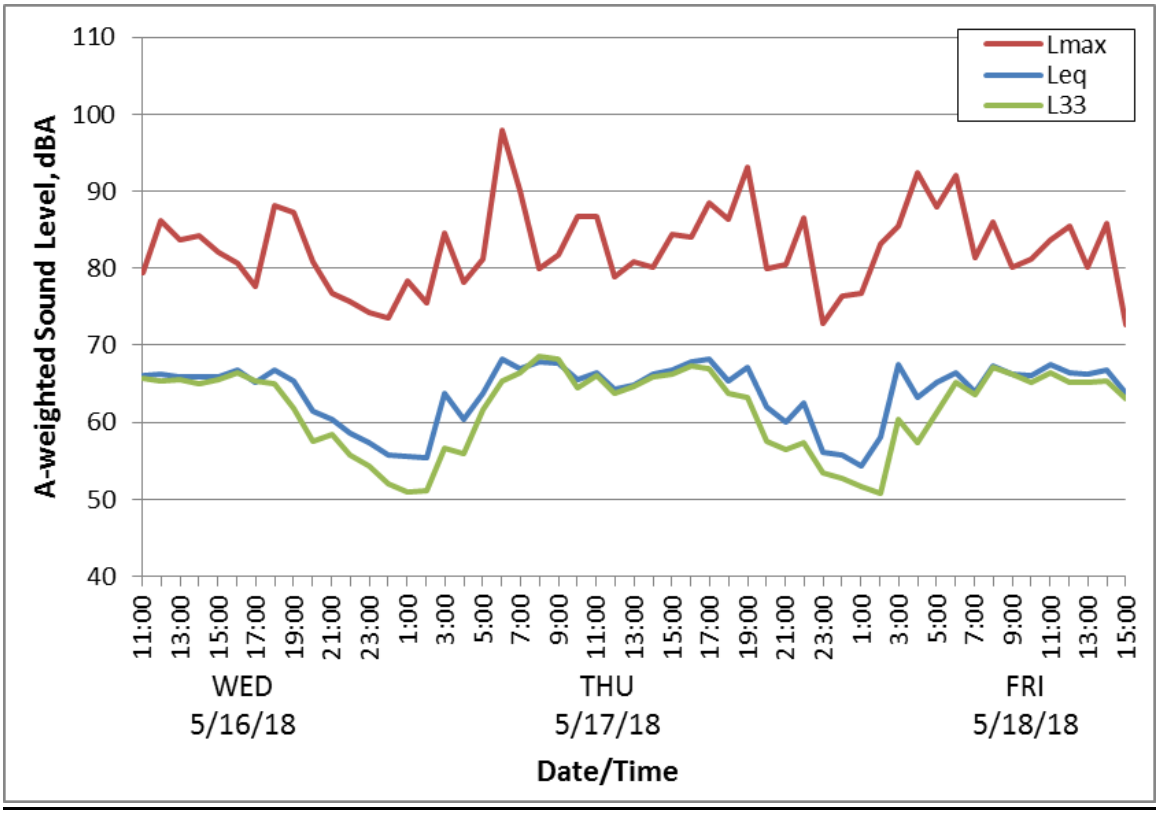
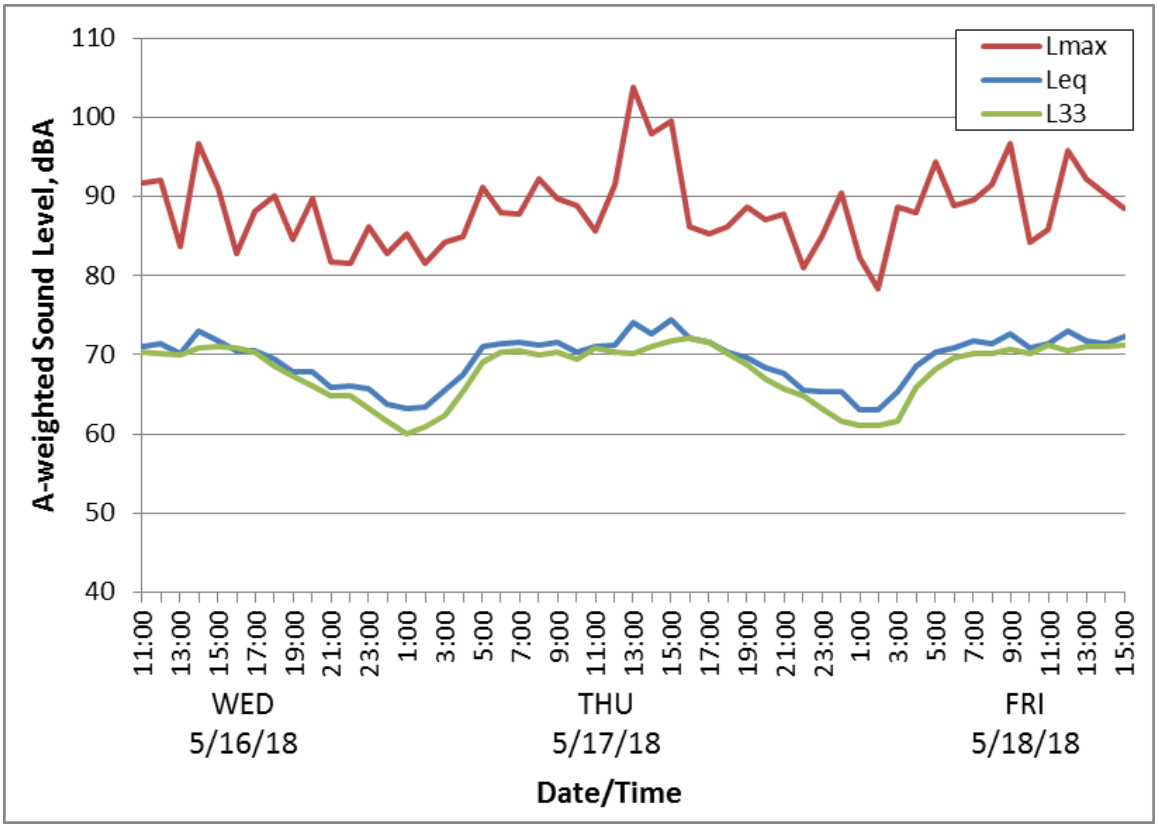


Figure 3: Long-term Noise Measurement Results at Location LT-2



Short-term noise measurements were made at four locations using a Larson Davis Model 824 Sound Level Meter at a height of five feet above ground. Calibrations were checked with a Larson Davis CAL200 calibrator. The short-term measurements allowed for direct observation of the existing noise environment and non-traffic noise sources can be identified. Additionally, traffic was classified and counted for comparison with predicted modeling results.

The short-term measurements were made from May 16-18, 2018. The weather condition during the measurement period on May 16, 2018 was 65 degrees Fahrenheit and sunny, clear skies with calm winds while the weather condition during the measurement period on 18 May 2018 was 53 degrees Fahrenheit and cloudy skies with an estimated 17 to 20 mph winds.

The short-term measurement at Location ST-1 was made at the setback of the sidewalk in front of the existing Copy Mill commercial business on Haskins Way. The short-term measurements at Location ST-2 were made approximately 5 feet from the existing building located at 400 East Jamie Street. The short-term measurement at Location ST-3 was made at the parking lot of 451 East Jamie Court (Parcel 015-012-090), near its east property line. The short-term measurement at Location ST-4 was made

approximately 12 feet from the road (East Grand Avenue) leading to the Genentech parking lot structure. At Location ST-4, there is a steel plate covering on the road which generated maximum noise levels up to 85 dBA when vehicles traveled over it. The short-term measurement results are summarized in Table 2.

Table 2: Short-Term Noise Measurement Results

Site	Location	Date and Time	L_{eq}	L_{50}	L_{max}
ST-1	On Haskins Way at setback of sidewalk	16 May 2018 11:20 AM – 11:35 AM	67	61	Cars: 62 – 72, (64 – 67 typ.) Med Trucks: 70 – 77 Heavy Trucks: 69 – 79 Truck Brakes: 88 Jets: 61 – 62 typ. Backup Beeper at Haskins Way/E. Jamie Ct Intersection: < 57
ST-2	400 East Jamie Court	16 May 2018 11:47 AM – 12:08 PM	61	59	Cars: <54, 55 – 57 Med Trucks: 60, 64 Heavy Trucks: 60 Jets: 55 – 70 Construction (steady): 62 Construction (cutting): 64 - 68 Street Sweeper on Haskins: 60 – 62
		18 May 2018 2:47 PM – 3:02 PM	66	55	Med Trucks: 54, 57 – 60 typ. Heavy Trucks: 61 - 64 Helicopter: 64, 76, 87 Parking Lot Car: 61
ST-3	451 East Jamie Court parking lot near east property line	16 May 2018 12:17 PM – 12:33 PM	63	59	Cars: < 58 Medium Trucks: 62, 65 Heavy Trucks, 76 – 77 Loading activity: 62 – 65 Nearby Truck Idle: 57, 63, 70 Backup Beeper: 75 Jets: 62 – 64
ST-4	On roadway leading to Genentech Parking structure, approx. 12 feet from edge of road	16 May 2018 12:17 PM – 12:33 PM	65	57	Cars (w/o metal sheet cover): 58 – 62 Steel Plate Cover: 69 – 71 typ., 85 Construction: 55 – 63 Street sweeper: 83
		18 May 2018 2:39 PM – 2:53 PM	67	57	

5 Impact Assessment

5.1 Construction Noise

5.1.1 Thresholds of Significance

The City's Municipal Code promulgates criteria for construction noise based on hours of operation. Therefore, for the purposes of this assessment, construction noise is considered significant if it:

- Occurs outside the allowable hours of operation or exceeds the special provisions of Municipal Code Section 8.32.050 (individual equipment exceeds 90 dB at 25 feet and 90 dB at any point outside the property plane)
- Causes ambient noise levels to increase significantly at nearby noise sensitive receptors

5.1.2 Construction Noise Impact

Phase 1 construction activities would last about 18 months and include the demolition of the existing building at 201 Haskins Way and the construction of a new office building, a surface parking lot, a parking garage, and a new building addition at 400 East Jamie Ct.

Based on the Preliminary Phase 1 Development Plan map[2], the demolition of the existing building and construction of the new buildings, at the nearest point, would be approximately 164 feet from the industrial buildings to the west across Haskins Way, 290 feet from the office/warehouse buildings to the north across East Grand Avenue, 340 feet from the Genentech office building to the northeast, and 290 feet from the South San Francisco Scavenger office building to the east. The nearest noise sensitive land use is the Genentech Childcare Facility at 342 Allerton Avenue currently under construction which is more than 1,200 feet away from project demolition and construction activities.

At this time, no specific Phase 2 development is proposed, and it is uncertain when or if such development would occur. However, in order to provide a conservative (worst case) analysis of construction impacts for CEQA purposes, it is assumed for purposes of this analysis that Phase 2 construction would commence in 2021 (immediately after

[2] 201 Haskins Way Project Summary. 9 March 2018

completion of Phase 1 construction) and would occur over an 18-month period. Phase 2 construction would not begin until existing uses are vacated. Phase 2 construction activities would include the expansion of the Phase 1 parking lot, the demolition of the existing buildings along East Grand Avenue, and the construction of a new office building.

Based on the Preliminary Phase 2 Conceptual Development Plan map, the demolition of existing buildings and construction of the new buildings would be approximately 120 feet from the industrial buildings to the west across Haskins Way, 105 feet from the office/warehouse buildings to the north across East Grand Avenue, 200 feet from the Genentech office building to the northeast, and 100 feet from the South San Francisco Scavenger office building to the east. The nearest noise sensitive land use is the Genentech Childcare Facility at 342 Allerton Avenue currently under construction which is more than 1,000 feet away from Phase 2 demolition and construction activities.

Table 3 shows reference noise levels at a distance of 50 feet for construction equipment expected to be used for the project. Table 3 also shows the calculated noise levels at a distance of 25 feet using a standard rate of 6 dB per halving of distance.

Table 3: Construction Equipment Noise Levels

Construction Equipment	Ref. Level dBA at 50 feet	Adjustment for Distance at 25 feet	Calculated Noise Level at 25 feet
Backhoe	78	6	84
Compressor	78	6	84
Concrete Saw	90	6	96
Dozer	82	6	88
Dump Truck	76	6	82
Gradall	83	6	89
Flat Bed Trucks	74	6	80
Excavator	81	6	87
Vacuum Street Sweeper	82	6	88
Tractor	84	6	90
Front End Loader	79	6	85
Compactor (ground)	83	6	89
Scraper	84	6	90
Auger Drill Rig	84	6	90
Slurry Trenching Machine	80	6	86
Gradall	83	6	89
Generator	81	6	87
Pneumatic Tools	85	6	91
Welder/Torch	74	6	80
Pump	81	6	87
Crane	81	6	87
Concrete Mixer Truck	79	6	85
Man-lift	75	6	81
Roller	80	6	86
Paver	77	6	83

Table 4 and Table 5 show the calculated maximum instantaneous exterior noise levels from project-related construction equipment at the neighboring office/industrial land uses under Phase 1 and Phase 2, respectively. Table 6 shows the calculated maximum instantaneous exterior noise levels from project-related construction equipment under both Phase 1 and Phase 2 at the Genentech Childcare Facility.

The calculated exterior noise levels are based on the methodology of the Federal Highway Administration's (FHWA) Roadway Construction Noise Model (2006) and

include a factor for acoustical shielding provided by the existing buildings (where appropriate). Standard construction with the windows closed provides a noise reduction of approximately 25 dBA, therefore, the noise levels in Tables 4, 5, and 6 below would also be attenuated by 25 dBA for persons inside the neighboring buildings.

Table 4: Construction Noise Levels at Adjacent Land Uses – Phase 1

Construction Equipment	Maximum Noise Levels (L_{max}) for Typical Construction Activities, dBA			
	Industrial Buildings to the west	Office/Warehouse buildings to the north	Genentech Office Building to the northeast	South San Francisco Scavenger Office Building
Backhoe	68	58	56	56
Compressor	68	58	56	56
Concrete Saw	80	70	68	68
Dozer	72	62	60	60
Dump Truck	66	56	54	54
Gradall	73	63	61	61
Flat Bed Trucks	64	54	52	52
Excavator	71	61	59	59
Vacuum Street Sweeper	72	62	60	60
Tractor	74	64	62	62
Front End Loader	69	59	57	57
Compactor (ground)	73	63	61	61
Scraper	74	64	62	62
Auger Drill Rig	74	64	62	62
Slurry Trenching Machine	70	60	58	58
Gradall	73	63	61	61
Generator	71	61	59	59
Pneumatic Tools	75	65	63	63
Welder	64	54	52	52
Pump	71	61	59	59
Crane	71	61	59	59
Concrete Mixer Truck	69	59	57	57
Man-lift	65	55	53	53
Roller	70	60	58	58
Paver	67	57	55	55

Table 5: Construction Noise Levels at Adjacent Land Uses – Phase 2

Construction Equipment	Maximum Noise Levels (L_{max}) for Typical Construction Activities, dBA			
	Industrial Buildings to the west (at 120 ft)	Office/Warehouse buildings to the north	Genentech Office Building to the northeast (at 200 ft)	South San Francisco Scavenger Office Building
Backhoe	70	67	66	59
Compressor	70	67	66	59
Concrete Saw	82	79	78	71
Dozer	74	71	70	63
Dump Truck	68	65	64	57
Gradall	75	72	71	64
Flat Bed Trucks	66	63	62	55
Excavator	73	70	69	62
Vacuum Street Sweeper	74	71	70	63
Tractor	76	73	72	65
Front End Loader	71	68	67	60
Compactor (ground)	75	72	71	64
Scraper	76	73	72	65
Auger Drill Rig	76	73	72	65
Slurry Trenching Machine	72	69	68	61
Gradall	75	72	71	64
Generator	73	70	69	62
Pneumatic Tools	77	74	73	66
Welder	66	63	62	55
Pump	73	70	69	62
Crane	73	70	69	62
Concrete Mixer Truck	71	68	67	60
Man-lift	67	64	63	56
Roller	72	69	68	61
Paver	69	66	65	58

Table 6: Construction Noise Levels at Genentech Childcare Facility

Construction Equipment	Maximum Noise Levels (L_{max}) for Typical Construction Activities, dBA	
	Phase 1	Phase 2
Backhoe	45	47
Compressor	45	47
Concrete Saw	57	59
Dozer	49	51
Dump Truck	43	45
Gradall	50	52
Flat Bed Trucks	41	43
Excavator	48	50
Vacuum Street Sweeper	49	51
Tractor	51	53
Front End Loader	46	48
Compactor (ground)	50	52
Scraper	51	53
Auger Drill Rig	51	53
Slurry Trenching Machine	47	49
Gradall	50	52
Generator	48	50
Pneumatic Tools	52	54
Welder	41	43
Pump	48	50
Crane	48	50
Concrete Mixer Truck	46	48
Man-lift	42	44
Roller	47	49
Paver	44	46

Construction-related activities would typically occur Monday through Friday, between 8 a.m. and 8 p.m., although some work is anticipated to occur on Saturdays between 9 a.m. and 8 p.m. or on Sundays between 10 a.m. and 6 p.m. According to the Municipal Code Section 8.32.050, the City does not place specific restrictions on noise emission during these hours. However, noise from construction activities would be noticeable at times at the neighboring buildings. For example, the measured outdoor ambient L_{eq} along Haskins way (ST-1) is 67 dBA while the calculated maximum noise levels from construction activities are generally 3 to 8 dBA higher. The increase in average noise levels will depend on the duration of the construction equipment and the number of simultaneous activities.

The nearest noise sensitive land use is the Genentech Childcare Facility at 342 Allerton Avenue. Based on the existing traffic volumes on East Grand Avenue and the distance between the facility and East Grand Avenue, the exterior noise levels due to traffic at the facility closest to the project site was calculated to be an L_{eq} of 63 dBA. Table 5 shows that given the distance of at least 1,000 feet from the project site, the noise from project-related construction would generally be less than 55 dBA outdoors. This may be noticeable at times but is less than the noise levels generated by other intermittent ambient noise sources, such as traffic and aircraft.

Construction activities are allowed by the City's code during regular business hours provided that noise from individual equipment does not exceed 90 dBA at 25 feet or that noise at any point outside the property plane does not exceed 90 dBA. Table 3 shows that all the individual construction equipment would generate less than 90 dBA at a distance of 25 feet except for concrete saws and pneumatic tools.

Pneumatic tools and concrete saws are expected to be primarily used at distances of more than 50 feet from the property plane. The noise level from a concrete saw or pneumatic tool would not exceed the property plane noise limit of 90 dBA at a distance of 50 feet or more from the property plane. However, there may be times when these could be used close to the property line. The louder of the two, the concrete saw, would only be used during the approximate 20-day demolition phase for Phase 1 and Phase 2. Since there is a chance that the concrete saw and pneumatic tools could be used close to the perimeter of the site, they could exceed the property plane noise limit of 90 dBA. This is less than significant impact with Mitigation Measure NO-1 ("Construction Noise Minimization and Mitigation").

Additionally, at the nearest noise sensitive land use (Genentech Childcare Facility), construction noise would be less than the noise levels generated by intermittent ambient

noise sources and is not expected to cause a significant increase in the ambient noise level. Therefore, this is considered a less than significant impact.

There is a potential for noise from construction of Phase 1 and Phase 2 to adversely affect neighboring office/warehouse buildings. There is also a potential for noise from construction during Phase 1 to affect existing Phase 2 area buildings (101 Haskins Way, 410 and 430 East Grand Avenue, and 451 East Jamie Court). Noise from construction during Phase 2 could also be disruptive to occupants of Phase 1 area buildings. Implementation of Mitigation Measure NO-1 ("Construction Noise Minimization and Mitigation") would reduce potential for annoyance to business operations at the neighboring office/warehouse buildings as well as Phase 1 occupants. This is considered a less than significant impact with mitigation.

Construction noise is considered a less than significant impact with mitigation.

Mitigation Measure NO-1: Construction Noise Minimization and Mitigation

In order to minimize the potential impact associated with construction, the following is recommended:

- All construction equipment shall be equipped with mufflers and sound control devices (e.g., intake silencers and noise shrouds) that are in good condition and appropriate for the equipment.
- Maintain all construction equipment to minimize noise emissions.
- Stationary equipment shall be located on the site to maintain the greatest possible distance to the existing office buildings, where feasible.
- Use temporary noise barriers around noisier equipment, where feasible, when the noise ordinance limits cannot be achieved.
- Unnecessary idling of internal combustion engines should be strictly prohibited.
- Provide advance notification to surrounding land uses disclosing the construction schedule, including the various types of activities that would be occurring throughout the duration of the construction period.
- The construction contractor shall provide the name and telephone number an on-site construction liaison. If construction noise is found to be intrusive to the community (complaints are received), the construction liaison shall investigate the source of the noise and require that reasonable measures be implemented to correct the problem.
- Schedule high noise-producing activities during times when they would be least likely to interfere with the noise sensitive activities of the neighboring land uses, when possible.

5.2 Operational Noise

5.2.1 Traffic Noise

The proposed project would influence existing and future traffic volumes. The following section describes the methodology of quantifying the increase in noise levels due to vehicular traffic with and without the project.

5.2.1.1 Thresholds of Significance

Neither the CEQA checklist nor the City's General Plan specify a quantitative method for determining whether a project would cause a significant increase in noise. In general, an increase of 3 dBA is just noticeable, a change of 5 dBA is clearly noticeable and a change of 10 dBA is perceived as a doubling (or halving).

In October 2009, an EIR for the Gateway Business Park Master Plan promulgated impact thresholds based on these increases. Therefore, for the purposes of this impact assessment, the following increases in traffic noise, based on the Gateway Business Park Master Plan EIR are considered to be significant:

Project Impact:

- 5 dBA or greater if the future noise level is within the normally acceptable range (CNEL 65 dBA or less for residences and child care; CNEL 70 dBA or less for offices and retail; CNEL 75 dBA or less for industrial land uses).

- 3 dBA or greater if future noise level is above the normally acceptable range.

Cumulative Impact:

- 5 dBA or greater if the future noise level is within the normally acceptable range (CNEL 65 dBA or less for residences and child care; CNEL 70 dBA or less for offices and retail; CNEL 75 dBA or less for industrial land uses) AND the project's contribution is cumulatively considerable (greater than 1 dBA)

- 3 dBA or greater if future noise level is above the normally acceptable range AND the project's contribution is cumulatively considerable (greater than 1 dBA).

5.2.1.2 Traffic Noise Calculation Methodology

In order to calculate the increase in traffic noise due to the project, the existing and future traffic noise levels were calculated using the Federal Highway Administration's Traffic Noise Model (TNM 2.5) using traffic volumes[3] from Kittelson & Associates, Inc. The model takes into account the vehicle class, speed, road surface, and distance. The TNM model calculates an L_{eq} based on peak-hour traffic data at a distance of 50 feet from the roadway centerline. The CNEL was determined based on the difference between the peak-hour L_{eq} and CNEL measured at the long-term monitoring locations.

5.2.1.3 Project Generated Traffic Noise Impact

Traffic noise levels with and without the project are shown in Table 7 along with the increase in noise due to the project for two scenarios:

- Phase 1
- Phase 1 Plus Phase 2

Table 7 shows that the increase in traffic noise would be less than 3 dBA for all roadways in the study area under the Phase 1 and Phase 1 & 2 buildout scenarios.

For commercial and industrial uses, the increases in traffic noise levels due to the project are less than both the significant increase thresholds of 5 dBA if the future noise level is within the normally acceptable range and 3 dBA if the future noise level exceeds the normally acceptable range. Therefore, the increase in traffic noise due to the project is less than significant.

For the child care centers/preschools along Gateway Boulevard (between Oyster Point Boulevard and East Grand Avenue) and Allerton Avenue in the study area, the existing and future traffic noise levels are above the normally acceptable range. The increases in traffic noise levels due to the project are less than the 3 dBA significant increase threshold. Therefore, the increase in traffic noise due to the project is less than significant.

Increase in traffic noise due to the project is considered a less than significant impact.

[3] *Barlow, Julie T., SWCA Environmental Consultants. "201 Haskins Noise Analysis." Email to Alan Rosen, RGD Acoustics, Inc. 10 August 2018.*

Table 7: Traffic Noise Levels with and without Project

Roadway	CNEL at 50 feet from Roadway Centerline, dBA				
	Existing	Existing Plus Phase 1	Increase over Existing	Existing Plus Phase 1 & 2	Increase over Existing
Oyster Point Blvd					
west of Gateway Blvd	75.2	75.2	0.0	75.3	0.1
east of Gateway Blvd	74.1	74.1	0.0	74.1	0.0
Gateway Blvd					
Oyster Point Blvd to East Grand Ave	70.4	70.5	0.1	70.5	0.1
East Grand Ave to Mitchell Ave	70.2	70.5	0.3	70.6	0.4
Grand Ave					
west of Airport Blvd	68.1	68.1	0.0	68.2	0.1
Poletti Way to East Grand Ave	69.7	69.9	0.2	70.0	0.3
East Grand Ave					
Dubuque Ave to Grand Ave	72.8	73.1	0.3	73.3	0.5
Grand Ave to Gateway Blvd	73.6	73.8	0.2	74.0	0.4
Gateway Blvd to Forbes Blvd	74.8	75.1	0.3	75.3	0.5
Forbes Blvd to Littlefield Ave	73.5	74.0	0.5	74.3	0.8
Littlefield Ave to Allerton Ave	74.4	74.9	0.5	75.2	0.8
Allerton Ave to Haskins Way	73.3	74.1	0.8	74.6	1.3
east of Haskins Way	68.0	68.0	0.0	68.0	0.0
Haskins Way					
south of East Grand Ave	68.9	70.8	1.9	71.8	2.9
Allerton Ave					
north of East Grand Ave	66.5	66.5	0.0	66.5	0.0
Littlefield Ave					
south of East Grand Ave	68.8	69.0	0.2	69.2	0.4
Forbes Blvd					
north of East Grand Ave	70.3	70.6	0.3	70.9	0.6
Harbor Way					
south of East Grand Ave	70.3	70.3	0.0	70.3	0.0
Airport Blvd					
north of Grand Ave	72.5	72.6	0.1	72.7	0.2
Grand Ave to San Mateo Ave	73.3	73.3	0.0	73.3	0.0
South Airport Blvd					
Mitchell Ave to US 101 NB ramp	73.5	73.6	0.1	73.7	0.2
US 101 NB ramp to Utah Ave	71.1	71.1	0.0	71.1	0.0
south of Utah Ave	73.4	73.4	0.0	73.5	0.1
San Mateo Ave					
west of Airport Blvd	71.4	71.4	0.0	71.4	0.0
Produce Ave					
south of San Mateo Ave	73.5	73.6	0.1	73.7	0.2
Utah Ave					
east of South Airport Blvd	72.9	73.0	0.1	73.1	0.2
Mitchell Ave					
east of Gateway Blvd	71.7	71.7	0.0	71.7	0.0
US 101 NB Ramps					
Off-ramp to East Grand Ave	71.1	71.2	0.1	71.3	0.2
intersecting South Airport Blvd	73.4	73.5	0.1	73.5	0.1

5.2.1.4 Cumulative Traffic Noise Impact

In the future, traffic will increase due to general growth in the area that is not directly related to the project. Table 8 shows the future traffic noise levels for the following scenarios:

- Future without Project
- Future with Project (Phase 1)
- Future with Project (Phase 1 & 2).

The future traffic volumes are based on the predictions for traffic in the year 2040. Table 8 shows that the increase in traffic noise from cumulative development would be less than 3 dBA for all roadways in the study area with the exception of Gateway Boulevard and sections of East Grand Avenue. At roadways with a cumulative increase of less than the threshold of 3 dBA, the increase in cumulative traffic noise due to the project is less than significant.

For Gateway Boulevard and sections of East Grand Avenue (between Dubuque Avenue to Gateway Boulevard and east of Haskins Way), the increases in traffic noise levels due to cumulative development range from 3.0 to 3.8 dBA. However, the project's incremental contribution to the cumulative increase is less than 1 dB which is not cumulatively considerable. Therefore, the project's contribution to the cumulative increase is less than significant.

The child care centers/preschools in the study area are located along Gateway Boulevard (between Oyster Point Boulevard and East Grand Avenue) and Allerton Avenue. Along Gateway Boulevard, the cumulative traffic noise increase is greater than the 3 dBA threshold, however, the project contribution is less than 1 dBA which is not cumulatively considerable. Along Allerton Avenue, the cumulative traffic noise increase is 1.9 dBA which is less than the 3 dBA threshold of significance. This is considered a less than significant cumulative impact.

The proposed project, under Phase 1 or project buildout, would not contribute considerably to a significant cumulative operational traffic noise impact. No mitigation is necessary.

Table 8: Cumulative Traffic Noise Levels with and without Project

Roadway	CNEL at 50 feet from Roadway Centerline, dBA							
	Existing	Future 2040 without Project	Future 2040 Plus Phase 1	Increase: Existing to Future Plus Phase 1	Project (Phase 1) Contribution to Increase	Future 2040 Plus Phase 1 & Phase 2	Increase: Existing to Future Plus Phase 1 & Phase 2	Project (Phase 1&2) Contribution to Increase
Oyster Point Blvd								
west of Gateway Blvd	75.2	78.1	78.1	2.9	0.0	78.1	2.9	0.0
east of Gateway Blvd	74.1	76.2	76.2	2.1	0.0	76.2	2.1	0.0
Gateway Blvd								
Oyster Point Blvd to East Grand Ave	70.4	73.5	73.6	3.2	0.1	73.6	3.2	0.1
East Grand Ave to Mitchell Ave	70.2	73.6	73.7	3.5	0.1	73.8	3.6	0.2
Grand Ave								
west of Airport Blvd	68.1	70.5	70.5	2.4	0.0	70.5	2.4	0.0
Poletti Way to East Grand Ave	69.7	70.0	70.2	0.5	0.2	70.3	0.6	0.3
East Grand Ave								
Dubuque Ave to Grand Ave	72.8	76.5	76.6	3.8	0.1	76.6	3.8	0.1
Grand Ave to Gateway Blvd	73.6	77.0	77.1	3.5	0.1	77.2	3.6	0.2
Gateway Blvd to Forbes Blvd	74.8	76.0	76.2	1.4	0.2	76.4	1.6	0.4
Forbes Blvd to Littlefield Ave	73.5	74.7	75.0	1.5	0.3	75.3	1.8	0.6
Littlefield Ave to Allerton Ave	74.4	75.1	75.4	1.0	0.3	75.7	1.3	0.6
Allerton Ave to Haskins Way	73.3	74.4	74.0	0.7	-0.4	74.4	1.1	0.0
east of Haskins Way	68.0	71.0	71.0	3.0	0.0	71.0	3.0	0.0
Haskins Way								
south of East Grand Ave	68.9	69.1	70.8	1.9	1.7	71.6	2.7	2.5
Allerton Ave								
north of East Grand Ave	66.5	68.4	68.4	1.9	0.0	68.4	1.9	0.0
Littlefield Ave								
south of East Grand Ave	68.8	70.0	70.1	1.3	0.1	70.3	1.5	0.3
Forbes Blvd								
north of East Grand Ave	70.3	72.0	72.2	1.9	0.2	72.3	2.0	0.3
Harbor Way								
south of East Grand Ave	70.3	71.1	71.1	0.8	0.0	71.1	0.8	0.0
Airport Blvd								
north of Grand Ave	72.5	74.6	74.7	2.2	0.1	74.5	2.0	-0.1
Grand Ave to San Mateo Ave	73.3	74.2	74.3	1.0	0.1	74.3	1.0	0.1
South Airport Blvd								
Mitchell Ave to US 101 NB ramp	73.5	75.5	75.5	2.0	0.0	75.6	2.1	0.1
US 101 NB ramp to Utah Ave	71.1	72.2	72.2	1.1	0.0	72.2	1.1	0.0
south of Utah Ave	73.4	74.9	74.9	1.5	0.0	75.0	1.6	0.1
San Mateo Ave								
west of Airport Blvd	71.4	72.4	72.4	1.0	0.0	72.4	1.0	0.0
Produce Ave								
south of San Mateo Ave	73.5	75.5	75.6	2.1	0.1	75.6	2.1	0.1
Utah Ave								
east of South Airport Blvd	72.9	74.6	74.7	1.8	0.1	74.7	1.8	0.1
Mitchell Ave								
east of Gateway Blvd	71.7	73.7	73.7	2.0	0.0	73.7	2.0	0.0
US 101 NB Ramps								
Off-ramp to East Grand Ave	71.1	71.1	71.2	0.1	0.1	71.3	0.2	0.2
intersecting South Airport Blvd	73.4	75.7	75.8	2.4	0.1	75.8	2.4	0.1

5.2.2 Mechanical Equipment (HVAC)

5.2.2.1 Thresholds of Significance

Mechanical equipment noise that exceeds the limits set forth in Table 8.32.030 of the City's municipal code is considered a significant impact.

5.2.2.2 Mechanical Equipment Noise Impact

The proposed project buildings under Phase 1 and Phase 2 are expected to have mechanical equipment generally associated with building ventilation/air-conditioning units, ventilation fans, but may also include other process specific equipment and possibly emergency engine-generators. Much of the equipment would likely be located on the rooftops of the proposed buildings, or at-grade next to the buildings. However, at the time of this report, the details and locations of the mechanical equipment are not known and therefore, calculations of specific noise levels at surrounding uses cannot be made.

According to the City's municipal code, maximum permissible sound levels from the project are determined by the land use category of the receiving property and the L_{50} noise standards are shown in Municipal Code Table 8.32.030. The large commercial systems that are often used in this type of building can generate high noise levels and therefore, they would have the potential to generate noise levels in excess of the City's municipal code requirement. Therefore, noise from mechanical equipment is considered a potentially significant impact. However, with the implementation of Mitigation Measure NO-2 (referred to as Mitigation Measure NO-3 in the EIR; "Mechanical Equipment Noise Requirements"), this impact would be reduced to a less than significant level.

Mitigation Measure NO-2: Mechanical Equipment Noise Requirements

Analysis of noise from the project's mechanical equipment must be conducted to determine if the equipment will comply with the City's municipal code requirements in Table 8.32.030 per section 8.32.030, and what, if any, noise control measures must be included in the design to meet the City's requirements. For example, the ambient noise at Location ST-1 was an L_{50} of 61 dBA at 11:20 AM (See Table 2). The requirement for a receiving land use that is industrial (M-1) is an L_{50} of 70 dBA. Therefore, the mechanical system would need to meet an L_{50} of 70 dBA at that time of day for the industrial uses to the west. Prior to issuance of building permit, the project applicant shall submit a report verifying that project mechanical equipment meets the noise levels required in Table 8.32.30. Typical noise control measures include barriers, enclosures, silencers and acoustical louvers at vent openings.

* * *

APPENDIX F

Air Quality and Greenhouse Gas Emissions Memo

Appendix F

AIR QUALITY AND GREENHOUSE GAS TECHNICAL MEMO

PREPARED BY SWCA ENVIRONMENTAL CONSULTANTS, INC.

OCTOBER 2, 2018

INTERNAL DRAFT – SUBJECT TO CHANGE

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Attachment I Intersection Volume Summary

1. Introduction

SWCA Environmental Consultants (SWCA) has prepared this technical report document on behalf of Alexandria Real Estate Equities, Inc (ARE). The purpose of this report is to elucidate the methodologies used to evaluate the effects of the proposed 201 Haskins Way Project on ambient air quality, greenhouse gas emissions (GHGs), and health risks. The evaluation of project impacts was conducted as recommended in the Bay Area Air Management District (BAAQMD) California Environmental Quality Act (CEQA) Air Quality Guidelines dated May 2017[1], which is incorporated into this technical document by reference.

1.1 Project Description

The proposed project area is bounded by the San Francisco Bay to the east and Highway 101 and railway lines to the west. The project site is composed of eight parcels encompassing approximately 18.2 acres which are outlined in **Figure 1-1**. Seven of the parcels are currently zoned as a Mixed Industrial (MI) district and one of the parcels is currently zoned as a Business Commercial (BC) district. As the project sponsor, ARE plans to rezone all eight existing parcels to a Business Technology Park (BTP) district. The proposed rezoning will allow construction of BTP offices and associated parking. The project plan consists of two phases of construction as summarized below:

Phase 1

Phase 1 of construction will involve the demolition of a 24,075-gross-square-foot (gsf) building at 201 Haskins Way along with the surface lot previously associated with light industrial trucking activity. Following demolition, a 311,368-gsf office building (201 Haskins Way Building) with a 63-foot-tall, 3-story wing and a 95-foot-tall, 5-story wing, a 720-stall, 5-level parking structure, and 183 surface parking spaces will be constructed on at 201 Haskins Way. A 25,000-gsf, 2-story addition to the existing western building at 400-450 East Jamie Court will also be constructed. Construction will commence in late 2018 or early 2019 and will be completed within approximately 18 months. It is assumed that operation of the project will begin immediately after construction is completed. **Figure 1-2** shows the planned Phase 1 and 2 building locations.

Phase 2

Phase 2 of construction will involve the demolition of approximately 157,995-gsf of light industrial buildings along with the associated surface parking lots on the parcels located at 101 and 151 Haskins Way, 410 and 430 East Grand Avenue, 451 East Jamie Court, and an unaddressed parcel at APN 015-102-290. As shown in **Figure 1-2**, a new 256,232-gsf office building (East Grand Building) with a 63-foot-tall, 3-story wing and a 95-foot-tall, 5-story wing will be constructed. The parking garage constructed during Phase 1 will be expanded to the two parcels to the east adding 340 stalls and 243 additional surface parking spaces will be added during Phase 2. Additionally, an additional 85,000 gsf of BTP office space would be constructed at 400-450 East Jamie Court. It is conservatively assumed that construction of Phase 2 will be commenced immediately upon termination of the Phase 1 construction project. Construction

[1] Available online at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx?la=en. Accessed June 6, 2018.

Figure 1-1 - Project Area Map

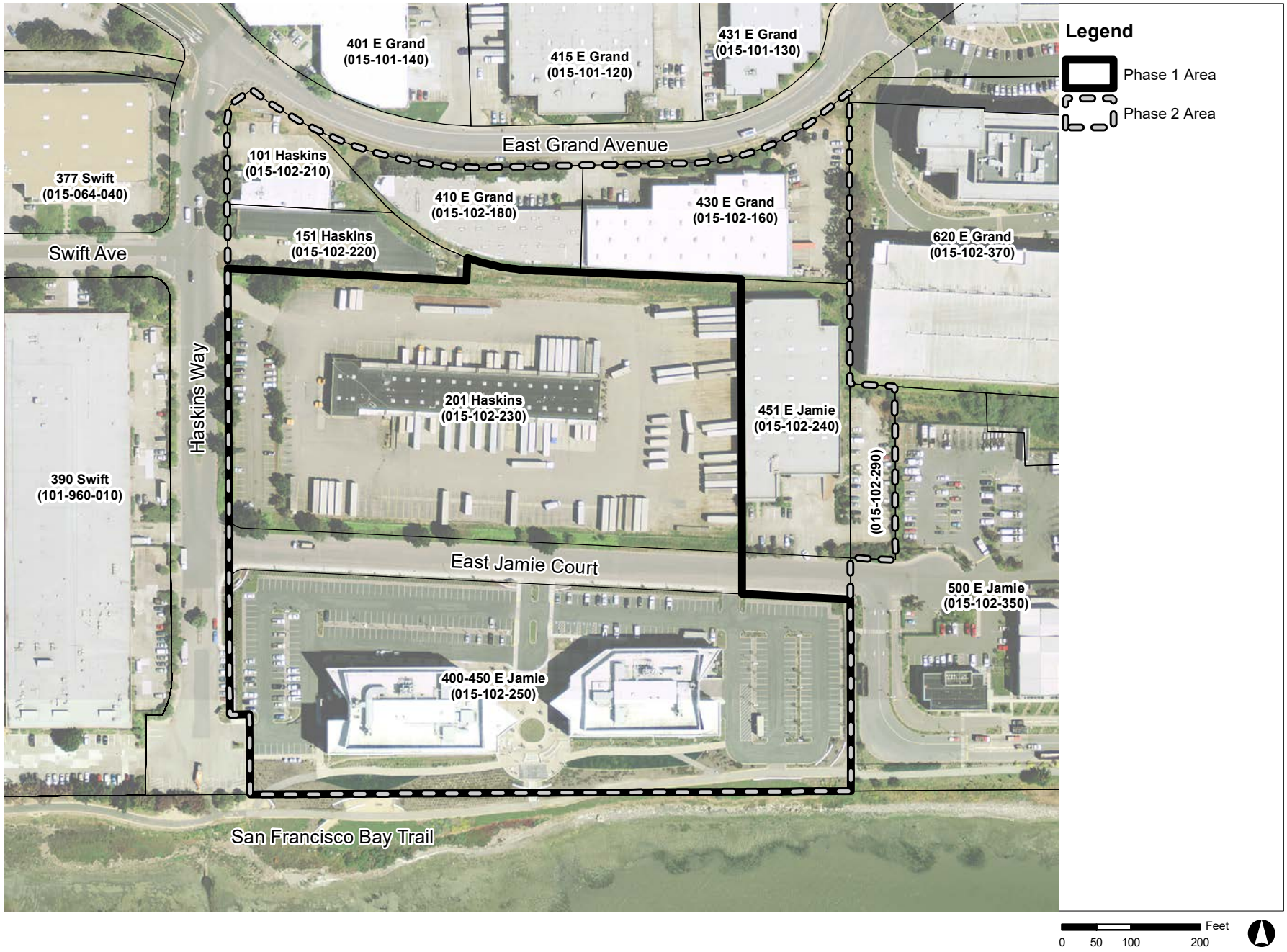


Figure 1-2 – Project Plan



PLANNED CONSTRUCTION

When Phase 1 of the Project is completed, an office building located at 201 Haskins Way, an office building addition to the existing western building located at 400-450 East Jamie Court, and a five-level Parking Garage within the blue-and-black outlined area will be constructed.

When Phase 2 of the Project is completed, an office building located on the northern parcels adjacent to East Grand Avenue, and an addition to the Phase 1 Parking Garage will be constructed. Additional office space is also planned for the 400-450 East Jamie Court Parcels, but the exact location on the parcels has is not yet determined.

activity on Phase 2 will likely be completed within approximately 18 months of the date of commencement and it is assumed that operation of the project will begin immediately after construction is completed.

1.2 Scope

BAAQMD has developed Thresholds of Significance (TOS) for certain air pollutants with which to compare project impacts. Should a project's emission levels exceed the TOS, the emissions would be considered cumulatively considerable and result in significant adverse impacts to the San Francisco Bay Area Basin's existing air quality conditions. This section summarizes which pollutants require evaluation in accordance with the BAAQMD CEQA Guidelines document.

Impacts Evaluated

Impacts from the 201 Haskins Way Project were compared to the screening criteria specified in the BAAQMD CEQA guidelines or to the TOS specified in **Table 1-1**, as applicable. The project impacts were assessed for criteria air pollutants and precursors (CAPs), local carbon monoxide (CO), and GHGs.

Impacts Not Evaluated

BAAQMD CEQA guidelines also specify that an individual project and cumulative Health Risk Assessment (HRA) be conducted for projects impacting off-site sensitive receptors[2] within the project zone of influence[3] and for newly sited on-site sensitive receptors potentially affected by on-site and off-site sources of toxic air contaminants (TACs). However, no new sensitive receptors will be sited as part of the project rezoning and there are no sensitive receptors within 1,000 feet of the project site. Thus, no HRA was conducted and project impacts will be less-than-significant.

Additionally, evaluation of worst case scenario impacts from accidental release of acutely hazardous air pollutants (HAPs) is recommended if:

- the project would site a new source that stores or uses potentially hazardous materials and is locating near receptors; or
- the project would site a new receptor near existing sources that store or use acutely hazardous materials

Because the rezoning project will consist of the development of office buildings and parking structures and lots, no storage or use of substantial amounts of hazardous materials is anticipated, and no new receptors would be created. Therefore, an evaluation of impacts of potential accidental release of HAPs was not conducted because it is evident that there will be no project impacts.

[2] BAAQMD refers to receptors throughout the May 2017 CEQA guidelines. A location should be considered a receptor if sensitive individuals are likely to spend a significant amount of time there. Sensitive individuals refer to those segments of the population most susceptible to poor air quality: children, the elderly, and those with pre-existing serious health problems affected by air quality (ARB 2005). Examples of receptors include residences, schools and school yards, parks and playgrounds, daycare centers, nursing homes, and medical facilities.

[3] BAAQMD CEQA guidelines specify that the zone of influence of a project is a 1,000-foot radius from the project property line or receptor.

Table 1-1

Air Quality CEQA Thresholds of Significance			
Pollutant	**Construction-Related**	**Operational-Related**	
Criteria Air Pollutants and Precursors (Regional)	**Average Daily Emissions (lb/day)**	**Average Daily Emissions (lb/day)**	**Maximum Annual Emissions (tpy)**
ROG	54	54	10
NO_x	54	54	10
PM_{10} (exhaust)	82	82	15
$PM_{2.5}$ (exhaust)	54	54	10
$PM_{10}/PM_{2.5}$ (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average) 20.0 ppm (1-hour average)	
GHGs - Projects other than Stationary Sources	None	Compliance with Qualified GHG Reduction Strategy; OR 1,100 MT CO_2e/yr; OR 4.6 MT CO_2e/SP/yr (residents + employees)	
GHGs - Stationary Sources	None	10,000 MT CO_2e/yr	
Risks and Hazards for new sources and receptors (Individual Project)	Same as Operational	Compliance with Qualified Community Risk Reduction Plan; OR Increased cancer risk of > 10.0 in a million; Increased non-cancer risk of > 1.0 Hazard Index; Ambient PM2.5 increase > 0.3 µg/m^3 **Zone of Influence:** 1,000-foot radius from property line of source or receptor	
Risk and Hazards for new sources and receptors (Cumulative Threshold)	Same as Operational	Compliance with Qualified Community Risk Reduction Plan; OR Increased cancer risk of > 100.0 in a million; Increased non-cancer risk of > 10.0 Hazard Index; Ambient PM2.5 increase > 0.8 µg/m^3 **Zone of Influence:** 1,000-foot radius from property line of source or receptor	
Accidental Release of Acutely Hazardous Air Pollutants	None	Storage or use of acutely hazardous materials locating near receptors or new receptors locating near stored or used acutely hazardous materials considered signficant	
Odors	None	Five confirmed complaints per year averaged over three years.	

Odor impacts could result from siting a new odor source near existing sensitive receptors or siting a new sensitive receptor near an existing odor source. The proposed rezoning project construction or operation would not create substantial odors, nor site a new sensitive receptor near an existing odor source. Therefore, impacts are assumed to be less than significant.

1.3 Impacts Evaluation

1.3.1 Criteria Air Pollutants and Precursors

CAP emissions were compared with the TOS shown in **Table 1-1** for construction-related average daily emissions and operational-related average daily and maximum annual emissions. California Emissions Estimator Model (CalEEMod)[4] Version 2016.3.2 was utilized to quantify CAP emissions from construction and operations. Emergency diesel generator emissions were quantified separately using the engine vendor specifications. Input data sources and justification are summarized in Section 2.

1.3.2 Greenhouse Gas Emissions

GHG emissions were compared with the TOS shown in **Table 1-1** for operational-related maximum annual emissions from the project including stationary sources. The BAAQMD does not have an adopted TOS for construction-related GHG emissions. However, construction related GHG emissions are quantified and added to operational emissions and compared with the BAAQMD operational threshold. CalEEMod and diesel emergency generator information was used to calculate GHG emissions for the GHG impacts evaluation. Input data sources and justification are summarized in Section 2. In addition, GHG emissions were examined for consistency with the City's CAP, Plan Bay Area, and the State's 2030 and 2050 emission reduction goals.

1.3.3 Local Carbon Monoxide

BAAQMD has established screening criteria to evaluate whether more in-depth analysis is warranted to assess impacts. The local CO was evaluated by comparison with the screening criteria established by BAAQMD. If all specified screening criteria are met, then it is assumed that proposed project emissions result in less-than-significant impact to air quality. To meet the BAAQMD screening criteria the project must:

- be consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans; and
- not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour; and
- not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway)

[4] California Emissions Estimator Model. Developed for California Air Pollution Control Officers Association (CAPCOA) in Collaboration with California Air Districts. The model can be downloaded from: http://caleemod.com/. Accessed May 29,2018.

Section 5 provides the results from the comparison of the local CO impacts with BAAQMD's established screening criteria. The impacts were determined to meet BAAQMD's screening criteria, which provide the Lead Agency with a conservative indication of whether the implementation of the proposed project would result in CO emissions that exceed BAAQMD's thresholds.

2. Emission Estimates

Project average daily and maximum annual emission rates for CAP and GHG emissions were calculated using CalEEMod, stationary source manufacturer's information and applicable emission factors. This data was used to directly assess TOS for construction and operational emissions from the project for CAPs and GHG emissions. The User's Guide for CalEEMod Version 2016.3.2 dated November 2017 (CalEEMod User's Guide) and associated Appendices are referenced throughout this section to explain the calculation methodologies and can be located on the CalEEMod website[5]. The CalEEMod User's Guide is incorporated by reference.

2.1 Construction Emissions

Emission rates from construction activities resulting from Phase 1 and Phase 2 of the project were calculated using CalEEMod. Project construction activities for Phase 1 and Phase 2 will not overlap, thus, two separate CalEEMod analyses were conducted to determine the average daily emissions for each of the two project phases.

Construction emissions generated from off-road construction equipment and on-road vehicles include reactive organic gas (ROG), oxides of nitrogen (NO_x), CO, sulfur dioxide (SO_2), direct emissions of particulate matter with a diameter less than 10 microns (PM_{10}) and particulate matter with a diameter less than 2.5 microns ($PM_{2.5}$), and GHG emissions. In addition, fugitive dust in the form of PM_{10} and $PM_{2.5}$ arises from construction activities such as materials movement, grading, demolition, and construction equipment or vehicle operations. Phases of construction where architectural coatings are applied contribute to the release of ROG emissions.

2.1.1 Off-road Equipment Emissions

The construction schedule (shown in **Table 2-1.1** and **Table 2-1.2**) and off-road equipment roster (shown in **Table 2-2**) for Phase 1 and Phase 2 were developed based on information from ARE and the construction company. In addition to information provided by the project applicant, CalEEMod defaults for horsepower (hp), load factor (LF), and individual pollutant grams per horsepower-hour (g/hp-hr) were used to calculate emissions. Load factor and g/hp-hr values used based on equipment type and construction year can be found by referring to the CalEEMod User's Guide, Appendix D Table 3.3 for hp and LF and Table 3.4 for g/hp-hr. ROG, NO_x, CO, SO_2, Exhaust PM_{10}, Exhaust $PM_{2.5}$, and GHG emissions are calculated for each piece of equipment based on the following formula:

Emissions (lbs)/day = g/hp-hr * hr/day * hp * LF/ 453.6 g/lb

Based on the calculated equipment emissions and construction schedule, daily average and maximum annual emissions for each construction year were calculated.

[5] User's Guide for CalEEMod Version 2016.3.2. Available online at: http://caleemod.com/. Accessed June 6, 2018

Table 2-1.1

Construction Schedule - Project Phase 1					
Construction Phase Number	Construction Phase Name	Construction Phase Start Date	Construction Phase End Date	Workdays per Week	Phase Duration
1	Demolition	12/12/2018	1/8/2019	5	20
2	Soils Abatement / Remove / Replace	12/26/2018	1/22/2019	5	20
3	Site Prep and Make Ready	1/23/2019	3/12/2019	5	35
4	Parking Garage Underground	2/22/2019	4/4/2019	5	30
5	Parking Garage Core Construction	4/4/2019	1/20/2020	5	208
6	Parking Garage Exterior Improvements	12/2/2019	12/30/2019	5	21
7	Lab / Office Building Underground	2/22/2019	4/18/2019	5	40
8	Lab / Office Building Core Construction	4/19/2019	4/14/2020	5	258
9	Lab / Office Building Exterior Improvements	1/15/2020	4/14/2020	5	65
10	Lab / Office Building Tenant Improvements	12/26/2019	10/27/2020	5	219
11	Landscaping and Site Improvements	1/6/2020	7/3/2020	5	130

Table 2-1.2

Construction Schedule - Project Phase 2					
Construction Phase Number	Construction Phase Name	Construction Phase Start Date	Construction Phase End Date	Workdays per Week	Phase Duration
1	Demolition	10/28/2020	11/24/2020	5	20
2	Soils Abatement / Remove / Replace	11/11/2020	12/8/2020	5	20
3	Site Prep and Make Ready	12/9/2020	1/26/2021	5	35
4	Parking Garage Underground	1/8/2021	2/18/2021	5	30
5	Parking Garage Core Construction	2/18/2021	7/7/2021	5	100
6	Parking Garage Exterior Improvements	5/18/2021	6/16/2021	5	22
7	Lab / Office Building Underground	1/8/2021	3/4/2021	5	40
8	Lab / Office Building Core Construction	3/5/2021	3/4/2022	5	261
9	Lab / Office Building Exterior Improvements	12/4/2021	3/4/2022	5	65
10	Lab / Office Building Tenant Improvements	11/14/2021	9/15/2022	5	219
11	Landscaping and Site Improvements	11/25/2021	5/25/2022	5	130

Table 2-2

Construction Equipment Roster[1]																						
Equipment Type	Construction Phase 1		Construction Phase 2		Construction Phase 3		Construction Phase 4		Construction Phase 5		Construction Phase 6		Construction Phase 7		Construction Phase 8		Construction Phase 9		Construction Phase 10		Construction Phase 11	
	No. Units	Hours/day	No. Units	Hours/day	No. Units	Hours/day	No. Units	Hours/day	No. Units	Hours/day	No. Units	Hours/day	No. Units	Hours/day	No. Units	Hours/day	No. Units	Hours/day	No. Units	Hours/day	No. Units	Hours/day
Aerial Lifts	-	-	-	-	-	-	-	-	1	7	1	6	-	-	4	7	3	6	1	7	-	-
Air Compressors	2	7	-	-	-	-	-	-	-	-	-	-	-	-	4	6	-	-	1	7	-	-
Bore/Drill Rigs	-	-	-	-	2	7	1	7	-	-	-	-	2	4	-	-	-	-	-	-	-	-
Cement and Mortar Mixers	-	-	-	-	-	-	-	-	6	4	-	-	-	-	-	-	-	-	-	-	2	4
Concrete/Industrial Saws	2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cranes	-	-	-	-	-	-	-	-	1	7	1	3	-	-	2	7	-	-	-	-	-	-
Crawler Tractors	-	-	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dumpers/Tenders	1	4	2	6	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6
Excavators	2	3	2	5	1	4	2	7	-	-	-	-	2	-	-	-	-	-	-	-	-	-
Forklifts	1	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator Sets	-	-	-	-	-	-	2	4	-	-	-	-	2	4	-	-	-	-	-	-	-	-
Off-Highway Trucks	2	4	3	4	2	4	-	-	1	4	1	4	-	-	2	4	2	4	2	4	-	-
Other General Industrial Equipment (Specify)	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	2	7	-	-	-	-
Paving Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	7
Plate Compactors	-	-	2	5	2	5	2	4	1	4	-	-	2	4	-	-	-	-	-	-	2	4
Pressure Washers	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	1	4	-	-	-	-
Pumps	-	-	-	-	-	-	-	-	1	6	-	-	-	-	-	-	-	-	-	-	-	-
Rollers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	5
Rough Terrain Forklifts	-	-	-	-	-	-	2	2	1	6	1	5	2	8	2	6	3	7	1	7	1	3
Rubber Tired Dozers	2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4
Rubber Tired Loaders	-	-	2	5	2	6	1	2	-	-	-	-	1	6	-	-	-	-	-	-	-	-
Scrapers	-	-	2	4	2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skid Steer Loaders	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6
Sweepers/Scrubbers	1	4	1	4	1	4	1	4	-	-	-	-	1	4	1	4	1	4	1	6	-	-
Tractors/Loaders/Backhoes	2	5	1	6	2	6	2	6	-	-	-	-	2	6	-	-	-	-	-	-	2	4
Trenchers	-	-	-	-	-	-	2	4	-	-	-	-	4	7	-	-	-	-	-	-	-	-
Welders	-	-	-	-	-	-	-	-	3	6	2	5	-	-	5	7	2	6	1	5	-	-

[1] Construction of Phase 1 and Phase 2 of the Project are sufficiently similar to assume the same equipment roster is utilized during the construction phases.

[2] Painting and Façade Equipment are classified as "Other General Industrial Equipment" in CalEEMod.

2.1.2 Onsite Fugitive Dust Emissions

Demolition and onsite materials movement activities generate fugitive dust. $PM_{2.5}$ and PM_{10} resulting from fugitive dust emissions were calculated using CalEEMod defaults and soils import/export and demolition volumes provided by ARE's construction company.

CalEEMod calculates demolition emissions based on methodologies and default emission factors from a 1988 report[6] prepared for the United States Environmental Protection Agency (U.S. EPA) by Midwest Research Institute (MRI). Fugitive dust from demolition operations are generated primarily through mechanical and/or explosive dismemberment and through debris loading and associated on-site truck traffic on paved and unpaved roads. Dust emissions from mechanical or explosive dismemberment are based on the tons of debris demolished, the mean wind speed, material moisture content (default of 2 percent), and a particle size multiplier for PM_{10} and $PM_{2.5}$ (default of 0.35 and 0.053, respectively). The dust emissions from debris loading are calculated using the tons of debris loaded, particle size multipliers, and an emission factor for total suspended particulates (TSP) (default of 0.58 lb/ton) from the 1988 MRI report. The TSP emission factor is based on two tests of the filling of trucks with crushed limestone using a front-end loader. Specific formulas used to calculate demolition emissions can be found in the CalEEMod User's Guide Appendix A, section 4.4.

Materials movement activities include site grading, dozers moving dirt onsite, and truck loading and unloading. Detailed calculation methodology can be found in the CalEEMod User's Guide Appendix A, Section 4.3.

For grading activities, emissions are calculated by multiplying pound per vehicle miles traveled (lb/VMT) emission factors by grading equipment vehicle miles traveled (VMT). Emission factors in lb/VMT for PM_{10} and $PM_{2.5}$ are determined by mean vehicle speed and U.S. EPA AP-42 Section 11.9[7], Table 11. 9-1 Emission Factor Equations and Scaling Factors for grading. The VMT for grading equipment is based on the total acres graded divided by the grading equipment blade width (default of 12 feet). The CalEEMod default for total acres graded is based on the type and number of grading equipment and equipment-specific grading rates from Walker's Building Estimator's Reference Book and determinations by the South Coast Air Quality Management District (SCAQMD).

Emissions from bulldozing are calculated by multiplying the pound per hour (lb/hr) emission factors by the hours of operation for bulldozing equipment. Emission factors in lb/hr for PM_{10} and $PM_{2.5}$ are determined by material moisture content, material silt content and U.S. EPA AP-42 Section 11.9, Table 11.9-1 Emission Factor Equations and Scaling Factors for bulldozing overburden material. CalEEMod uses the overburden constants associated with overburden as defaults for calculation of bulldozing dust emissions since of the available material options in AP-42 Table 11.9-1, overburden most closely models the bulldozed materials during construction.

Fugitive dust emissions from truck loading and unloading of imported and exported soils are based on the tons of loaded and unloaded materials, the mean wind speed, material moisture content, and a particle size multiplier for PM_{10} and $PM_{2.5}$ (default of 0.35 and 0.053, respectively).

[6] Grelinger, M.A., Muleski, G., Kinsey, J.S., Cowherd, C., & Hecht, D. Gap-filling PM10 emission factors for selected open-area dust sources. United States. 1988

[7] U.S. EPA AP-42, Fifth Edition, Volume I Chapter 11: Mineral Products Industry. Section 11.9: Western Surface Coal Mining. Available online at: https://www3.epa.gov/ttnchie1/ap42/ch11/. Accessed June 6, 2018.

2.1.3 On-Road Vehicle Emissions

During construction, worker trips, vendor trips, and hauling trips by on-road mobile sources contribute to exhaust emissions of ROG, NO_x, CO, SO_2, Exhaust PM_{10}, Exhaust $PM_{2.5}$, and GHG emissions. Another source of emissions is known as evaporative emissions where ROG is emitted due to venting of fuel from a vehicle when a vehicle is parked, driven, and refueled. PM emissions from brake and tire wear as well as on-road fugitive dust emissions associated with vehicles travelling over paved and unpaved roads also result from construction-related travel. The CalEEMod User's Guide, Appendix A, Section 4.5 and 4.6 describe in detail the emission factors used, CalEEMod default assumptions, and calculation methodologies for the emissions associated with on-road vehicle emissions.

The number of worker and vendor trips per day is estimated based on the methodology specified in the CalEEMod User's Guide, Appendix A, Section 4.5, which is explained in more detail in the footnote associated with **Table 2-3**. The number of hauling trips is based on the amount of material demolished, imported, and exported and the information provided by the construction company that each truck has the capacity to haul 20 cubic yards of materials. Haul trips are assumed not to be phased since the imported soils are sourced from a different location than exported soils. The number of trips per phase of construction is shown in **Table 2-3** along with associated trip lengths. Default trip lengths from CalEEMod were utilized for worker and vendor trips. Since the location of the landfill where demolished and exported materials will be taken and the location of the quarry where backfill material will be sourced from are known, the trip lengths are adjusted appropriately for haul trips based on actual trip lengths, number of haul trips for import and export, and the distances to the respective locations.

Based on the trips per day and associated trip lengths, vehicle miles traveled were determined. EMFAC2014 web database[8] emission factors for each pollutant (except methane), vehicle class, season, and operating year for San Mateo County based on aggregated model year and speed data were used to determine the annual and seasonal lb/VMT for on-road vehicle direct emissions. The CalEEMod User's Guide Appendix A, Section 4.5 and 4.6 explains this in more detail.

Methane emission factors in lb/VMT were provided by the California Air Resources Board (CARB). The CalEEMod default vehicle mixes were used for worker, vendor, and hauling trips. To determine fugitive dust ($PM_{2.5}$ and PM_{10}) emissions, it was assumed that all roads travelled by workers, vendors, and haulers were 100% paved due to site geography. Methodologies in CalEEMod used to calculate fugitive dust emissions for vehicles travelling on paved roads are based on U.S. EPA's AP-42 Section 13.2.1.[9] CalEEMod default values for road silt loading and average weight of vehicles travelling the road as well as precipitation data for San Mateo county were used. CalEEMod conservatively assumes no precipitation when calculating daily emissions.

2.1.4 Architectural Coating and Paving Emissions

ROG emissions result from off-gassing from evaporation of solvents contained in surface coatings and off-gassing associated with asphalt paving of parking lots.

ROG emissions from architectural coatings are based on the estimated surface area painted and an lb VOC/square foot emission factor which varies by construction start year, location, and coating

[8] California Air Resources Board EMFAC2014 Web Database. Available online at: https://www.arb.ca.gov/emfac/2014/. Accessed June 6,2018.

[9] U.S. EPA AP-42, Fifth Edition, Volume I Chapter 13: Miscellaneous Sources. Section 13.2: Introduction to Fugitive Dust Sources. Section 13.2.1: Paved Roads. Available online at: https://www3.epa.gov/ttn/chief/ap42/ch13/. Accessed June 6, 2018.

Table 2-3

Construction Trips							
Project Phase	Construction Phase	Worker Trips[1]	Worker Trip Length (mi)[2]	Vendor Trips[1]	Vendor Trip Length (mi)[2]	Hauling Trips[3]	Hauling Trip Length (mi)[4]
1	Demolition	20	10.8	-	-	230	19
	Soils Abatement and Replacement	20	10.8	-	-	814	12.6
	Site Prep and Make Ready	19	10.8	-	-	-	-
	Parking Garage Underground	11	10.8	5	7.3	-	-
	Office Building Underground	13	10.8	6	7.3	-	-
	Parking Garage Core	96	10.8	43	7.3	-	-
	Office Building Core	113	10.8	50	7.3	-	-
	Parking Garage exterior improvements	22	10.8	-	-	-	-
	Office Building Tenant Imrovements	19	10.8	-	-	-	-
	Landscaping and Site Improvements	19	10.8	-	-	-	-
	Office Building Exterior Improvements	7	10.8	-	-	-	-
2	Demolition	20	10.8	-	-	1509	19
	Soils Abatement and Replacement	20	10.8	-	-	659	12.6
	Site Prep and Make Ready	19	10.8	-	-	-	-
	Parking Garage Underground	6	10.8	3	7.3	-	-
	Office Building Underground	13	10.8	6	7.3	-	-
	Parking Garage Core	46	10.8	21	7.3	-	-
	Office Building Core	114	10.8	51	7.3	-	-
	Parking Garage exterior improvements	11	10.8	-	-	-	-
	Office Building Tenant Imrovements	19	10.8	-	-	-	-
	Landscaping and Site Improvements	19	10.8	-	-	-	-
	Office Building Exterior Improvements	7	10.8	-	-	-	-

[1] Calculated according to methodologies specified in the CalEEmod User's Guide Appendix A. For all construction phases except building construction and architectural coating phases, the number of workers based on 1.25 workers per equipment in that phase. For building construction phases, worker and vendor trip rates are based on SMAQMD Building Construction worker and Vendor Trip rates. These rates were obtained from a comprehensive field study conducted by SMAQMD in 2008 (updated 2010) of worker/vendor trips associated with construction of different land use types and are used as the basis for the CalEEMod default values. These rates are utilized to estimate the worker and vendor trip rates associated with this project and where necessary adjusted using the same approach to account for multiple phases in order to run CalEEMod. Architectural coating worker trips are based on 20% of the associated building construction phase trips. Note that construction coating stage for the office building are separated into interior and exterior coating phases in the project construction schedule. Therefore, the outdoor coating stage is assumed to require 25% of the worker trips and the indoor coating stage is assumed to require 75% of the worker trips based on CalEEmod default assumption that exterior shell is 25% of building surface area.

[2] CalEEMod default trip rates.

[3] Based on the volumes of debris from demolition, soils exported, and soils imported.

[4] Distance to Half Moon Bay Landfill is 19 miles. Distance to quarry where imported material is sourced is 6.2 miles. Hauling Trip length for Soils abatement and replacement Phase is based on weighted average trip length.

type. The default CalEEMod factors for San Mateo County for non-residential interior, non-residential exterior, and parking lot paint were used to estimate surface coating emissions. Methodologies from the CalEEMod User's Guide, Appendix A, Section 4.7 for estimating office building and parking lot surface areas were used. The estimated building and parking lot surface areas for coating operations are shown in **Table 2-4** and the associated footnote goes into more detail on the methodology for estimating these surface areas.

Asphalt paving off-gas emissions of ROG are determined based on the acreage of parking lot area and a default emission factor of 2.62 lb ROG/acre based on the factor developed by the Sacramento Metropolitan Air Quality Management District (SMAQMD) in the 1994 development of Air Quality TOS document, first edition and are incorporated by reference in the CALEEMod User's Guide Appendix A, page 18. The parking garage area is assumed to be concrete with no off-gassing and thus only surface parking lot areas are used to determine ROG emissions associated with asphalt paving.

To conservatively estimate emissions from asphalt paving activities, it is assumed that the entire acreage of the construction site not used by building or parking structure footprints makes up the parking lot area and will be asphalt-paved. This is a conservative estimate since a portion of the BTP district will be landscaped and pedestrian sidewalks and other walkways will not be asphalt-coated. Table 2-3

2.2 Operational Emissions

Emission rates from all operational-related activities resulting from Phase 1 and Phase 2 of the project except for stationary diesel-fired emergency generator engines were calculated using CalEEMod. Project operational-related activities for Phase 1 and Phase 2 were summed to determine the average daily emissions and maximum annual emission rates. Phase 1 and Phase 2 operational-related emissions are however, evaluated separately to allow demonstration that both phases of project operation will meet the specified TOS. This is particularly important to evaluate the GHG emission metric ton (MT) carbon dioxide equivalent (CO_2e) per service population[10] (SP) per year TOS as provided in **Table 1-1** since the operational-related emissions from Phase 1 and Phase 2 of the project will have different annual CO_2e emissions and service populations. It is important to note that stationary source emissions of CO_2e for emergency generator engines were evaluated and compared against the TOS of 10,000 $MTCO_2e$/yr of GHG emissions since stationary sources are regulated under CARB's Mandatory Reporting Rule for GHG[11] which requires mandatory reporting of GHG emissions for stationary combustion sources under Subarticle 2, Section 95115. Additionally, impacts from these emissions are being mitigated at stationary sources through the California Cap and Trade Program[12]. Because of this, the CO_2e emissions associated with stationary source operational-related emissions are not aggregated with the other project operational-related GHG emissions to assess the $MTCO_2e$/SP/yr threshold.

[10] BAAQMD's CEQA guidelines specify that service population is determined based on the number of residents (not relevant to this project) plus the number of jobs estimated for a given point in time. The estimated service population for the project is based on 300 square feet per employee.

[11] California Code of Regulations Title 17. Public Health, Division 3. Air Resources, Chapter 1. Air Resources Board, Subchapter 10. Climate Change, Article 2: Mandatory Greenhouse Gas Emissions Reporting (2016 Regulation). Available online at: https://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-2016-unofficial-2017-10-10.pdf?_ga=2.143509363.710610083.1528304228-428886969.1525371933. Accessed June 6, 2018.

[12] California Code of Regulations Title 17. Public Health, Division 3. Air Resources, Chapter 1. Air Resources Board, Subchapter 10. Climate Change, Article 5: California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms. Available online: https://arb.ca.gov/cc/capandtrade/capandtrade/unofficial_ct_100217.pdf. Accessed June 6, 2018.

Table 2-4

Coating Surface Areas						
Project Phase	**Structure**	**Area (gsf)[1]**	**Surface area[2]**	**Interior SA[3]**	**Exterior SA[3]**	**Lot area to be painted[4]**
1	201 Haskins Way	311,368	622,736	467,052	155,684	-
	400-450 Jamie Court	25,000	50,000	37,500	12,500	-
	Parking Garage (spaces)	288,000	-	-	-	17,280
	Parking Lot	81,200	-	-	-	4,872
2	East Grand Building	256,232	512,464	384,348	128,116	-
	400-450 Jamie Court	85,000	170,000	127,500	42,500	-
	Parking Garage (spaces)	136,000	-	-	-	8,160
	Parking Lot	97,200	-	-	-	5,832

[1] CalEEMod calculates the gross square footage of the parking garage and lots based on the number of spaces for coating ROG emission estimates.

[2] CalEEMod Appendix A specifies that nonresidential building surface areas be estimated based on two-times the floor square footage.

[3] CalEEMod Appendix A specifies that fraction of surface area being coated should be based on 75% of estimated building surface area for building interior spaces, and 25% of estimated building surface area for building exterior shell.

[4] CalEEMod default assumption is that 6 percent of parking lot surface area is coated.

Previous light trucking operations at 201 Haskins Way ceased prior to the issuance of the NOP and therefore, according to BAAQMD CEQA guidelines[13], the emission levels associated with this previous land use cannot be subtracted from the emission levels estimated for the new proposed land use. Additionally, since the Phase 2 development is still conceptual, it is unclear whether the current land use operations will continue or would continue regardless of the Phase II project approval. Therefore, a conservative approach was taken for the impacts analyses and none of the existing emission levels associated with current land uses are subtracted from estimated project emission levels to determine net project impacts. Emissions generated from mobile sources, area sources, and stationary sources associated with the BTP district operations are summarized below.

2.2.1 Mobile Source Emissions

Mobile source emissions include emissions from on-road vehicles used for transport to and from the office park by workers, delivery drivers, and customers. There will be additional mobile source emissions from BTP district operation and maintenance activities. These emissions will result from the use of off-road equipment such as forklifts, cranes, and power washers. These mobile sources contribute to emissions of ROG, NO_x, CO, SO_2, direct emissions of PM_{10} and $PM_{2.5}$, and GHG emissions. Fugitive dust in the form of PM_{10} and $PM_{2.5}$ are also created due to vehicle travel over paved roadways. Off-road equipment emissions are determined in the same manner as off-road equipment emissions during the construction phase (see Section 2.1.1, Off-road Equipment Emissions on pp. F-5). On-road vehicle emissions are calculated as described below.

Trip rates associated with the project were based on a traffic study which quantified peak hour trips associated with the proposed project operations for Phase 1 and Phase 2. PM peak hour[14] total trips were doubled to estimate a daily trip rate, which should afford an adequately conservative estimate of daily trips associated with each Phase of operation. Based on this and the BTP district square footage, SWCA determined a weekday trip rate in trips/ksf/day. The trip rates determined by this method were lower than CalEEMod default values for this land use type due to higher than typical suburban utilization of alternative modes of transportation. A summary of the assumed trip rates for weekdays, Saturdays, and Sundays is shown in **Table 2-5** and the associated footnote goes into more detail on how these rates were determined.

Trip type percentages were adjusted from CalEEMod defaults for commercial land usage to be 71 percent worker trips, (C-W), 19 percent delivery driver trips (C-NW), and 10 percent customer trips (C-C) since the nature of the project would result in less customer trips than with typical commercial land usage. CalEEMod defaults for trip lengths and trip characteristics with regard to primary, diverted, or pass-by trips were used. Using the variables listed above, the CalEEMod program calculated a value for daily VMT based on the methodology described in the CalEEMod User's Guide, Appendix A, Section 5.1.

[13] BAAQMD CEQA Guidelines state: "If a proposed project involves the removal of existing emission sources, BAAQMD recommends subtracting the existing emissions levels from the emissions levels estimated for the new proposed land use. This net calculation is permissible only if the existing emission sources were operational at the time that the Notice of Preparation (NOP) for the CEQA project was circulated or in the absence of an NOP when environmental analysis begins, and would continue if the proposed redevelopment project is not approved. This net calculation is not permitted for emission sources that ceased to operate, or the land uses were vacated and/or demolished, prior to circulation of the NOP or the commencement of environmental analysis. This approach is consistent with the definition of baseline conditions pursuant to CEQA."

[14] The traffic study evaluated peak hour traffic during PM and AM peak hours. PM peak hour traffic volumes were the highest, and thus, these were used to conservatively estimate trip rates.

Table 2-5

Trip Rates					
Phase	New Office ksf	PM Peak Hour Trips[1]	Weekday Trip Rate (trips/ksf/day)[2]	Saturday Trip Rate[3] (trips/ksf/day)	Sunday Trip Rate[3] (trips/ksf/day)
1	336.368	313	1.86	0.27	0.12
2	341.232	317	1.86	0.27	0.12

[1] Traffic peak hour trips are from the traffic study conducted for the project.

[2] Weekday Trip rate assumes that the peak hour trips per day are doubled to conservatively account for worker trips for lunch breaks and commuter trips from workers with different work schedules than typical.

[3] Saturday and Sunday Trip rates are based on the ratio of CalEEMod default Weekday, Saturday and Sunday Trip rates.

The lb/VMT emission factors were determined in the same manner as emission factors from on-road vehicles associated with construction (described in section 2.1.3, On-Road Vehicle Emissions on pp. F-7**)**. CalEEMod defaults for fleet mix, road silt, and average vehicle weight were used to derive these factors, and like construction trips, trips related to operation of the BTP district are assumed to occur over 100% paved road surfaces. The emission factors, methodologies, and calculations to determine the VMT and lb/VMT factors are described in detail in the CalEEMod User's Guide, Appendix A, Section 5.

Based on the daily CalEEMod defaults for VMT and lb/VMT, emissions of CAPs, GHGs, and fugitive dust associated with BTP district operations for both Phase 1 and Phase 2.

2.2.2 Area Source Emissions

Area source emissions are classified into the direct and indirect area source emissions associated with project operations. Direct area source emissions occur when emissions are released from inside the project area. Direct emissions will include:

- ROG emissions from consumer products;
- ROG emissions from reapplication of architectural coatings;
- CAP and GHG emissions from landscaping equipment and;
- CAP and GHG emissions from building natural gas usage

Indirect area sources include sources of emissions where the emission point is located outside the project area, but the emissions are a direct result of the project's use of a resource or generation of waste through normal operations. For CEQA project impacts analyses, pollutant indirect impacts are attributed to a project when:

- pollutant emissions that are not permitted or effectively regulated through stationary source requirements at the emission point; and,
- the efforts of the operation responsible for using the resource or generating the waste are most effective in reducing the impacts should be attributed to project operational-related impacts.

Because the BAAQMD has a well-developed system for regulating CAPs from stationary sources (such as power plants, wastewater treatment plants, and landfills), GHGs are the only pollutants that are compared to CEQA TOS as indirect area source impacts. Indirect area source emissions applicable to the project are listed below:

- GHG emissions from electricity usage (generated by the burning of fuel at the power plant which produces electricity);
- GHG emissions from electricity usage for supplying freshwater to the BTP;
- GHG emissions from electricity usage for treating wastewater and distributing treated wastewater;
- GHG emissions evolved from wastewater in the wastewater treatment process (includes methane and nitrous oxides that are emitted directly at the wastewater treatment plant); and
- GHG emissions (methane) resulting from the disposal of solid waste in landfills

For area sources, CalEEMod defaults and the calculation methodologies specified in the CalEEMod User's Guide, Appendix A, Section 6 through Section 9 were used to determine emissions.

2.2.3 Stationary Source Emissions

Stationary source emissions result from the operation of emergency diesel generators which serve the BTP district office buildings. For the project it was assumed that one 896 hp emergency generator will be located next to the building footprint for each newly constructed office building (2 in Phase 1 operation and 2 more in Phase 2 operation) for a total of four emergency generators. These units will be operated 20 minutes per day, once per week for maintenance and testing purposes.

Emissions from the emergency generators include ROG, NO_x, CO, SO_2, exhaust emissions of PM_{10} and $PM_{2.5}$, and GHG emissions. The engine will be compliant with U.S. EPA's Tier exhaust emission standards for nonroad compression-ignition engines applicable to its model year. To be conservative, the Tier 2 emission factors were used to calculate ROG, NO_x, CO, PM_{10} and $PM_{2.5}$. GHG emissions of CO_2, CH_4, and N_2O were calculated using 40 CFR Part 98, Subpart C Tables C-1 and C-2 emission factors for diesel fuel (petroleum distillate No. 2).

Emergency standby engines with a model year of 2012 or newer have specified limitations for operations in non-emergency situations. As specified in Section 9-8-330 of BAAQMD Regulation 9, Rule 8[15], emergency standby engines may not be operated for maintenance and readiness checks more than 50 hours per year unless required to comply with NFPA testing requirements. The maintenance and testing schedule proposed once operations begin in the BTP district should be well below the 50 hours per year limitation for maintenance and readiness testing specified in the BAAQMD regulation, but emissions of CAPs and GHGs are conservatively based on 50 hours per year of operation.

3. Results

Section 3 of this technical document discusses results of analyses conducted and demonstrates that the project will not result in cumulatively considerable impacts based on comparison against BAAQMD TOS or screening thresholds. Project impacts would be considered cumulatively considerable if the TOS is exceeded after mitigation is applied. All impacts related to the project construction and operation were determined to be either less-than-significant, or less-than-significant with mitigation.

As provided in Section 1.2 of this Chapter (regarding scope), no quantitative analysis was required to determine potential project impacts to sensitive receptors regarding cancer risk, non-cancer health index, $PM_{2.5}$ concentrations, accidental release of acutely hazardous pollutants, or odors since no sensitive receptors exist within the project zone of influence. Therefore, these topics are not addressed in this section, but a summary of all pollutant emissions, potential risks assessed and justification of CEQA significance level determined is listed in **Table 5-1**. Full CalEEMod results are included in **Attachments A-H** for reference.

3.1 Criteria Air Pollutant and Precursors

[15] Bay Area Air Quality Management District Current Rules. Reg 9, Rule 8: Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines. Available online at: http://www.baaqmd.gov/rules-and-compliance/current-rules. Accessed June 6, 2018.

Table 5-1

Air Quality CEQA Assessment Results			
Criteria Evaluated	**Contribution to Impacts**	**Mitigation Proposed**	**Justification for Determination**
Average Daily CAP Construction-Related Emissions	Less-than-significant with Mitigation	MM AQ-1: Off-road equipment greater that 25 horsepower used during construction shall meet the Tier 4 Final off-road emission standards. Should the utilization of equipment meeting this standard prove to be technically infeasible, the construction contractor will select the lowest-emitting off-road equipment available. The construction contractor shall develop a Construction Emissions Minimization Plan (CEMP) which establishes the process used to select the lowest-emitting off-road equipment and specify the steps that will be taken to reduce emissions of CAPs. The CEMP will be submitted to the City's Planning Department and approved prior to utilizing off-road equipment greater than 25 horsepower that does not meet Tier 4 Final off-road emission standards. MM AQ-2: Implement BAAQMD Basic Construction Mitigation Measures.	CalEEMod results reveal that after implementation of the specified mitigation measures for both Phase 1 and Phase 2 of the project, the average daily construction emissions are below the Thresholds of Significance developed by the BAAQMD.
Average Daily CAP Operational-Related Emissions	Less-than-significant	None	CalEEMod results combined with average daily diesel-fired emergency generator emissions reveal that once the rezoning project is complete, the average daily operational-related emissions from Phase 1 and Phase 2 of the project are below the Thresholds of Significance developed by the BAAQMD.
Maximum Annual CAP Operational-Related Emissions	Less-than-significant	None	CalEEMod results combined with annual diesel-fired emergency generator emissions reveal that once the rezoning project is complete, the maximum annual operational-related emissions from Phase 1 and Phase 2 of the project are below the Thresholds of Significance developed by the BAAQMD.
Maximum Annual GHG Construction-Related Emissions	Less-than-significant	None	CalEEMod was used to quantify construction-related GHG emissions. No specific Threshold of Significance is specified for construction-related GHG emissions. However, BAAQMD recommends assessing these emissions against local and state GHG emission reduction goals. To accomplish this, GHG emissions from construction were distributed over an assumed 40 year project lifespan since GHG emissions have long term impacts on climate. The average annual construction-related CO_2e emissions were added to the annual operational-related CO_2e emissions and the combined total was evaluated against the operational-related Threshold of Significance established by BAAQMD.
Maximum Annual GHG Operational-Related Emissions	Less-than-significant	None	CalEEMod results combined with annual diesel-fired emergency generator emissions reveal that once the rezoning project is complete, the maximum annual operational-related GHG emissions from Phase 1 and Phase 2 of the project are below the Thresholds of Significance developed by the BAAQMD. As mentioned above, annual average construction-related GHG emissions were included when comparing the project emissions against the operational Threshold of Signficance as well.
Excess lifetime cancer risk, chronic hazard index, and fine articulate matter ($PM_{2.5}$) concentration from project construction on off-site sensitive receptors.	Less-than-significant	None	BAAQMD CEQA Gudelines recommend that potential effects of TAC and $PM_{2.5}$ sources from construction-related activities on sensitive receptors located within 1,000 feet of the project property boundary be evaluated. There are no sensitive receptors located within 1,000 feet of the project, and therefore, the risk impacts are estimated to be less-than-significant.
Excess lifetime cancer risk, chronic hazard index, and fine articulate matter ($PM_{2.5}$) concentration from project operation on off-site sensitive receptors.	Less-than-significant	None	BAAQMD CEQA Gudelines recommend that potential effects of TAC and PM2.5 sources from construction-related activities on sensitive receptors located within 1,000 feet of the project property boundary be evaluated. There are no sensitive receptors located within 1,000 feet of the project, and therefore, the risk impacts are estimated to be less-than-significant.
Excess lifetime cancer risk, chronic hazard index, and fine articulate matter ($PM_{2.5}$) concentration from project construction on on-site sensitive receptors.	No Impact	None	There are no new receptors sited as part of the proposed project.
Excess lifetime cancer risk, chronic hazard index, and fine articulate matter ($PM_{2.5}$) concentration from project operation on on-site sensitive receptors.	No Impact	None	There are no new receptors sited as part of the proposed project.
Cumulative excess lifetime cancer risk, chronic hazard index, and fine articulate matter ($PM_{2.5}$) concentration from project construction on off-site sensitive receptors.	Less-than-significant	None	Since individual project impacts are less-than-significant, no cumulative impacts are anticipated on off-site receptors.
Cumulative excess lifetime cancer risk, chronic hazard index, and fine articulate matter ($PM_{2.5}$) concentration from project operation on off-site sensitive receptors.	Less-than-significant	None	Since individual project impacts are less-than-significant, no cumulative impacts are anticipated on off-site receptors.

Table 5-1

Air Quality CEQA Assessment Results			
Criteria Evaluated	**Contribution to Impacts**	**Mitigation Proposed**	**Justification for Determination**
Cumulative excess lifetime cancer risk, chronic hazard index, and fine articulate matter ($PM_{2.5}$) concentration from project construction on on-site sensitive receptors.	No Impact	None	There are no new receptors sited as part of the proposed project.
Cumulative excess lifetime cancer risk, chronic hazard index, and fine articulate matter ($PM_{2.5}$) concentration from project operation on on-site sensitive receptors.	No Impact	None	There are no new receptors sited as part of the proposed project.
Storage or use of acutely hazardous materials locating near receptors or new receptors locating near stored or used acutely hazardous materials.	No Impact	None	There are no new receptors sited as part of the proposed project and there will not be hazardous materials used or stored as part of project operations.
Odor Complaints	No Impact	None	The project construction and operation would not contribute to objectionable odors that affect a significant number of people.

3.1.1 Construction CAPs

The TOS for construction-related CAPs and precursors are:

- Daily average ROG, NO_x, and $PM_{2.5}$ emissions of greater than 54 lb/day;
- Daily average PM_{10} emissions of greater than 82 lb/day; and,
- No specific TOS is established for $PM_{2.5}$ and PM_{10} from construction fugitive dust. However, if best management practices are implemented during construction, then it is assumed that these emissions are below the TOS.

Based on calculated data, CAP emissions from construction were less-than-significant with mitigation. The highest average daily pre-mitigation and post-mitigation construction emissions from Phase 1 and Phase 2 of the construction project are listed in **Tables 5-2** and **5-3**, respectively. For both Phase 1 and Phase 2 of construction, the pre-mitigation emissions of NO_x are higher than the TOS of 54 lb/day. The following mitigation measure will be applied during construction of the project:

> *MM AQ-1: Off-road equipment greater that 25 horsepower used during construction shall meet the Tier 4 Final off-road emission standards. Should the utilization of equipment meeting this standard prove to be technically infeasible, the construction contractor will select the lowest-emitting off-road equipment available. The construction contractor shall develop a Construction Emissions Minimization Plan (CEMP) which establishes the process used to select the lowest-emitting off-road equipment and specify the steps that will be taken to reduce emissions of CAPs. The CEMP will be submitted to the City's Planning Department and approved prior to utilizing off-road equipment greater than 25 horsepower that does not meet Tier 4 Final off-road emission standards.*

For all construction projects, BAAQMD's Basic Construction Mitigation Measures should be implemented to reduce emissions regardless of whether impacts would exceed Thresholds of Significance. The Basic Construction Mitigation Measures establish best practices during construction and implementation of these measures is considered in determining whether fugitive dust emissions from construction meet the TOS. These mitigation measures are listed below and will be applied to project construction:

> *MM AQ-2: Implement BAAQMD Basic Construction Mitigation Measures. These measures are listed below:*
>
> - *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 mph.*
> - *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.*

Table 5-2

Unmitigated Construction-Related CAP Emissions[1]						
Project Phase	**ROG (lb/day)**	**NO_x (lb/day)**	**Exhaust PM_{10} (lb/day)**	**Exhaust $PM_{2.5}$ (lb/day)**	**Fugitive PM_{10} (lb/day)**	**Fugitive $PM_{2.5}$ (lb/day)**
Phase 1	43.00	118.86	5.37	4.98	4.47	0.93
Phase2	39.57	108.65	4.31	3.99	3.62	0.78
BAAQMD TOS	54	54	82	54	Best Management Practices	Best Management Practices

[1] Displays unmitigated maximum average daily emission rates determined based from CalEEmod version 2016.3.2.

Table 5-3

Mitigated Construction-Related CAP Emissions[1]						
Project Phase	**ROG (lb/day)**	**NO_x (lb/day)**	**Exhaust PM_{10} (lb/day)**	**Exhaust $PM_{2.5}$ (lb/day)**	**Fugitive PM_{10} (lb/day)**	**Fugitive $PM_{2.5}$ (lb/day)**
Phase 1	33.34	39.55	0.42	0.42	3.32	0.75
Phase2	32.41	40.51	0.32	0.32	2.69	0.64
BAAQMD TOS	54	54	82	54	Best Management Practices	Best Management Practices

[1] Displays mitigated maximum average daily emission rates determined based from CalEEmod version 2016.3.2.

- *Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.*
- *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.*
- *Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.*

3.1.2 Operational CAPs

The TOS for operational-related CAPs and precursors are:

- Daily average ROG, NO_x, and $PM_{2.5}$ emissions of greater than 54 lb/day;
- Daily average PM_{10} emissions of greater than 82 lb/day;
- Maximum annual ROG, NO_x, and $PM_{2.5}$ emissions of greater than 10 tons per year (tpy); and,
- Maximum annual PM_{10} emissions of greater than 15 tpy

Based on calculated data, CAP emissions from the operation of Phase 1, Phase 2, and Phase 1 & 2 operation combined were less than significant without any mitigation measures applied. The highest average daily and maximum annual emissions from Phase 1, Phase 2, and Phase 1 & 2 operation are shown in **Tables 5-4** and **5-5**.

3.2 Greenhouse Gases

3.2.1 Construction GHGs

There is no established TOS specifically for GHG emissions resulting from construction. However, impacts from construction-related GHG emissions should be assessed to determine compatibility with local and state GHG emission reduction goals. The GHG emissions for each year of construction for each Project Phase are listed in **Table 5-6**. To assess GHG impacts from construction, the GHG emissions for the Phase 1, Phase 2, and Phase 1 & 2 construction periods (approximately 18 months for each phase) were amortized over an assumed lifespan of 40 years for the BTP district office buildings. **Table 5-6** lists the construction-related GHG emissions in $MTCO_2e$/yr determined using the aforementioned method.

The appropriate amortized MT/yr CO_2e construction values were then added to Phase 1 and Phase 1 & 2 operational-related GHG emissions to assess compliance with operational TOS as described in Section 3.2.2, Operational GHGs. This methodology is consistent with the approach adopted as standard practice by multiple local Air Quality Districts for assessing construction GHG emission impacts. Using this methodology, potential impacts related to GHG construction emissions can be assessed in a quantitative manner.

Table 5-4

Unmitigated Operational-Related CAP Emissions[1]						
Project Phase	**ROG (lb/day)**	**NO_x (lb/day)**	**Exhaust PM_{10} (lb/day)**	**Exhaust $PM_{2.5}$ (lb/day)**	**Fugitive PM_{10} (lb/day)**	**Fugitive $PM_{2.5}$ (lb/day)**
Phase 1	10.86	15.45	0.63	0.60	3.68	0.98
Phase 2	10.69	13.44	0.53	0.51	3.73	1.00
Combined	21.55	28.89	1.16	1.11	7.41	1.98
BAAQMD TOS	54	54	82	54	None	None

[1] Displays unmitigated maximum average daily emission rates determined based from CalEEmod version 2016.3.2.

Table 5-5

Unmitigated Operational-Related CAP Emissions[1]						
Project Phase	**ROG (tpy)**	**NO_x (tpy)**	**Exhaust PM_{10} (tpy)**	**Exhaust $PM_{2.5}$ (tpy)**	**Fugitive PM_{10} (tpy)**	**Fugitive $PM_{2.5}$ (tpy)**
Phase 1	1.81	1.47	0.06	0.06	0.48	0.13
Phase 2	1.80	1.37	0.06	0.05	0.00	0.13
Combined	3.61	2.84	0.12	0.12	0.48	0.26
BAAQMD TOS	10	10	15	10	None	None

[1] Displays unmitigated maximum annual emission rates determined based from CalEEmod version 2016.3.2.

Table 5-6

Unmitigated Construction-Related GHG Emissions[1]		
Construction Year	**Phase 1 Construction (MT CO_2e/yr)**	**Phase 2 Construction (MT CO_2e/yr)**
2018	57.67	-
2019	1438.74	-
2020	801.04	235.19
2021	-	1255.03
2022	-	563.30
Total Construction Emissions (MT)	2297.44	2053.53
Construction MT/yr (amortized)[2]	57.44	51.34

[1] Displays unmitigated maximum annual emission rates determined based from CalEEmod version 2016.3.2.

[2] Total construction emissions of CO2e is metric tons is distributed over 40 years (assumed lifetime of the BTP district) to calculate an average annual MT/yr emission rate so that construction emissions can be added to operational emissions of the project. In this way, all project GHG emissions can be quantitatively assessed against the BAAQMD TOS.

Table 5-7

Unmitigated Operational-Related GHG Emissions with Amortized Construction[1]			
Source Description	**Phase 1 Operation/Construction (MT CO_2e/yr)**	**Phase 1 Operation/ Phase 1&2 Construction (MT CO_2e/yr)**	**Phase 1&2 Operation/Construction (MT CO_2e/yr)**
Area	0.02	0.02	0.04
Energy	2070.09	2070.09	3904.37
Mobile	486.46	486.46	955.07
Off-Road	27.46	27.46	54.92
Waste	157.32	157.32	316.91
Water	213.31	213.31	429.70
Vegetation (amortized)[1]	-0.88	-0.88	-2.01
Construction (amortized)[1]	45.95	87.02	87.02
Maximum Annual Emissions (MT/yr)	2999.73	3040.80	5746.02
Service Population (SP)	1120.00	1120.00	2260.00
Emissions per SP (MT/SP/yr)	2.68	2.72	2.54
BAAQMD TOS (MT/SP/yr)	4.60	4.60	4.60

[1] Displays unmitigated maximum annual emission rates determined based from CalEEmod version 2016.3.2 and adds amortized construction rates from Table 5-6

[2] Total construction emissions of CO2e is metric tons is distributed over 40 years (assumed lifetime of the BTP district) to calculate an average annual MT/yr emission rate so that construction emissions can be added to operational emissions of the project. In this way, all project GHG emissions can be quantitatively assessed against the BAAQMD TOS. Reduction in CO2e from net new tree sequestration is also amortized over 40 years for consistency.

3.2.2 Operational GHGs

The TOS for Operational Emissions of GHG are:

- 1,100 $MTCO_2e$/yr or 4.6 $MTCO_2e$/SP/year for all project operations except stationary sources[16];
- 10,000 $MTCO_2e$/yr for stationary source emissions

The stationary source emergency generator emissions are below the 10,000 $MTCO_2e$/year threshold during Phase 1, and Phase 1 & 2 project operations. Emergency generator GHG emission calculations as shown in **Figure 5-1.**

The GHG emissions from non-stationary sources are below the 4.6 $MTCO_2e$/yr TOS during Phase 1, and Phase 1 & 2 operations. **Table 5-7** lists the maximum annual CO_2e emissions in MT/year, the SP, and the maximum annual $MTCO_2e$/SP/yr for Phase 1 operation plus amortized Phase 1 construction, Phase 1 operation plus amortized Phase 1 and 2 construction, and combined Phase 1 and 2 operation plus amortized Phase 1 and 2 construction.

Impacts from GHG emissions were determined to be less-than-significant without the need for mitigation.

3.3 Localized Carbon Monoxide

There are no TOS associated with CO concentrations with respect to construction. For project operations, the TOS is based on 1- and 8-hour CAAQS for CO concentrations.

Impacts from the project operation due to effects on local CO concentrations were determined to be less-than-significant based on BAAQMD's established screening criteria as listed below:

- The project is consistent with an applicable congestion management program established by the county's congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans;
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour; and
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

The project is consistent with the San Mateo County Congestion Management program and would not cause traffic volumes to exceed the volumes listed in the screening criteria for any intersection as shown Attachment I. Therefore, the project meets the screening criteria and will not lead to significant air quality impacts with respect to local CO concentrations.

[16] As mentioned in Section 3.2.1, Construction GHGs, average annual construction emissions during the construction period were distributed over a building lifespan of 40 years and have been added to GHG operational emissions as a method for assessing the significance of GHG emissions during construction.

Attachment A

PROJECT PHASE 1 ANNUAL EMISSION REPORT

PREPARED BY SWCA ENVIRONMENTAL CONSULTANTS, INC.

Haskins Way Rezone Phase I

San Mateo County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	311.37	1000sqft	1.80	311,368.00	0
Office Park	25.00	1000sqft	0.30	25,000.00	0
Enclosed Parking with Elevator	720.00	Space	1.30	288,000.00	0
Parking Lot	203.00	Space	3.35	81,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	70
Climate Zone	5			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See Appendix F of the Environmental Impact Report

Construction Phase - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

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Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment -

Off-road Equipment - See Appendix F of the Environmental Impact Report

Trips and VMT - See Appendix F of the Environmental Impact Report

Demolition - See Appendix F of the Environmental Impact Report

Grading - See Appendix F of the Environmental Impact Report

Architectural Coating - See Appendix F of the Environmental Impact Report

Vehicle Trips - See Appendix F of the Environmental Impact Report

Area Coating - See Appendix F of the Environmental Impact Report

Land Use Change -

Sequestration - See Appendix F of the Environmental Impact Report

Construction Off-road Equipment Mitigation - See Appendix F of the Environmental Impact Report

Operational Off-Road Equipment - See Appendix F of the Environmental Impact Report

Stationary Sources - Emergency Generators and Fire Pumps - See Appendix F of the Environmental Impact Report

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	168,184.00	0.00
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tblArchitecturalCoating	ConstArea_Nonresidential_Interior	504,552.00	0.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
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tblVehicleTrips	WD_TR	11.42	1.86

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					
2018	0.0449	0.4726	0.2796	6.2000e-004	0.0215	0.0221	0.0436	3.9500e-003	0.0208	0.0247	0.0000	57.3397	57.3397	0.0130	0.0000	57.6654
2019	1.0442	9.1389	7.0548	0.0161	0.2631	0.3956	0.6588	0.0662	0.3758	0.4419	0.0000	1,431.4171	1,431.4171	0.2927	0.0000	1,438.7355
2020	2.3990	5.2065	4.4216	9.1400e-003	0.0804	0.2436	0.3241	0.0217	0.2290	0.2508	0.0000	796.1108	796.1108	0.1972	0.0000	801.0401
Maximum	**2.3990**	**9.1389**	**7.0548**	**0.0161**	**0.2631**	**0.3956**	**0.6588**	**0.0662**	**0.3758**	**0.4419**	**0.0000**	**1,431.4171**	**1,431.4171**	**0.2927**	**0.0000**	**1,438.7355**

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					
2018	8.6700e-003	0.0908	0.2971	6.2000e-004	0.0133	1.1200e-003	0.0144	2.7100e-003	1.1100e-003	3.8300e-003	0.0000	57.3396	57.3396	0.0130	0.0000	57.6653
2019	0.3111	3.0373	7.6771	0.0161	0.2440	0.0328	0.2768	0.0640	0.0324	0.0963	0.0000	1,431.4158	1,431.4158	0.2927	0.0000	1,438.7343
2020	1.9648	1.4685	4.9549	9.1400e-003	0.0804	0.0168	0.0973	0.0217	0.0167	0.0385	0.0000	796.1099	796.1099	0.1972	0.0000	801.0393
Maximum	**1.9648**	**3.0373**	**7.6771**	**0.0161**	**0.2440**	**0.0328**	**0.2768**	**0.0640**	**0.0324**	**0.0963**	**0.0000**	**1,431.4158**	**1,431.4158**	**0.2927**	**0.0000**	**1,438.7343**

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	ROG	NOx	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	34.50	68.98	-9.98	0.00	7.48	92.33	62.15	3.77	91.97	80.68	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	12-12-2018	3-11-2019	2.4398	0.4232
2	3-12-2019	6-11-2019	2.4593	0.7551
3	6-12-2019	9-11-2019	2.5451	0.9934
4	9-12-2019	12-11-2019	2.5710	1.0034
5	12-12-2019	3-11-2020	4.1044	1.7824
6	3-12-2020	6-11-2020	2.7096	1.1392
7	6-12-2020	9-11-2020	1.0493	0.5332
8	9-12-2020	9-30-2020	0.1769	0.1041
		Highest	4.1044	1.7824

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	1.5217	1.1000e-004	0.0117	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0225	0.0225	6.0000e-005	0.0000	0.0240
Energy	0.0338	0.3069	0.2578	1.8400e-003		0.0233	0.0233		0.0233	0.0233	0.0000	2,061.3394	2,061.3394	0.0845	0.0223	2,070.0925
Mobile	0.1318	0.4402	1.5751	5.3200e-003	0.4776	5.7700e-003	0.4834	0.1284	5.4200e-003	0.1338	0.0000	486.0149	486.0149	0.0178	0.0000	486.4606
Offroad	0.0283	0.2561	0.2322	3.1000e-004		0.0186	0.0186		0.0172	0.0172	0.0000	27.2549	27.2549	8.2200e-003	0.0000	27.4603
Waste						0.0000	0.0000		0.0000	0.0000	63.4996	0.0000	63.4996	3.7527	0.0000	157.3177
Water						0.0000	0.0000		0.0000	0.0000	18.9668	131.4163	150.3831	1.9540	0.0472	213.3073
Total	**1.7156**	**1.0032**	**2.0767**	**7.4700e-003**	**0.4776**	**0.0478**	**0.5254**	**0.1284**	**0.0460**	**0.1743**	**82.4664**	**2,706.0480**	**2,788.5144**	**5.8174**	**0.0695**	**2,954.6623**

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	1.5217	1.1000e-004	0.0117	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0225	0.0225	6.0000e-005	0.0000	0.0240
Energy	0.0338	0.3069	0.2578	1.8400e-003		0.0233	0.0233		0.0233	0.0233	0.0000	2,061.3394	2,061.3394	0.0845	0.0223	2,070.0925
Mobile	0.1318	0.4402	1.5751	5.3200e-003	0.4776	5.7700e-003	0.4834	0.1284	5.4200e-003	0.1338	0.0000	486.0149	486.0149	0.0178	0.0000	486.4606
Offroad	0.0283	0.2561	0.2322	3.1000e-004		0.0186	0.0186		0.0172	0.0172	0.0000	27.2549	27.2549	8.2200e-003	0.0000	27.4603
Waste						0.0000	0.0000		0.0000	0.0000	63.4996	0.0000	63.4996	3.7527	0.0000	157.3177
Water						0.0000	0.0000		0.0000	0.0000	18.9668	131.4163	150.3831	1.9540	0.0472	213.3073
Total	**1.7156**	**1.0032**	**2.0767**	**7.4700e-003**	**0.4776**	**0.0478**	**0.5254**	**0.1284**	**0.0460**	**0.1743**	**82.4664**	**2,706.0480**	**2,788.5144**	**5.8174**	**0.0695**	**2,954.6623**

	ROG	NOx	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**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	43.8960
Total	**43.8960**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/12/2018	1/8/2019	5	20	
2	Soils Abatement/Remove/Replace	Site Preparation	12/26/2018	1/22/2019	5	20	
3	Site Prep and Make Ready	Site Preparation	1/23/2019	3/12/2019	5	35	
4	Parking Garage Underground	Building Construction	2/22/2019	4/4/2019	5	30	
5	Office Building Underground	Building Construction	2/22/2019	4/18/2019	5	40	
6	Parking Garage Core Construction	Building Construction	4/4/2019	1/20/2020	5	208	
7	Office Building Core Construction	Building Construction	4/19/2019	4/14/2020	5	258	
8	Parking Garage Exterior Improvements	Architectural Coating	12/2/2019	12/30/2019	5	21	
9	Office Building Tenant Improvements	Architectural Coating	12/26/2019	10/27/2020	5	219	
10	Landscaping and Site Improvements	Paving	1/6/2020	7/3/2020	5	130	
11	Office Building Exterior Improvements	Architectural Coating	1/15/2020	4/14/2020	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 4.65

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Air Compressors	2	7.00	78	0.48
Demolition	Concrete/Industrial Saws	2	6.00	81	0.73
Demolition	Dumpers/Tenders	1	4.00	16	0.38
Demolition	Excavators	2	3.00	158	0.38

Demolition	Forklifts	1	7.00	89	0.20
Demolition	Off-Highway Trucks	2	4.00	402	0.38
Demolition	Rubber Tired Dozers	2	6.00	247	0.40
Demolition	Skid Steer Loaders	1	6.00	65	0.37
Demolition	Sweepers/Scrubbers	1	4.00	64	0.46
Demolition	Tractors/Loaders/Backhoes	2	5.00	97	0.37
Soils Abatement/Remove/Replace	Crawler Tractors	1	4.00	212	0.43
Soils Abatement/Remove/Replace	Dumpers/Tenders	2	6.00	16	0.38
Soils Abatement/Remove/Replace	Excavators	2	5.00	158	0.38
Soils Abatement/Remove/Replace	Off-Highway Trucks	3	4.00	402	0.38
Soils Abatement/Remove/Replace	Plate Compactors	2	5.00	8	0.43
Soils Abatement/Remove/Replace	Rubber Tired Loaders	2	5.00	203	0.36
Soils Abatement/Remove/Replace	Scrapers	2	4.00	367	0.48
Soils Abatement/Remove/Replace	Sweepers/Scrubbers	1	4.00	64	0.46
Soils Abatement/Remove/Replace	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Site Prep and Make Ready	Bore/Drill Rigs	2	7.00	221	0.50
Site Prep and Make Ready	Dumpers/Tenders	1	6.00	16	0.38
Site Prep and Make Ready	Excavators	1	4.00	158	0.38
Site Prep and Make Ready	Off-Highway Trucks	2	4.00	402	0.38
Site Prep and Make Ready	Plate Compactors	2	5.00	8	0.43
Site Prep and Make Ready	Rubber Tired Loaders	2	6.00	203	0.36
Site Prep and Make Ready	Scrapers	2	6.00	367	0.48
Site Prep and Make Ready	Sweepers/Scrubbers	1	4.00	64	0.46
Site Prep and Make Ready	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Bore/Drill Rigs	1	7.00	221	0.50
Parking Garage Underground	Excavators	2	7.00	158	0.38
Parking Garage Underground	Generator Sets	2	4.00	84	0.74

Parking Garage Underground	Plate Compactors	2	4.00	8	0.43
Parking Garage Underground	Rough Terrain Forklifts	2	2.00	100	0.40
Parking Garage Underground	Rubber Tired Loaders	1	2.00	203	0.36
Parking Garage Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Parking Garage Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Trenchers	2	4.00	78	0.50
Office Building Underground	Bore/Drill Rigs	2	4.00	221	0.50
Office Building Underground	Excavators	2	7.00	158	0.38
Office Building Underground	Generator Sets	2	4.00	84	0.74
Office Building Underground	Plate Compactors	2	4.00	8	0.43
Office Building Underground	Rough Terrain Forklifts	2	8.00	100	0.40
Office Building Underground	Rubber Tired Loaders	1	6.00	203	0.36
Office Building Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Office Building Underground	Trenchers	4	7.00	78	0.50
Parking Garage Core Construction	Aerial Lifts	1	7.00	63	0.31
Parking Garage Core Construction	Cement and Mortar Mixers	6	4.00	9	0.56
Parking Garage Core Construction	Cranes	1	7.00	231	0.29
Parking Garage Core Construction	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Core Construction	Plate Compactors	1	4.00	8	0.43
Parking Garage Core Construction	Pumps	1	6.00	84	0.74
Parking Garage Core Construction	Rough Terrain Forklifts	1	6.00	100	0.40
Parking Garage Core Construction	Welders	3	6.00	46	0.45
Office Building Core Construction	Aerial Lifts	4	7.00	63	0.31
Office Building Core Construction	Air Compressors	4	6.00	78	0.48
Office Building Core Construction	Cranes	2	7.00	231	0.29
Office Building Core Construction	Off-Highway Trucks	2	4.00	402	0.38

Office Building Core Construction	Rough Terrain Forklifts	2	6.00	100	0.40
Office Building Core Construction	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Core Construction	Welders	5	7.00	46	0.45
Parking Garage Exterior Improvements	Aerial Lifts	1	6.00	63	0.31
Parking Garage Exterior Improvements	Cranes	1	3.00	231	0.29
Parking Garage Exterior Improvements	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Exterior Improvements	Other General Industrial Equipment	1	4.00	88	0.34
Parking Garage Exterior Improvements	Pressure Washers	1	2.00	13	0.30
Parking Garage Exterior Improvements	Rough Terrain Forklifts	1	5.00	100	0.40
Parking Garage Exterior Improvements	Welders	2	5.00	46	0.45
Office Building Tenant Improvements	Aerial Lifts	1	7.00	63	0.31
Office Building Tenant Improvements	Air Compressors	1	7.00	78	0.48
Office Building Tenant Improvements	Off-Highway Trucks	2	4.00	402	0.38
Office Building Tenant Improvements	Rough Terrain Forklifts	1	7.00	100	0.40
Office Building Tenant Improvements	Sweepers/Scrubbers	1	6.00	64	0.46
Office Building Tenant Improvements	Welders	1	5.00	46	0.45
Landscaping and Site Improvements	Cement and Mortar Mixers	2	4.00	9	0.56
Landscaping and Site Improvements	Dumpers/Tenders	1	6.00	16	0.38
Landscaping and Site Improvements	Paving Equipment	2	7.00	132	0.36
Landscaping and Site Improvements	Plate Compactors	2	4.00	8	0.43
Landscaping and Site Improvements	Rollers	2	5.00	80	0.38
Landscaping and Site Improvements	Rough Terrain Forklifts	1	3.00	100	0.40
Landscaping and Site Improvements	Rubber Tired Dozers	2	4.00	247	0.40
Landscaping and Site Improvements	Skid Steer Loaders	1	6.00	65	0.37
Landscaping and Site Improvements	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Office Building Exterior Improvements	Aerial Lifts	3	6.00	63	0.31
Office Building Exterior Improvements	Off-Highway Trucks	2	4.00	402	0.38

Office Building Exterior Improvements	Other General Industrial Equipment	2	7.00	88	0.34
Office Building Exterior Improvements	Pressure Washers	1	4.00	13	0.30
Office Building Exterior Improvements	Rough Terrain Forklifts	3	7.00	100	0.40
Office Building Exterior Improvements	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Exterior Improvements	Welders	2	6.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	16	20.00	0.00	230.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Soils Abatement/Remove/Re	16	20.00	0.00	814.00	10.80	7.30	12.60	LD_Mix	HDT_Mix	HHDT
Site Prep and Make Ready	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Underground	15	11.00	5.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Underground	18	13.00	6.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Core Construction	15	96.00	43.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Core Construction	20	113.00	50.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Exterior Improvements	8	22.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Tenant Improvements	7	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Landscaping and Site Improvements	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Exterior Improvements	14	7.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0140	0.0000	0.0140	2.1200e-003	0.0000	2.1200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0348	0.3303	0.2051	3.8000e-004		0.0181	0.0181		0.0171	0.0171	0.0000	34.2603	34.2603	8.4000e-003	0.0000	34.4704
Total	**0.0348**	**0.3303**	**0.2051**	**3.8000e-004**	**0.0140**	**0.0181**	**0.0321**	**2.1200e-003**	**0.0171**	**0.0192**	**0.0000**	**34.2603**	**34.2603**	**8.4000e-003**	**0.0000**	**34.4704**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.2000e-004	0.0286	0.0103	6.0000e-005	1.6900e-003	1.2000e-004	1.8100e-003	4.5000e-004	1.1000e-004	5.6000e-004	0.0000	6.6007	6.6007	7.9000e-004	0.0000	6.6203
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	4.6000e-004	3.3000e-004	3.3600e-003	1.0000e-005	1.1000e-003	1.0000e-005	1.1100e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.9783	0.9783	2.0000e-005	0.0000	0.9789
Total	**1.2800e-003**	**0.0289**	**0.0137**	**7.0000e-005**	**2.7900e-003**	**1.3000e-004**	**2.9200e-003**	**7.4000e-004**	**1.2000e-004**	**8.6000e-004**	**0.0000**	**7.5790**	**7.5790**	**8.1000e-004**	**0.0000**	**7.5992**

3.2 Demolition - 2018

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					6.2900e-003	0.0000	6.2900e-003	9.5000e-004	0.0000	9.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9000e-003	0.0307	0.2162	3.8000e-004		6.5000e-004	6.5000e-004		6.5000e-004	6.5000e-004	0.0000	34.2602	34.2602	8.4000e-003	0.0000	34.4703
Total	**4.9000e-003**	**0.0307**	**0.2162**	**3.8000e-004**	**6.2900e-003**	**6.5000e-004**	**6.9400e-003**	**9.5000e-004**	**6.5000e-004**	**1.6000e-003**	**0.0000**	**34.2602**	**34.2602**	**8.4000e-003**	**0.0000**	**34.4703**

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	8.2000e-004	0.0286	0.0103	6.0000e-005	1.6900e-003	1.2000e-004	1.8100e-003	4.5000e-004	1.1000e-004	5.6000e-004	0.0000	6.6007	6.6007	7.9000e-004	0.0000	6.6203
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	4.6000e-004	3.3000e-004	3.3600e-003	1.0000e-005	1.1000e-003	1.0000e-005	1.1100e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.9783	0.9783	2.0000e-005	0.0000	0.9789
Total	**1.2800e-003**	**0.0289**	**0.0137**	**7.0000e-005**	**2.7900e-003**	**1.3000e-004**	**2.9200e-003**	**7.4000e-004**	**1.2000e-004**	**8.6000e-004**	**0.0000**	**7.5790**	**7.5790**	**8.1000e-004**	**0.0000**	**7.5992**

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.9900e-003	0.0000	5.9900e-003	9.1000e-004	0.0000	9.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0138	0.1304	0.0864	1.6000e-004		6.9800e-003	6.9800e-003		6.5800e-003	6.5800e-003	0.0000	14.5100	14.5100	3.5600e-003	0.0000	14.5991
Total	**0.0138**	**0.1304**	**0.0864**	**1.6000e-004**	**5.9900e-003**	**6.9800e-003**	**0.0130**	**9.1000e-004**	**6.5800e-003**	**7.4900e-003**	**0.0000**	**14.5100**	**14.5100**	**3.5600e-003**	**0.0000**	**14.5991**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.3000e-004	0.0116	4.4500e-003	3.0000e-005	1.5100e-003	5.0000e-005	1.5600e-003	3.9000e-004	4.0000e-005	4.3000e-004	0.0000	2.7884	2.7884	3.4000e-004	0.0000	2.7969
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	1.8000e-004	1.2000e-004	1.2900e-003	0.0000	4.7000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4062	0.4062	1.0000e-005	0.0000	0.4064
Total	**5.1000e-004**	**0.0117**	**5.7400e-003**	**3.0000e-005**	**1.9800e-003**	**5.0000e-005**	**2.0400e-003**	**5.2000e-004**	**4.0000e-005**	**5.6000e-004**	**0.0000**	**3.1946**	**3.1946**	**3.5000e-004**	**0.0000**	**3.2033**

3.2 Demolition - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.7000e-003	0.0000	2.7000e-003	4.1000e-004	0.0000	4.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1000e-003	0.0132	0.0927	1.6000e-004		2.8000e-004	2.8000e-004		2.8000e-004	2.8000e-004	0.0000	14.5100	14.5100	3.5600e-003	0.0000	14.5991
Total	**2.1000e-003**	**0.0132**	**0.0927**	**1.6000e-004**	**2.7000e-003**	**2.8000e-004**	**2.9800e-003**	**4.1000e-004**	**2.8000e-004**	**6.9000e-004**	**0.0000**	**14.5100**	**14.5100**	**3.5600e-003**	**0.0000**	**14.5991**

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	3.3000e-004	0.0116	4.4500e-003	3.0000e-005	1.5100e-003	5.0000e-005	1.5600e-003	3.9000e-004	4.0000e-005	4.3000e-004	0.0000	2.7884	2.7884	3.4000e-004	0.0000	2.7969
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	1.8000e-004	1.2000e-004	1.2900e-003	0.0000	4.7000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4062	0.4062	1.0000e-005	0.0000	0.4064
Total	**5.1000e-004**	**0.0117**	**5.7400e-003**	**3.0000e-005**	**1.9800e-003**	**5.0000e-005**	**2.0400e-003**	**5.2000e-004**	**4.0000e-005**	**5.6000e-004**	**0.0000**	**3.1946**	**3.1946**	**3.5000e-004**	**0.0000**	**3.2033**

3.3 Soils Abatement/Remove/Replace - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.2000e-004	0.0000	9.2000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.0800e-003	0.0916	0.0522	1.2000e-004		3.7600e-003	3.7600e-003		3.4600e-003	3.4600e-003	0.0000	10.6085	10.6085	3.2500e-003	0.0000	10.6898
Total	**8.0800e-003**	**0.0916**	**0.0522**	**1.2000e-004**	**9.2000e-004**	**3.7600e-003**	**4.6800e-003**	**1.4000e-004**	**3.4600e-003**	**3.6000e-003**	**0.0000**	**10.6085**	**10.6085**	**3.2500e-003**	**0.0000**	**10.6898**

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	6.2000e-004	0.0217	7.6900e-003	5.0000e-005	3.4400e-003	8.0000e-005	3.5200e-003	8.7000e-004	8.0000e-005	9.5000e-004	0.0000	4.6124	4.6124	5.6000e-004	0.0000	4.6263
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	9.6000e-004	0.0000	3.1000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2795	0.2795	1.0000e-005	0.0000	0.2797
Total	**7.5000e-004**	**0.0218**	**8.6500e-003**	**5.0000e-005**	**3.7500e-003**	**8.0000e-005**	**3.8400e-003**	**9.5000e-004**	**8.0000e-005**	**1.0400e-003**	**0.0000**	**4.8919**	**4.8919**	**5.7000e-004**	**0.0000**	**4.9060**

3.3 Soils Abatement/Remove/Replace - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.1000e-004	0.0000	4.1000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7500e-003	9.3600e-003	0.0586	1.2000e-004		2.6000e-004	2.6000e-004		2.6000e-004	2.6000e-004	0.0000	10.6085	10.6085	3.2500e-003	0.0000	10.6898
Total	**1.7500e-003**	**9.3600e-003**	**0.0586**	**1.2000e-004**	**4.1000e-004**	**2.6000e-004**	**6.7000e-004**	**6.0000e-005**	**2.6000e-004**	**3.2000e-004**	**0.0000**	**10.6085**	**10.6085**	**3.2500e-003**	**0.0000**	**10.6898**

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	6.2000e-004	0.0217	7.6900e-003	5.0000e-005	3.4400e-003	8.0000e-005	3.5200e-003	8.7000e-004	8.0000e-005	9.5000e-004	0.0000	4.6124	4.6124	5.6000e-004	0.0000	4.6263
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	9.6000e-004	0.0000	3.1000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2795	0.2795	1.0000e-005	0.0000	0.2797
Total	**7.5000e-004**	**0.0218**	**8.6500e-003**	**5.0000e-005**	**3.7500e-003**	**8.0000e-005**	**3.8400e-003**	**9.5000e-004**	**8.0000e-005**	**1.0400e-003**	**0.0000**	**4.8919**	**4.8919**	**5.7000e-004**	**0.0000**	**4.9060**

3.3 Soils Abatement/Remove/Replace - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.2000e-004	0.0000	9.2000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0299	0.3287	0.1991	4.7000e-004		0.0134	0.0134		0.0123	0.0123	0.0000	41.7556	41.7556	0.0130	0.0000	42.0807
Total	**0.0299**	**0.3287**	**0.1991**	**4.7000e-004**	**9.2000e-004**	**0.0134**	**0.0143**	**1.4000e-004**	**0.0123**	**0.0125**	**0.0000**	**41.7556**	**41.7556**	**0.0130**	**0.0000**	**42.0807**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.3100e-003	0.0825	0.0308	1.8000e-004	4.0800e-003	3.0000e-004	4.3800e-003	1.1000e-003	2.9000e-004	1.3900e-003	0.0000	18.1923	18.1923	2.2300e-003	0.0000	18.2482
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	4.7000e-004	3.3000e-004	3.4300e-003	1.0000e-005	1.2600e-003	1.0000e-005	1.2700e-003	3.4000e-004	1.0000e-005	3.4000e-004	0.0000	1.0833	1.0833	2.0000e-005	0.0000	1.0838
Total	**2.7800e-003**	**0.0828**	**0.0342**	**1.9000e-004**	**5.3400e-003**	**3.1000e-004**	**5.6500e-003**	**1.4400e-003**	**3.0000e-004**	**1.7300e-003**	**0.0000**	**19.2756**	**19.2756**	**2.2500e-003**	**0.0000**	**19.3320**

3.3 Soils Abatement/Remove/Replace - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.1000e-004	0.0000	4.1000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.9900e-003	0.0374	0.2344	4.7000e-004		1.0600e-003	1.0600e-003		1.0600e-003	1.0600e-003	0.0000	41.7555	41.7555	0.0130	0.0000	42.0807
Total	**6.9900e-003**	**0.0374**	**0.2344**	**4.7000e-004**	**4.1000e-004**	**1.0600e-003**	**1.4700e-003**	**6.0000e-005**	**1.0600e-003**	**1.1200e-003**	**0.0000**	**41.7555**	**41.7555**	**0.0130**	**0.0000**	**42.0807**

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	2.3100e-003	0.0825	0.0308	1.8000e-004	4.0800e-003	3.0000e-004	4.3800e-003	1.1000e-003	2.9000e-004	1.3900e-003	0.0000	18.1923	18.1923	2.2300e-003	0.0000	18.2482
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	4.7000e-004	3.3000e-004	3.4300e-003	1.0000e-005	1.2600e-003	1.0000e-005	1.2700e-003	3.4000e-004	1.0000e-005	3.4000e-004	0.0000	1.0833	1.0833	2.0000e-005	0.0000	1.0838
Total	**2.7800e-003**	**0.0828**	**0.0342**	**1.9000e-004**	**5.3400e-003**	**3.1000e-004**	**5.6500e-003**	**1.4400e-003**	**3.0000e-004**	**1.7300e-003**	**0.0000**	**19.2756**	**19.2756**	**2.2500e-003**	**0.0000**	**19.3320**

3.4 Site Prep and Make Ready - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0278	0.0000	0.0278	3.0100e-003	0.0000	3.0100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0721	0.8227	0.5033	1.2500e-003		0.0328	0.0328		0.0302	0.0302	0.0000	111.7631	111.7631	0.0351	0.0000	112.6397
Total	**0.0721**	**0.8227**	**0.5033**	**1.2500e-003**	**0.0278**	**0.0328**	**0.0606**	**3.0100e-003**	**0.0302**	**0.0332**	**0.0000**	**111.7631**	**111.7631**	**0.0351**	**0.0000**	**112.6397**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.8000e-004	6.9000e-004	7.1300e-003	2.0000e-005	2.6200e-003	2.0000e-005	2.6300e-003	7.0000e-004	2.0000e-005	7.1000e-004	0.0000	2.2511	2.2511	5.0000e-005	0.0000	2.2523
Total	**9.8000e-004**	**6.9000e-004**	**7.1300e-003**	**2.0000e-005**	**2.6200e-003**	**2.0000e-005**	**2.6300e-003**	**7.0000e-004**	**2.0000e-005**	**7.1000e-004**	**0.0000**	**2.2511**	**2.2511**	**5.0000e-005**	**0.0000**	**2.2523**

3.4 Site Prep and Make Ready - 2019

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					0.0125	0.0000	0.0125	1.3500e-003	0.0000	1.3500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0173	0.0886	0.6094	1.2500e-003		2.4700e-003	2.4700e-003		2.4700e-003	2.4700e-003	0.0000	111.7630	111.7630	0.0351	0.0000	112.6396
Total	**0.0173**	**0.0886**	**0.6094**	**1.2500e-003**	**0.0125**	**2.4700e-003**	**0.0150**	**1.3500e-003**	**2.4700e-003**	**3.8200e-003**	**0.0000**	**111.7630**	**111.7630**	**0.0351**	**0.0000**	**112.6396**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.8000e-004	6.9000e-004	7.1300e-003	2.0000e-005	2.6200e-003	2.0000e-005	2.6300e-003	7.0000e-004	2.0000e-005	7.1000e-004	0.0000	2.2511	2.2511	5.0000e-005	0.0000	2.2523
Total	**9.8000e-004**	**6.9000e-004**	**7.1300e-003**	**2.0000e-005**	**2.6200e-003**	**2.0000e-005**	**2.6300e-003**	**7.0000e-004**	**2.0000e-005**	**7.1000e-004**	**0.0000**	**2.2511**	**2.2511**	**5.0000e-005**	**0.0000**	**2.2523**

3.5 Parking Garage Underground - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0342	0.3412	0.3017	5.5000e-004		0.0190	0.0190		0.0178	0.0178	0.0000	49.1174	49.1174	0.0133	0.0000	49.4498
Total	**0.0342**	**0.3412**	**0.3017**	**5.5000e-004**		**0.0190**	**0.0190**		**0.0178**	**0.0178**	**0.0000**	**49.1174**	**49.1174**	**0.0133**	**0.0000**	**49.4498**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.6000e-004	9.5800e-003	3.6800e-003	2.0000e-005	4.9000e-004	7.0000e-005	5.5000e-004	1.4000e-004	6.0000e-005	2.0000e-004	0.0000	2.0063	2.0063	1.8000e-004	0.0000	2.0107
Worker	4.9000e-004	3.4000e-004	3.5400e-003	1.0000e-005	1.3000e-003	1.0000e-005	1.3100e-003	3.5000e-004	1.0000e-005	3.5000e-004	0.0000	1.1171	1.1171	2.0000e-005	0.0000	1.1177
Total	**8.5000e-004**	**9.9200e-003**	**7.2200e-003**	**3.0000e-005**	**1.7900e-003**	**8.0000e-005**	**1.8600e-003**	**4.9000e-004**	**7.0000e-005**	**5.5000e-004**	**0.0000**	**3.1234**	**3.1234**	**2.0000e-004**	**0.0000**	**3.1284**

3.5 Parking Garage Underground - 2019

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	7.3400e-003	0.0416	0.3586	5.5000e-004		1.0100e-003	1.0100e-003		1.0100e-003	1.0100e-003	0.0000	49.1173	49.1173	0.0133	0.0000	49.4497
Total	**7.3400e-003**	**0.0416**	**0.3586**	**5.5000e-004**		**1.0100e-003**	**1.0100e-003**		**1.0100e-003**	**1.0100e-003**	**0.0000**	**49.1173**	**49.1173**	**0.0133**	**0.0000**	**49.4497**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.6000e-004	9.5800e-003	3.6800e-003	2.0000e-005	4.9000e-004	7.0000e-005	5.5000e-004	1.4000e-004	6.0000e-005	2.0000e-004	0.0000	2.0063	2.0063	1.8000e-004	0.0000	2.0107
Worker	4.9000e-004	3.4000e-004	3.5400e-003	1.0000e-005	1.3000e-003	1.0000e-005	1.3100e-003	3.5000e-004	1.0000e-005	3.5000e-004	0.0000	1.1171	1.1171	2.0000e-005	0.0000	1.1177
Total	**8.5000e-004**	**9.9200e-003**	**7.2200e-003**	**3.0000e-005**	**1.7900e-003**	**8.0000e-005**	**1.8600e-003**	**4.9000e-004**	**7.0000e-005**	**5.5000e-004**	**0.0000**	**3.1234**	**3.1234**	**2.0000e-004**	**0.0000**	**3.1284**

3.6 Office Building Underground - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0763	0.7638	0.6251	1.1000e-003		0.0445	0.0445		0.0413	0.0413	0.0000	97.6295	97.6295	0.0279	0.0000	98.3268
Total	**0.0763**	**0.7638**	**0.6251**	**1.1000e-003**		**0.0445**	**0.0445**		**0.0413**	**0.0413**	**0.0000**	**97.6295**	**97.6295**	**0.0279**	**0.0000**	**98.3268**

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	5.7000e-004	0.0153	5.8800e-003	3.0000e-005	7.8000e-004	1.1000e-004	8.9000e-004	2.3000e-004	1.0000e-004	3.3000e-004	0.0000	3.2101	3.2101	2.8000e-004	0.0000	3.2171
Worker	7.7000e-004	5.4000e-004	5.5800e-003	2.0000e-005	2.0500e-003	1.0000e-005	2.0600e-003	5.4000e-004	1.0000e-005	5.6000e-004	0.0000	1.7603	1.7603	4.0000e-005	0.0000	1.7612
Total	**1.3400e-003**	**0.0159**	**0.0115**	**5.0000e-005**	**2.8300e-003**	**1.2000e-004**	**2.9500e-003**	**7.7000e-004**	**1.1000e-004**	**8.9000e-004**	**0.0000**	**4.9703**	**4.9703**	**3.2000e-004**	**0.0000**	**4.9784**

3.6 Office Building Underground - 2019

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	0.0142	0.0745	0.7228	1.1000e-003		1.9400e-003	1.9400e-003		1.9400e-003	1.9400e-003	0.0000	97.6293	97.6293	0.0279	0.0000	98.3267
Total	**0.0142**	**0.0745**	**0.7228**	**1.1000e-003**		**1.9400e-003**	**1.9400e-003**		**1.9400e-003**	**1.9400e-003**	**0.0000**	**97.6293**	**97.6293**	**0.0279**	**0.0000**	**98.3267**

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	5.7000e-004	0.0153	5.8800e-003	3.0000e-005	7.8000e-004	1.1000e-004	8.9000e-004	2.3000e-004	1.0000e-004	3.3000e-004	0.0000	3.2101	3.2101	2.8000e-004	0.0000	3.2171
Worker	7.7000e-004	5.4000e-004	5.5800e-003	2.0000e-005	2.0500e-003	1.0000e-005	2.0600e-003	5.4000e-004	1.0000e-005	5.6000e-004	0.0000	1.7603	1.7603	4.0000e-005	0.0000	1.7612
Total	**1.3400e-003**	**0.0159**	**0.0115**	**5.0000e-005**	**2.8300e-003**	**1.2000e-004**	**2.9500e-003**	**7.7000e-004**	**1.1000e-004**	**8.9000e-004**	**0.0000**	**4.9703**	**4.9703**	**3.2000e-004**	**0.0000**	**4.9784**

3.7 Parking Garage Core Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2284	1.8036	1.4179	2.7900e-003		0.0854	0.0854		0.0821	0.0821	0.0000	233.8732	233.8732	0.0545	0.0000	235.2344
Total	**0.2284**	**1.8036**	**1.4179**	**2.7900e-003**		**0.0854**	**0.0854**		**0.0821**	**0.0821**	**0.0000**	**233.8732**	**233.8732**	**0.0545**	**0.0000**	**235.2344**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	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	0.0198	0.5326	0.2045	1.1200e-003	0.0272	3.6800e-003	0.0309	7.8600e-003	3.5200e-003	0.0114	0.0000	111.5763	111.5763	9.8500e-003	0.0000	111.8226
Worker	0.0275	0.0194	0.1998	7.0000e-004	0.0733	4.7000e-004	0.0738	0.0195	4.3000e-004	0.0199	0.0000	63.0452	63.0452	1.3500e-003	0.0000	63.0790
Total	**0.0474**	**0.5520**	**0.4043**	**1.8200e-003**	**0.1005**	**4.1500e-003**	**0.1046**	**0.0274**	**3.9500e-003**	**0.0313**	**0.0000**	**174.6215**	**174.6215**	**0.0112**	**0.0000**	**174.9016**

3.7 Parking Garage Core Construction - 2019

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	0.0538	0.5127	1.5279	2.7900e-003		8.4300e-003	8.4300e-003		8.4300e-003	8.4300e-003	0.0000	233.8729	233.8729	0.0545	0.0000	235.2341
Total	**0.0538**	**0.5127**	**1.5279**	**2.7900e-003**		**8.4300e-003**	**8.4300e-003**		**8.4300e-003**	**8.4300e-003**	**0.0000**	**233.8729**	**233.8729**	**0.0545**	**0.0000**	**235.2341**

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	0.0198	0.5326	0.2045	1.1200e-003	0.0272	3.6800e-003	0.0309	7.8600e-003	3.5200e-003	0.0114	0.0000	111.5763	111.5763	9.8500e-003	0.0000	111.8226
Worker	0.0275	0.0194	0.1998	7.0000e-004	0.0733	4.7000e-004	0.0738	0.0195	4.3000e-004	0.0199	0.0000	63.0452	63.0452	1.3500e-003	0.0000	63.0790
Total	**0.0474**	**0.5520**	**0.4043**	**1.8200e-003**	**0.1005**	**4.1500e-003**	**0.1046**	**0.0274**	**3.9500e-003**	**0.0313**	**0.0000**	**174.6215**	**174.6215**	**0.0112**	**0.0000**	**174.9016**

3.7 Parking Garage Core Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0150	0.1201	0.0999	2.0000e-004		5.4300e-003	5.4300e-003		5.2200e-003	5.2200e-003	0.0000	16.6612	16.6612	3.8500e-003	0.0000	16.7575
Total	**0.0150**	**0.1201**	**0.0999**	**2.0000e-004**		**5.4300e-003**	**5.4300e-003**		**5.2200e-003**	**5.2200e-003**	**0.0000**	**16.6612**	**16.6612**	**3.8500e-003**	**0.0000**	**16.7575**

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	1.1700e-003	0.0349	0.0139	8.0000e-005	1.9600e-003	1.7000e-004	2.1400e-003	5.7000e-004	1.7000e-004	7.3000e-004	0.0000	7.9763	7.9763	6.9000e-004	0.0000	7.9936
Worker	1.8300e-003	1.2400e-003	0.0131	5.0000e-005	5.2900e-003	3.0000e-005	5.3200e-003	1.4100e-003	3.0000e-005	1.4400e-003	0.0000	4.4052	4.4052	9.0000e-005	0.0000	4.4073
Total	**3.0000e-003**	**0.0361**	**0.0270**	**1.3000e-004**	**7.2500e-003**	**2.0000e-004**	**7.4600e-003**	**1.9800e-003**	**2.0000e-004**	**2.1700e-003**	**0.0000**	**12.3815**	**12.3815**	**7.8000e-004**	**0.0000**	**12.4009**

3.7 Parking Garage Core Construction - 2020

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	3.8800e-003	0.0370	0.1103	2.0000e-004		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004	0.0000	16.6612	16.6612	3.8500e-003	0.0000	16.7575
Total	**3.8800e-003**	**0.0370**	**0.1103**	**2.0000e-004**		**6.1000e-004**	**6.1000e-004**		**6.1000e-004**	**6.1000e-004**	**0.0000**	**16.6612**	**16.6612**	**3.8500e-003**	**0.0000**	**16.7575**

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	1.1700e-003	0.0349	0.0139	8.0000e-005	1.9600e-003	1.7000e-004	2.1400e-003	5.7000e-004	1.7000e-004	7.3000e-004	0.0000	7.9763	7.9763	6.9000e-004	0.0000	7.9936
Worker	1.8300e-003	1.2400e-003	0.0131	5.0000e-005	5.2900e-003	3.0000e-005	5.3200e-003	1.4100e-003	3.0000e-005	1.4400e-003	0.0000	4.4052	4.4052	9.0000e-005	0.0000	4.4073
Total	**3.0000e-003**	**0.0361**	**0.0270**	**1.3000e-004**	**7.2500e-003**	**2.0000e-004**	**7.4600e-003**	**1.9800e-003**	**2.0000e-004**	**2.1700e-003**	**0.0000**	**12.3815**	**12.3815**	**7.8000e-004**	**0.0000**	**12.4009**

3.8 Office Building Core Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4430	3.5270	2.8871	5.3700e-003		0.1776	0.1776		0.1703	0.1703	0.0000	461.5167	461.5167	0.1131	0.0000	464.3443
Total	**0.4430**	**3.5270**	**2.8871**	**5.3700e-003**		**0.1776**	**0.1776**		**0.1703**	**0.1703**	**0.0000**	**461.5167**	**461.5167**	**0.1131**	**0.0000**	**464.3443**

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	0.0217	0.5842	0.2243	1.2300e-003	0.0298	4.0300e-003	0.0339	8.6200e-003	3.8600e-003	0.0125	0.0000	122.3835	122.3835	0.0108	0.0000	122.6536
Worker	0.0306	0.0215	0.2218	7.7000e-004	0.0814	5.2000e-004	0.0819	0.0217	4.8000e-004	0.0221	0.0000	70.0018	70.0018	1.5000e-003	0.0000	70.0392
Total	**0.0523**	**0.6057**	**0.4462**	**2.0000e-003**	**0.1112**	**4.5500e-003**	**0.1158**	**0.0303**	**4.3400e-003**	**0.0346**	**0.0000**	**192.3852**	**192.3852**	**0.0123**	**0.0000**	**192.6929**

3.8 Office Building Core Construction - 2019

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	0.0765	0.9548	3.0827	5.3700e-003		7.9500e-003	7.9500e-003		7.9500e-003	7.9500e-003	0.0000	461.5162	461.5162	0.1131	0.0000	464.3437
Total	**0.0765**	**0.9548**	**3.0827**	**5.3700e-003**		**7.9500e-003**	**7.9500e-003**		**7.9500e-003**	**7.9500e-003**	**0.0000**	**461.5162**	**461.5162**	**0.1131**	**0.0000**	**464.3437**

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	0.0217	0.5842	0.2243	1.2300e-003	0.0298	4.0300e-003	0.0339	8.6200e-003	3.8600e-003	0.0125	0.0000	122.3835	122.3835	0.0108	0.0000	122.6536
Worker	0.0306	0.0215	0.2218	7.7000e-004	0.0814	5.2000e-004	0.0819	0.0217	4.8000e-004	0.0221	0.0000	70.0018	70.0018	1.5000e-003	0.0000	70.0392
Total	**0.0523**	**0.6057**	**0.4462**	**2.0000e-003**	**0.1112**	**4.5500e-003**	**0.1158**	**0.0303**	**4.3400e-003**	**0.0346**	**0.0000**	**192.3852**	**192.3852**	**0.0123**	**0.0000**	**192.6929**

3.8 Office Building Core Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1648	1.3267	1.1564	2.2000e-003		0.0636	0.0636		0.0610	0.0610	0.0000	186.5214	186.5214	0.0455	0.0000	187.6584
Total	**0.1648**	**1.3267**	**1.1564**	**2.2000e-003**		**0.0636**	**0.0636**		**0.0610**	**0.0610**	**0.0000**	**186.5214**	**186.5214**	**0.0455**	**0.0000**	**187.6584**

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	7.2700e-003	0.2174	0.0866	5.0000e-004	0.0122	1.0800e-003	0.0133	3.5300e-003	1.0400e-003	4.5700e-003	0.0000	49.6863	49.6863	4.3200e-003	0.0000	49.7943
Worker	0.0116	7.8300e-003	0.0825	3.1000e-004	0.0334	2.1000e-004	0.0336	8.8800e-003	1.9000e-004	9.0700e-003	0.0000	27.7781	27.7781	5.4000e-004	0.0000	27.7916
Total	**0.0188**	**0.2253**	**0.1690**	**8.1000e-004**	**0.0456**	**1.2900e-003**	**0.0469**	**0.0124**	**1.2300e-003**	**0.0136**	**0.0000**	**77.4644**	**77.4644**	**4.8600e-003**	**0.0000**	**77.5859**

3.8 Office Building Core Construction - 2020

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	0.0313	0.3913	1.2634	2.2000e-003		3.2600e-003	3.2600e-003		3.2600e-003	3.2600e-003	0.0000	186.5211	186.5211	0.0455	0.0000	187.6582
Total	**0.0313**	**0.3913**	**1.2634**	**2.2000e-003**		**3.2600e-003**	**3.2600e-003**		**3.2600e-003**	**3.2600e-003**	**0.0000**	**186.5211**	**186.5211**	**0.0455**	**0.0000**	**187.6582**

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	7.2700e-003	0.2174	0.0866	5.0000e-004	0.0122	1.0800e-003	0.0133	3.5300e-003	1.0400e-003	4.5700e-003	0.0000	49.6863	49.6863	4.3200e-003	0.0000	49.7943
Worker	0.0116	7.8300e-003	0.0825	3.1000e-004	0.0334	2.1000e-004	0.0336	8.8800e-003	1.9000e-004	9.0700e-003	0.0000	27.7781	27.7781	5.4000e-004	0.0000	27.7916
Total	**0.0188**	**0.2253**	**0.1690**	**8.1000e-004**	**0.0456**	**1.2900e-003**	**0.0469**	**0.0124**	**1.2300e-003**	**0.0136**	**0.0000**	**77.4644**	**77.4644**	**4.8600e-003**	**0.0000**	**77.5859**

3.9 Parking Garage Exterior Improvements - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0135	0.1135	0.0887	1.8000e-004		5.3500e-003	5.3500e-003		5.0300e-003	5.0300e-003	0.0000	15.2572	15.2572	4.4400e-003	0.0000	15.3682
Total	**0.0135**	**0.1135**	**0.0887**	**1.8000e-004**		**5.3500e-003**	**5.3500e-003**		**5.0300e-003**	**5.0300e-003**	**0.0000**	**15.2572**	**15.2572**	**4.4400e-003**	**0.0000**	**15.3682**

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	6.8000e-004	4.8000e-004	4.9600e-003	2.0000e-005	1.8200e-003	1.0000e-005	1.8300e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.5639	1.5639	3.0000e-005	0.0000	1.5648
Total	**6.8000e-004**	**4.8000e-004**	**4.9600e-003**	**2.0000e-005**	**1.8200e-003**	**1.0000e-005**	**1.8300e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.5639**	**1.5639**	**3.0000e-005**	**0.0000**	**1.5648**

3.9 Parking Garage Exterior Improvements - 2019

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	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.5900e-003	0.0283	0.0991	1.8000e-004		3.1000e-004	3.1000e-004		3.1000e-004	3.1000e-004	0.0000	15.2572	15.2572	4.4400e-003	0.0000	15.3682
Total	**2.5900e-003**	**0.0283**	**0.0991**	**1.8000e-004**		**3.1000e-004**	**3.1000e-004**		**3.1000e-004**	**3.1000e-004**	**0.0000**	**15.2572**	**15.2572**	**4.4400e-003**	**0.0000**	**15.3682**

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	6.8000e-004	4.8000e-004	4.9600e-003	2.0000e-005	1.8200e-003	1.0000e-005	1.8300e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.5639	1.5639	3.0000e-005	0.0000	1.5648
Total	**6.8000e-004**	**4.8000e-004**	**4.9600e-003**	**2.0000e-005**	**1.8200e-003**	**1.0000e-005**	**1.8300e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.5639**	**1.5639**	**3.0000e-005**	**0.0000**	**1.5648**

3.10 Office Building Tenant Improvements - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0228					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.2700e-003	0.0288	0.0235	5.0000e-005		1.4200e-003	1.4200e-003		1.3400e-003	1.3400e-003	0.0000	4.3514	4.3514	1.2000e-003	0.0000	4.3815
Total	**0.0260**	**0.0288**	**0.0235**	**5.0000e-005**		**1.4200e-003**	**1.4200e-003**		**1.3400e-003**	**1.3400e-003**	**0.0000**	**4.3514**	**4.3514**	**1.2000e-003**	**0.0000**	**4.3815**

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	1.1000e-004	8.0000e-005	8.2000e-004	0.0000	3.0000e-004	0.0000	3.0000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2573	0.2573	1.0000e-005	0.0000	0.2574
Total	**1.1000e-004**	**8.0000e-005**	**8.2000e-004**	**0.0000**	**3.0000e-004**	**0.0000**	**3.0000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.2573**	**0.2573**	**1.0000e-005**	**0.0000**	**0.2574**

3.10 Office Building Tenant Improvements - 2019

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	0.0228					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.9000e-004	7.0600e-003	0.0277	5.0000e-005		8.0000e-005	8.0000e-005		8.0000e-005	8.0000e-005	0.0000	4.3514	4.3514	1.2000e-003	0.0000	4.3815
Total	**0.0235**	**7.0600e-003**	**0.0277**	**5.0000e-005**		**8.0000e-005**	**8.0000e-005**		**8.0000e-005**	**8.0000e-005**	**0.0000**	**4.3514**	**4.3514**	**1.2000e-003**	**0.0000**	**4.3815**

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	1.1000e-004	8.0000e-005	8.2000e-004	0.0000	3.0000e-004	0.0000	3.0000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2573	0.2573	1.0000e-005	0.0000	0.2574
Total	**1.1000e-004**	**8.0000e-005**	**8.2000e-004**	**0.0000**	**3.0000e-004**	**0.0000**	**3.0000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.2573**	**0.2573**	**1.0000e-005**	**0.0000**	**0.2574**

3.10 Office Building Tenant Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.2235					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1627	1.4074	1.2372	2.6500e-003		0.0677	0.0677		0.0639	0.0639	0.0000	229.7185	229.7185	0.0642	0.0000	231.3234
Total	**1.3862**	**1.4074**	**1.2372**	**2.6500e-003**		**0.0677**	**0.0677**		**0.0639**	**0.0639**	**0.0000**	**229.7185**	**229.7185**	**0.0642**	**0.0000**	**231.3234**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5700e-003	3.7700e-003	0.0398	1.5000e-004	0.0161	1.0000e-004	0.0162	4.2800e-003	9.0000e-005	4.3700e-003	0.0000	13.3892	13.3892	2.6000e-004	0.0000	13.3957
Total	**5.5700e-003**	**3.7700e-003**	**0.0398**	**1.5000e-004**	**0.0161**	**1.0000e-004**	**0.0162**	**4.2800e-003**	**9.0000e-005**	**4.3700e-003**	**0.0000**	**13.3892**	**13.3892**	**2.6000e-004**	**0.0000**	**13.3957**

3.10 Office Building Tenant Improvements - 2020

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	1.2235					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0369	0.3796	1.4879	2.6500e-003		4.1400e-003	4.1400e-003		4.1400e-003	4.1400e-003	0.0000	229.7182	229.7182	0.0642	0.0000	231.3231
Total	**1.2605**	**0.3796**	**1.4879**	**2.6500e-003**		**4.1400e-003**	**4.1400e-003**		**4.1400e-003**	**4.1400e-003**	**0.0000**	**229.7182**	**229.7182**	**0.0642**	**0.0000**	**231.3231**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5700e-003	3.7700e-003	0.0398	1.5000e-004	0.0161	1.0000e-004	0.0162	4.2800e-003	9.0000e-005	4.3700e-003	0.0000	13.3892	13.3892	2.6000e-004	0.0000	13.3957
Total	**5.5700e-003**	**3.7700e-003**	**0.0398**	**1.5000e-004**	**0.0161**	**1.0000e-004**	**0.0162**	**4.2800e-003**	**9.0000e-005**	**4.3700e-003**	**0.0000**	**13.3892**	**13.3892**	**2.6000e-004**	**0.0000**	**13.3957**

3.11 Landscaping and Site Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1415	1.4430	1.0286	1.7300e-003		0.0741	0.0741		0.0684	0.0684	0.0000	149.8986	149.8986	0.0468	0.0000	151.0686
Paving	4.3900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1458**	**1.4430**	**1.0286**	**1.7300e-003**		**0.0741**	**0.0741**		**0.0684**	**0.0684**	**0.0000**	**149.8986**	**149.8986**	**0.0468**	**0.0000**	**151.0686**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3700e-003	2.2800e-003	0.0240	9.0000e-005	9.7200e-003	6.0000e-005	9.7800e-003	2.5900e-003	6.0000e-005	2.6400e-003	0.0000	8.0958	8.0958	1.6000e-004	0.0000	8.0997
Total	**3.3700e-003**	**2.2800e-003**	**0.0240**	**9.0000e-005**	**9.7200e-003**	**6.0000e-005**	**9.7800e-003**	**2.5900e-003**	**6.0000e-005**	**2.6400e-003**	**0.0000**	**8.0958**	**8.0958**	**1.6000e-004**	**0.0000**	**8.0997**

3.11 Landscaping and Site Improvements - 2020

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	0.0311	0.2003	1.1014	1.7300e-003		5.0800e-003	5.0800e-003		5.0800e-003	5.0800e-003	0.0000	149.8984	149.8984	0.0468	0.0000	151.0684
Paving	4.3900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0355**	**0.2003**	**1.1014**	**1.7300e-003**		**5.0800e-003**	**5.0800e-003**		**5.0800e-003**	**5.0800e-003**	**0.0000**	**149.8984**	**149.8984**	**0.0468**	**0.0000**	**151.0684**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3700e-003	2.2800e-003	0.0240	9.0000e-005	9.7200e-003	6.0000e-005	9.7800e-003	2.5900e-003	6.0000e-005	2.6400e-003	0.0000	8.0958	8.0958	1.6000e-004	0.0000	8.0997
Total	**3.3700e-003**	**2.2800e-003**	**0.0240**	**9.0000e-005**	**9.7200e-003**	**6.0000e-005**	**9.7800e-003**	**2.5900e-003**	**6.0000e-005**	**2.6400e-003**	**0.0000**	**8.0958**	**8.0958**	**1.6000e-004**	**0.0000**	**8.0997**

3.12 Office Building Exterior Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.5847					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0710	0.6415	0.6354	1.1700e-003		0.0311	0.0311		0.0290	0.0290	0.0000	100.4889	100.4889	0.0308	0.0000	101.2579
Total	**0.6557**	**0.6415**	**0.6354**	**1.1700e-003**		**0.0311**	**0.0311**		**0.0290**	**0.0290**	**0.0000**	**100.4889**	**100.4889**	**0.0308**	**0.0000**	**101.2579**

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	6.2000e-004	4.2000e-004	4.4300e-003	2.0000e-005	1.7900e-003	1.0000e-005	1.8000e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.4913	1.4913	3.0000e-005	0.0000	1.4921
Total	**6.2000e-004**	**4.2000e-004**	**4.4300e-003**	**2.0000e-005**	**1.7900e-003**	**1.0000e-005**	**1.8000e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.4913**	**1.4913**	**3.0000e-005**	**0.0000**	**1.4921**

3.12 Office Building Exterior Improvements - 2020

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	0.5847					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0176	0.1923	0.7277	1.1700e-003		2.0700e-003	2.0700e-003		2.0700e-003	2.0700e-003	0.0000	100.4888	100.4888	0.0308	0.0000	101.2578
Total	**0.6022**	**0.1923**	**0.7277**	**1.1700e-003**		**2.0700e-003**	**2.0700e-003**		**2.0700e-003**	**2.0700e-003**	**0.0000**	**100.4888**	**100.4888**	**0.0308**	**0.0000**	**101.2578**

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	6.2000e-004	4.2000e-004	4.4300e-003	2.0000e-005	1.7900e-003	1.0000e-005	1.8000e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.4913	1.4913	3.0000e-005	0.0000	1.4921
Total	**6.2000e-004**	**4.2000e-004**	**4.4300e-003**	**2.0000e-005**	**1.7900e-003**	**1.0000e-005**	**1.8000e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.4913**	**1.4913**	**3.0000e-005**	**0.0000**	**1.4921**

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	0.1318	0.4402	1.5751	5.3200e-003	0.4776	5.7700e-003	0.4834	0.1284	5.4200e-003	0.1338	0.0000	486.0149	486.0149	0.0178	0.0000	486.4606
Unmitigated	0.1318	0.4402	1.5751	5.3200e-003	0.4776	5.7700e-003	0.4834	0.1284	5.4200e-003	0.1338	0.0000	486.0149	486.0149	0.0178	0.0000	486.4606

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
Office Park	579.15	84.07	37.36	1,192,727	1,192,727
Office Park	46.50	6.75	3.00	95,764	95,764
Parking Lot	0.00	0.00	0.00		
Total	625.65	90.82	40.36	1,288,492	1,288,492

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.490452	0.049742	0.253638	0.136789	0.017926	0.006526	0.021436	0.006323	0.003943	0.003278	0.008771	0.000435	0.000741
Office Park	0.490452	0.049742	0.253638	0.136789	0.017926	0.006526	0.021436	0.006323	0.003943	0.003278	0.008771	0.000435	0.000741
Parking Lot	0.490452	0.049742	0.253638	0.136789	0.017926	0.006526	0.021436	0.006323	0.003943	0.003278	0.008771	0.000435	0.000741

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,727.2922	1,727.2922	0.0781	0.0162	1,734.0602
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,727.2922	1,727.2922	0.0781	0.0162	1,734.0602
NaturalGas Mitigated	0.0338	0.3069	0.2578	1.8400e-003		0.0233	0.0233		0.0233	0.0233	0.0000	334.0472	334.0472	6.4000e-003	6.1200e-003	336.0323
NaturalGas Unmitigated	0.0338	0.3069	0.2578	1.8400e-003		0.0233	0.0233		0.0233	0.0233	0.0000	334.0472	334.0472	6.4000e-003	6.1200e-003	336.0323

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Office Park	465250	2.5100e-003	0.0228	0.0192	1.4000e-004		1.7300e-003	1.7300e-003		1.7300e-003	1.7300e-003	0.0000	24.8275	24.8275	4.8000e-004	4.6000e-004	24.9751
Office Park	5.79456e+006	0.0313	0.2841	0.2386	1.7000e-003		0.0216	0.0216		0.0216	0.0216	0.0000	309.2197	309.2197	5.9300e-003	5.6700e-003	311.0573
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0338**	**0.3069**	**0.2578**	**1.8400e-003**		**0.0233**	**0.0233**		**0.0233**	**0.0233**	**0.0000**	**334.0472**	**334.0472**	**6.4100e-003**	**6.1300e-003**	**336.0323**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Office Park	465250	2.5100e-003	0.0228	0.0192	1.4000e-004		1.7300e-003	1.7300e-003		1.7300e-003	1.7300e-003	0.0000	24.8275	24.8275	4.8000e-004	4.6000e-004	24.9751
Office Park	5.79456e+006	0.0313	0.2841	0.2386	1.7000e-003		0.0216	0.0216		0.0216	0.0216	0.0000	309.2197	309.2197	5.9300e-003	5.6700e-003	311.0573
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0338**	**0.3069**	**0.2578**	**1.8400e-003**		**0.0233**	**0.0233**		**0.0233**	**0.0233**	**0.0000**	**334.0472**	**334.0472**	**6.4100e-003**	**6.1300e-003**	**336.0323**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	1.68768e+006	490.9655	0.0222	4.5900e-003	492.8892
Office Park	3.90767e+006	1,136.7855	0.0514	0.0106	1,141.2398
Office Park	313750	91.2735	4.1300e-003	8.5000e-004	91.6311
Parking Lot	28420	8.2677	3.7000e-004	8.0000e-005	8.3001
Total		**1,727.2922**	**0.0781**	**0.0162**	**1,734.0602**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	1.68768e+006	490.9655	0.0222	4.5900e-003	492.8892
Office Park	3.90767e+006	1,136.7855	0.0514	0.0106	1,141.2398
Office Park	313750	91.2735	4.1300e-003	8.5000e-004	91.6311
Parking Lot	28420	8.2677	3.7000e-004	8.0000e-005	8.3001
Total		**1,727.2922**	**0.0781**	**0.0162**	**1,734.0602**

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	1.5217	1.1000e-004	0.0117	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0225	0.0225	6.0000e-005	0.0000	0.0240
Unmitigated	1.5217	1.1000e-004	0.0117	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0225	0.0225	6.0000e-005	0.0000	0.0240

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	0.1831					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.3376					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.1000e-003	1.1000e-004	0.0117	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0225	0.0225	6.0000e-005	0.0000	0.0240
Total	**1.5218**	**1.1000e-004**	**0.0117**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0225**	**0.0225**	**6.0000e-005**	**0.0000**	**0.0240**

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	0.1831					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.3376					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.1000e-003	1.1000e-004	0.0117	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0225	0.0225	6.0000e-005	0.0000	0.0240
Total	**1.5218**	**1.1000e-004**	**0.0117**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0225**	**0.0225**	**6.0000e-005**	**0.0000**	**0.0240**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	150.3831	1.9540	0.0472	213.3073
Unmitigated	150.3831	1.9540	0.0472	213.3073

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Office Park	59.7843 / 36.642	150.3831	1.9540	0.0472	213.3073
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**150.3831**	**1.9540**	**0.0472**	**213.3073**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Office Park	59.7843 / 36.642	150.3831	1.9540	0.0472	213.3073
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**150.3831**	**1.9540**	**0.0472**	**213.3073**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	63.4996	3.7527	0.0000	157.3177
Unmitigated	63.4996	3.7527	0.0000	157.3177

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Office Park	312.82	63.4996	3.7527	0.0000	157.3177
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**63.4996**	**3.7527**	**0.0000**	**157.3177**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Office Park	312.82	63.4996	3.7527	0.0000	157.3177
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**63.4996**	**3.7527**	**0.0000**	**157.3177**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Cranes	1	8.00	2	231	0.29	Diesel
Forklifts	1	8.00	365	89	0.20	Diesel
Generator Sets	4	0.30	52	84	0.74	Diesel
Pressure Washers	1	16.00	1	13	0.30	Diesel

UnMitigated/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
Equipment Type	tons/yr										MT/yr					
Cranes	4.5000e-004	5.3900e-003	2.1200e-003	1.0000e-005		2.2000e-004	2.2000e-004		2.0000e-004	2.0000e-004	0.0000	0.5069	0.5069	1.6000e-004	0.0000	0.5110
Forklifts	0.0263	0.2368	0.2154	2.8000e-004		0.0176	0.0176		0.0162	0.0162	0.0000	24.5082	24.5082	7.9300e-003	0.0000	24.7063
Generator Sets	1.5600e-003	0.0136	0.0145	3.0000e-005		7.7000e-004	7.7000e-004		7.7000e-004	7.7000e-004	0.0000	2.2043	2.2043	1.2000e-004	0.0000	2.2074
Pressure Washers	4.0000e-005	3.1000e-004	2.4000e-004	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.0355	0.0355	0.0000	0.0000	0.0356
Total	**0.0283**	**0.2561**	**0.2322**	**3.2000e-004**		**0.0186**	**0.0186**		**0.0172**	**0.0172**	**0.0000**	**27.2549**	**27.2549**	**8.2100e-003**	**0.0000**	**27.4603**

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

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	43.8960	0.0000	0.0000	43.8960

11.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	62	43.8960	0.0000	0.0000	43.8960
Total		**43.8960**	**0.0000**	**0.0000**	**43.8960**

Attachment B

PROJECT PHASE 1 SUMMER EMISSION REPORT

PREPARED BY SWCA ENVIRONMENTAL CONSULTANTS, INC.

Haskins Way Rezone Phase I

San Mateo County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	311.37	1000sqft	1.80	311,368.00	0
Office Park	25.00	1000sqft	0.30	25,000.00	0
Enclosed Parking with Elevator	720.00	Space	1.30	288,000.00	0
Parking Lot	203.00	Space	3.35	81,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	70
Climate Zone	5			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See Appendix F of the Environmental Impact Report

Construction Phase - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

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Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment -

Off-road Equipment - See Appendix F of the Environmental Impact Report

Trips and VMT - See Appendix F of the Environmental Impact Report

Demolition - See Appendix F of the Environmental Impact Report

Grading - See Appendix F of the Environmental Impact Report

Architectural Coating - See Appendix F of the Environmental Impact Report

Vehicle Trips - See Appendix F of the Environmental Impact Report

Area Coating - See Appendix F of the Environmental Impact Report

Land Use Change -

Sequestration - See Appendix F of the Environmental Impact Report

Construction Off-road Equipment Mitigation - See Appendix F of the Environmental Impact Report

Operational Off-Road Equipment - See Appendix F of the Environmental Impact Report

Stationary Sources - Emergency Generators and Fire Pumps - See Appendix F of the Environmental Impact Report

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	168,184.00	0.00
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	168,184.00	0.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	504,552.00	0.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	504,552.00	0.00
tblArchitecturalCoating	ConstArea_Parking	22,152.00	0.00
tblArchitecturalCoating	ConstArea_Parking	22,152.00	0.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

Haskins Way Rezone Phase I - San Mateo County, Summer

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	65.00
tblConstructionPhase	NumDays	20.00	21.00
tblConstructionPhase	NumDays	20.00	219.00
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tblConstructionPhase	NumDays	230.00	40.00
tblConstructionPhase	NumDays	230.00	208.00
tblConstructionPhase	NumDays	230.00	258.00
tblConstructionPhase	NumDays	20.00	130.00
tblConstructionPhase	NumDays	10.00	20.00
tblConstructionPhase	NumDays	10.00	35.00
tblGrading	AcresOfGrading	25.00	0.00
tblGrading	MaterialExported	0.00	8,775.00
tblGrading	MaterialImported	0.00	7,500.00
tblLandUse	LandUseSquareFeet	311,370.00	311,368.00
tblLandUse	LotAcreage	0.57	0.30
tblLandUse	LotAcreage	7.15	1.80
tblLandUse	LotAcreage	6.48	1.30
tblLandUse	LotAcreage	1.83	3.35
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
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tblOffRoadEquipment	UsageHours	8.00	6.00
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tblOffRoadEquipment	UsageHours	7.00	6.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	7.00	6.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	6.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	5.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	2.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	365.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	52.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	1.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	0.30
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	16.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	4.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00

tblSequestration	NumberOfNewTrees	0.00	62.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	12.60
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripNumber	185.00	230.00
tblTripsAndVMT	HaulingTripNumber	2,034.00	814.00
tblTripsAndVMT	VendorTripNumber	116.00	5.00
tblTripsAndVMT	VendorTripNumber	116.00	6.00
tblTripsAndVMT	VendorTripNumber	116.00	43.00
tblTripsAndVMT	VendorTripNumber	116.00	50.00
tblTripsAndVMT	WorkerTripNumber	40.00	20.00
tblTripsAndVMT	WorkerTripNumber	38.00	19.00
tblTripsAndVMT	WorkerTripNumber	53.00	7.00
tblTripsAndVMT	WorkerTripNumber	40.00	20.00
tblTripsAndVMT	WorkerTripNumber	38.00	19.00
tblTripsAndVMT	WorkerTripNumber	263.00	11.00
tblTripsAndVMT	WorkerTripNumber	263.00	13.00
tblTripsAndVMT	WorkerTripNumber	263.00	96.00
tblTripsAndVMT	WorkerTripNumber	263.00	113.00

tblTripsAndVMT	WorkerTripNumber	53.00	22.00
tblTripsAndVMT	WorkerTripNumber	53.00	19.00
tblVehicleTrips	CC_TTP	48.00	10.00
tblVehicleTrips	CW_TTP	33.00	71.00
tblVehicleTrips	ST_TR	1.64	0.27
tblVehicleTrips	SU_TR	0.76	0.12
tblVehicleTrips	WD_TR	11.42	1.86

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					
2018	9.5572	107.6822	61.5904	0.1486	4.4702	4.5300	9.0001	0.9252	4.2337	5.1589	0.0000	15,172.1248	15,172.1248	3.5505	0.0000	15,260.8873
2019	22.6808	109.4068	81.6240	0.1740	3.4741	5.3731	7.5236	0.7253	4.9834	5.2702	0.0000	16,960.7461	16,960.7461	4.7586	0.0000	17,045.5385
2020	42.9059	118.5960	101.3584	0.2191	2.7142	5.2637	7.9779	0.7341	4.9710	5.7051	0.0000	21,097.5471	21,097.5471	4.7097	0.0000	21,215.2897
Maximum	**42.9059**	**118.5960**	**101.3584**	**0.2191**	**4.4702**	**5.3731**	**9.0001**	**0.9252**	**4.9834**	**5.7051**	**0.0000**	**21,097.5471**	**21,097.5471**	**4.7586**	**0.0000**	**21,215.2897**

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					
2018	2.1238	23.7910	66.3947	0.1486	3.3215	0.2838	3.6053	0.7513	0.2812	1.0325	0.0000	15,172.1248	15,172.1248	3.5505	0.0000	15,260.8873
2019	14.5420	34.0844	96.3617	0.1740	2.6813	0.3357	3.0170	0.7253	0.3312	1.0565	0.0000	16,960.7460	16,960.7460	4.7586	0.0000	17,045.5385
2020	33.2427	39.2877	111.9940	0.2191	2.7142	0.4196	3.1339	0.7341	0.4163	1.1504	0.0000	21,097.5471	21,097.5471	4.7097	0.0000	21,215.2897
Maximum	**33.2427**	**39.2877**	**111.9940**	**0.2191**	**3.3215**	**0.4196**	**3.6053**	**0.7513**	**0.4163**	**1.1504**	**0.0000**	**21,097.5471**	**21,097.5471**	**4.7586**	**0.0000**	**21,215.2897**

	ROG	NOx	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	**33.58**	**71.06**	**-12.34**	**0.00**	**18.22**	**93.15**	**60.18**	**7.29**	**92.75**	**79.92**	**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	8.3445	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941
Energy	0.1850	1.6814	1.4124	0.0101		0.1278	0.1278		0.1278	0.1278		2,017.6659	2,017.6659	0.0387	0.0370	2,029.6559
Mobile	1.0633	3.0826	11.8431	0.0413	3.6770	0.0426	3.7195	0.9845	0.0400	1.0245		4,155.7629	4,155.7629	0.1459		4,159.4095
Offroad	0.7461	7.8321	4.3393	9.3800e-003		0.3775	0.3775		0.3520	0.3520		878.4557	878.4557	0.2418		884.5017
Total	**10.3389**	**12.5973**	**17.7242**	**0.0607**	**3.6770**	**0.5484**	**4.2253**	**0.9845**	**0.5203**	**1.5048**		**7,052.1601**	**7,052.1601**	**0.4271**	**0.0370**	**7,073.8612**

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	lb/day										lb/day					
Area	8.3445	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941
Energy	0.1850	1.6814	1.4124	0.0101		0.1278	0.1278		0.1278	0.1278		2,017.6659	2,017.6659	0.0387	0.0370	2,029.6559
Mobile	1.0633	3.0826	11.8431	0.0413	3.6770	0.0426	3.7195	0.9845	0.0400	1.0245		4,155.7629	4,155.7629	0.1459		4,159.4095
Offroad	0.7461	7.8321	4.3393	9.3800e-003		0.3775	0.3775		0.3520	0.3520		878.4557	878.4557	0.2418		884.5017
Total	**10.3389**	**12.5973**	**17.7242**	**0.0607**	**3.6770**	**0.5484**	**4.2253**	**0.9845**	**0.5203**	**1.5048**		**7,052.1601**	**7,052.1601**	**0.4271**	**0.0370**	**7,073.8612**

	ROG	NOx	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

Haskins Way Rezone Phase I - San Mateo County, Summer

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/12/2018	1/8/2019	5	20	
2	Soils Abatement/Remove/Replace	Site Preparation	12/26/2018	1/22/2019	5	20	
3	Site Prep and Make Ready	Site Preparation	1/23/2019	3/12/2019	5	35	
4	Parking Garage Underground	Building Construction	2/22/2019	4/4/2019	5	30	
5	Office Building Underground	Building Construction	2/22/2019	4/18/2019	5	40	
6	Parking Garage Core Construction	Building Construction	4/4/2019	1/20/2020	5	208	
7	Office Building Core Construction	Building Construction	4/19/2019	4/14/2020	5	258	
8	Parking Garage Exterior Improvements	Architectural Coating	12/2/2019	12/30/2019	5	21	
9	Office Building Tenant Improvements	Architectural Coating	12/26/2019	10/27/2020	5	219	
10	Landscaping and Site Improvements	Paving	1/6/2020	7/3/2020	5	130	
11	Office Building Exterior Improvements	Architectural Coating	1/15/2020	4/14/2020	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 4.65

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Air Compressors	2	7.00	78	0.48
Demolition	Concrete/Industrial Saws	2	6.00	81	0.73
Demolition	Dumpers/Tenders	1	4.00	16	0.38
Demolition	Excavators	2	3.00	158	0.38

Demolition	Forklifts	1	7.00	89	0.20
Demolition	Off-Highway Trucks	2	4.00	402	0.38
Demolition	Rubber Tired Dozers	2	6.00	247	0.40
Demolition	Skid Steer Loaders	1	6.00	65	0.37
Demolition	Sweepers/Scrubbers	1	4.00	64	0.46
Demolition	Tractors/Loaders/Backhoes	2	5.00	97	0.37
Soils Abatement/Remove/Replace	Crawler Tractors	1	4.00	212	0.43
Soils Abatement/Remove/Replace	Dumpers/Tenders	2	6.00	16	0.38
Soils Abatement/Remove/Replace	Excavators	2	5.00	158	0.38
Soils Abatement/Remove/Replace	Off-Highway Trucks	3	4.00	402	0.38
Soils Abatement/Remove/Replace	Plate Compactors	2	5.00	8	0.43
Soils Abatement/Remove/Replace	Rubber Tired Loaders	2	5.00	203	0.36
Soils Abatement/Remove/Replace	Scrapers	2	4.00	367	0.48
Soils Abatement/Remove/Replace	Sweepers/Scrubbers	1	4.00	64	0.46
Soils Abatement/Remove/Replace	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Site Prep and Make Ready	Bore/Drill Rigs	2	7.00	221	0.50
Site Prep and Make Ready	Dumpers/Tenders	1	6.00	16	0.38
Site Prep and Make Ready	Excavators	1	4.00	158	0.38
Site Prep and Make Ready	Off-Highway Trucks	2	4.00	402	0.38
Site Prep and Make Ready	Plate Compactors	2	5.00	8	0.43
Site Prep and Make Ready	Rubber Tired Loaders	2	6.00	203	0.36
Site Prep and Make Ready	Scrapers	2	6.00	367	0.48
Site Prep and Make Ready	Sweepers/Scrubbers	1	4.00	64	0.46
Site Prep and Make Ready	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Bore/Drill Rigs	1	7.00	221	0.50
Parking Garage Underground	Excavators	2	7.00	158	0.38
Parking Garage Underground	Generator Sets	2	4.00	84	0.74

Parking Garage Underground	Plate Compactors	2	4.00	8	0.43
Parking Garage Underground	Rough Terrain Forklifts	2	2.00	100	0.40
Parking Garage Underground	Rubber Tired Loaders	1	2.00	203	0.36
Parking Garage Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Parking Garage Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Trenchers	2	4.00	78	0.50
Office Building Underground	Bore/Drill Rigs	2	4.00	221	0.50
Office Building Underground	Excavators	2	7.00	158	0.38
Office Building Underground	Generator Sets	2	4.00	84	0.74
Office Building Underground	Plate Compactors	2	4.00	8	0.43
Office Building Underground	Rough Terrain Forklifts	2	8.00	100	0.40
Office Building Underground	Rubber Tired Loaders	1	6.00	203	0.36
Office Building Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Office Building Underground	Trenchers	4	7.00	78	0.50
Parking Garage Core Construction	Aerial Lifts	1	7.00	63	0.31
Parking Garage Core Construction	Cement and Mortar Mixers	6	4.00	9	0.56
Parking Garage Core Construction	Cranes	1	7.00	231	0.29
Parking Garage Core Construction	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Core Construction	Plate Compactors	1	4.00	8	0.43
Parking Garage Core Construction	Pumps	1	6.00	84	0.74
Parking Garage Core Construction	Rough Terrain Forklifts	1	6.00	100	0.40
Parking Garage Core Construction	Welders	3	6.00	46	0.45
Office Building Core Construction	Aerial Lifts	4	7.00	63	0.31
Office Building Core Construction	Air Compressors	4	6.00	78	0.48
Office Building Core Construction	Cranes	2	7.00	231	0.29
Office Building Core Construction	Off-Highway Trucks	2	4.00	402	0.38

Office Building Core Construction	Rough Terrain Forklifts	2	6.00	100	0.40
Office Building Core Construction	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Core Construction	Welders	5	7.00	46	0.45
Parking Garage Exterior Improvements	Aerial Lifts	1	6.00	63	0.31
Parking Garage Exterior Improvements	Cranes	1	3.00	231	0.29
Parking Garage Exterior Improvements	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Exterior Improvements	Other General Industrial Equipment	1	4.00	88	0.34
Parking Garage Exterior Improvements	Pressure Washers	1	2.00	13	0.30
Parking Garage Exterior Improvements	Rough Terrain Forklifts	1	5.00	100	0.40
Parking Garage Exterior Improvements	Welders	2	5.00	46	0.45
Office Building Tenant Improvements	Aerial Lifts	1	7.00	63	0.31
Office Building Tenant Improvements	Air Compressors	1	7.00	78	0.48
Office Building Tenant Improvements	Off-Highway Trucks	2	4.00	402	0.38
Office Building Tenant Improvements	Rough Terrain Forklifts	1	7.00	100	0.40
Office Building Tenant Improvements	Sweepers/Scrubbers	1	6.00	64	0.46
Office Building Tenant Improvements	Welders	1	5.00	46	0.45
Landscaping and Site Improvements	Cement and Mortar Mixers	2	4.00	9	0.56
Landscaping and Site Improvements	Dumpers/Tenders	1	6.00	16	0.38
Landscaping and Site Improvements	Paving Equipment	2	7.00	132	0.36
Landscaping and Site Improvements	Plate Compactors	2	4.00	8	0.43
Landscaping and Site Improvements	Rollers	2	5.00	80	0.38
Landscaping and Site Improvements	Rough Terrain Forklifts	1	3.00	100	0.40
Landscaping and Site Improvements	Rubber Tired Dozers	2	4.00	247	0.40
Landscaping and Site Improvements	Skid Steer Loaders	1	6.00	65	0.37
Landscaping and Site Improvements	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Office Building Exterior Improvements	Aerial Lifts	3	6.00	63	0.31
Office Building Exterior Improvements	Off-Highway Trucks	2	4.00	402	0.38

Office Building Exterior Improvements	Other General Industrial Equipment	2	7.00	88	0.34
Office Building Exterior Improvements	Pressure Washers	1	4.00	13	0.30
Office Building Exterior Improvements	Rough Terrain Forklifts	3	7.00	100	0.40
Office Building Exterior Improvements	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Exterior Improvements	Welders	2	6.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	16	20.00	0.00	230.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Soils Abatement/Remove/Re	16	20.00	0.00	814.00	10.80	7.30	12.60	LD_Mix	HDT_Mix	HHDT
Site Prep and Make Ready	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Underground	15	11.00	5.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Underground	18	13.00	6.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Core Construction	15	96.00	43.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Core Construction	20	113.00	50.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Exterior Improvements	8	22.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Tenant Improvements	7	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Landscaping and Site Improvements	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Exterior Improvements	14	7.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.9965	0.0000	1.9965	0.3023	0.0000	0.3023			0.0000			0.0000
Off-Road	4.9647	47.1807	29.2937	0.0546		2.5916	2.5916		2.4452	2.4452		5,395.0663	5,395.0663	1.3234		5,428.1506
Total	**4.9647**	**47.1807**	**29.2937**	**0.0546**	**1.9965**	**2.5916**	**4.5882**	**0.3023**	**2.4452**	**2.7475**		**5,395.0663**	**5,395.0663**	**1.3234**		**5,428.1506**

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	0.1163	3.9878	1.4528	9.3200e-003	0.2516	0.0165	0.2681	0.0671	0.0158	0.0829		1,044.1428	1,044.1428	0.1231		1,047.2213
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	0.0659	0.0418	0.5066	1.6400e-003	0.1643	1.0200e-003	0.1653	0.0436	9.4000e-004	0.0445		163.5573	163.5573	3.7900e-003		163.6521
Total	**0.1822**	**4.0296**	**1.9594**	**0.0110**	**0.4159**	**0.0175**	**0.4334**	**0.1107**	**0.0167**	**0.1274**		**1,207.7001**	**1,207.7001**	**0.1269**		**1,210.8734**

3.2 Demolition - 2018

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					0.8984	0.0000	0.8984	0.1360	0.0000	0.1360			0.0000			0.0000
Off-Road	0.6994	4.3871	30.8868	0.0546		0.0928	0.0928		0.0928	0.0928	0.0000	5,395.0663	5,395.0663	1.3234		5,428.1506
Total	**0.6994**	**4.3871**	**30.8868**	**0.0546**	**0.8984**	**0.0928**	**0.9912**	**0.1360**	**0.0928**	**0.2288**	**0.0000**	**5,395.0663**	**5,395.0663**	**1.3234**		**5,428.1506**

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	0.1163	3.9878	1.4528	9.3200e-003	0.2516	0.0165	0.2681	0.0671	0.0158	0.0829		1,044.1428	1,044.1428	0.1231		1,047.2213
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	0.0659	0.0418	0.5066	1.6400e-003	0.1643	1.0200e-003	0.1653	0.0436	9.4000e-004	0.0445		163.5573	163.5573	3.7900e-003		163.6521
Total	**0.1822**	**4.0296**	**1.9594**	**0.0110**	**0.4159**	**0.0175**	**0.4334**	**0.1107**	**0.0167**	**0.1274**		**1,207.7001**	**1,207.7001**	**0.1269**		**1,210.8734**

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.9965	0.0000	1.9965	0.3023	0.0000	0.3023			0.0000			0.0000
Off-Road	4.5959	43.4661	28.8099	0.0546		2.3262	2.3262		2.1924	2.1924		5,331.5149	5,331.5149	1.3095		5,364.2514
Total	**4.5959**	**43.4661**	**28.8099**	**0.0546**	**1.9965**	**2.3262**	**4.3227**	**0.3023**	**2.1924**	**2.4947**		**5,331.5149**	**5,331.5149**	**1.3095**		**5,364.2514**

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	0.1095	3.7749	1.4652	9.1400e-003	0.5267	0.0151	0.5418	0.1346	0.0144	0.1491		1,029.2484	1,029.2484	0.1246		1,032.3626
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	0.0597	0.0367	0.4547	1.5900e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		158.4636	158.4636	3.3500e-003		158.5475
Total	**0.1692**	**3.8116**	**1.9199**	**0.0107**	**0.6910**	**0.0161**	**0.7071**	**0.1782**	**0.0154**	**0.1936**		**1,187.7120**	**1,187.7120**	**0.1279**		**1,190.9101**

3.2 Demolition - 2019

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					0.8984	0.0000	0.8984	0.1360	0.0000	0.1360			0.0000			0.0000
Off-Road	0.6994	4.3867	30.8868	0.0546		0.0927	0.0927		0.0927	0.0927	0.0000	5,331.5149	5,331.5149	1.3095		5,364.2514
Total	**0.6994**	**4.3867**	**30.8868**	**0.0546**	**0.8984**	**0.0927**	**0.9911**	**0.1360**	**0.0927**	**0.2287**	**0.0000**	**5,331.5149**	**5,331.5149**	**1.3095**		**5,364.2514**

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	0.1095	3.7749	1.4652	9.1400e-003	0.5267	0.0151	0.5418	0.1346	0.0144	0.1491		1,029.2484	1,029.2484	0.1246		1,032.3626
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	0.0597	0.0367	0.4547	1.5900e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		158.4636	158.4636	3.3500e-003		158.5475
Total	**0.1692**	**3.8116**	**1.9199**	**0.0107**	**0.6910**	**0.0161**	**0.7071**	**0.1782**	**0.0154**	**0.1936**		**1,187.7120**	**1,187.7120**	**0.1279**		**1,190.9101**

3.3 Soils Abatement/Remove/Replace - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0920	0.0000	0.0920	0.0139	0.0000	0.0139			0.0000			0.0000
Off-Road	4.0415	45.7768	26.0820	0.0585		1.8797	1.8797		1.7325	1.7325		5,846.9481	5,846.9481	1.7927		5,891.7642
Total	**4.0415**	**45.7768**	**26.0820**	**0.0585**	**0.0920**	**1.8797**	**1.9717**	**0.0139**	**1.7325**	**1.7464**		**5,846.9481**	**5,846.9481**	**1.7927**		**5,891.7642**

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	0.3029	10.6533	3.7486	0.0228	1.8015	0.0401	1.8416	0.4548	0.0384	0.4931		2,558.8531	2,558.8531	0.3038		2,566.4469
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	0.0659	0.0418	0.5066	1.6400e-003	0.1643	1.0200e-003	0.1653	0.0436	9.4000e-004	0.0445		163.5573	163.5573	3.7900e-003		163.6521
Total	**0.3689**	**10.6951**	**4.2553**	**0.0245**	**1.9658**	**0.0412**	**2.0069**	**0.4983**	**0.0393**	**0.5377**		**2,722.4104**	**2,722.4104**	**0.3075**		**2,730.0990**

3.3 Soils Abatement/Remove/Replace - 2018

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					0.0414	0.0000	0.0414	6.2700e-003	0.0000	6.2700e-003			0.0000			0.0000
Off-Road	0.8733	4.6792	29.2933	0.0585		0.1324	0.1324		0.1324	0.1324	0.0000	5,846.9481	5,846.9481	1.7927		5,891.7642
Total	**0.8733**	**4.6792**	**29.2933**	**0.0585**	**0.0414**	**0.1324**	**0.1738**	**6.2700e-003**	**0.1324**	**0.1386**	**0.0000**	**5,846.9481**	**5,846.9481**	**1.7927**		**5,891.7642**

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	0.3029	10.6533	3.7486	0.0228	1.8015	0.0401	1.8416	0.4548	0.0384	0.4931		2,558.8531	2,558.8531	0.3038		2,566.4469
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	0.0659	0.0418	0.5066	1.6400e-003	0.1643	1.0200e-003	0.1653	0.0436	9.4000e-004	0.0445		163.5573	163.5573	3.7900e-003		163.6521
Total	**0.3689**	**10.6951**	**4.2553**	**0.0245**	**1.9658**	**0.0412**	**2.0069**	**0.4983**	**0.0393**	**0.5377**		**2,722.4104**	**2,722.4104**	**0.3075**		**2,730.0990**

3.3 Soils Abatement/Remove/Replace - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0920	0.0000	0.0920	0.0139	0.0000	0.0139			0.0000			0.0000
Off-Road	3.7374	41.0850	24.8887	0.0585		1.6695	1.6695		1.5391	1.5391		5,753.4568	5,753.4568	1.7921		5,798.2583
Total	**3.7374**	**41.0850**	**24.8887**	**0.0585**	**0.0920**	**1.6695**	**1.7615**	**0.0139**	**1.5391**	**1.5530**		**5,753.4568**	**5,753.4568**	**1.7921**		**5,798.2583**

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	0.2840	10.1109	3.7588	0.0224	0.5302	0.0367	0.5670	0.1427	0.0351	0.1779		2,523.3532	2,523.3532	0.3056		2,530.9922
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	0.0597	0.0367	0.4547	1.5900e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		158.4636	158.4636	3.3500e-003		158.5475
Total	**0.3437**	**10.1476**	**4.2136**	**0.0240**	**0.6945**	**0.0377**	**0.7323**	**0.1863**	**0.0361**	**0.2224**		**2,681.8169**	**2,681.8169**	**0.3089**		**2,689.5396**

3.3 Soils Abatement/Remove/Replace - 2019

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					0.0414	0.0000	0.0414	6.2700e-003	0.0000	6.2700e-003			0.0000			0.0000
Off-Road	0.8733	4.6778	29.2932	0.0585		0.1320	0.1320		0.1320	0.1320	0.0000	5,753.4568	5,753.4568	1.7921		5,798.2583
Total	**0.8733**	**4.6778**	**29.2932**	**0.0585**	**0.0414**	**0.1320**	**0.1735**	**6.2700e-003**	**0.1320**	**0.1383**	**0.0000**	**5,753.4568**	**5,753.4568**	**1.7921**		**5,798.2583**

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	0.2840	10.1109	3.7588	0.0224	0.5302	0.0367	0.5670	0.1427	0.0351	0.1779		2,523.3532	2,523.3532	0.3056		2,530.9922
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	0.0597	0.0367	0.4547	1.5900e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		158.4636	158.4636	3.3500e-003		158.5475
Total	**0.3437**	**10.1476**	**4.2136**	**0.0240**	**0.6945**	**0.0377**	**0.7323**	**0.1863**	**0.0361**	**0.2224**		**2,681.8169**	**2,681.8169**	**0.3089**		**2,689.5396**

3.4 Site Prep and Make Ready - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	4.1225	47.0098	28.7596	0.0714		1.8713	1.8713		1.7237	1.7237		7,039.8701	7,039.8701	2.2086		7,095.0857
Total	**4.1225**	**47.0098**	**28.7596**	**0.0714**	**1.5908**	**1.8713**	**3.4621**	**0.1718**	**1.7237**	**1.8954**		**7,039.8701**	**7,039.8701**	**2.2086**		**7,095.0857**

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	0.0567	0.0349	0.4320	1.5100e-003	0.1561	9.6000e-004	0.1570	0.0414	8.8000e-004	0.0423		150.5405	150.5405	3.1900e-003		150.6201
Total	**0.0567**	**0.0349**	**0.4320**	**1.5100e-003**	**0.1561**	**9.6000e-004**	**0.1570**	**0.0414**	**8.8000e-004**	**0.0423**		**150.5405**	**150.5405**	**3.1900e-003**		**150.6201**

3.4 Site Prep and Make Ready - 2019

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					0.7158	0.0000	0.7158	0.0773	0.0000	0.0773			0.0000			0.0000
Off-Road	0.9871	5.0607	34.8207	0.0714		0.1411	0.1411		0.1411	0.1411	0.0000	7,039.8701	7,039.8701	2.2086		7,095.0856
Total	**0.9871**	**5.0607**	**34.8207**	**0.0714**	**0.7158**	**0.1411**	**0.8570**	**0.0773**	**0.1411**	**0.2184**	**0.0000**	**7,039.8701**	**7,039.8701**	**2.2086**		**7,095.0856**

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	0.0567	0.0349	0.4320	1.5100e-003	0.1561	9.6000e-004	0.1570	0.0414	8.8000e-004	0.0423		150.5405	150.5405	3.1900e-003		150.6201
Total	**0.0567**	**0.0349**	**0.4320**	**1.5100e-003**	**0.1561**	**9.6000e-004**	**0.1570**	**0.0414**	**8.8000e-004**	**0.0423**		**150.5405**	**150.5405**	**3.1900e-003**		**150.6201**

3.5 Parking Garage Underground - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2820	22.7467	20.1134	0.0369		1.2660	1.2660		1.1836	1.1836		3,609.5102	3,609.5102	0.9770		3,633.9358
Total	**2.2820**	**22.7467**	**20.1134**	**0.0369**		**1.2660**	**1.2660**		**1.1836**	**1.1836**		**3,609.5102**	**3,609.5102**	**0.9770**		**3,633.9358**

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	0.0233	0.6281	0.2347	1.3600e-003	0.0337	4.3700e-003	0.0381	9.7100e-003	4.1800e-003	0.0139		148.5071	148.5071	0.0129		148.8286
Worker	0.0328	0.0202	0.2501	8.7000e-004	0.0904	5.6000e-004	0.0909	0.0240	5.1000e-004	0.0245		87.1550	87.1550	1.8400e-003		87.2011
Total	**0.0561**	**0.6483**	**0.4848**	**2.2300e-003**	**0.1241**	**4.9300e-003**	**0.1290**	**0.0337**	**4.6900e-003**	**0.0384**		**235.6621**	**235.6621**	**0.0147**		**236.0297**

3.5 Parking Garage Underground - 2019

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	0.4893	2.7741	23.9077	0.0369		0.0676	0.0676		0.0676	0.0676	0.0000	3,609.5101	3,609.5101	0.9770		3,633.9358
Total	**0.4893**	**2.7741**	**23.9077**	**0.0369**		**0.0676**	**0.0676**		**0.0676**	**0.0676**	**0.0000**	**3,609.5101**	**3,609.5101**	**0.9770**		**3,633.9358**

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	0.0233	0.6281	0.2347	1.3600e-003	0.0337	4.3700e-003	0.0381	9.7100e-003	4.1800e-003	0.0139		148.5071	148.5071	0.0129		148.8286
Worker	0.0328	0.0202	0.2501	8.7000e-004	0.0904	5.6000e-004	0.0909	0.0240	5.1000e-004	0.0245		87.1550	87.1550	1.8400e-003		87.2011
Total	**0.0561**	**0.6483**	**0.4848**	**2.2300e-003**	**0.1241**	**4.9300e-003**	**0.1290**	**0.0337**	**4.6900e-003**	**0.0384**		**235.6621**	**235.6621**	**0.0147**		**236.0297**

3.6 Office Building Underground - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.8158	38.1896	31.2571	0.0548		2.2240	2.2240		2.0650	2.0650		5,380.9026	5,380.9026	1.5375		5,419.3395
Total	**3.8158**	**38.1896**	**31.2571**	**0.0548**		**2.2240**	**2.2240**		**2.0650**	**2.0650**		**5,380.9026**	**5,380.9026**	**1.5375**		**5,419.3395**

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	0.0279	0.7537	0.2816	1.6300e-003	0.0405	5.2400e-003	0.0457	0.0117	5.0100e-003	0.0167		178.2085	178.2085	0.0154		178.5944
Worker	0.0388	0.0239	0.2956	1.0300e-003	0.1068	6.6000e-004	0.1075	0.0283	6.0000e-004	0.0289		103.0014	103.0014	2.1800e-003		103.0559
Total	**0.0667**	**0.7776**	**0.5772**	**2.6600e-003**	**0.1473**	**5.9000e-003**	**0.1532**	**0.0400**	**5.6100e-003**	**0.0456**		**281.2099**	**281.2099**	**0.0176**		**281.6502**

3.6 Office Building Underground - 2019

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	0.7092	3.7272	36.1394	0.0548		0.0969	0.0969		0.0969	0.0969	0.0000	5,380.9026	5,380.9026	1.5375		5,419.3395
Total	**0.7092**	**3.7272**	**36.1394**	**0.0548**		**0.0969**	**0.0969**		**0.0969**	**0.0969**	**0.0000**	**5,380.9026**	**5,380.9026**	**1.5375**		**5,419.3395**

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	0.0279	0.7537	0.2816	1.6300e-003	0.0405	5.2400e-003	0.0457	0.0117	5.0100e-003	0.0167		178.2085	178.2085	0.0154		178.5944
Worker	0.0388	0.0239	0.2956	1.0300e-003	0.1068	6.6000e-004	0.1075	0.0283	6.0000e-004	0.0289		103.0014	103.0014	2.1800e-003		103.0559
Total	**0.0667**	**0.7776**	**0.5772**	**2.6600e-003**	**0.1473**	**5.9000e-003**	**0.1532**	**0.0400**	**5.6100e-003**	**0.0456**		**281.2099**	**281.2099**	**0.0176**		**281.6502**

3.7 Parking Garage Core Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3541	18.5942	14.6174	0.0288		0.8807	0.8807		0.8463	0.8463		2,657.7430	2,657.7430	0.6187		2,673.2116
Total	**2.3541**	**18.5942**	**14.6174**	**0.0288**		**0.8807**	**0.8807**		**0.8463**	**0.8463**		**2,657.7430**	**2,657.7430**	**0.6187**		**2,673.2116**

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	0.2002	5.4015	2.0180	0.0117	0.2902	0.0376	0.3278	0.0835	0.0359	0.1194		1,277.1612	1,277.1612	0.1106		1,279.9262
Worker	0.2865	0.1762	2.1828	7.6300e-003	0.7886	4.8500e-003	0.7935	0.2092	4.4700e-003	0.2136		760.6254	760.6254	0.0161		761.0278
Total	**0.4868**	**5.5777**	**4.2008**	**0.0193**	**1.0788**	**0.0424**	**1.1212**	**0.2927**	**0.0404**	**0.3331**		**2,037.7866**	**2,037.7866**	**0.1267**		**2,040.9540**

3.7 Parking Garage Core Construction - 2019

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	0.5550	5.2854	15.7514	0.0288		0.0869	0.0869		0.0869	0.0869	0.0000	2,657.7430	2,657.7430	0.6187		2,673.2116
Total	**0.5550**	**5.2854**	**15.7514**	**0.0288**		**0.0869**	**0.0869**		**0.0869**	**0.0869**	**0.0000**	**2,657.7430**	**2,657.7430**	**0.6187**		**2,673.2116**

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	0.2002	5.4015	2.0180	0.0117	0.2902	0.0376	0.3278	0.0835	0.0359	0.1194		1,277.1612	1,277.1612	0.1106		1,279.9262
Worker	0.2865	0.1762	2.1828	7.6300e-003	0.7886	4.8500e-003	0.7935	0.2092	4.4700e-003	0.2136		760.6254	760.6254	0.0161		761.0278
Total	**0.4868**	**5.5777**	**4.2008**	**0.0193**	**1.0788**	**0.0424**	**1.1212**	**0.2927**	**0.0404**	**0.3331**		**2,037.7866**	**2,037.7866**	**0.1267**		**2,040.9540**

3.7 Parking Garage Core Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1464	17.1521	14.2644	0.0288		0.7752	0.7752		0.7451	0.7451		2,623.6941	2,623.6941	0.6063		2,638.8526
Total	**2.1464**	**17.1521**	**14.2644**	**0.0288**		**0.7752**	**0.7752**		**0.7451**	**0.7451**		**2,623.6941**	**2,623.6941**	**0.6063**		**2,638.8526**

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	0.1633	4.9110	1.9039	0.0115	0.2902	0.0246	0.3148	0.0835	0.0235	0.1070		1,265.3324	1,265.3324	0.1080		1,268.0321
Worker	0.2638	0.1564	1.9866	7.3800e-003	0.7886	4.7500e-003	0.7934	0.2092	4.3700e-003	0.2136		736.4341	736.4341	0.0142		736.7900
Total	**0.4270**	**5.0674**	**3.8905**	**0.0189**	**1.0788**	**0.0294**	**1.1082**	**0.2927**	**0.0279**	**0.3206**		**2,001.7665**	**2,001.7665**	**0.1222**		**2,004.8221**

3.7 Parking Garage Core Construction - 2020

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	0.5550	5.2854	15.7517	0.0288		0.0867	0.0867		0.0867	0.0867	0.0000	2,623.6941	2,623.6941	0.6063		2,638.8526
Total	**0.5550**	**5.2854**	**15.7517**	**0.0288**		**0.0867**	**0.0867**		**0.0867**	**0.0867**	**0.0000**	**2,623.6941**	**2,623.6941**	**0.6063**		**2,638.8526**

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	0.1633	4.9110	1.9039	0.0115	0.2902	0.0246	0.3148	0.0835	0.0235	0.1070		1,265.3324	1,265.3324	0.1080		1,268.0321
Worker	0.2638	0.1564	1.9866	7.3800e-003	0.7886	4.7500e-003	0.7934	0.2092	4.3700e-003	0.2136		736.4341	736.4341	0.0142		736.7900
Total	**0.4270**	**5.0674**	**3.8905**	**0.0189**	**1.0788**	**0.0294**	**1.1082**	**0.2927**	**0.0279**	**0.3206**		**2,001.7665**	**2,001.7665**	**0.1222**		**2,004.8221**

3.8 Office Building Core Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.8417	38.5463	31.5527	0.0587		1.9408	1.9408		1.8617	1.8617		5,559.9467	5,559.9467	1.3626		5,594.0106
Total	**4.8417**	**38.5463**	**31.5527**	**0.0587**		**1.9408**	**1.9408**		**1.8617**	**1.8617**		**5,559.9467**	**5,559.9467**	**1.3626**		**5,594.0106**

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	0.2328	6.2809	2.3465	0.0136	0.3374	0.0437	0.3811	0.0971	0.0418	0.1389		1,485.0712	1,485.0712	0.1286		1,488.2863
Worker	0.3372	0.2074	2.5693	8.9800e-003	0.9283	5.7100e-003	0.9340	0.2462	5.2600e-003	0.2515		895.3195	895.3195	0.0189		895.7931
Total	**0.5701**	**6.4883**	**4.9158**	**0.0225**	**1.2657**	**0.0494**	**1.3151**	**0.3433**	**0.0470**	**0.3904**		**2,380.3907**	**2,380.3907**	**0.1476**		**2,384.0794**

3.8 Office Building Core Construction - 2019

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	0.8356	10.4353	33.6911	0.0587		0.0869	0.0869		0.0869	0.0869	0.0000	5,559.9467	5,559.9467	1.3626		5,594.0106
Total	**0.8356**	**10.4353**	**33.6911**	**0.0587**		**0.0869**	**0.0869**		**0.0869**	**0.0869**	**0.0000**	**5,559.9467**	**5,559.9467**	**1.3626**		**5,594.0106**

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	0.2328	6.2809	2.3465	0.0136	0.3374	0.0437	0.3811	0.0971	0.0418	0.1389		1,485.0712	1,485.0712	0.1286		1,488.2863
Worker	0.3372	0.2074	2.5693	8.9800e-003	0.9283	5.7100e-003	0.9340	0.2462	5.2600e-003	0.2515		895.3195	895.3195	0.0189		895.7931
Total	**0.5701**	**6.4883**	**4.9158**	**0.0225**	**1.2657**	**0.0494**	**1.3151**	**0.3433**	**0.0470**	**0.3904**		**2,380.3907**	**2,380.3907**	**0.1476**		**2,384.0794**

3.8 Office Building Core Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.3957	35.3791	30.8372	0.0587		1.6954	1.6954		1.6256	1.6256		5,482.7895	5,482.7895	1.3369		5,516.2120
Total	**4.3957**	**35.3791**	**30.8372**	**0.0587**		**1.6954**	**1.6954**		**1.6256**	**1.6256**		**5,482.7895**	**5,482.7895**	**1.3369**		**5,516.2120**

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	0.1898	5.7104	2.2138	0.0134	0.3375	0.0286	0.3661	0.0971	0.0274	0.1245		1,471.3167	1,471.3167	0.1256		1,474.4559
Worker	0.3105	0.1841	2.3384	8.6900e-003	0.9283	5.5900e-003	0.9339	0.2462	5.1500e-003	0.2514		866.8443	866.8443	0.0168		867.2633
Total	**0.5003**	**5.8945**	**4.5523**	**0.0221**	**1.2657**	**0.0342**	**1.2999**	**0.3433**	**0.0325**	**0.3758**		**2,338.1610**	**2,338.1610**	**0.1423**		**2,341.7192**

3.8 Office Building Core Construction - 2020

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	0.8356	10.4353	33.6911	0.0587		0.0869	0.0869		0.0869	0.0869	0.0000	5,482.7895	5,482.7895	1.3369		5,516.2120
Total	**0.8356**	**10.4353**	**33.6911**	**0.0587**		**0.0869**	**0.0869**		**0.0869**	**0.0869**	**0.0000**	**5,482.7895**	**5,482.7895**	**1.3369**		**5,516.2120**

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	0.1898	5.7104	2.2138	0.0134	0.3375	0.0286	0.3661	0.0971	0.0274	0.1245		1,471.3167	1,471.3167	0.1256		1,474.4559
Worker	0.3105	0.1841	2.3384	8.6900e-003	0.9283	5.5900e-003	0.9339	0.2462	5.1500e-003	0.2514		866.8443	866.8443	0.0168		867.2633
Total	**0.5003**	**5.8945**	**4.5523**	**0.0221**	**1.2657**	**0.0342**	**1.2999**	**0.3433**	**0.0325**	**0.3758**		**2,338.1610**	**2,338.1610**	**0.1423**		**2,341.7192**

3.9 Parking Garage Exterior Improvements - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.2882	10.8104	8.4431	0.0168		0.5092	0.5092		0.4787	0.4787		1,601.7329	1,601.7329	0.4660		1,613.3827
Total	**1.2882**	**10.8104**	**8.4431**	**0.0168**		**0.5092**	**0.5092**		**0.4787**	**0.4787**		**1,601.7329**	**1,601.7329**	**0.4660**		**1,613.3827**

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	0.0657	0.0404	0.5002	1.7500e-003	0.1807	1.1100e-003	0.1818	0.0479	1.0200e-003	0.0490		174.3100	174.3100	3.6900e-003		174.4022
Total	**0.0657**	**0.0404**	**0.5002**	**1.7500e-003**	**0.1807**	**1.1100e-003**	**0.1818**	**0.0479**	**1.0200e-003**	**0.0490**		**174.3100**	**174.3100**	**3.6900e-003**		**174.4022**

3.9 Parking Garage Exterior Improvements - 2019

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	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2468	2.6909	9.4342	0.0168		0.0295	0.0295		0.0295	0.0295	0.0000	1,601.7329	1,601.7329	0.4660		1,613.3827
Total	**0.2468**	**2.6909**	**9.4342**	**0.0168**		**0.0295**	**0.0295**		**0.0295**	**0.0295**	**0.0000**	**1,601.7329**	**1,601.7329**	**0.4660**		**1,613.3827**

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	0.0657	0.0404	0.5002	1.7500e-003	0.1807	1.1100e-003	0.1818	0.0479	1.0200e-003	0.0490		174.3100	174.3100	3.6900e-003		174.4022
Total	**0.0657**	**0.0404**	**0.5002**	**1.7500e-003**	**0.1807**	**1.1100e-003**	**0.1818**	**0.0479**	**1.0200e-003**	**0.0490**		**174.3100**	**174.3100**	**3.6900e-003**		**174.4022**

3.10 Office Building Tenant Improvements - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.3818					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.6358	14.4190	11.7398	0.0247		0.7115	0.7115		0.6716	0.6716		2,398.2956	2,398.2956	0.6633		2,414.8779
Total	**13.0176**	**14.4190**	**11.7398**	**0.0247**		**0.7115**	**0.7115**		**0.6716**	**0.6716**		**2,398.2956**	**2,398.2956**	**0.6633**		**2,414.8779**

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	0.0567	0.0349	0.4320	1.5100e-003	0.1561	9.6000e-004	0.1570	0.0414	8.8000e-004	0.0423		150.5405	150.5405	3.1900e-003		150.6201
Total	**0.0567**	**0.0349**	**0.4320**	**1.5100e-003**	**0.1561**	**9.6000e-004**	**0.1570**	**0.0414**	**8.8000e-004**	**0.0423**		**150.5405**	**150.5405**	**3.1900e-003**		**150.6201**

3.10 Office Building Tenant Improvements - 2019

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	11.3818					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3436	3.5316	13.8407	0.0247		0.0385	0.0385		0.0385	0.0385	0.0000	2,398.2956	2,398.2956	0.6633		2,414.8779
Total	**11.7254**	**3.5316**	**13.8407**	**0.0247**		**0.0385**	**0.0385**		**0.0385**	**0.0385**	**0.0000**	**2,398.2956**	**2,398.2956**	**0.6633**		**2,414.8779**

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	0.0567	0.0349	0.4320	1.5100e-003	0.1561	9.6000e-004	0.1570	0.0414	8.8000e-004	0.0423		150.5405	150.5405	3.1900e-003		150.6201
Total	**0.0567**	**0.0349**	**0.4320**	**1.5100e-003**	**0.1561**	**9.6000e-004**	**0.1570**	**0.0414**	**8.8000e-004**	**0.0423**		**150.5405**	**150.5405**	**3.1900e-003**		**150.6201**

3.10 Office Building Tenant Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.3818					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.5134	13.0916	11.5089	0.0247		0.6302	0.6302		0.5944	0.5944		2,355.5468	2,355.5468	0.6583		2,372.0039
Total	**12.8952**	**13.0916**	**11.5089**	**0.0247**		**0.6302**	**0.6302**		**0.5944**	**0.5944**		**2,355.5468**	**2,355.5468**	**0.6583**		**2,372.0039**

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	0.0522	0.0310	0.3932	1.4600e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		145.7526	145.7526	2.8200e-003		145.8230
Total	**0.0522**	**0.0310**	**0.3932**	**1.4600e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**145.7526**	**145.7526**	**2.8200e-003**		**145.8230**

3.10 Office Building Tenant Improvements - 2020

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	11.3818					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3436	3.5316	13.8407	0.0247		0.0385	0.0385		0.0385	0.0385	0.0000	2,355.5468	2,355.5468	0.6583		2,372.0039
Total	**11.7254**	**3.5316**	**13.8407**	**0.0247**		**0.0385**	**0.0385**		**0.0385**	**0.0385**	**0.0000**	**2,355.5468**	**2,355.5468**	**0.6583**		**2,372.0039**

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	0.0522	0.0310	0.3932	1.4600e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		145.7526	145.7526	2.8200e-003		145.8230
Total	**0.0522**	**0.0310**	**0.3932**	**1.4600e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**145.7526**	**145.7526**	**2.8200e-003**		**145.8230**

3.11 Landscaping and Site Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1762	22.1999	15.8241	0.0267		1.1404	1.1404		1.0521	1.0521		2,542.0761	2,542.0761	0.7936		2,561.9165
Paving	0.0675					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2437**	**22.1999**	**15.8241**	**0.0267**		**1.1404**	**1.1404**		**1.0521**	**1.0521**		**2,542.0761**	**2,542.0761**	**0.7936**		**2,561.9165**

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	0.0522	0.0310	0.3932	1.4600e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		145.7526	145.7526	2.8200e-003		145.8230
Total	**0.0522**	**0.0310**	**0.3932**	**1.4600e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**145.7526**	**145.7526**	**2.8200e-003**		**145.8230**

3.11 Landscaping and Site Improvements - 2020

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	0.4787	3.0819	16.9451	0.0267		0.0781	0.0781		0.0781	0.0781	0.0000	2,542.0761	2,542.0761	0.7936		2,561.9165
Paving	0.0675					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5463**	**3.0819**	**16.9451**	**0.0267**		**0.0781**	**0.0781**		**0.0781**	**0.0781**	**0.0000**	**2,542.0761**	**2,542.0761**	**0.7936**		**2,561.9165**

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	0.0522	0.0310	0.3932	1.4600e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		145.7526	145.7526	2.8200e-003		145.8230
Total	**0.0522**	**0.0310**	**0.3932**	**1.4600e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**145.7526**	**145.7526**	**2.8200e-003**		**145.8230**

3.12 Office Building Exterior Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	17.9892					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	2.1848	19.7380	19.5498	0.0359		0.9568	0.9568		0.8913	0.8913		3,408.3096	3,408.3096	1.0433		3,434.3930
Total	**20.1740**	**19.7380**	**19.5498**	**0.0359**		**0.9568**	**0.9568**		**0.8913**	**0.8913**		**3,408.3096**	**3,408.3096**	**1.0433**		**3,434.3930**

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	0.0192	0.0114	0.1449	5.4000e-004	0.0575	3.5000e-004	0.0579	0.0153	3.2000e-004	0.0156		53.6983	53.6983	1.0400e-003		53.7243
Total	**0.0192**	**0.0114**	**0.1449**	**5.4000e-004**	**0.0575**	**3.5000e-004**	**0.0579**	**0.0153**	**3.2000e-004**	**0.0156**		**53.6983**	**53.6983**	**1.0400e-003**		**53.7243**

3.12 Office Building Exterior Improvements - 2020

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	17.9892					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.5403	5.9183	22.3915	0.0359		0.0637	0.0637		0.0637	0.0637	0.0000	3,408.3096	3,408.3096	1.0433		3,434.3930
Total	**18.5295**	**5.9183**	**22.3915**	**0.0359**		**0.0637**	**0.0637**		**0.0637**	**0.0637**	**0.0000**	**3,408.3096**	**3,408.3096**	**1.0433**		**3,434.3930**

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	0.0192	0.0114	0.1449	5.4000e-004	0.0575	3.5000e-004	0.0579	0.0153	3.2000e-004	0.0156		53.6983	53.6983	1.0400e-003		53.7243
Total	**0.0192**	**0.0114**	**0.1449**	**5.4000e-004**	**0.0575**	**3.5000e-004**	**0.0579**	**0.0153**	**3.2000e-004**	**0.0156**		**53.6983**	**53.6983**	**1.0400e-003**		**53.7243**

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	1.0633	3.0826	11.8431	0.0413	3.6770	0.0426	3.7195	0.9845	0.0400	1.0245		4,155.7629	4,155.7629	0.1459		4,159.4095
Unmitigated	1.0633	3.0826	11.8431	0.0413	3.6770	0.0426	3.7195	0.9845	0.0400	1.0245		4,155.7629	4,155.7629	0.1459		4,159.4095

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
Office Park	579.15	84.07	37.36	1,192,727	1,192,727
Office Park	46.50	6.75	3.00	95,764	95,764
Parking Lot	0.00	0.00	0.00		
Total	625.65	90.82	40.36	1,288,492	1,288,492

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.490452	0.049742	0.253638	0.136789	0.017926	0.006526	0.021436	0.006323	0.003943	0.003278	0.008771	0.000435	0.000741
Office Park	0.490452	0.049742	0.253638	0.136789	0.017926	0.006526	0.021436	0.006323	0.003943	0.003278	0.008771	0.000435	0.000741
Parking Lot	0.490452	0.049742	0.253638	0.136789	0.017926	0.006526	0.021436	0.006323	0.003943	0.003278	0.008771	0.000435	0.000741

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	0.1850	1.6814	1.4124	0.0101		0.1278	0.1278		0.1278	0.1278		2,017.6659	2,017.6659	0.0387	0.0370	2,029.6559
NaturalGas Unmitigated	0.1850	1.6814	1.4124	0.0101		0.1278	0.1278		0.1278	0.1278		2,017.6659	2,017.6659	0.0387	0.0370	2,029.6559

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					
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
Office Park	1274.66	0.0138	0.1250	0.1050	7.5000e-004		9.5000e-003	9.5000e-003		9.5000e-003	9.5000e-003		149.9597	149.9597	2.8700e-003	2.7500e-003	150.8509
Office Park	15875.5	0.1712	1.5564	1.3074	9.3400e-003		0.1183	0.1183		0.1183	0.1183		1,867.7062	1,867.7062	0.0358	0.0342	1,878.8050
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1850**	**1.6814**	**1.4124**	**0.0101**		**0.1278**	**0.1278**		**0.1278**	**0.1278**		**2,017.6659**	**2,017.6659**	**0.0387**	**0.0370**	**2,029.6559**

5.2 Energy by Land Use - NaturalGas

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					
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
Office Park	1.27466	0.0138	0.1250	0.1050	7.5000e-004		9.5000e-003	9.5000e-003		9.5000e-003	9.5000e-003		149.9597	149.9597	2.8700e-003	2.7500e-003	150.8509
Office Park	15.8755	0.1712	1.5564	1.3074	9.3400e-003		0.1183	0.1183		0.1183	0.1183		1,867.7062	1,867.7062	0.0358	0.0342	1,878.8050
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1850**	**1.6814**	**1.4124**	**0.0101**		**0.1278**	**0.1278**		**0.1278**	**0.1278**		**2,017.6659**	**2,017.6659**	**0.0387**	**0.0370**	**2,029.6559**

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	8.3445	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941
Unmitigated	8.3445	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941

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	1.0033					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.3291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0122	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941
Total	**8.3445**	**1.1900e-003**	**0.1294**	**1.0000e-005**		**4.6000e-004**	**4.6000e-004**		**4.6000e-004**	**4.6000e-004**		**0.2756**	**0.2756**	**7.4000e-004**		**0.2941**

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	1.0033					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.3291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0122	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941
Total	**8.3445**	**1.1900e-003**	**0.1294**	**1.0000e-005**		**4.6000e-004**	**4.6000e-004**		**4.6000e-004**	**4.6000e-004**		**0.2756**	**0.2756**	**7.4000e-004**		**0.2941**

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
Cranes	1	8.00	2	231	0.29	Diesel
Forklifts	1	8.00	365	89	0.20	Diesel
Generator Sets	4	0.30	52	84	0.74	Diesel
Pressure Washers	1	16.00	1	13	0.30	Diesel

UnMitigated/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
Equipment Type	lb/day										lb/day					
Cranes	0.4534	5.3915	2.1154	5.7700e-003		0.2223	0.2223		0.2045	0.2045		558.7896	558.7896	0.1807		563.3077
Forklifts	0.1440	1.2975	1.1803	1.5300e-003		0.0967	0.0967		0.0889	0.0889		148.0308	148.0308	0.0479		149.2277
Generator Sets	0.0599	0.5218	0.5558	9.9000e-004		0.0294	0.0294		0.0294	0.0294		93.4552	93.4552	5.2600e-003		93.5867
Pressure Washers	0.0889	0.6213	0.4878	1.1000e-003		0.0292	0.0292		0.0292	0.0292		78.1800	78.1800	7.9800e-003		78.3795
Total	**0.7461**	**7.8321**	**4.3393**	**9.3900e-003**		**0.3775**	**0.3775**		**0.3520**	**0.3520**		**878.4557**	**878.4557**	**0.2418**		**884.5017**

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

Attachment C

PROJECT PHASE 1 WINTER EMISSION REPORT

PREPARED BY SWCA ENVIRONMENTAL CONSULTANTS, INC.

Haskins Way Rezone Phase I

San Mateo County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	311.37	1000sqft	1.80	311,368.00	0
Office Park	25.00	1000sqft	0.30	25,000.00	0
Enclosed Parking with Elevator	720.00	Space	1.30	288,000.00	0
Parking Lot	203.00	Space	3.35	81,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	70
Climate Zone	5			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See Appendix F of the Environmental Impact Report

Construction Phase - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

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Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment -

Off-road Equipment - See Appendix F of the Environmental Impact Report

Trips and VMT - See Appendix F of the Environmental Impact Report

Demolition - See Appendix F of the Environmental Impact Report

Grading - See Appendix F of the Environmental Impact Report

Architectural Coating - See Appendix F of the Environmental Impact Report

Vehicle Trips - See Appendix F of the Environmental Impact Report

Area Coating - See Appendix F of the Environmental Impact Report

Land Use Change -

Sequestration - See Appendix F of the Environmental Impact Report

Construction Off-road Equipment Mitigation - See Appendix F of the Environmental Impact Report

Operational Off-Road Equipment - See Appendix F of the Environmental Impact Report

Stationary Sources - Emergency Generators and Fire Pumps - See Appendix F of the Environmental Impact Report

Table Name	Column Name	Default Value	New Value
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tblArchitecturalCoating	ConstArea_Nonresidential_Interior	504,552.00	0.00
tblArchitecturalCoating	ConstArea_Parking	22,152.00	0.00
tblArchitecturalCoating	ConstArea_Parking	22,152.00	0.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final

Haskins Way Rezone Phase I - San Mateo County, Winter

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstructionPhase	NumDays	10.00	20.00
tblConstructionPhase	NumDays	10.00	35.00
tblGrading	AcresOfGrading	25.00	0.00
tblGrading	MaterialExported	0.00	8,775.00
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tblLandUse	LotAcreage	0.57	0.30
tblLandUse	LotAcreage	7.15	1.80
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tblLandUse	LotAcreage	1.83	3.35
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
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tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	365.00
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tblVehicleTrips	CW_TTP	33.00	71.00
tblVehicleTrips	ST_TR	1.64	0.27
tblVehicleTrips	SU_TR	0.76	0.12
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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					
2018	9.5870	108.0638	61.8555	0.1479	4.4702	4.5320	9.0022	0.9252	4.2356	5.1609	0.0000	15,100.9969	15,100.9969	3.5572	0.0000	15,189.9272
2019	22.7835	109.4496	81.6463	0.1724	3.4741	5.3733	7.5255	0.7253	4.9836	5.2704	0.0000	16,791.2712	16,791.2712	4.7591	0.0000	16,876.1818
2020	43.0018	118.8615	101.5554	0.2175	2.7142	5.2649	7.9792	0.7341	4.9722	5.7063	0.0000	20,929.7754	20,929.7754	4.7134	0.0000	21,047.6102
Maximum	**43.0018**	**118.8615**	**101.5554**	**0.2175**	**4.4702**	**5.3733**	**9.0022**	**0.9252**	**4.9836**	**5.7063**	**0.0000**	**20,929.7754**	**20,929.7754**	**4.7591**	**0.0000**	**21,047.6102**

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					
2018	2.1535	24.1727	66.6598	0.1479	3.3215	0.2858	3.6073	0.7513	0.2831	1.0344	0.0000	15,100.9969	15,100.9969	3.5572	0.0000	15,189.9272
2019	14.6447	34.3973	96.3840	0.1724	2.6813	0.3375	3.0189	0.7253	0.3329	1.0583	0.0000	16,791.2712	16,791.2712	4.7591	0.0000	16,876.1817
2020	33.3386	39.5532	112.1910	0.2175	2.7142	0.4209	3.1352	0.7341	0.4176	1.1516	0.0000	20,929.7754	20,929.7754	4.7134	0.0000	21,047.6102
Maximum	**33.3386**	**39.5532**	**112.1910**	**0.2175**	**3.3215**	**0.4209**	**3.6073**	**0.7513**	**0.4176**	**1.1516**	**0.0000**	**20,929.7754**	**20,929.7754**	**4.7591**	**0.0000**	**21,047.6102**

	ROG	NOx	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	**33.48**	**70.83**	**-12.31**	**0.00**	**18.22**	**93.12**	**60.17**	**7.29**	**92.72**	**79.90**	**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	8.3445	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941
Energy	0.1850	1.6814	1.4124	0.0101		0.1278	0.1278		0.1278	0.1278		2,017.6659	2,017.6659	0.0387	0.0370	2,029.6559
Mobile	0.9832	3.3536	12.1567	0.0392	3.6770	0.0427	3.7197	0.9845	0.0401	1.0247		3,945.3354	3,945.3354	0.1477		3,949.0271
Offroad	0.7461	7.8321	4.3393	9.3800e-003		0.3775	0.3775		0.3520	0.3520		878.4557	878.4557	0.2418		884.5017
Total	**10.2588**	**12.8682**	**18.0378**	**0.0586**	**3.6770**	**0.5485**	**4.2255**	**0.9845**	**0.5204**	**1.5049**		**6,841.7326**	**6,841.7326**	**0.4289**	**0.0370**	**6,863.4787**

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	lb/day										lb/day					
Area	8.3445	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941
Energy	0.1850	1.6814	1.4124	0.0101		0.1278	0.1278		0.1278	0.1278		2,017.6659	2,017.6659	0.0387	0.0370	2,029.6559
Mobile	0.9832	3.3536	12.1567	0.0392	3.6770	0.0427	3.7197	0.9845	0.0401	1.0247		3,945.3354	3,945.3354	0.1477		3,949.0271
Offroad	0.7461	7.8321	4.3393	9.3800e-003		0.3775	0.3775		0.3520	0.3520		878.4557	878.4557	0.2418		884.5017
Total	**10.2588**	**12.8682**	**18.0378**	**0.0586**	**3.6770**	**0.5485**	**4.2255**	**0.9845**	**0.5204**	**1.5049**		**6,841.7326**	**6,841.7326**	**0.4289**	**0.0370**	**6,863.4787**

	ROG	NOx	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

Haskins Way Rezone Phase I - San Mateo County, Winter

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/12/2018	1/8/2019	5	20	
2	Soils Abatement/Remove/Replace	Site Preparation	12/26/2018	1/22/2019	5	20	
3	Site Prep and Make Ready	Site Preparation	1/23/2019	3/12/2019	5	35	
4	Parking Garage Underground	Building Construction	2/22/2019	4/4/2019	5	30	
5	Office Building Underground	Building Construction	2/22/2019	4/18/2019	5	40	
6	Parking Garage Core Construction	Building Construction	4/4/2019	1/20/2020	5	208	
7	Office Building Core Construction	Building Construction	4/19/2019	4/14/2020	5	258	
8	Parking Garage Exterior Improvements	Architectural Coating	12/2/2019	12/30/2019	5	21	
9	Office Building Tenant Improvements	Architectural Coating	12/26/2019	10/27/2020	5	219	
10	Landscaping and Site Improvements	Paving	1/6/2020	7/3/2020	5	130	
11	Office Building Exterior Improvements	Architectural Coating	1/15/2020	4/14/2020	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 4.65

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Air Compressors	2	7.00	78	0.48
Demolition	Concrete/Industrial Saws	2	6.00	81	0.73
Demolition	Dumpers/Tenders	1	4.00	16	0.38
Demolition	Excavators	2	3.00	158	0.38

Demolition	Forklifts	1	7.00	89	0.20
Demolition	Off-Highway Trucks	2	4.00	402	0.38
Demolition	Rubber Tired Dozers	2	6.00	247	0.40
Demolition	Skid Steer Loaders	1	6.00	65	0.37
Demolition	Sweepers/Scrubbers	1	4.00	64	0.46
Demolition	Tractors/Loaders/Backhoes	2	5.00	97	0.37
Soils Abatement/Remove/Replace	Crawler Tractors	1	4.00	212	0.43
Soils Abatement/Remove/Replace	Dumpers/Tenders	2	6.00	16	0.38
Soils Abatement/Remove/Replace	Excavators	2	5.00	158	0.38
Soils Abatement/Remove/Replace	Off-Highway Trucks	3	4.00	402	0.38
Soils Abatement/Remove/Replace	Plate Compactors	2	5.00	8	0.43
Soils Abatement/Remove/Replace	Rubber Tired Loaders	2	5.00	203	0.36
Soils Abatement/Remove/Replace	Scrapers	2	4.00	367	0.48
Soils Abatement/Remove/Replace	Sweepers/Scrubbers	1	4.00	64	0.46
Soils Abatement/Remove/Replace	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Site Prep and Make Ready	Bore/Drill Rigs	2	7.00	221	0.50
Site Prep and Make Ready	Dumpers/Tenders	1	6.00	16	0.38
Site Prep and Make Ready	Excavators	1	4.00	158	0.38
Site Prep and Make Ready	Off-Highway Trucks	2	4.00	402	0.38
Site Prep and Make Ready	Plate Compactors	2	5.00	8	0.43
Site Prep and Make Ready	Rubber Tired Loaders	2	6.00	203	0.36
Site Prep and Make Ready	Scrapers	2	6.00	367	0.48
Site Prep and Make Ready	Sweepers/Scrubbers	1	4.00	64	0.46
Site Prep and Make Ready	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Bore/Drill Rigs	1	7.00	221	0.50
Parking Garage Underground	Excavators	2	7.00	158	0.38
Parking Garage Underground	Generator Sets	2	4.00	84	0.74

Parking Garage Underground	Plate Compactors	2	4.00	8	0.43
Parking Garage Underground	Rough Terrain Forklifts	2	2.00	100	0.40
Parking Garage Underground	Rubber Tired Loaders	1	2.00	203	0.36
Parking Garage Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Parking Garage Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Trenchers	2	4.00	78	0.50
Office Building Underground	Bore/Drill Rigs	2	4.00	221	0.50
Office Building Underground	Excavators	2	7.00	158	0.38
Office Building Underground	Generator Sets	2	4.00	84	0.74
Office Building Underground	Plate Compactors	2	4.00	8	0.43
Office Building Underground	Rough Terrain Forklifts	2	8.00	100	0.40
Office Building Underground	Rubber Tired Loaders	1	6.00	203	0.36
Office Building Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Office Building Underground	Trenchers	4	7.00	78	0.50
Parking Garage Core Construction	Aerial Lifts	1	7.00	63	0.31
Parking Garage Core Construction	Cement and Mortar Mixers	6	4.00	9	0.56
Parking Garage Core Construction	Cranes	1	7.00	231	0.29
Parking Garage Core Construction	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Core Construction	Plate Compactors	1	4.00	8	0.43
Parking Garage Core Construction	Pumps	1	6.00	84	0.74
Parking Garage Core Construction	Rough Terrain Forklifts	1	6.00	100	0.40
Parking Garage Core Construction	Welders	3	6.00	46	0.45
Office Building Core Construction	Aerial Lifts	4	7.00	63	0.31
Office Building Core Construction	Air Compressors	4	6.00	78	0.48
Office Building Core Construction	Cranes	2	7.00	231	0.29
Office Building Core Construction	Off-Highway Trucks	2	4.00	402	0.38

Office Building Core Construction	Rough Terrain Forklifts	2	6.00	100	0.40
Office Building Core Construction	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Core Construction	Welders	5	7.00	46	0.45
Parking Garage Exterior Improvements	Aerial Lifts	1	6.00	63	0.31
Parking Garage Exterior Improvements	Cranes	1	3.00	231	0.29
Parking Garage Exterior Improvements	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Exterior Improvements	Other General Industrial Equipment	1	4.00	88	0.34
Parking Garage Exterior Improvements	Pressure Washers	1	2.00	13	0.30
Parking Garage Exterior Improvements	Rough Terrain Forklifts	1	5.00	100	0.40
Parking Garage Exterior Improvements	Welders	2	5.00	46	0.45
Office Building Tenant Improvements	Aerial Lifts	1	7.00	63	0.31
Office Building Tenant Improvements	Air Compressors	1	7.00	78	0.48
Office Building Tenant Improvements	Off-Highway Trucks	2	4.00	402	0.38
Office Building Tenant Improvements	Rough Terrain Forklifts	1	7.00	100	0.40
Office Building Tenant Improvements	Sweepers/Scrubbers	1	6.00	64	0.46
Office Building Tenant Improvements	Welders	1	5.00	46	0.45
Landscaping and Site Improvements	Cement and Mortar Mixers	2	4.00	9	0.56
Landscaping and Site Improvements	Dumpers/Tenders	1	6.00	16	0.38
Landscaping and Site Improvements	Paving Equipment	2	7.00	132	0.36
Landscaping and Site Improvements	Plate Compactors	2	4.00	8	0.43
Landscaping and Site Improvements	Rollers	2	5.00	80	0.38
Landscaping and Site Improvements	Rough Terrain Forklifts	1	3.00	100	0.40
Landscaping and Site Improvements	Rubber Tired Dozers	2	4.00	247	0.40
Landscaping and Site Improvements	Skid Steer Loaders	1	6.00	65	0.37
Landscaping and Site Improvements	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Office Building Exterior Improvements	Aerial Lifts	3	6.00	63	0.31
Office Building Exterior Improvements	Off-Highway Trucks	2	4.00	402	0.38

Office Building Exterior Improvements	Other General Industrial Equipment	2	7.00	88	0.34
Office Building Exterior Improvements	Pressure Washers	1	4.00	13	0.30
Office Building Exterior Improvements	Rough Terrain Forklifts	3	7.00	100	0.40
Office Building Exterior Improvements	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Exterior Improvements	Welders	2	6.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	16	20.00	0.00	230.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Soils Abatement/Remove/Re	16	20.00	0.00	814.00	10.80	7.30	12.60	LD_Mix	HDT_Mix	HHDT
Site Prep and Make Ready	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Underground	15	11.00	5.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Underground	18	13.00	6.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Core Construction	15	96.00	43.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Core Construction	20	113.00	50.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Exterior Improvements	8	22.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Tenant Improvements	7	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Landscaping and Site Improvements	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Exterior Improvements	14	7.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.9965	0.0000	1.9965	0.3023	0.0000	0.3023			0.0000			0.0000
Off-Road	4.9647	47.1807	29.2937	0.0546		2.5916	2.5916		2.4452	2.4452		5,395.0663	5,395.0663	1.3234		5,428.1506
Total	**4.9647**	**47.1807**	**29.2937**	**0.0546**	**1.9965**	**2.5916**	**4.5882**	**0.3023**	**2.4452**	**2.7475**		**5,395.0663**	**5,395.0663**	**1.3234**		**5,428.1506**

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	0.1196	4.1110	1.5093	9.2200e-003	0.2516	0.0169	0.2685	0.0671	0.0162	0.0833		1,032.9164	1,032.9164	0.1246		1,036.0319
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	0.0731	0.0516	0.4962	1.5400e-003	0.1643	1.0200e-003	0.1653	0.0436	9.4000e-004	0.0445		153.4723	153.4723	3.6600e-003		153.5637
Total	**0.1927**	**4.1626**	**2.0055**	**0.0108**	**0.4159**	**0.0180**	**0.4338**	**0.1107**	**0.0171**	**0.1278**		**1,186.3887**	**1,186.3887**	**0.1283**		**1,189.5955**

3.2 Demolition - 2018

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					0.8984	0.0000	0.8984	0.1360	0.0000	0.1360			0.0000			0.0000
Off-Road	0.6994	4.3871	30.8868	0.0546		0.0928	0.0928		0.0928	0.0928	0.0000	5,395.0663	5,395.0663	1.3234		5,428.1506
Total	**0.6994**	**4.3871**	**30.8868**	**0.0546**	**0.8984**	**0.0928**	**0.9912**	**0.1360**	**0.0928**	**0.2288**	**0.0000**	**5,395.0663**	**5,395.0663**	**1.3234**		**5,428.1506**

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	0.1196	4.1110	1.5093	9.2200e-003	0.2516	0.0169	0.2685	0.0671	0.0162	0.0833		1,032.9164	1,032.9164	0.1246		1,036.0319
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	0.0731	0.0516	0.4962	1.5400e-003	0.1643	1.0200e-003	0.1653	0.0436	9.4000e-004	0.0445		153.4723	153.4723	3.6600e-003		153.5637
Total	**0.1927**	**4.1626**	**2.0055**	**0.0108**	**0.4159**	**0.0180**	**0.4338**	**0.1107**	**0.0171**	**0.1278**		**1,186.3887**	**1,186.3887**	**0.1283**		**1,189.5955**

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.9965	0.0000	1.9965	0.3023	0.0000	0.3023			0.0000			0.0000
Off-Road	4.5959	43.4661	28.8099	0.0546		2.3262	2.3262		2.1924	2.1924		5,331.5149	5,331.5149	1.3095		5,364.2514
Total	**4.5959**	**43.4661**	**28.8099**	**0.0546**	**1.9965**	**2.3262**	**4.3227**	**0.3023**	**2.1924**	**2.4947**		**5,331.5149**	**5,331.5149**	**1.3095**		**5,364.2514**

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	0.1123	3.8906	1.5115	9.0400e-003	0.5267	0.0155	0.5422	0.1346	0.0148	0.1495		1,018.0471	1,018.0471	0.1258		1,021.1929
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	0.0663	0.0453	0.4426	1.4900e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		148.6946	148.6946	3.2200e-003		148.7750
Total	**0.1785**	**3.9359**	**1.9540**	**0.0105**	**0.6910**	**0.0165**	**0.7075**	**0.1782**	**0.0158**	**0.1940**		**1,166.7417**	**1,166.7417**	**0.1291**		**1,169.9679**

3.2 Demolition - 2019

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					0.8984	0.0000	0.8984	0.1360	0.0000	0.1360			0.0000			0.0000
Off-Road	0.6994	4.3867	30.8868	0.0546		0.0927	0.0927		0.0927	0.0927	0.0000	5,331.5149	5,331.5149	1.3095		5,364.2514
Total	**0.6994**	**4.3867**	**30.8868**	**0.0546**	**0.8984**	**0.0927**	**0.9911**	**0.1360**	**0.0927**	**0.2287**	**0.0000**	**5,331.5149**	**5,331.5149**	**1.3095**		**5,364.2514**

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	0.1123	3.8906	1.5115	9.0400e-003	0.5267	0.0155	0.5422	0.1346	0.0148	0.1495		1,018.0471	1,018.0471	0.1258		1,021.1929
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	0.0663	0.0453	0.4426	1.4900e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		148.6946	148.6946	3.2200e-003		148.7750
Total	**0.1785**	**3.9359**	**1.9540**	**0.0105**	**0.6910**	**0.0165**	**0.7075**	**0.1782**	**0.0158**	**0.1940**		**1,166.7417**	**1,166.7417**	**0.1291**		**1,169.9679**

3.3 Soils Abatement/Remove/Replace - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0920	0.0000	0.0920	0.0139	0.0000	0.0139			0.0000			0.0000
Off-Road	4.0415	45.7768	26.0820	0.0585		1.8797	1.8797		1.7325	1.7325		5,846.9481	5,846.9481	1.7927		5,891.7642
Total	**4.0415**	**45.7768**	**26.0820**	**0.0585**	**0.0920**	**1.8797**	**1.9717**	**0.0139**	**1.7325**	**1.7464**		**5,846.9481**	**5,846.9481**	**1.7927**		**5,891.7642**

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	0.3150	10.8922	3.9781	0.0225	1.8015	0.0417	1.8432	0.4548	0.0399	0.4947		2,519.1216	2,519.1216	0.3093		2,526.8532
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	0.0731	0.0516	0.4962	1.5400e-003	0.1643	1.0200e-003	0.1653	0.0436	9.4000e-004	0.0445		153.4723	153.4723	3.6600e-003		153.5637
Total	**0.3881**	**10.9438**	**4.4743**	**0.0240**	**1.9658**	**0.0428**	**2.0085**	**0.4983**	**0.0409**	**0.5392**		**2,672.5938**	**2,672.5938**	**0.3129**		**2,680.4168**

3.3 Soils Abatement/Remove/Replace - 2018

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					0.0414	0.0000	0.0414	6.2700e-003	0.0000	6.2700e-003			0.0000			0.0000
Off-Road	0.8733	4.6792	29.2933	0.0585		0.1324	0.1324		0.1324	0.1324	0.0000	5,846.9481	5,846.9481	1.7927		5,891.7642
Total	**0.8733**	**4.6792**	**29.2933**	**0.0585**	**0.0414**	**0.1324**	**0.1738**	**6.2700e-003**	**0.1324**	**0.1386**	**0.0000**	**5,846.9481**	**5,846.9481**	**1.7927**		**5,891.7642**

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	0.3150	10.8922	3.9781	0.0225	1.8015	0.0417	1.8432	0.4548	0.0399	0.4947		2,519.1216	2,519.1216	0.3093		2,526.8532
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	0.0731	0.0516	0.4962	1.5400e-003	0.1643	1.0200e-003	0.1653	0.0436	9.4000e-004	0.0445		153.4723	153.4723	3.6600e-003		153.5637
Total	**0.3881**	**10.9438**	**4.4743**	**0.0240**	**1.9658**	**0.0428**	**2.0085**	**0.4983**	**0.0409**	**0.5392**		**2,672.5938**	**2,672.5938**	**0.3129**		**2,680.4168**

3.3 Soils Abatement/Remove/Replace - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0920	0.0000	0.0920	0.0139	0.0000	0.0139			0.0000			0.0000
Off-Road	3.7374	41.0850	24.8887	0.0585		1.6695	1.6695		1.5391	1.5391		5,753.4568	5,753.4568	1.7921		5,798.2583
Total	**3.7374**	**41.0850**	**24.8887**	**0.0585**	**0.0920**	**1.6695**	**1.7615**	**0.0139**	**1.5391**	**1.5530**		**5,753.4568**	**5,753.4568**	**1.7921**		**5,798.2583**

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	0.2942	10.3345	3.9593	0.0221	0.5302	0.0382	0.5684	0.1427	0.0365	0.1793		2,483.7104	2,483.7104	0.3103		2,491.4677
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	0.0663	0.0453	0.4426	1.4900e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		148.6946	148.6946	3.2200e-003		148.7750
Total	**0.3605**	**10.3798**	**4.4018**	**0.0235**	**0.6945**	**0.0392**	**0.7337**	**0.1863**	**0.0375**	**0.2238**		**2,632.4049**	**2,632.4049**	**0.3135**		**2,640.2427**

3.3 Soils Abatement/Remove/Replace - 2019

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					0.0414	0.0000	0.0414	6.2700e-003	0.0000	6.2700e-003			0.0000			0.0000
Off-Road	0.8733	4.6778	29.2932	0.0585		0.1320	0.1320		0.1320	0.1320	0.0000	5,753.4568	5,753.4568	1.7921		5,798.2583
Total	**0.8733**	**4.6778**	**29.2932**	**0.0585**	**0.0414**	**0.1320**	**0.1735**	**6.2700e-003**	**0.1320**	**0.1383**	**0.0000**	**5,753.4568**	**5,753.4568**	**1.7921**		**5,798.2583**

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	0.2942	10.3345	3.9593	0.0221	0.5302	0.0382	0.5684	0.1427	0.0365	0.1793		2,483.7104	2,483.7104	0.3103		2,491.4677
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	0.0663	0.0453	0.4426	1.4900e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		148.6946	148.6946	3.2200e-003		148.7750
Total	**0.3605**	**10.3798**	**4.4018**	**0.0235**	**0.6945**	**0.0392**	**0.7337**	**0.1863**	**0.0375**	**0.2238**		**2,632.4049**	**2,632.4049**	**0.3135**		**2,640.2427**

3.4 Site Prep and Make Ready - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	4.1225	47.0098	28.7596	0.0714		1.8713	1.8713		1.7237	1.7237		7,039.8701	7,039.8701	2.2086		7,095.0857
Total	**4.1225**	**47.0098**	**28.7596**	**0.0714**	**1.5908**	**1.8713**	**3.4621**	**0.1718**	**1.7237**	**1.8954**		**7,039.8701**	**7,039.8701**	**2.2086**		**7,095.0857**

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	0.0630	0.0431	0.4204	1.4200e-003	0.1561	9.6000e-004	0.1570	0.0414	8.8000e-004	0.0423		141.2598	141.2598	3.0600e-003		141.3362
Total	**0.0630**	**0.0431**	**0.4204**	**1.4200e-003**	**0.1561**	**9.6000e-004**	**0.1570**	**0.0414**	**8.8000e-004**	**0.0423**		**141.2598**	**141.2598**	**3.0600e-003**		**141.3362**

3.4 Site Prep and Make Ready - 2019

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					0.7158	0.0000	0.7158	0.0773	0.0000	0.0773			0.0000			0.0000
Off-Road	0.9871	5.0607	34.8207	0.0714		0.1411	0.1411		0.1411	0.1411	0.0000	7,039.8701	7,039.8701	2.2086		7,095.0856
Total	**0.9871**	**5.0607**	**34.8207**	**0.0714**	**0.7158**	**0.1411**	**0.8570**	**0.0773**	**0.1411**	**0.2184**	**0.0000**	**7,039.8701**	**7,039.8701**	**2.2086**		**7,095.0856**

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	0.0630	0.0431	0.4204	1.4200e-003	0.1561	9.6000e-004	0.1570	0.0414	8.8000e-004	0.0423		141.2598	141.2598	3.0600e-003		141.3362
Total	**0.0630**	**0.0431**	**0.4204**	**1.4200e-003**	**0.1561**	**9.6000e-004**	**0.1570**	**0.0414**	**8.8000e-004**	**0.0423**		**141.2598**	**141.2598**	**3.0600e-003**		**141.3362**

3.5 Parking Garage Underground - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2820	22.7467	20.1134	0.0369		1.2660	1.2660		1.1836	1.1836		3,609.5102	3,609.5102	0.9770		3,633.9358
Total	**2.2820**	**22.7467**	**20.1134**	**0.0369**		**1.2660**	**1.2660**		**1.1836**	**1.1836**		**3,609.5102**	**3,609.5102**	**0.9770**		**3,633.9358**

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	0.0244	0.6391	0.2567	1.3300e-003	0.0337	4.4700e-003	0.0382	9.7100e-003	4.2700e-003	0.0140		145.9608	145.9608	0.0132		146.2910
Worker	0.0365	0.0249	0.2434	8.2000e-004	0.0904	5.6000e-004	0.0909	0.0240	5.1000e-004	0.0245		81.7820	81.7820	1.7700e-003		81.8262
Total	**0.0608**	**0.6640**	**0.5001**	**2.1500e-003**	**0.1241**	**5.0300e-003**	**0.1291**	**0.0337**	**4.7800e-003**	**0.0385**		**227.7428**	**227.7428**	**0.0150**		**228.1172**

3.5 Parking Garage Underground - 2019

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	0.4893	2.7741	23.9077	0.0369		0.0676	0.0676		0.0676	0.0676	0.0000	3,609.5101	3,609.5101	0.9770		3,633.9358
Total	**0.4893**	**2.7741**	**23.9077**	**0.0369**		**0.0676**	**0.0676**		**0.0676**	**0.0676**	**0.0000**	**3,609.5101**	**3,609.5101**	**0.9770**		**3,633.9358**

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	0.0244	0.6391	0.2567	1.3300e-003	0.0337	4.4700e-003	0.0382	9.7100e-003	4.2700e-003	0.0140		145.9608	145.9608	0.0132		146.2910
Worker	0.0365	0.0249	0.2434	8.2000e-004	0.0904	5.6000e-004	0.0909	0.0240	5.1000e-004	0.0245		81.7820	81.7820	1.7700e-003		81.8262
Total	**0.0608**	**0.6640**	**0.5001**	**2.1500e-003**	**0.1241**	**5.0300e-003**	**0.1291**	**0.0337**	**4.7800e-003**	**0.0385**		**227.7428**	**227.7428**	**0.0150**		**228.1172**

3.6 Office Building Underground - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.8158	38.1896	31.2571	0.0548		2.2240	2.2240		2.0650	2.0650		5,380.9026	5,380.9026	1.5375		5,419.3395
Total	**3.8158**	**38.1896**	**31.2571**	**0.0548**		**2.2240**	**2.2240**		**2.0650**	**2.0650**		**5,380.9026**	**5,380.9026**	**1.5375**		**5,419.3395**

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	0.0293	0.7669	0.3080	1.6000e-003	0.0405	5.3600e-003	0.0459	0.0117	5.1300e-003	0.0168		175.1530	175.1530	0.0159		175.5492
Worker	0.0431	0.0295	0.2877	9.7000e-004	0.1068	6.6000e-004	0.1075	0.0283	6.0000e-004	0.0289		96.6515	96.6515	2.0900e-003		96.7037
Total	**0.0723**	**0.7964**	**0.5957**	**2.5700e-003**	**0.1473**	**6.0200e-003**	**0.1533**	**0.0400**	**5.7300e-003**	**0.0457**		**271.8044**	**271.8044**	**0.0179**		**272.2529**

3.6 Office Building Underground - 2019

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	0.7092	3.7272	36.1394	0.0548		0.0969	0.0969		0.0969	0.0969	0.0000	5,380.9026	5,380.9026	1.5375		5,419.3395
Total	**0.7092**	**3.7272**	**36.1394**	**0.0548**		**0.0969**	**0.0969**		**0.0969**	**0.0969**	**0.0000**	**5,380.9026**	**5,380.9026**	**1.5375**		**5,419.3395**

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	0.0293	0.7669	0.3080	1.6000e-003	0.0405	5.3600e-003	0.0459	0.0117	5.1300e-003	0.0168		175.1530	175.1530	0.0159		175.5492
Worker	0.0431	0.0295	0.2877	9.7000e-004	0.1068	6.6000e-004	0.1075	0.0283	6.0000e-004	0.0289		96.6515	96.6515	2.0900e-003		96.7037
Total	**0.0723**	**0.7964**	**0.5957**	**2.5700e-003**	**0.1473**	**6.0200e-003**	**0.1533**	**0.0400**	**5.7300e-003**	**0.0457**		**271.8044**	**271.8044**	**0.0179**		**272.2529**

3.7 Parking Garage Core Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3541	18.5942	14.6174	0.0288		0.8807	0.8807		0.8463	0.8463		2,657.7430	2,657.7430	0.6187		2,673.2116
Total	**2.3541**	**18.5942**	**14.6174**	**0.0288**		**0.8807**	**0.8807**		**0.8463**	**0.8463**		**2,657.7430**	**2,657.7430**	**0.6187**		**2,673.2116**

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	0.2097	5.4964	2.2074	0.0115	0.2902	0.0384	0.3286	0.0835	0.0367	0.1202		1,255.2629	1,255.2629	0.1136		1,258.1022
Worker	0.3181	0.2175	2.1243	7.1600e-003	0.7886	4.8500e-003	0.7935	0.2092	4.4700e-003	0.2136		713.7339	713.7339	0.0154		714.1199
Total	**0.5278**	**5.7140**	**4.3317**	**0.0186**	**1.0788**	**0.0433**	**1.1221**	**0.2927**	**0.0412**	**0.3339**		**1,968.9968**	**1,968.9968**	**0.1290**		**1,972.2221**

3.7 Parking Garage Core Construction - 2019

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	0.5550	5.2854	15.7514	0.0288		0.0869	0.0869		0.0869	0.0869	0.0000	2,657.7430	2,657.7430	0.6187		2,673.2116
Total	**0.5550**	**5.2854**	**15.7514**	**0.0288**		**0.0869**	**0.0869**		**0.0869**	**0.0869**	**0.0000**	**2,657.7430**	**2,657.7430**	**0.6187**		**2,673.2116**

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	0.2097	5.4964	2.2074	0.0115	0.2902	0.0384	0.3286	0.0835	0.0367	0.1202		1,255.2629	1,255.2629	0.1136		1,258.1022
Worker	0.3181	0.2175	2.1243	7.1600e-003	0.7886	4.8500e-003	0.7935	0.2092	4.4700e-003	0.2136		713.7339	713.7339	0.0154		714.1199
Total	**0.5278**	**5.7140**	**4.3317**	**0.0186**	**1.0788**	**0.0433**	**1.1221**	**0.2927**	**0.0412**	**0.3339**		**1,968.9968**	**1,968.9968**	**0.1290**		**1,972.2221**

3.7 Parking Garage Core Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1464	17.1521	14.2644	0.0288		0.7752	0.7752		0.7451	0.7451		2,623.6941	2,623.6941	0.6063		2,638.8526
Total	**2.1464**	**17.1521**	**14.2644**	**0.0288**		**0.7752**	**0.7752**		**0.7451**	**0.7451**		**2,623.6941**	**2,623.6941**	**0.6063**		**2,638.8526**

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	0.1712	4.9889	2.0721	0.0113	0.2902	0.0252	0.3154	0.0835	0.0241	0.1076		1,243.2598	1,243.2598	0.1105		1,246.0221
Worker	0.2936	0.1931	1.9236	6.9300e-003	0.7886	4.7500e-003	0.7934	0.2092	4.3700e-003	0.2136		691.0672	691.0672	0.0136		691.4068
Total	**0.4647**	**5.1820**	**3.9957**	**0.0183**	**1.0788**	**0.0300**	**1.1088**	**0.2927**	**0.0285**	**0.3212**		**1,934.3270**	**1,934.3270**	**0.1241**		**1,937.4289**

3.7 Parking Garage Core Construction - 2020

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	0.5550	5.2854	15.7517	0.0288		0.0867	0.0867		0.0867	0.0867	0.0000	2,623.6941	2,623.6941	0.6063		2,638.8526
Total	**0.5550**	**5.2854**	**15.7517**	**0.0288**		**0.0867**	**0.0867**		**0.0867**	**0.0867**	**0.0000**	**2,623.6941**	**2,623.6941**	**0.6063**		**2,638.8526**

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	0.1712	4.9889	2.0721	0.0113	0.2902	0.0252	0.3154	0.0835	0.0241	0.1076		1,243.2598	1,243.2598	0.1105		1,246.0221
Worker	0.2936	0.1931	1.9236	6.9300e-003	0.7886	4.7500e-003	0.7934	0.2092	4.3700e-003	0.2136		691.0672	691.0672	0.0136		691.4068
Total	**0.4647**	**5.1820**	**3.9957**	**0.0183**	**1.0788**	**0.0300**	**1.1088**	**0.2927**	**0.0285**	**0.3212**		**1,934.3270**	**1,934.3270**	**0.1241**		**1,937.4289**

3.8 Office Building Core Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.8417	38.5463	31.5527	0.0587		1.9408	1.9408		1.8617	1.8617		5,559.9467	5,559.9467	1.3626		5,594.0106
Total	**4.8417**	**38.5463**	**31.5527**	**0.0587**		**1.9408**	**1.9408**		**1.8617**	**1.8617**		**5,559.9467**	**5,559.9467**	**1.3626**		**5,594.0106**

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	0.2438	6.3912	2.5668	0.0133	0.3374	0.0447	0.3821	0.0971	0.0427	0.1398		1,459.6080	1,459.6080	0.1321		1,462.9096
Worker	0.3744	0.2561	2.5005	8.4300e-003	0.9283	5.7100e-003	0.9340	0.2462	5.2600e-003	0.2515		840.1243	840.1243	0.0182		840.5786
Total	**0.6182**	**6.6472**	**5.0673**	**0.0218**	**1.2657**	**0.0504**	**1.3161**	**0.3433**	**0.0480**	**0.3913**		**2,299.7323**	**2,299.7323**	**0.1502**		**2,303.4882**

3.8 Office Building Core Construction - 2019

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	0.8356	10.4353	33.6911	0.0587		0.0869	0.0869		0.0869	0.0869	0.0000	5,559.9467	5,559.9467	1.3626		5,594.0106
Total	**0.8356**	**10.4353**	**33.6911**	**0.0587**		**0.0869**	**0.0869**		**0.0869**	**0.0869**	**0.0000**	**5,559.9467**	**5,559.9467**	**1.3626**		**5,594.0106**

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	0.2438	6.3912	2.5668	0.0133	0.3374	0.0447	0.3821	0.0971	0.0427	0.1398		1,459.6080	1,459.6080	0.1321		1,462.9096
Worker	0.3744	0.2561	2.5005	8.4300e-003	0.9283	5.7100e-003	0.9340	0.2462	5.2600e-003	0.2515		840.1243	840.1243	0.0182		840.5786
Total	**0.6182**	**6.6472**	**5.0673**	**0.0218**	**1.2657**	**0.0504**	**1.3161**	**0.3433**	**0.0480**	**0.3913**		**2,299.7323**	**2,299.7323**	**0.1502**		**2,303.4882**

3.8 Office Building Core Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.3957	35.3791	30.8372	0.0587		1.6954	1.6954		1.6256	1.6256		5,482.7895	5,482.7895	1.3369		5,516.2120
Total	**4.3957**	**35.3791**	**30.8372**	**0.0587**		**1.6954**	**1.6954**		**1.6256**	**1.6256**		**5,482.7895**	**5,482.7895**	**1.3369**		**5,516.2120**

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	0.1990	5.8011	2.4094	0.0132	0.3375	0.0293	0.3668	0.0971	0.0280	0.1251		1,445.6509	1,445.6509	0.1285		1,448.8630
Worker	0.3455	0.2272	2.2643	8.1600e-003	0.9283	5.5900e-003	0.9339	0.2462	5.1500e-003	0.2514		813.4437	813.4437	0.0160		813.8434
Total	**0.5446**	**6.0283**	**4.6737**	**0.0213**	**1.2657**	**0.0349**	**1.3006**	**0.3433**	**0.0332**	**0.3765**		**2,259.0946**	**2,259.0946**	**0.1445**		**2,262.7063**

3.8 Office Building Core Construction - 2020

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	0.8356	10.4353	33.6911	0.0587		0.0869	0.0869		0.0869	0.0869	0.0000	5,482.7895	5,482.7895	1.3369		5,516.2120
Total	**0.8356**	**10.4353**	**33.6911**	**0.0587**		**0.0869**	**0.0869**		**0.0869**	**0.0869**	**0.0000**	**5,482.7895**	**5,482.7895**	**1.3369**		**5,516.2120**

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	0.1990	5.8011	2.4094	0.0132	0.3375	0.0293	0.3668	0.0971	0.0280	0.1251		1,445.6509	1,445.6509	0.1285		1,448.8630
Worker	0.3455	0.2272	2.2643	8.1600e-003	0.9283	5.5900e-003	0.9339	0.2462	5.1500e-003	0.2514		813.4437	813.4437	0.0160		813.8434
Total	**0.5446**	**6.0283**	**4.6737**	**0.0213**	**1.2657**	**0.0349**	**1.3006**	**0.3433**	**0.0332**	**0.3765**		**2,259.0946**	**2,259.0946**	**0.1445**		**2,262.7063**

3.9 Parking Garage Exterior Improvements - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.2882	10.8104	8.4431	0.0168		0.5092	0.5092		0.4787	0.4787		1,601.7329	1,601.7329	0.4660		1,613.3827
Total	**1.2882**	**10.8104**	**8.4431**	**0.0168**		**0.5092**	**0.5092**		**0.4787**	**0.4787**		**1,601.7329**	**1,601.7329**	**0.4660**		**1,613.3827**

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	0.0729	0.0499	0.4868	1.6400e-003	0.1807	1.1100e-003	0.1818	0.0479	1.0200e-003	0.0490		163.5640	163.5640	3.5400e-003		163.6525
Total	**0.0729**	**0.0499**	**0.4868**	**1.6400e-003**	**0.1807**	**1.1100e-003**	**0.1818**	**0.0479**	**1.0200e-003**	**0.0490**		**163.5640**	**163.5640**	**3.5400e-003**		**163.6525**

3.9 Parking Garage Exterior Improvements - 2019

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	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2468	2.6909	9.4342	0.0168		0.0295	0.0295		0.0295	0.0295	0.0000	1,601.7329	1,601.7329	0.4660		1,613.3827
Total	**0.2468**	**2.6909**	**9.4342**	**0.0168**		**0.0295**	**0.0295**		**0.0295**	**0.0295**	**0.0000**	**1,601.7329**	**1,601.7329**	**0.4660**		**1,613.3827**

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	0.0729	0.0499	0.4868	1.6400e-003	0.1807	1.1100e-003	0.1818	0.0479	1.0200e-003	0.0490		163.5640	163.5640	3.5400e-003		163.6525
Total	**0.0729**	**0.0499**	**0.4868**	**1.6400e-003**	**0.1807**	**1.1100e-003**	**0.1818**	**0.0479**	**1.0200e-003**	**0.0490**		**163.5640**	**163.5640**	**3.5400e-003**		**163.6525**

3.10 Office Building Tenant Improvements - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.3818					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.6358	14.4190	11.7398	0.0247		0.7115	0.7115		0.6716	0.6716		2,398.2956	2,398.2956	0.6633		2,414.8779
Total	**13.0176**	**14.4190**	**11.7398**	**0.0247**		**0.7115**	**0.7115**		**0.6716**	**0.6716**		**2,398.2956**	**2,398.2956**	**0.6633**		**2,414.8779**

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	0.0630	0.0431	0.4204	1.4200e-003	0.1561	9.6000e-004	0.1570	0.0414	8.8000e-004	0.0423		141.2598	141.2598	3.0600e-003		141.3362
Total	**0.0630**	**0.0431**	**0.4204**	**1.4200e-003**	**0.1561**	**9.6000e-004**	**0.1570**	**0.0414**	**8.8000e-004**	**0.0423**		**141.2598**	**141.2598**	**3.0600e-003**		**141.3362**

3.10 Office Building Tenant Improvements - 2019

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	11.3818					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3436	3.5316	13.8407	0.0247		0.0385	0.0385		0.0385	0.0385	0.0000	2,398.2956	2,398.2956	0.6633		2,414.8779
Total	**11.7254**	**3.5316**	**13.8407**	**0.0247**		**0.0385**	**0.0385**		**0.0385**	**0.0385**	**0.0000**	**2,398.2956**	**2,398.2956**	**0.6633**		**2,414.8779**

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	0.0630	0.0431	0.4204	1.4200e-003	0.1561	9.6000e-004	0.1570	0.0414	8.8000e-004	0.0423		141.2598	141.2598	3.0600e-003		141.3362
Total	**0.0630**	**0.0431**	**0.4204**	**1.4200e-003**	**0.1561**	**9.6000e-004**	**0.1570**	**0.0414**	**8.8000e-004**	**0.0423**		**141.2598**	**141.2598**	**3.0600e-003**		**141.3362**

3.10 Office Building Tenant Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	11.3818					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.5134	13.0916	11.5089	0.0247		0.6302	0.6302		0.5944	0.5944		2,355.5468	2,355.5468	0.6583		2,372.0039
Total	**12.8952**	**13.0916**	**11.5089**	**0.0247**		**0.6302**	**0.6302**		**0.5944**	**0.5944**		**2,355.5468**	**2,355.5468**	**0.6583**		**2,372.0039**

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	0.0581	0.0382	0.3807	1.3700e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		136.7737	136.7737	2.6900e-003		136.8409
Total	**0.0581**	**0.0382**	**0.3807**	**1.3700e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**136.7737**	**136.7737**	**2.6900e-003**		**136.8409**

3.10 Office Building Tenant Improvements - 2020

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	11.3818					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3436	3.5316	13.8407	0.0247		0.0385	0.0385		0.0385	0.0385	0.0000	2,355.5468	2,355.5468	0.6583		2,372.0039
Total	**11.7254**	**3.5316**	**13.8407**	**0.0247**		**0.0385**	**0.0385**		**0.0385**	**0.0385**	**0.0000**	**2,355.5468**	**2,355.5468**	**0.6583**		**2,372.0039**

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	0.0581	0.0382	0.3807	1.3700e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		136.7737	136.7737	2.6900e-003		136.8409
Total	**0.0581**	**0.0382**	**0.3807**	**1.3700e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**136.7737**	**136.7737**	**2.6900e-003**		**136.8409**

3.11 Landscaping and Site Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1762	22.1999	15.8241	0.0267		1.1404	1.1404		1.0521	1.0521		2,542.0761	2,542.0761	0.7936		2,561.9165
Paving	0.0675					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2437**	**22.1999**	**15.8241**	**0.0267**		**1.1404**	**1.1404**		**1.0521**	**1.0521**		**2,542.0761**	**2,542.0761**	**0.7936**		**2,561.9165**

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	0.0581	0.0382	0.3807	1.3700e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		136.7737	136.7737	2.6900e-003		136.8409
Total	**0.0581**	**0.0382**	**0.3807**	**1.3700e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**136.7737**	**136.7737**	**2.6900e-003**		**136.8409**

3.11 Landscaping and Site Improvements - 2020

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	0.4787	3.0819	16.9451	0.0267		0.0781	0.0781		0.0781	0.0781	0.0000	2,542.0761	2,542.0761	0.7936		2,561.9165
Paving	0.0675					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5463**	**3.0819**	**16.9451**	**0.0267**		**0.0781**	**0.0781**		**0.0781**	**0.0781**	**0.0000**	**2,542.0761**	**2,542.0761**	**0.7936**		**2,561.9165**

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	0.0581	0.0382	0.3807	1.3700e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		136.7737	136.7737	2.6900e-003		136.8409
Total	**0.0581**	**0.0382**	**0.3807**	**1.3700e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**136.7737**	**136.7737**	**2.6900e-003**		**136.8409**

3.12 Office Building Exterior Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	17.9892					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	2.1848	19.7380	19.5498	0.0359		0.9568	0.9568		0.8913	0.8913		3,408.3096	3,408.3096	1.0433		3,434.3930
Total	**20.1740**	**19.7380**	**19.5498**	**0.0359**		**0.9568**	**0.9568**		**0.8913**	**0.8913**		**3,408.3096**	**3,408.3096**	**1.0433**		**3,434.3930**

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	0.0214	0.0141	0.1403	5.1000e-004	0.0575	3.5000e-004	0.0579	0.0153	3.2000e-004	0.0156		50.3903	50.3903	9.9000e-004		50.4151
Total	**0.0214**	**0.0141**	**0.1403**	**5.1000e-004**	**0.0575**	**3.5000e-004**	**0.0579**	**0.0153**	**3.2000e-004**	**0.0156**		**50.3903**	**50.3903**	**9.9000e-004**		**50.4151**

3.12 Office Building Exterior Improvements - 2020

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	17.9892					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.5403	5.9183	22.3915	0.0359		0.0637	0.0637		0.0637	0.0637	0.0000	3,408.3096	3,408.3096	1.0433		3,434.3930
Total	**18.5295**	**5.9183**	**22.3915**	**0.0359**		**0.0637**	**0.0637**		**0.0637**	**0.0637**	**0.0000**	**3,408.3096**	**3,408.3096**	**1.0433**		**3,434.3930**

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	0.0214	0.0141	0.1403	5.1000e-004	0.0575	3.5000e-004	0.0579	0.0153	3.2000e-004	0.0156		50.3903	50.3903	9.9000e-004		50.4151
Total	**0.0214**	**0.0141**	**0.1403**	**5.1000e-004**	**0.0575**	**3.5000e-004**	**0.0579**	**0.0153**	**3.2000e-004**	**0.0156**		**50.3903**	**50.3903**	**9.9000e-004**		**50.4151**

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	0.9832	3.3536	12.1567	0.0392	3.6770	0.0427	3.7197	0.9845	0.0401	1.0247		3,945.3354	3,945.3354	0.1477		3,949.0271
Unmitigated	0.9832	3.3536	12.1567	0.0392	3.6770	0.0427	3.7197	0.9845	0.0401	1.0247		3,945.3354	3,945.3354	0.1477		3,949.0271

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
Office Park	579.15	84.07	37.36	1,192,727	1,192,727
Office Park	46.50	6.75	3.00	95,764	95,764
Parking Lot	0.00	0.00	0.00		
Total	625.65	90.82	40.36	1,288,492	1,288,492

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.490452	0.049742	0.253638	0.136789	0.017926	0.006526	0.021436	0.006323	0.003943	0.003278	0.008771	0.000435	0.000741
Office Park	0.490452	0.049742	0.253638	0.136789	0.017926	0.006526	0.021436	0.006323	0.003943	0.003278	0.008771	0.000435	0.000741
Parking Lot	0.490452	0.049742	0.253638	0.136789	0.017926	0.006526	0.021436	0.006323	0.003943	0.003278	0.008771	0.000435	0.000741

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	0.1850	1.6814	1.4124	0.0101		0.1278	0.1278		0.1278	0.1278		2,017.6659	2,017.6659	0.0387	0.0370	2,029.6559
NaturalGas Unmitigated	0.1850	1.6814	1.4124	0.0101		0.1278	0.1278		0.1278	0.1278		2,017.6659	2,017.6659	0.0387	0.0370	2,029.6559

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					
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
Office Park	1274.66	0.0138	0.1250	0.1050	7.5000e-004		9.5000e-003	9.5000e-003		9.5000e-003	9.5000e-003		149.9597	149.9597	2.8700e-003	2.7500e-003	150.8509
Office Park	15875.5	0.1712	1.5564	1.3074	9.3400e-003		0.1183	0.1183		0.1183	0.1183		1,867.7062	1,867.7062	0.0358	0.0342	1,878.8050
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1850**	**1.6814**	**1.4124**	**0.0101**		**0.1278**	**0.1278**		**0.1278**	**0.1278**		**2,017.6659**	**2,017.6659**	**0.0387**	**0.0370**	**2,029.6559**

5.2 Energy by Land Use - NaturalGas

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					
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
Office Park	1.27466	0.0138	0.1250	0.1050	7.5000e-004		9.5000e-003	9.5000e-003		9.5000e-003	9.5000e-003		149.9597	149.9597	2.8700e-003	2.7500e-003	150.8509
Office Park	15.8755	0.1712	1.5564	1.3074	9.3400e-003		0.1183	0.1183		0.1183	0.1183		1,867.7062	1,867.7062	0.0358	0.0342	1,878.8050
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1850**	**1.6814**	**1.4124**	**0.0101**		**0.1278**	**0.1278**		**0.1278**	**0.1278**		**2,017.6659**	**2,017.6659**	**0.0387**	**0.0370**	**2,029.6559**

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	8.3445	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941
Unmitigated	8.3445	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941

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	1.0033					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.3291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0122	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941
Total	**8.3445**	**1.1900e-003**	**0.1294**	**1.0000e-005**		**4.6000e-004**	**4.6000e-004**		**4.6000e-004**	**4.6000e-004**		**0.2756**	**0.2756**	**7.4000e-004**		**0.2941**

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	1.0033					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.3291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0122	1.1900e-003	0.1294	1.0000e-005		4.6000e-004	4.6000e-004		4.6000e-004	4.6000e-004		0.2756	0.2756	7.4000e-004		0.2941
Total	**8.3445**	**1.1900e-003**	**0.1294**	**1.0000e-005**		**4.6000e-004**	**4.6000e-004**		**4.6000e-004**	**4.6000e-004**		**0.2756**	**0.2756**	**7.4000e-004**		**0.2941**

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
Cranes	1	8.00	2	231	0.29	Diesel
Forklifts	1	8.00	365	89	0.20	Diesel
Generator Sets	4	0.30	52	84	0.74	Diesel
Pressure Washers	1	16.00	1	13	0.30	Diesel

UnMitigated/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
Equipment Type	lb/day										lb/day					
Cranes	0.4534	5.3915	2.1154	5.7700e-003		0.2223	0.2223		0.2045	0.2045		558.7896	558.7896	0.1807		563.3077
Forklifts	0.1440	1.2975	1.1803	1.5300e-003		0.0967	0.0967		0.0889	0.0889		148.0308	148.0308	0.0479		149.2277
Generator Sets	0.0599	0.5218	0.5558	9.9000e-004		0.0294	0.0294		0.0294	0.0294		93.4552	93.4552	5.2600e-003		93.5867
Pressure Washers	0.0889	0.6213	0.4878	1.1000e-003		0.0292	0.0292		0.0292	0.0292		78.1800	78.1800	7.9800e-003		78.3795
Total	**0.7461**	**7.8321**	**4.3393**	**9.3900e-003**		**0.3775**	**0.3775**		**0.3520**	**0.3520**		**878.4557**	**878.4557**	**0.2418**		**884.5017**

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

Attachment D

PROJECT PHASE 1 MITIGATION REPORT

PREPARED BY SWCA ENVIRONMENTAL CONSULTANTS, INC.

Haskins Way Rezone Phase I

San Mateo County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO	CH4	N2O	CO2e
Percent Reduction												
Demolition	0.83	0.83	-0.06	0.00	0.96	0.95	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping and Site Improvements	0.74	0.86	-0.07	0.00	0.93	0.92	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Core Construction	0.74	0.62	-0.06	0.00	0.93	0.93	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Exterior Improvements	0.08	0.70	-0.14	0.00	0.93	0.93	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Tenant Improvements	0.09	0.73	-0.20	0.00	0.94	0.93	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Underground	0.80	0.88	-0.15	0.00	0.95	0.95	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Core Construction	0.63	0.55	-0.06	0.00	0.86	0.86	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Exterior Improvements	0.77	0.75	-0.11	0.00	0.94	0.94	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Underground	0.77	0.85	-0.18	0.00	0.94	0.94	0.00	0.00	0.00	0.00	0.00	0.00
Site Prep and Make Ready	0.75	0.89	-0.21	0.00	0.92	0.92	0.00	0.00	0.00	0.00	0.00	0.00
Soils Abatement/Remove/Replace	0.70	0.71	-0.14	0.00	0.90	0.90	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Aerial Lifts	Diesel	Tier 4 Final	10	10	No Change	0.00
Air Compressors	Diesel	Tier 4 Final	7	7	No Change	0.00
Bore/Drill Rigs	Diesel	Tier 4 Final	5	5	No Change	0.00

Cement and Mortar Mixers	Diesel	No Change	0	8	No Change	0.00
Concrete/Industrial Saws	Diesel	Tier 4 Final	2	2	No Change	0.00
Cranes	Diesel	Tier 4 Final	4	4	No Change	0.00
Crawler Tractors	Diesel	Tier 4 Final	1	1	No Change	0.00
Dumpers/Tenders	Diesel	No Change	0	5	No Change	0.00
Excavators	Diesel	Tier 4 Final	9	9	No Change	0.00
Forklifts	Diesel	Tier 4 Final	1	1	No Change	0.00
Generator Sets	Diesel	Tier 4 Final	4	4	No Change	0.00
Off-Highway Trucks	Diesel	Tier 4 Final	15	15	No Change	0.00
Other General Industrial Equipment	Diesel	Tier 4 Final	3	3	No Change	0.00
Paving Equipment	Diesel	Tier 4 Final	2	2	No Change	0.00
Plate Compactors	Diesel	No Change	0	11	No Change	0.00
Pressure Washers	Diesel	No Change	0	2	No Change	0.00
Pumps	Diesel	Tier 4 Final	1	1	No Change	0.00
Rollers	Diesel	Tier 4 Final	2	2	No Change	0.00
Rough Terrain Forklifts	Diesel	Tier 4 Final	13	13	No Change	0.00
Rubber Tired Dozers	Diesel	Tier 4 Final	4	4	No Change	0.00
Rubber Tired Loaders	Diesel	Tier 4 Final	6	6	No Change	0.00
Scrapers	Diesel	Tier 4 Final	4	4	No Change	0.00
Skid Steer Loaders	Diesel	Tier 4 Final	2	2	No Change	0.00
Sweepers/Scrubbers	Diesel	Tier 4 Final	8	8	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	11	11	No Change	0.00
Trenchers	Diesel	Tier 4 Final	6	6	No Change	0.00
Welders	Diesel	Tier 4 Final	13	13	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Aerial Lifts	2.89500E-002	4.78400E-001	7.86500E-001	1.21000E-003	1.12900E-002	1.03900E-002	0.00000E+000	1.07477E+002	1.07477E+002	3.43200E-002	0.00000E+000	1.08335E+002
Air Compressors	1.71580E-001	1.18540E+000	1.22580E+000	1.98000E-003	8.13400E-002	8.13400E-002	0.00000E+000	1.70323E+002	1.70323E+002	1.39400E-002	0.00000E+000	1.70672E+002
Bore/Drill Rigs	1.78100E-002	2.35350E-001	1.31770E-001	6.00000E-004	6.67000E-003	6.14000E-003	0.00000E+000	5.36263E+001	5.36263E+001	1.69700E-002	0.00000E+000	5.40504E+001
Cement and Mortar Mixers	2.21500E-002	1.38810E-001	1.16260E-001	2.70000E-004	5.42000E-003	5.42000E-003	0.00000E+000	1.72770E+001	1.72770E+001	1.79000E-003	0.00000E+000	1.73219E+001
Concrete/Industrial Saws	7.53000E-003	5.72600E-002	5.57600E-002	9.00000E-005	3.84000E-003	3.84000E-003	0.00000E+000	8.06485E+000	8.06485E+000	6.10000E-004	0.00000E+000	8.08003E+000
Cranes	1.58000E-001	1.88221E+000	7.22600E-001	1.85000E-003	7.93400E-002	7.29900E-002	0.00000E+000	1.65370E+002	1.65370E+002	5.25800E-002	0.00000E+000	1.66684E+002
Crawler Tractors	3.08000E-003	4.04800E-002	1.29800E-002	4.00000E-005	1.53000E-003	1.41000E-003	0.00000E+000	3.53759E+000	3.53759E+000	1.12000E-003	0.00000E+000	3.56548E+000
Dumpers/Tenders	6.02000E-003	3.80900E-002	2.05400E-002	6.00000E-005	1.46000E-003	1.46000E-003	0.00000E+000	4.52639E+000	4.52639E+000	4.90000E-004	0.00000E+000	4.53853E+000
Excavators	2.36900E-002	2.44580E-001	2.93790E-001	4.60000E-004	1.18000E-002	1.08600E-002	0.00000E+000	4.17912E+001	4.17912E+001	1.32000E-002	0.00000E+000	4.21213E+001
Forklifts	1.51000E-003	1.33900E-002	1.05500E-002	1.00000E-005	1.06000E-003	9.80000E-004	0.00000E+000	1.21487E+000	1.21487E+000	3.80000E-004	0.00000E+000	1.22437E+000
Generator Sets	1.55400E-002	1.32230E-001	1.30310E-001	2.30000E-004	7.90000E-003	7.90000E-003	0.00000E+000	1.97823E+001	1.97823E+001	1.25000E-003	0.00000E+000	1.98136E+001
Off-Highway Trucks	2.55360E-001	2.51999E+000	1.45007E+000	4.90000E-003	9.17300E-002	8.43900E-002	0.00000E+000	4.35260E+002	4.35260E+002	1.39130E-001	0.00000E+000	4.38738E+002
Other General Industrial Equipment	1.47700E-002	1.34330E-001	1.23760E-001	1.60000E-004	9.83000E-003	9.04000E-003	0.00000E+000	1.40043E+001	1.40043E+001	4.52000E-003	0.00000E+000	1.41173E+001
Paving Equipment	2.36000E-002	2.43580E-001	2.88290E-001	4.60000E-004	1.21800E-002	1.12100E-002	0.00000E+000	4.07123E+001	4.07123E+001	1.31700E-002	0.00000E+000	4.10414E+001
Plate Compactors	7.47000E-003	4.68400E-002	3.92300E-002	9.00000E-005	1.82000E-003	1.82000E-003	0.00000E+000	5.82966E+000	5.82966E+000	6.10000E-004	0.00000E+000	5.84479E+000
Pressure Washers	8.40000E-004	5.88000E-003	4.61000E-003	1.00000E-005	2.80000E-004	2.80000E-004	0.00000E+000	6.69340E-001	6.69340E-001	7.00000E-005	0.00000E+000	6.71050E-001
Pumps	3.64400E-002	2.97440E-001	2.94830E-001	5.10000E-004	1.84000E-002	1.84000E-002	0.00000E+000	4.40862E+001	4.40862E+001	2.93000E-003	0.00000E+000	4.41594E+001
Rollers	1.69100E-002	1.69090E-001	1.53840E-001	2.10000E-004	1.07800E-002	9.92000E-003	0.00000E+000	1.87269E+001	1.87269E+001	6.06000E-003	0.00000E+000	1.88783E+001
Rough Terrain Forklifts	7.32700E-002	9.50600E-001	1.22029E+000	1.83000E-003	4.11000E-002	3.78100E-002	0.00000E+000	1.62515E+002	1.62515E+002	5.19800E-002	0.00000E+000	1.63814E+002
Rubber Tired Dozers	8.75200E-002	9.22810E-001	3.33790E-001	6.80000E-004	4.51300E-002	4.15200E-002	0.00000E+000	6.04308E+001	6.04308E+001	1.94200E-002	0.00000E+000	6.09163E+001

Rubber Tired Loaders	2.30100E-002	2.78760E-001	9.66700E-002	3.60000E-004	9.35000E-003	8.60000E-003	0.00000E+000	3.23016E+001	3.23016E+001	1.02100E-002	0.00000E+000	3.25570E+001
Scrapers	3.87800E-002	4.70680E-001	2.93680E-001	5.50000E-004	1.84500E-002	1.69700E-002	0.00000E+000	4.93674E+001	4.93674E+001	1.56100E-002	0.00000E+000	4.97575E+001
Skid Steer Loaders	4.57000E-003	6.06900E-002	7.82000E-002	1.20000E-004	2.67000E-003	2.46000E-003	0.00000E+000	1.02603E+001	1.02603E+001	3.30000E-003	0.00000E+000	1.03428E+001
Sweepers/Scrubbers	5.51600E-002	4.76860E-001	3.96620E-001	5.10000E-004	3.85000E-002	3.54200E-002	0.00000E+000	4.49012E+001	4.49012E+001	1.43800E-002	0.00000E+000	4.52608E+001
Tractors/Loaders/Backhoes	3.69500E-002	3.70650E-001	3.75920E-001	5.10000E-004	2.43700E-002	2.24200E-002	0.00000E+000	4.53351E+001	4.53351E+001	1.44500E-002	0.00000E+000	4.56964E+001
Trenchers	3.69200E-002	3.32970E-001	2.24320E-001	2.90000E-004	2.51700E-002	2.31600E-002	0.00000E+000	2.57437E+001	2.57437E+001	8.15000E-003	0.00000E+000	2.59473E+001
Welders	3.44960E-001	1.49278E+000	1.66642E+000	2.37000E-003	8.87800E-002	8.87800E-002	0.00000E+000	1.74798E+002	1.74798E+002	2.81400E-002	0.00000E+000	1.75502E+002

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Aerial Lifts	2.97300E-002	6.78880E-001	9.16740E-001	1.21000E-003	1.98000E-003	1.98000E-003	0.00000E+000	1.07477E+002	1.07477E+002	3.43200E-002	0.00000E+000	1.08335E+002
Air Compressors	1.98200E-002	8.59000E-002	1.22237E+000	1.98000E-003	2.64000E-003	2.64000E-003	0.00000E+000	1.70323E+002	1.70323E+002	1.39400E-002	0.00000E+000	1.70671E+002
Bore/Drill Rigs	7.45000E-003	3.23000E-002	2.73330E-001	6.00000E-004	9.90000E-004	9.90000E-004	0.00000E+000	5.36262E+001	5.36262E+001	1.69700E-002	0.00000E+000	5.40504E+001
Cement and Mortar Mixers	2.21500E-002	1.38810E-001	1.16260E-001	2.70000E-004	5.42000E-003	5.42000E-003	0.00000E+000	1.72770E+001	1.72770E+001	1.79000E-003	0.00000E+000	1.73218E+001
Concrete/Industrial Saws	9.40000E-004	4.07000E-003	5.78800E-002	9.00000E-005	1.30000E-004	1.30000E-004	0.00000E+000	8.06484E+000	8.06484E+000	6.10000E-004	0.00000E+000	8.08002E+000
Cranes	2.27300E-002	9.85100E-002	8.33560E-001	1.85000E-003	3.03000E-003	3.03000E-003	0.00000E+000	1.65370E+002	1.65370E+002	5.25800E-002	0.00000E+000	1.66684E+002
Crawler Tractors	4.80000E-004	2.09000E-003	1.76900E-002	4.00000E-005	6.00000E-005	6.00000E-005	0.00000E+000	3.53759E+000	3.53759E+000	1.12000E-003	0.00000E+000	3.56548E+000
Dumpers/Tenders	6.02000E-003	3.80900E-002	2.05400E-002	6.00000E-005	1.46000E-003	1.46000E-003	0.00000E+000	4.52638E+000	4.52638E+000	4.90000E-004	0.00000E+000	4.53853E+000
Excavators	5.72000E-003	2.47800E-002	3.52620E-001	4.60000E-004	7.60000E-004	7.60000E-004	0.00000E+000	4.17911E+001	4.17911E+001	1.32000E-002	0.00000E+000	4.21212E+001
Forklifts	1.60000E-004	7.10000E-004	1.01600E-002	1.00000E-005	2.00000E-005	2.00000E-005	0.00000E+000	1.21487E+000	1.21487E+000	3.80000E-004	0.00000E+000	1.22437E+000
Generator Sets	2.30000E-003	9.98000E-003	1.41970E-001	2.30000E-004	3.10000E-004	3.10000E-004	0.00000E+000	1.97822E+001	1.97822E+001	1.25000E-003	0.00000E+000	1.98136E+001
Off-Highway Trucks	5.99300E-002	2.59710E-001	2.19754E+000	4.90000E-003	7.99000E-003	7.99000E-003	0.00000E+000	4.35259E+002	4.35259E+002	1.39130E-001	0.00000E+000	4.38737E+002
Other General Industrial Equipment	1.97000E-003	8.52000E-003	1.21300E-001	1.60000E-004	2.60000E-004	2.60000E-004	0.00000E+000	1.40043E+001	1.40043E+001	4.52000E-003	0.00000E+000	1.41173E+001

Paving Equipment	5.72000E-003	2.47900E-002	3.52740E-001	4.60000E-004	7.60000E-004	7.60000E-004	0.00000E+000	4.07122E+001	4.07122E+001	1.31700E-002	0.00000E+000	4.10414E+001
Plate Compactors	7.47000E-003	4.68400E-002	3.92300E-002	9.00000E-005	1.82000E-003	1.82000E-003	0.00000E+000	5.82965E+000	5.82965E+000	6.10000E-004	0.00000E+000	5.84478E+000
Pressure Washers	8.40000E-004	5.88000E-003	4.61000E-003	1.00000E-005	2.80000E-004	2.80000E-004	0.00000E+000	6.69340E-001	6.69340E-001	7.00000E-005	0.00000E+000	6.71050E-001
Pumps	5.13000E-003	2.22300E-002	3.16400E-001	5.10000E-004	6.80000E-004	6.80000E-004	0.00000E+000	4.40861E+001	4.40861E+001	2.93000E-003	0.00000E+000	4.41593E+001
Rollers	2.61000E-003	1.13300E-002	1.61180E-001	2.10000E-004	3.50000E-004	3.50000E-004	0.00000E+000	1.87269E+001	1.87269E+001	6.06000E-003	0.00000E+000	1.88783E+001
Rough Terrain Forklifts	2.24800E-002	9.74100E-002	1.38622E+000	1.83000E-003	3.00000E-003	3.00000E-003	0.00000E+000	1.62514E+002	1.62514E+002	5.19800E-002	0.00000E+000	1.63814E+002
Rubber Tired Dozers	8.36000E-003	3.62400E-002	3.06690E-001	6.80000E-004	1.12000E-003	1.12000E-003	0.00000E+000	6.04307E+001	6.04307E+001	1.94200E-002	0.00000E+000	6.09162E+001
Rubber Tired Loaders	4.45000E-003	1.92700E-002	1.63050E-001	3.60000E-004	5.90000E-004	5.90000E-004	0.00000E+000	3.23016E+001	3.23016E+001	1.02100E-002	0.00000E+000	3.25569E+001
Scrapers	6.76000E-003	2.92800E-002	2.47780E-001	5.50000E-004	9.00000E-004	9.00000E-004	0.00000E+000	4.93673E+001	4.93673E+001	1.56100E-002	0.00000E+000	4.97575E+001
Skid Steer Loaders	2.86000E-003	6.53800E-002	8.82800E-002	1.20000E-004	1.90000E-004	1.90000E-004	0.00000E+000	1.02602E+001	1.02602E+001	3.30000E-003	0.00000E+000	1.03428E+001
Sweepers/Scrubbers	1.24100E-002	2.83290E-001	3.82550E-001	5.10000E-004	8.30000E-004	8.30000E-004	0.00000E+000	4.49012E+001	4.49012E+001	1.43800E-002	0.00000E+000	4.52607E+001
Tractors/Loaders/Backhoes	6.22000E-003	2.69500E-002	3.83510E-001	5.10000E-004	8.30000E-004	8.30000E-004	0.00000E+000	4.53350E+001	4.53350E+001	1.44500E-002	0.00000E+000	4.56964E+001
Trenchers	3.51000E-003	1.52000E-002	2.16330E-001	2.90000E-004	4.70000E-004	4.70000E-004	0.00000E+000	2.57437E+001	2.57437E+001	8.15000E-003	0.00000E+000	2.59473E+001
Welders	4.06900E-002	9.32390E-001	1.39010E+000	2.37000E-003	2.71000E-003	2.71000E-003	0.00000E+000	1.74798E+002	1.74798E+002	2.81400E-002	0.00000E+000	1.75502E+002

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Aerial Lifts	-2.69430E-002	-4.19064E-001	-1.65594E-001	0.00000E+000	8.24624E-001	8.09432E-001	0.00000E+000	1.20956E-006	1.20956E-006	0.00000E+000	0.00000E+000	1.19998E-006
Air Compressors	8.84485E-001	9.27535E-001	2.79817E-003	0.00000E+000	9.67544E-001	9.67544E-001	0.00000E+000	1.17424E-006	1.17424E-006	0.00000E+000	0.00000E+000	1.17184E-006
Bore/Drill Rigs	5.81696E-001	8.62758E-001	-1.07430E+000	0.00000E+000	8.51574E-001	8.38762E-001	0.00000E+000	1.11886E-006	1.11886E-006	0.00000E+000	0.00000E+000	1.29509E-006
Cement and Mortar Mixers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.15761E-006	1.15761E-006	0.00000E+000	0.00000E+000	1.15461E-006
Concrete/Industrial Saws	8.75166E-001	9.28921E-001	-3.80201E-002	0.00000E+000	9.66146E-001	9.66146E-001	0.00000E+000	1.23995E-006	1.23995E-006	0.00000E+000	0.00000E+000	1.23762E-006
Cranes	8.56139E-001	9.47663E-001	-1.53557E-001	0.00000E+000	9.61810E-001	9.58487E-001	0.00000E+000	1.20941E-006	1.20941E-006	0.00000E+000	0.00000E+000	1.13988E-006
Crawler Tractors	8.44156E-001	9.48370E-001	-3.62866E-001	0.00000E+000	9.60784E-001	9.57447E-001	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000

Dumpers/Tenders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	2.20927E-006	2.20927E-006	0.00000E+000	0.00000E+000	0.00000E+000
Excavators	7.58548E-001	8.98683E-001	-2.00245E-001	0.00000E+000	9.35593E-001	9.30018E-001	0.00000E+000	9.57140E-007	9.57140E-007	0.00000E+000	0.00000E+000	1.18705E-006
Forklifts	8.94040E-001	9.46975E-001	3.69668E-002	0.00000E+000	9.81132E-001	9.79592E-001	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Generator Sets	8.51995E-001	9.24525E-001	-8.94789E-002	0.00000E+000	9.60759E-001	9.60759E-001	0.00000E+000	1.01101E-006	1.01101E-006	0.00000E+000	0.00000E+000	1.00941E-006
Off-Highway Trucks	7.65312E-001	8.96940E-001	-5.15472E-001	0.00000E+000	9.12897E-001	9.05321E-001	0.00000E+000	1.19469E-006	1.19469E-006	0.00000E+000	0.00000E+000	1.18522E-006
Other General Industrial Equipment	8.66622E-001	9.36574E-001	1.98772E-002	0.00000E+000	9.73550E-001	9.71239E-001	0.00000E+000	1.42814E-006	1.42814E-006	0.00000E+000	0.00000E+000	1.41670E-006
Paving Equipment	7.57627E-001	8.98226E-001	-2.23560E-001	0.00000E+000	9.37603E-001	9.32203E-001	0.00000E+000	1.22813E-006	1.22813E-006	0.00000E+000	0.00000E+000	1.21828E-006
Plate Compactors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.71537E-006	1.71537E-006	0.00000E+000	0.00000E+000	1.71093E-006
Pressure Washers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Pumps	8.59221E-001	9.25262E-001	-7.31608E-002	0.00000E+000	9.63043E-001	9.63043E-001	0.00000E+000	1.13414E-006	1.13414E-006	0.00000E+000	0.00000E+000	1.35872E-006
Rollers	8.45653E-001	9.32994E-001	-4.77119E-002	0.00000E+000	9.67532E-001	9.64718E-001	0.00000E+000	1.06798E-006	1.06798E-006	0.00000E+000	0.00000E+000	1.05942E-006
Rough Terrain Forklifts	6.93190E-001	8.97528E-001	-1.35976E-001	0.00000E+000	9.27007E-001	9.20656E-001	0.00000E+000	1.16913E-006	1.16913E-006	0.00000E+000	0.00000E+000	1.22090E-006
Rubber Tired Dozers	9.04479E-001	9.60729E-001	8.11888E-002	0.00000E+000	9.75183E-001	9.73025E-001	0.00000E+000	1.15835E-006	1.15835E-006	0.00000E+000	0.00000E+000	1.14912E-006
Rubber Tired Loaders	8.06606E-001	9.30872E-001	-6.86666E-001	0.00000E+000	9.36898E-001	9.31395E-001	0.00000E+000	1.23833E-006	1.23833E-006	0.00000E+000	0.00000E+000	1.22862E-006
Scrapers	8.25683E-001	9.37792E-001	1.56293E-001	0.00000E+000	9.51220E-001	9.46965E-001	0.00000E+000	1.21538E-006	1.21538E-006	0.00000E+000	0.00000E+000	1.20585E-006
Skid Steer Loaders	3.74179E-001	-7.72780E-002	-1.28900E-001	0.00000E+000	9.28839E-001	9.22764E-001	0.00000E+000	9.74635E-007	9.74635E-007	0.00000E+000	0.00000E+000	9.66853E-007
Sweepers/Scrubbers	7.75018E-001	4.05926E-001	3.54748E-002	0.00000E+000	9.78442E-001	9.76567E-001	0.00000E+000	1.11356E-006	1.11356E-006	0.00000E+000	0.00000E+000	1.10471E-006
Tractors/Loaders/Backhoes	8.31664E-001	9.27290E-001	-2.01905E-002	0.00000E+000	9.65942E-001	9.62979E-001	0.00000E+000	1.10290E-006	1.10290E-006	0.00000E+000	0.00000E+000	1.31301E-006
Trenchers	9.04930E-001	9.54350E-001	3.56188E-002	0.00000E+000	9.81327E-001	9.79706E-001	0.00000E+000	1.16533E-006	1.16533E-006	0.00000E+000	0.00000E+000	1.15619E-006
Welders	8.82044E-001	3.75400E-001	1.65817E-001	0.00000E+000	9.69475E-001	9.69475E-001	0.00000E+000	1.20139E-006	1.20139E-006	0.00000E+000	0.00000E+000	1.13959E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input	Mitigation Input	Mitigation Input

No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
No	Replace Ground Cover of Area Disturbed	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	0.00		
No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Demolition	Fugitive Dust	0.02	0.00	0.01	0.00	0.55	0.55
Demolition	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping and Site Improvements	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping and Site Improvements	Roads	0.01	0.00	0.01	0.00	0.00	0.00
Office Building Core Construction	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Core Construction	Roads	0.16	0.04	0.16	0.04	0.00	0.00
Office Building Exterior Improvements	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Exterior Improvements	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Tenant Improvements	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Tenant Improvements	Roads	0.02	0.00	0.02	0.00	0.00	0.00
Office Building Underground	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Underground	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Core Construction	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Core Construction	Roads	0.11	0.03	0.11	0.03	0.00	0.00
Parking Garage Exterior Improvements	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Exterior Improvements	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Underground	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Underground	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Site Prep and Make Ready	Fugitive Dust	0.03	0.00	0.01	0.00	0.55	0.55
Site Prep and Make Ready	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Soils Abatement/Remove/Replace	Fugitive Dust	0.00	0.00	0.00	0.00	0.55	0.54
Soils Abatement/Remove/Replace	Roads	0.01	0.00	0.01	0.00	0.00	0.00

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	0.11	0.33		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			

No	Neighborhood Enhancements	Improve Pedestrian Network				
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.00			
No	Commute	Implement Trip Reduction Program				
No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"				
No	Commute	Workplace Parking Charge				
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program				
	Commute	Commute Subtotal	0.00			

No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	100.00
No	Use Low VOC Paint (Residential Exterior)	150.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	150.00
No	Use Low VOC Paint (Parking)	150.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy		
No	Use Reclaimed Water		
No	Use Grey Water		
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction		
No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape		

Solid Waste Mitigation

Mitigation Measures	Input Value

Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

Attachment E

PROJECT PHASE 2 ANNUAL EMISSION REPORT

PREPARED BY SWCA ENVIRONMENTAL CONSULTANTS, INC.

Haskins Way Rezone Phase II

San Mateo County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	256.23	1000sqft	1.47	256,232.00	0
Office Park	85.00	1000sqft	0.39	85,000.00	0
Enclosed Parking with Elevator	340.00	Space	0.61	136,000.00	0
Parking Lot	243.00	Space	3.15	97,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	70
Climate Zone	5			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See Appendix F of the Environmental Impact Report

Construction Phase - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

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Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Trips and VMT - See Appendix F of the Environmental Impact Report

Demolition -

Grading - See Appendix F of the Environmental Impact Report

Architectural Coating - See Appendix F of the Environmental Impact Report

Vehicle Trips - See Appendix F of the Environmental Impact Report

Land Use Change -

Sequestration - See Appendix F of the Environmental Impact Report

Construction Off-road Equipment Mitigation - See Appendix F of the Environmental Impact Report

Operational Off-Road Equipment - See Appendix F of the Environmental Impact Report

Stationary Sources - Emergency Generators and Fire Pumps -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	170,616.00	0.00

tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	170,616.00	0.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	511,848.00	0.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	511,848.00	0.00
tblArchitecturalCoating	ConstArea_Parking	13,992.00	0.00
tblArchitecturalCoating	ConstArea_Parking	13,992.00	0.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	15.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstructionPhase	NumDays	230.00	30.00
tblConstructionPhase	NumDays	230.00	40.00
tblConstructionPhase	NumDays	230.00	100.00
tblConstructionPhase	NumDays	230.00	261.00
tblConstructionPhase	NumDays	20.00	130.00
tblConstructionPhase	NumDays	10.00	20.00
tblConstructionPhase	NumDays	10.00	35.00
tblGrading	AcresOfGrading	25.00	0.00
tblGrading	MaterialExported	0.00	7,102.00
tblGrading	MaterialImported	0.00	6,070.00
tblLandUse	LandUseSquareFeet	256,230.00	256,232.00
tblLandUse	LotAcreage	5.88	1.47
tblLandUse	LotAcreage	1.95	0.39
tblLandUse	LotAcreage	3.06	0.61
tblLandUse	LotAcreage	2.19	3.15
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	5.00
tblOffRoadEquipment	UsageHours	8.00	6.00

tblOffRoadEquipment	UsageHours	8.00	3.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	4.00
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tblOffRoadEquipment	UsageHours	6.00	7.00
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tblOffRoadEquipment	UsageHours	8.00	5.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	2.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	365.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	52.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	1.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	0.30
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	16.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	4.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblSequestration	NumberOfNewTrees	0.00	80.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00

tblTripsAndVMT	HaulingTripLength	20.00	12.60
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripNumber	149.00	1,509.00
tblTripsAndVMT	HaulingTripNumber	1,647.00	659.00
tblTripsAndVMT	VendorTripNumber	94.00	3.00
tblTripsAndVMT	VendorTripNumber	94.00	6.00
tblTripsAndVMT	VendorTripNumber	94.00	21.00
tblTripsAndVMT	VendorTripNumber	94.00	51.00
tblTripsAndVMT	WorkerTripNumber	40.00	20.00
tblTripsAndVMT	WorkerTripNumber	38.00	19.00
tblTripsAndVMT	WorkerTripNumber	41.00	7.00
tblTripsAndVMT	WorkerTripNumber	40.00	20.00
tblTripsAndVMT	WorkerTripNumber	38.00	19.00
tblTripsAndVMT	WorkerTripNumber	207.00	6.00
tblTripsAndVMT	WorkerTripNumber	207.00	13.00
tblTripsAndVMT	WorkerTripNumber	207.00	46.00
tblTripsAndVMT	WorkerTripNumber	207.00	114.00
tblTripsAndVMT	WorkerTripNumber	41.00	11.00
tblTripsAndVMT	WorkerTripNumber	41.00	19.00
tblVehicleTrips	CC_TTP	48.00	10.00
tblVehicleTrips	CW_TTP	33.00	71.00

tblVehicleTrips	ST_TR	1.64	0.27
tblVehicleTrips	SU_TR	0.76	0.12
tblVehicleTrips	WD_TR	11.42	1.86

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1208	1.4500	0.8959	2.5400e-003	0.0646	0.0514	0.1160	0.0110	0.0478	0.0588	0.0000	233.8204	233.8204	0.0549	0.0000	235.1931
2021	1.1783	7.0010	6.3810	0.0143	0.1969	0.2928	0.4897	0.0490	0.2778	0.3268	0.0000	1,248.3940	1,248.3940	0.2656	0.0000	1,255.0346
2022	1.7912	2.9208	3.0202	6.4300e-003	0.0504	0.1264	0.1768	0.0136	0.1188	0.1323	0.0000	559.7498	559.7498	0.1421	0.0000	563.3033
Maximum	**1.7912**	**7.0010**	**6.3810**	**0.0143**	**0.1969**	**0.2928**	**0.4897**	**0.0490**	**0.2778**	**0.3268**	**0.0000**	**1,248.3940**	**1,248.3940**	**0.2656**	**0.0000**	**1,255.0346**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.0341	0.4467	1.0371	2.5400e-003	0.0400	4.4100e-003	0.0444	7.9300e-003	4.3700e-003	0.0123	0.0000	233.8202	233.8202	0.0549	0.0000	235.1929
2021	0.6117	2.4717	7.2061	0.0143	0.1816	0.0230	0.2046	0.0474	0.0229	0.0702	0.0000	1,248.3929	1,248.3929	0.2656	0.0000	1,255.0334
2022	1.5552	0.9720	3.5502	6.4300e-003	0.0504	0.0114	0.0618	0.0136	0.0114	0.0250	0.0000	559.7492	559.7492	0.1421	0.0000	563.3027
Maximum	**1.5552**	**2.4717**	**7.2061**	**0.0143**	**0.1816**	**0.0230**	**0.2046**	**0.0474**	**0.0229**	**0.0702**	**0.0000**	**1,248.3929**	**1,248.3929**	**0.2656**	**0.0000**	**1,255.0334**

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	ROG	NOx	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	**28.78**	**65.79**	**-14.53**	**0.00**	**12.80**	**91.75**	**60.28**	**6.41**	**91.31**	**79.25**	**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	**10-28-2020**	**1-27-2021**	2.3591	0.6006
2	**1-28-2021**	**4-27-2021**	1.9384	0.6305
3	**4-28-2021**	**7-27-2021**	1.9731	0.7977
4	**7-28-2021**	**10-27-2021**	1.3756	0.5642
5	**10-28-2021**	**1-27-2022**	3.1864	1.5432
6	**1-28-2022**	**4-27-2022**	2.2923	1.1441
7	**4-28-2022**	**7-27-2022**	0.9217	0.5317
8	**7-28-2022**	**9-30-2022**	0.3977	0.2718
		Highest	3.1864	1.5432

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	1.5313	8.0000e-005	8.5100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0165	0.0165	4.0000e-005	0.0000	0.0176
Energy	0.0342	0.3113	0.2615	1.8700e-003		0.0237	0.0237		0.0237	0.0237	0.0000	1,826.4365	1,826.4365	0.0738	0.0201	1,834.2789
Mobile	0.1184	0.3769	1.4178	5.1100e-003	0.4846	4.2400e-003	0.4889	0.1302	3.9600e-003	0.1342	0.0000	468.1965	468.1965	0.0166	0.0000	468.6119
Offroad	0.0224	0.2084	0.2270	3.1000e-004		0.0135	0.0135		0.0125	0.0125	0.0000	27.2549	27.2549	8.2000e-003	0.0000	27.4599
Waste						0.0000	0.0000		0.0000	0.0000	64.4172	0.0000	64.4172	3.8069	0.0000	159.5908
Water						0.0000	0.0000		0.0000	0.0000	19.2408	133.3151	152.5559	1.9823	0.0479	216.3892
Total	**1.7064**	**0.8967**	**1.9148**	**7.2900e-003**	**0.4846**	**0.0414**	**0.5261**	**0.1302**	**0.0401**	**0.1704**	**83.6580**	**2,455.2194**	**2,538.8774**	**5.8878**	**0.0680**	**2,706.3483**

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	1.5313	8.0000e-005	8.5100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0165	0.0165	4.0000e-005	0.0000	0.0176
Energy	0.0342	0.3113	0.2615	1.8700e-003		0.0237	0.0237		0.0237	0.0237	0.0000	1,826.4365	1,826.4365	0.0738	0.0201	1,834.2789
Mobile	0.1184	0.3769	1.4178	5.1100e-003	0.4846	4.2400e-003	0.4889	0.1302	3.9600e-003	0.1342	0.0000	468.1965	468.1965	0.0166	0.0000	468.6119
Offroad	0.0224	0.2084	0.2270	3.1000e-004		0.0135	0.0135		0.0125	0.0125	0.0000	27.2549	27.2549	8.2000e-003	0.0000	27.4599
Waste						0.0000	0.0000		0.0000	0.0000	64.4172	0.0000	64.4172	3.8069	0.0000	159.5908
Water						0.0000	0.0000		0.0000	0.0000	19.2408	133.3151	152.5559	1.9823	0.0479	216.3892
Total	**1.7064**	**0.8967**	**1.9148**	**7.2900e-003**	**0.4846**	**0.0414**	**0.5261**	**0.1302**	**0.0401**	**0.1704**	**83.6580**	**2,455.2194**	**2,538.8774**	**5.8878**	**0.0680**	**2,706.3483**

	ROG	NOx	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**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	56.6400
Total	**56.6400**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/28/2020	11/24/2020	5	20	
2	Soils Abatement/Remove/Replace	Site Preparation	11/11/2020	12/8/2020	5	20	
3	Site Prep and Make Ready	Site Preparation	12/9/2020	1/26/2021	5	35	
4	Parking Garage Underground	Building Construction	1/8/2021	2/18/2021	5	30	
5	Office Building Underground	Building Construction	1/8/2021	3/4/2021	5	40	
6	Parking Garage Core Construction	Building Construction	2/18/2021	7/7/2021	5	100	
7	Office Building Core Construction	Building Construction	3/5/2021	3/4/2022	5	261	
8	Parking Garage Exterior Improvements	Architectural Coating	5/18/2021	6/16/2021	5	22	
9	Office Building Tenant Improvements	Architectural Coating	11/14/2021	9/15/2022	5	219	
10	Landscaping and Site Improvements	Paving	11/25/2021	5/25/2022	5	130	
11	Office Building Exterior Improvements	Architectural Coating	12/4/2021	3/4/2022	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.76

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Air Compressors	2	7.00	78	0.48
Demolition	Concrete/Industrial Saws	2	6.00	81	0.73
Demolition	Dumpers/Tenders	1	4.00	16	0.38
Demolition	Excavators	2	3.00	158	0.38

Demolition	Forklifts	1	7.00	89	0.20
Demolition	Off-Highway Trucks	2	4.00	402	0.38
Demolition	Rubber Tired Dozers	2	6.00	247	0.40
Demolition	Skid Steer Loaders	1	6.00	65	0.37
Demolition	Sweepers/Scrubbers	1	4.00	64	0.46
Demolition	Tractors/Loaders/Backhoes	2	5.00	97	0.37
Soils Abatement/Remove/Replace	Crawler Tractors	1	4.00	212	0.43
Soils Abatement/Remove/Replace	Dumpers/Tenders	2	6.00	16	0.38
Soils Abatement/Remove/Replace	Excavators	2	5.00	158	0.38
Soils Abatement/Remove/Replace	Off-Highway Trucks	3	4.00	402	0.38
Soils Abatement/Remove/Replace	Plate Compactors	2	5.00	8	0.43
Soils Abatement/Remove/Replace	Rubber Tired Loaders	2	5.00	203	0.36
Soils Abatement/Remove/Replace	Scrapers	2	4.00	367	0.48
Soils Abatement/Remove/Replace	Sweepers/Scrubbers	1	4.00	64	0.46
Soils Abatement/Remove/Replace	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Site Prep and Make Ready	Bore/Drill Rigs	2	7.00	221	0.50
Site Prep and Make Ready	Dumpers/Tenders	1	6.00	16	0.38
Site Prep and Make Ready	Excavators	1	4.00	158	0.38
Site Prep and Make Ready	Off-Highway Trucks	2	4.00	402	0.38
Site Prep and Make Ready	Plate Compactors	2	5.00	8	0.43
Site Prep and Make Ready	Rubber Tired Loaders	2	6.00	203	0.36
Site Prep and Make Ready	Scrapers	2	6.00	367	0.48
Site Prep and Make Ready	Sweepers/Scrubbers	1	4.00	64	0.46
Site Prep and Make Ready	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Bore/Drill Rigs	1	7.00	221	0.50
Parking Garage Underground	Excavators	2	7.00	158	0.38
Parking Garage Underground	Generator Sets	2	4.00	84	0.74

Parking Garage Underground	Plate Compactors	2	4.00	8	0.43
Parking Garage Underground	Rough Terrain Forklifts	2	2.00	100	0.40
Parking Garage Underground	Rubber Tired Loaders	1	2.00	203	0.36
Parking Garage Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Parking Garage Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Trenchers	2	4.00	78	0.50
Office Building Underground	Bore/Drill Rigs	2	4.00	221	0.50
Office Building Underground	Excavators	2	7.00	158	0.38
Office Building Underground	Generator Sets	2	4.00	84	0.74
Office Building Underground	Plate Compactors	2	4.00	8	0.43
Office Building Underground	Rough Terrain Forklifts	2	8.00	100	0.40
Office Building Underground	Rubber Tired Loaders	1	6.00	203	0.36
Office Building Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Office Building Underground	Trenchers	4	7.00	78	0.50
Parking Garage Core Construction	Aerial Lifts	1	7.00	63	0.31
Parking Garage Core Construction	Cement and Mortar Mixers	6	4.00	9	0.56
Parking Garage Core Construction	Cranes	1	7.00	231	0.29
Parking Garage Core Construction	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Core Construction	Plate Compactors	1	4.00	8	0.43
Parking Garage Core Construction	Pumps	1	6.00	84	0.74
Parking Garage Core Construction	Rough Terrain Forklifts	1	6.00	100	0.40
Parking Garage Core Construction	Welders	3	6.00	46	0.45
Office Building Core Construction	Aerial Lifts	4	7.00	63	0.31
Office Building Core Construction	Air Compressors	4	6.00	78	0.48
Office Building Core Construction	Cranes	2	7.00	231	0.29
Office Building Core Construction	Off-Highway Trucks	2	4.00	402	0.38

Office Building Core Construction	Rough Terrain Forklifts	2	6.00	100	0.40
Office Building Core Construction	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Core Construction	Welders	5	7.00	46	0.45
Parking Garage Exterior Improvements	Aerial Lifts	1	6.00	63	0.31
Parking Garage Exterior Improvements	Cranes	1	3.00	231	0.29
Parking Garage Exterior Improvements	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Exterior Improvements	Other General Industrial Equipment	1	4.00	88	0.34
Parking Garage Exterior Improvements	Pressure Washers	1	2.00	13	0.30
Parking Garage Exterior Improvements	Rough Terrain Forklifts	1	5.00	100	0.40
Parking Garage Exterior Improvements	Welders	2	5.00	46	0.45
Office Building Tenant Improvements	Aerial Lifts	1	7.00	63	0.31
Office Building Tenant Improvements	Air Compressors	1	7.00	78	0.48
Office Building Tenant Improvements	Off-Highway Trucks	2	4.00	402	0.38
Office Building Tenant Improvements	Rough Terrain Forklifts	1	7.00	100	0.40
Office Building Tenant Improvements	Sweepers/Scrubbers	1	6.00	64	0.46
Office Building Tenant Improvements	Welders	1	5.00	46	0.45
Landscaping and Site Improvements	Cement and Mortar Mixers	2	4.00	9	0.56
Landscaping and Site Improvements	Dumpers/Tenders	1	6.00	16	0.38
Landscaping and Site Improvements	Paving Equipment	2	7.00	132	0.36
Landscaping and Site Improvements	Plate Compactors	2	4.00	8	0.43
Landscaping and Site Improvements	Rollers	2	5.00	80	0.38
Landscaping and Site Improvements	Rough Terrain Forklifts	1	3.00	100	0.40
Landscaping and Site Improvements	Rubber Tired Dozers	2	4.00	247	0.40
Landscaping and Site Improvements	Skid Steer Loaders	1	6.00	65	0.37
Landscaping and Site Improvements	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Office Building Exterior Improvements	Aerial Lifts	3	6.00	63	0.31
Office Building Exterior Improvements	Off-Highway Trucks	2	4.00	402	0.38

Office Building Exterior Improvements	Other General Industrial Equipment	2	7.00	88	0.34
Office Building Exterior Improvements	Pressure Washers	1	4.00	13	0.30
Office Building Exterior Improvements	Rough Terrain Forklifts	3	7.00	100	0.40
Office Building Exterior Improvements	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Exterior Improvements	Welders	2	6.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	16	20.00	0.00	1,509.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Soils Abatement/Remove/Re	16	20.00	0.00	659.00	10.80	7.30	12.60	LD_Mix	HDT_Mix	HHDT
Site Prep and Make Ready	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Underground	15	6.00	3.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Underground	18	13.00	6.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Core Construction	15	46.00	21.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Core Construction	20	114.00	51.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Exterior Improvements	8	11.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Tenant Improvements	7	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Landscaping and Site Improvements	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Exterior Improvements	14	7.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0162	0.0000	0.0162	2.4400e-003	0.0000	2.4400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0428	0.3997	0.2831	5.5000e-004		0.0209	0.0209		0.0197	0.0197	0.0000	47.6236	47.6236	0.0118	0.0000	47.9181
Total	**0.0428**	**0.3997**	**0.2831**	**5.5000e-004**	**0.0162**	**0.0209**	**0.0371**	**2.4400e-003**	**0.0197**	**0.0222**	**0.0000**	**47.6236**	**47.6236**	**0.0118**	**0.0000**	**47.9181**

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	6.4100e-003	0.2346	0.0974	5.9000e-004	0.0120	7.2000e-004	0.0127	3.2900e-003	6.9000e-004	3.9900e-003	0.0000	60.1292	60.1292	7.5000e-003	0.0000	60.3168
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5000e-004	3.7000e-004	3.8900e-003	1.0000e-005	1.5700e-003	1.0000e-005	1.5800e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.3111	1.3111	3.0000e-005	0.0000	1.3117
Total	**6.9600e-003**	**0.2349**	**0.1013**	**6.0000e-004**	**0.0136**	**7.3000e-004**	**0.0143**	**3.7100e-003**	**7.0000e-004**	**4.4200e-003**	**0.0000**	**61.4403**	**61.4403**	**7.5300e-003**	**0.0000**	**61.6285**

3.2 Demolition - 2020

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					7.2700e-003	0.0000	7.2700e-003	1.1000e-003	0.0000	1.1000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.9900e-003	0.0439	0.3089	5.5000e-004		9.3000e-004	9.3000e-004		9.3000e-004	9.3000e-004	0.0000	47.6236	47.6236	0.0118	0.0000	47.9181
Total	**6.9900e-003**	**0.0439**	**0.3089**	**5.5000e-004**	**7.2700e-003**	**9.3000e-004**	**8.2000e-003**	**1.1000e-003**	**9.3000e-004**	**2.0300e-003**	**0.0000**	**47.6236**	**47.6236**	**0.0118**	**0.0000**	**47.9181**

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	6.4100e-003	0.2346	0.0974	5.9000e-004	0.0120	7.2000e-004	0.0127	3.2900e-003	6.9000e-004	3.9900e-003	0.0000	60.1292	60.1292	7.5000e-003	0.0000	60.3168
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5000e-004	3.7000e-004	3.8900e-003	1.0000e-005	1.5700e-003	1.0000e-005	1.5800e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.3111	1.3111	3.0000e-005	0.0000	1.3117
Total	**6.9600e-003**	**0.2349**	**0.1013**	**6.0000e-004**	**0.0136**	**7.3000e-004**	**0.0143**	**3.7100e-003**	**7.0000e-004**	**4.4200e-003**	**0.0000**	**61.4403**	**61.4403**	**7.5300e-003**	**0.0000**	**61.6285**

3.3 Soils Abatement/Remove/Replace - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.4000e-004	0.0000	7.4000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0350	0.3724	0.2390	5.8000e-004		0.0151	0.0151		0.0139	0.0139	0.0000	51.0737	51.0737	0.0163	0.0000	51.4801
Total	**0.0350**	**0.3724**	**0.2390**	**5.8000e-004**	**7.4000e-004**	**0.0151**	**0.0158**	**1.1000e-004**	**0.0139**	**0.0140**	**0.0000**	**51.0737**	**51.0737**	**0.0163**	**0.0000**	**51.4801**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0500e-003	0.0775	0.0310	1.8000e-004	3.4800e-003	2.2000e-004	3.6900e-003	9.5000e-004	2.1000e-004	1.1600e-003	0.0000	18.1672	18.1672	2.2600e-003	0.0000	18.2237
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5000e-004	3.7000e-004	3.8900e-003	1.0000e-005	1.5700e-003	1.0000e-005	1.5800e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.3111	1.3111	3.0000e-005	0.0000	1.3117
Total	**2.6000e-003**	**0.0779**	**0.0349**	**1.9000e-004**	**5.0500e-003**	**2.3000e-004**	**5.2700e-003**	**1.3700e-003**	**2.2000e-004**	**1.5900e-003**	**0.0000**	**19.4782**	**19.4782**	**2.2900e-003**	**0.0000**	**19.5354**

3.3 Soils Abatement/Remove/Replace - 2020

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					3.4000e-004	0.0000	3.4000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.7300e-003	0.0468	0.2929	5.8000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003	0.0000	51.0737	51.0737	0.0163	0.0000	51.4800
Total	**8.7300e-003**	**0.0468**	**0.2929**	**5.8000e-004**	**3.4000e-004**	**1.3200e-003**	**1.6600e-003**	**5.0000e-005**	**1.3200e-003**	**1.3700e-003**	**0.0000**	**51.0737**	**51.0737**	**0.0163**	**0.0000**	**51.4800**

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	2.0500e-003	0.0775	0.0310	1.8000e-004	3.4800e-003	2.2000e-004	3.6900e-003	9.5000e-004	2.1000e-004	1.1600e-003	0.0000	18.1672	18.1672	2.2600e-003	0.0000	18.2237
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.5000e-004	3.7000e-004	3.8900e-003	1.0000e-005	1.5700e-003	1.0000e-005	1.5800e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.3111	1.3111	3.0000e-005	0.0000	1.3117
Total	**2.6000e-003**	**0.0779**	**0.0349**	**1.9000e-004**	**5.0500e-003**	**2.3000e-004**	**5.2700e-003**	**1.3700e-003**	**2.2000e-004**	**1.5900e-003**	**0.0000**	**19.4782**	**19.4782**	**2.2900e-003**	**0.0000**	**19.5354**

3.4 Site Prep and Make Ready - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0278	0.0000	0.0278	3.0100e-003	0.0000	3.0100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0330	0.3648	0.2345	6.1000e-004		0.0144	0.0144		0.0133	0.0133	0.0000	53.1459	53.1459	0.0170	0.0000	53.5719
Total	**0.0330**	**0.3648**	**0.2345**	**6.1000e-004**	**0.0278**	**0.0144**	**0.0422**	**3.0100e-003**	**0.0133**	**0.0163**	**0.0000**	**53.1459**	**53.1459**	**0.0170**	**0.0000**	**53.5719**

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	4.4000e-004	3.0000e-004	3.1400e-003	1.0000e-005	1.2700e-003	1.0000e-005	1.2800e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.0587	1.0587	2.0000e-005	0.0000	1.0592
Total	**4.4000e-004**	**3.0000e-004**	**3.1400e-003**	**1.0000e-005**	**1.2700e-003**	**1.0000e-005**	**1.2800e-003**	**3.4000e-004**	**1.0000e-005**	**3.5000e-004**	**0.0000**	**1.0587**	**1.0587**	**2.0000e-005**	**0.0000**	**1.0592**

3.4 Site Prep and Make Ready - 2020

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					0.0125	0.0000	0.0125	1.3500e-003	0.0000	1.3500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.3900e-003	0.0430	0.2960	6.1000e-004		1.2000e-003	1.2000e-003		1.2000e-003	1.2000e-003	0.0000	53.1458	53.1458	0.0170	0.0000	53.5718
Total	**8.3900e-003**	**0.0430**	**0.2960**	**6.1000e-004**	**0.0125**	**1.2000e-003**	**0.0137**	**1.3500e-003**	**1.2000e-003**	**2.5500e-003**	**0.0000**	**53.1458**	**53.1458**	**0.0170**	**0.0000**	**53.5718**

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	4.4000e-004	3.0000e-004	3.1400e-003	1.0000e-005	1.2700e-003	1.0000e-005	1.2800e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.0587	1.0587	2.0000e-005	0.0000	1.0592
Total	**4.4000e-004**	**3.0000e-004**	**3.1400e-003**	**1.0000e-005**	**1.2700e-003**	**1.0000e-005**	**1.2800e-003**	**3.4000e-004**	**1.0000e-005**	**3.5000e-004**	**0.0000**	**1.0587**	**1.0587**	**2.0000e-005**	**0.0000**	**1.0592**

3.4 Site Prep and Make Ready - 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					0.0278	0.0000	0.0278	3.0100e-003	0.0000	3.0100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0322	0.3421	0.2393	6.4000e-004		0.0134	0.0134		0.0124	0.0124	0.0000	56.3172	56.3172	0.0181	0.0000	56.7686
Total	**0.0322**	**0.3421**	**0.2393**	**6.4000e-004**	**0.0278**	**0.0134**	**0.0413**	**3.0100e-003**	**0.0124**	**0.0154**	**0.0000**	**56.3172**	**56.3172**	**0.0181**	**0.0000**	**56.7686**

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	4.4000e-004	2.8000e-004	3.0700e-003	1.0000e-005	1.3500e-003	1.0000e-005	1.3500e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.0811	1.0811	2.0000e-005	0.0000	1.0816
Total	**4.4000e-004**	**2.8000e-004**	**3.0700e-003**	**1.0000e-005**	**1.3500e-003**	**1.0000e-005**	**1.3500e-003**	**3.6000e-004**	**1.0000e-005**	**3.7000e-004**	**0.0000**	**1.0811**	**1.0811**	**2.0000e-005**	**0.0000**	**1.0816**

3.4 Site Prep and Make Ready - 2021

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					0.0125	0.0000	0.0125	1.3500e-003	0.0000	1.3500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.8800e-003	0.0455	0.3134	6.4000e-004		1.2700e-003	1.2700e-003		1.2700e-003	1.2700e-003	0.0000	56.3171	56.3171	0.0181	0.0000	56.7686
Total	**8.8800e-003**	**0.0455**	**0.3134**	**6.4000e-004**	**0.0125**	**1.2700e-003**	**0.0138**	**1.3500e-003**	**1.2700e-003**	**2.6200e-003**	**0.0000**	**56.3171**	**56.3171**	**0.0181**	**0.0000**	**56.7686**

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	4.4000e-004	2.8000e-004	3.0700e-003	1.0000e-005	1.3500e-003	1.0000e-005	1.3500e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.0811	1.0811	2.0000e-005	0.0000	1.0816
Total	**4.4000e-004**	**2.8000e-004**	**3.0700e-003**	**1.0000e-005**	**1.3500e-003**	**1.0000e-005**	**1.3500e-003**	**3.6000e-004**	**1.0000e-005**	**3.7000e-004**	**0.0000**	**1.0811**	**1.0811**	**2.0000e-005**	**0.0000**	**1.0816**

3.5 Parking Garage Underground - 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	0.0292	0.2848	0.2993	5.5000e-004		0.0150	0.0150		0.0140	0.0140	0.0000	48.3138	48.3138	0.0132	0.0000	48.6441
Total	**0.0292**	**0.2848**	**0.2993**	**5.5000e-004**		**0.0150**	**0.0150**		**0.0140**	**0.0140**	**0.0000**	**48.3138**	**48.3138**	**0.0132**	**0.0000**	**48.6441**

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	1.4000e-004	4.6900e-003	2.0100e-003	1.0000e-005	2.9000e-004	1.0000e-005	3.0000e-004	8.0000e-005	1.0000e-005	1.0000e-004	0.0000	1.1777	1.1777	1.0000e-004	0.0000	1.1802
Worker	2.3000e-004	1.5000e-004	1.6200e-003	1.0000e-005	7.1000e-004	0.0000	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5690	0.5690	1.0000e-005	0.0000	0.5693
Total	**3.7000e-004**	**4.8400e-003**	**3.6300e-003**	**2.0000e-005**	**1.0000e-003**	**1.0000e-005**	**1.0100e-003**	**2.7000e-004**	**1.0000e-005**	**2.9000e-004**	**0.0000**	**1.7467**	**1.7467**	**1.1000e-004**	**0.0000**	**1.7495**

3.5 Parking Garage Underground - 2021

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	7.3400e-003	0.0416	0.3586	5.5000e-004		1.0100e-003	1.0100e-003		1.0100e-003	1.0100e-003	0.0000	48.3137	48.3137	0.0132	0.0000	48.6441
Total	**7.3400e-003**	**0.0416**	**0.3586**	**5.5000e-004**		**1.0100e-003**	**1.0100e-003**		**1.0100e-003**	**1.0100e-003**	**0.0000**	**48.3137**	**48.3137**	**0.0132**	**0.0000**	**48.6441**

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	1.4000e-004	4.6900e-003	2.0100e-003	1.0000e-005	2.9000e-004	1.0000e-005	3.0000e-004	8.0000e-005	1.0000e-005	1.0000e-004	0.0000	1.1777	1.1777	1.0000e-004	0.0000	1.1802
Worker	2.3000e-004	1.5000e-004	1.6200e-003	1.0000e-005	7.1000e-004	0.0000	7.1000e-004	1.9000e-004	0.0000	1.9000e-004	0.0000	0.5690	0.5690	1.0000e-005	0.0000	0.5693
Total	**3.7000e-004**	**4.8400e-003**	**3.6300e-003**	**2.0000e-005**	**1.0000e-003**	**1.0000e-005**	**1.0100e-003**	**2.7000e-004**	**1.0000e-005**	**2.9000e-004**	**0.0000**	**1.7467**	**1.7467**	**1.1000e-004**	**0.0000**	**1.7495**

3.6 Office Building Underground - 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	0.0659	0.6499	0.6194	1.1000e-003		0.0362	0.0362		0.0336	0.0336	0.0000	95.8901	95.8901	0.0278	0.0000	96.5850
Total	**0.0659**	**0.6499**	**0.6194**	**1.1000e-003**		**0.0362**	**0.0362**		**0.0336**	**0.0336**	**0.0000**	**95.8901**	**95.8901**	**0.0278**	**0.0000**	**96.5850**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.8000e-004	0.0125	5.3600e-003	3.0000e-005	7.8000e-004	3.0000e-005	8.1000e-004	2.3000e-004	3.0000e-005	2.5000e-004	0.0000	3.1404	3.1404	2.7000e-004	0.0000	3.1472
Worker	6.6000e-004	4.3000e-004	4.6700e-003	2.0000e-005	2.0500e-003	1.0000e-005	2.0600e-003	5.4000e-004	1.0000e-005	5.6000e-004	0.0000	1.6438	1.6438	3.0000e-005	0.0000	1.6445
Total	**1.0400e-003**	**0.0129**	**0.0100**	**5.0000e-005**	**2.8300e-003**	**4.0000e-005**	**2.8700e-003**	**7.7000e-004**	**4.0000e-005**	**8.1000e-004**	**0.0000**	**4.7842**	**4.7842**	**3.0000e-004**	**0.0000**	**4.7917**

3.6 Office Building Underground - 2021

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	0.0142	0.0745	0.7228	1.1000e-003		1.9400e-003	1.9400e-003		1.9400e-003	1.9400e-003	0.0000	95.8900	95.8900	0.0278	0.0000	96.5849
Total	**0.0142**	**0.0745**	**0.7228**	**1.1000e-003**		**1.9400e-003**	**1.9400e-003**		**1.9400e-003**	**1.9400e-003**	**0.0000**	**95.8900**	**95.8900**	**0.0278**	**0.0000**	**96.5849**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.8000e-004	0.0125	5.3600e-003	3.0000e-005	7.8000e-004	3.0000e-005	8.1000e-004	2.3000e-004	3.0000e-005	2.5000e-004	0.0000	3.1404	3.1404	2.7000e-004	0.0000	3.1472
Worker	6.6000e-004	4.3000e-004	4.6700e-003	2.0000e-005	2.0500e-003	1.0000e-005	2.0600e-003	5.4000e-004	1.0000e-005	5.6000e-004	0.0000	1.6438	1.6438	3.0000e-005	0.0000	1.6445
Total	**1.0400e-003**	**0.0129**	**0.0100**	**5.0000e-005**	**2.8300e-003**	**4.0000e-005**	**2.8700e-003**	**7.7000e-004**	**4.0000e-005**	**8.1000e-004**	**0.0000**	**4.7842**	**4.7842**	**3.0000e-004**	**0.0000**	**4.7917**

3.7 Parking Garage Core 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	0.0976	0.7821	0.6959	1.4400e-003		0.0337	0.0337		0.0324	0.0324	0.0000	119.0076	119.0076	0.0270	0.0000	119.6830
Total	**0.0976**	**0.7821**	**0.6959**	**1.4400e-003**		**0.0337**	**0.0337**		**0.0324**	**0.0324**	**0.0000**	**119.0076**	**119.0076**	**0.0270**	**0.0000**	**119.6830**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3500e-003	0.1094	0.0469	2.8000e-004	6.8400e-003	2.5000e-004	7.0900e-003	1.9800e-003	2.4000e-004	2.2200e-003	0.0000	27.4788	27.4788	2.3700e-003	0.0000	27.5382
Worker	5.8600e-003	3.8100e-003	0.0413	1.6000e-004	0.0181	1.1000e-004	0.0182	4.8200e-003	1.0000e-004	4.9200e-003	0.0000	14.5408	14.5408	2.6000e-004	0.0000	14.5474
Total	**9.2100e-003**	**0.1132**	**0.0883**	**4.4000e-004**	**0.0250**	**3.6000e-004**	**0.0253**	**6.8000e-003**	**3.4000e-004**	**7.1400e-003**	**0.0000**	**42.0197**	**42.0197**	**2.6300e-003**	**0.0000**	**42.0857**

3.7 Parking Garage Core Construction - 2021

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	0.0278	0.2643	0.7876	1.4400e-003		4.3300e-003	4.3300e-003		4.3300e-003	4.3300e-003	0.0000	119.0074	119.0074	0.0270	0.0000	119.6829
Total	**0.0278**	**0.2643**	**0.7876**	**1.4400e-003**		**4.3300e-003**	**4.3300e-003**		**4.3300e-003**	**4.3300e-003**	**0.0000**	**119.0074**	**119.0074**	**0.0270**	**0.0000**	**119.6829**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3500e-003	0.1094	0.0469	2.8000e-004	6.8400e-003	2.5000e-004	7.0900e-003	1.9800e-003	2.4000e-004	2.2200e-003	0.0000	27.4788	27.4788	2.3700e-003	0.0000	27.5382
Worker	5.8600e-003	3.8100e-003	0.0413	1.6000e-004	0.0181	1.1000e-004	0.0182	4.8200e-003	1.0000e-004	4.9200e-003	0.0000	14.5408	14.5408	2.6000e-004	0.0000	14.5474
Total	**9.2100e-003**	**0.1132**	**0.0883**	**4.4000e-004**	**0.0250**	**3.6000e-004**	**0.0253**	**6.8000e-003**	**3.4000e-004**	**7.1400e-003**	**0.0000**	**42.0197**	**42.0197**	**2.6300e-003**	**0.0000**	**42.0857**

3.8 Office Building Core 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	0.4275	3.4568	3.2519	6.3400e-003		0.1564	0.1564		0.1499	0.1499	0.0000	537.1762	537.1762	0.1285	0.0000	540.3873
Total	**0.4275**	**3.4568**	**3.2519**	**6.3400e-003**		**0.1564**	**0.1564**		**0.1499**	**0.1499**	**0.0000**	**537.1762**	**537.1762**	**0.1285**	**0.0000**	**540.3873**

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	0.0176	0.5736	0.2462	1.4400e-003	0.0359	1.3100e-003	0.0372	0.0104	1.2600e-003	0.0116	0.0000	144.1461	144.1461	0.0125	0.0000	144.4576
Worker	0.0314	0.0204	0.2213	8.6000e-004	0.0969	5.9000e-004	0.0975	0.0258	5.4000e-004	0.0263	0.0000	77.8378	77.8378	1.4100e-003	0.0000	77.8731
Total	**0.0490**	**0.5940**	**0.4674**	**2.3000e-003**	**0.1328**	**1.9000e-003**	**0.1347**	**0.0362**	**1.8000e-003**	**0.0380**	**0.0000**	**221.9839**	**221.9839**	**0.0139**	**0.0000**	**222.3307**

3.8 Office Building Core Construction - 2021

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	0.0902	1.1270	3.6386	6.3400e-003		9.3900e-003	9.3900e-003		9.3900e-003	9.3900e-003	0.0000	537.1755	537.1755	0.1285	0.0000	540.3867
Total	**0.0902**	**1.1270**	**3.6386**	**6.3400e-003**		**9.3900e-003**	**9.3900e-003**		**9.3900e-003**	**9.3900e-003**	**0.0000**	**537.1755**	**537.1755**	**0.1285**	**0.0000**	**540.3867**

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	0.0176	0.5736	0.2462	1.4400e-003	0.0359	1.3100e-003	0.0372	0.0104	1.2600e-003	0.0116	0.0000	144.1461	144.1461	0.0125	0.0000	144.4576
Worker	0.0314	0.0204	0.2213	8.6000e-004	0.0969	5.9000e-004	0.0975	0.0258	5.4000e-004	0.0263	0.0000	77.8378	77.8378	1.4100e-003	0.0000	77.8731
Total	**0.0490**	**0.5940**	**0.4674**	**2.3000e-003**	**0.1328**	**1.9000e-003**	**0.1347**	**0.0362**	**1.8000e-003**	**0.0380**	**0.0000**	**221.9839**	**221.9839**	**0.0139**	**0.0000**	**222.3307**

3.8 Office Building Core 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	0.0810	0.6402	0.6652	1.3200e-003		0.0277	0.0277		0.0266	0.0266	0.0000	111.9240	111.9240	0.0265	0.0000	112.5861
Total	**0.0810**	**0.6402**	**0.6652**	**1.3200e-003**		**0.0277**	**0.0277**		**0.0266**	**0.0266**	**0.0000**	**111.9240**	**111.9240**	**0.0265**	**0.0000**	**112.5861**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.4400e-003	0.1124	0.0512	3.0000e-004	7.4800e-003	2.4000e-004	7.7200e-003	2.1600e-003	2.3000e-004	2.3900e-003	0.0000	29.6443	29.6443	2.5800e-003	0.0000	29.7087
Worker	6.1800e-003	3.8400e-003	0.0429	1.7000e-004	0.0202	1.2000e-004	0.0203	5.3700e-003	1.1000e-004	5.4800e-003	0.0000	15.6230	15.6230	2.7000e-004	0.0000	15.6297
Total	**9.6200e-003**	**0.1162**	**0.0941**	**4.7000e-004**	**0.0277**	**3.6000e-004**	**0.0280**	**7.5300e-003**	**3.4000e-004**	**7.8700e-003**	**0.0000**	**45.2673**	**45.2673**	**2.8500e-003**	**0.0000**	**45.3384**

3.8 Office Building Core Construction - 2022

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	0.0188	0.2348	0.7581	1.3200e-003		1.9600e-003	1.9600e-003		1.9600e-003	1.9600e-003	0.0000	111.9238	111.9238	0.0265	0.0000	112.5860
Total	**0.0188**	**0.2348**	**0.7581**	**1.3200e-003**		**1.9600e-003**	**1.9600e-003**		**1.9600e-003**	**1.9600e-003**	**0.0000**	**111.9238**	**111.9238**	**0.0265**	**0.0000**	**112.5860**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.4400e-003	0.1124	0.0512	3.0000e-004	7.4800e-003	2.4000e-004	7.7200e-003	2.1600e-003	2.3000e-004	2.3900e-003	0.0000	29.6443	29.6443	2.5800e-003	0.0000	29.7087
Worker	6.1800e-003	3.8400e-003	0.0429	1.7000e-004	0.0202	1.2000e-004	0.0203	5.3700e-003	1.1000e-004	5.4800e-003	0.0000	15.6230	15.6230	2.7000e-004	0.0000	15.6297
Total	**9.6200e-003**	**0.1162**	**0.0941**	**4.7000e-004**	**0.0277**	**3.6000e-004**	**0.0280**	**7.5300e-003**	**3.4000e-004**	**7.8700e-003**	**0.0000**	**45.2673**	**45.2673**	**2.8500e-003**	**0.0000**	**45.3384**

3.9 Parking Garage Exterior Improvements - 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					
Archit. Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0116	0.0974	0.0880	1.8000e-004		4.2000e-003	4.2000e-003		3.9500e-003	3.9500e-003	0.0000	15.6919	15.6919	4.5500e-003	0.0000	15.8057
Total	**0.0116**	**0.0974**	**0.0880**	**1.8000e-004**		**4.2000e-003**	**4.2000e-003**		**3.9500e-003**	**3.9500e-003**	**0.0000**	**15.6919**	**15.6919**	**4.5500e-003**	**0.0000**	**15.8057**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1000e-004	2.0000e-004	2.1700e-003	1.0000e-005	9.5000e-004	1.0000e-005	9.6000e-004	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	0.7650	0.7650	1.0000e-005	0.0000	0.7653
Total	**3.1000e-004**	**2.0000e-004**	**2.1700e-003**	**1.0000e-005**	**9.5000e-004**	**1.0000e-005**	**9.6000e-004**	**2.5000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**0.7650**	**0.7650**	**1.0000e-005**	**0.0000**	**0.7653**

3.9 Parking Garage Exterior Improvements - 2021

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	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7100e-003	0.0296	0.1038	1.8000e-004		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	15.6919	15.6919	4.5500e-003	0.0000	15.8057
Total	**2.7100e-003**	**0.0296**	**0.1038**	**1.8000e-004**		**3.2000e-004**	**3.2000e-004**		**3.2000e-004**	**3.2000e-004**	**0.0000**	**15.6919**	**15.6919**	**4.5500e-003**	**0.0000**	**15.8057**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1000e-004	2.0000e-004	2.1700e-003	1.0000e-005	9.5000e-004	1.0000e-005	9.6000e-004	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	0.7650	0.7650	1.0000e-005	0.0000	0.7653
Total	**3.1000e-004**	**2.0000e-004**	**2.1700e-003**	**1.0000e-005**	**9.5000e-004**	**1.0000e-005**	**9.6000e-004**	**2.5000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**0.7650**	**0.7650**	**1.0000e-005**	**0.0000**	**0.7653**

3.10 Office Building Tenant Improvements - 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					
Archit. Coating	0.1974					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0238	0.2007	0.1965	4.3000e-004		9.2300e-003	9.2300e-003		8.7100e-003	8.7100e-003	0.0000	37.3957	37.3957	0.0104	0.0000	37.6549
Total	**0.2212**	**0.2007**	**0.1965**	**4.3000e-004**		**9.2300e-003**	**9.2300e-003**		**8.7100e-003**	**8.7100e-003**	**0.0000**	**37.3957**	**37.3957**	**0.0104**	**0.0000**	**37.6549**

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	8.5000e-004	5.5000e-004	5.9800e-003	2.0000e-005	2.6200e-003	2.0000e-005	2.6300e-003	7.0000e-004	1.0000e-005	7.1000e-004	0.0000	2.1021	2.1021	4.0000e-005	0.0000	2.1031
Total	**8.5000e-004**	**5.5000e-004**	**5.9800e-003**	**2.0000e-005**	**2.6200e-003**	**2.0000e-005**	**2.6300e-003**	**7.0000e-004**	**1.0000e-005**	**7.1000e-004**	**0.0000**	**2.1021**	**2.1021**	**4.0000e-005**	**0.0000**	**2.1031**

3.10 Office Building Tenant Improvements - 2021

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	0.1974					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.0100e-003	0.0618	0.2422	4.3000e-004		6.7000e-004	6.7000e-004		6.7000e-004	6.7000e-004	0.0000	37.3957	37.3957	0.0104	0.0000	37.6549
Total	**0.2034**	**0.0618**	**0.2422**	**4.3000e-004**		**6.7000e-004**	**6.7000e-004**		**6.7000e-004**	**6.7000e-004**	**0.0000**	**37.3957**	**37.3957**	**0.0104**	**0.0000**	**37.6549**

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	8.5000e-004	5.5000e-004	5.9800e-003	2.0000e-005	2.6200e-003	2.0000e-005	2.6300e-003	7.0000e-004	1.0000e-005	7.1000e-004	0.0000	2.1021	2.1021	4.0000e-005	0.0000	2.1031
Total	**8.5000e-004**	**5.5000e-004**	**5.9800e-003**	**2.0000e-005**	**2.6200e-003**	**2.0000e-005**	**2.6300e-003**	**7.0000e-004**	**1.0000e-005**	**7.1000e-004**	**0.0000**	**2.1021**	**2.1021**	**4.0000e-005**	**0.0000**	**2.1031**

3.10 Office Building Tenant Improvements - 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	1.0375					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1117	0.8932	1.0057	2.2700e-003		0.0392	0.0392		0.0370	0.0370	0.0000	196.6320	196.6320	0.0543	0.0000	197.9898
Total	**1.1492**	**0.8932**	**1.0057**	**2.2700e-003**		**0.0392**	**0.0392**		**0.0370**	**0.0370**	**0.0000**	**196.6320**	**196.6320**	**0.0543**	**0.0000**	**197.9898**

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	4.2100e-003	2.6200e-003	0.0292	1.2000e-004	0.0138	8.0000e-005	0.0138	3.6600e-003	8.0000e-005	3.7400e-003	0.0000	10.6468	10.6468	1.8000e-004	0.0000	10.6513
Total	**4.2100e-003**	**2.6200e-003**	**0.0292**	**1.2000e-004**	**0.0138**	**8.0000e-005**	**0.0138**	**3.6600e-003**	**8.0000e-005**	**3.7400e-003**	**0.0000**	**10.6468**	**10.6468**	**1.8000e-004**	**0.0000**	**10.6513**

3.10 Office Building Tenant Improvements - 2022

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	1.0375					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0316	0.3249	1.2733	2.2700e-003		3.5400e-003	3.5400e-003		3.5400e-003	3.5400e-003	0.0000	196.6318	196.6318	0.0543	0.0000	197.9895
Total	**1.0691**	**0.3249**	**1.2733**	**2.2700e-003**		**3.5400e-003**	**3.5400e-003**		**3.5400e-003**	**3.5400e-003**	**0.0000**	**196.6318**	**196.6318**	**0.0543**	**0.0000**	**197.9895**

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	4.2100e-003	2.6200e-003	0.0292	1.2000e-004	0.0138	8.0000e-005	0.0138	3.6600e-003	8.0000e-005	3.7400e-003	0.0000	10.6468	10.6468	1.8000e-004	0.0000	10.6513
Total	**4.2100e-003**	**2.6200e-003**	**0.0292**	**1.2000e-004**	**0.0138**	**8.0000e-005**	**0.0138**	**3.6600e-003**	**8.0000e-005**	**3.7400e-003**	**0.0000**	**10.6468**	**10.6468**	**1.8000e-004**	**0.0000**	**10.6513**

3.11 Landscaping and Site Improvements - 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	0.0279	0.2834	0.2120	3.6000e-004		0.0142	0.0142		0.0131	0.0131	0.0000	31.1340	31.1340	9.7200e-003	0.0000	31.3770
Paving	8.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0287**	**0.2834**	**0.2120**	**3.6000e-004**		**0.0142**	**0.0142**		**0.0131**	**0.0131**	**0.0000**	**31.1340**	**31.1340**	**9.7200e-003**	**0.0000**	**31.3770**

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	6.5000e-004	4.3000e-004	4.6100e-003	2.0000e-005	2.0200e-003	1.0000e-005	2.0300e-003	5.4000e-004	1.0000e-005	5.5000e-004	0.0000	1.6216	1.6216	3.0000e-005	0.0000	1.6224
Total	**6.5000e-004**	**4.3000e-004**	**4.6100e-003**	**2.0000e-005**	**2.0200e-003**	**1.0000e-005**	**2.0300e-003**	**5.4000e-004**	**1.0000e-005**	**5.5000e-004**	**0.0000**	**1.6216**	**1.6216**	**3.0000e-005**	**0.0000**	**1.6224**

3.11 Landscaping and Site Improvements - 2021

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	6.4600e-003	0.0416	0.2288	3.6000e-004		1.0500e-003	1.0500e-003		1.0500e-003	1.0500e-003	0.0000	31.1340	31.1340	9.7200e-003	0.0000	31.3770
Paving	8.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.3200e-003**	**0.0416**	**0.2288**	**3.6000e-004**		**1.0500e-003**	**1.0500e-003**		**1.0500e-003**	**1.0500e-003**	**0.0000**	**31.1340**	**31.1340**	**9.7200e-003**	**0.0000**	**31.3770**

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	6.5000e-004	4.3000e-004	4.6100e-003	2.0000e-005	2.0200e-003	1.0000e-005	2.0300e-003	5.4000e-004	1.0000e-005	5.5000e-004	0.0000	1.6216	1.6216	3.0000e-005	0.0000	1.6224
Total	**6.5000e-004**	**4.3000e-004**	**4.6100e-003**	**2.0000e-005**	**2.0200e-003**	**1.0000e-005**	**2.0300e-003**	**5.4000e-004**	**1.0000e-005**	**5.5000e-004**	**0.0000**	**1.6216**	**1.6216**	**3.0000e-005**	**0.0000**	**1.6224**

3.11 Landscaping and Site Improvements - 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	0.0911	0.9212	0.7831	1.3700e-003		0.0444	0.0444		0.0410	0.0410	0.0000	118.7799	118.7799	0.0371	0.0000	119.7069
Paving	3.2700e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0944**	**0.9212**	**0.7831**	**1.3700e-003**		**0.0444**	**0.0444**		**0.0410**	**0.0410**	**0.0000**	**118.7799**	**118.7799**	**0.0371**	**0.0000**	**119.7069**

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	2.3600e-003	1.4600e-003	0.0164	7.0000e-005	7.7000e-003	5.0000e-005	7.7500e-003	2.0500e-003	4.0000e-005	2.0900e-003	0.0000	5.9599	5.9599	1.0000e-004	0.0000	5.9624
Total	**2.3600e-003**	**1.4600e-003**	**0.0164**	**7.0000e-005**	**7.7000e-003**	**5.0000e-005**	**7.7500e-003**	**2.0500e-003**	**4.0000e-005**	**2.0900e-003**	**0.0000**	**5.9599**	**5.9599**	**1.0000e-004**	**0.0000**	**5.9624**

3.11 Landscaping and Site Improvements - 2022

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	0.0247	0.1587	0.8727	1.3700e-003		4.0100e-003	4.0100e-003		4.0100e-003	4.0100e-003	0.0000	118.7797	118.7797	0.0371	0.0000	119.7068
Paving	3.2700e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0279**	**0.1587**	**0.8727**	**1.3700e-003**		**4.0100e-003**	**4.0100e-003**		**4.0100e-003**	**4.0100e-003**	**0.0000**	**118.7797**	**118.7797**	**0.0371**	**0.0000**	**119.7068**

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	2.3600e-003	1.4600e-003	0.0164	7.0000e-005	7.7000e-003	5.0000e-005	7.7500e-003	2.0500e-003	4.0000e-005	2.0900e-003	0.0000	5.9599	5.9599	1.0000e-004	0.0000	5.9624
Total	**2.3600e-003**	**1.4600e-003**	**0.0164**	**7.0000e-005**	**7.7000e-003**	**5.0000e-005**	**7.7500e-003**	**2.0500e-003**	**4.0000e-005**	**2.0900e-003**	**0.0000**	**5.9599**	**5.9599**	**1.0000e-004**	**0.0000**	**5.9624**

3.12 Office Building Exterior Improvements - 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					
Archit. Coating	0.1825					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0198	0.1773	0.1922	3.6000e-004		8.1300e-003	8.1300e-003		7.5700e-003	7.5700e-003	0.0000	30.9209	30.9209	9.4200e-003	0.0000	31.1563
Total	**0.2023**	**0.1773**	**0.1922**	**3.6000e-004**		**8.1300e-003**	**8.1300e-003**		**7.5700e-003**	**7.5700e-003**	**0.0000**	**30.9209**	**30.9209**	**9.4200e-003**	**0.0000**	**31.1563**

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	1.8000e-004	1.2000e-004	1.2600e-003	0.0000	5.5000e-004	0.0000	5.5000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4426	0.4426	1.0000e-005	0.0000	0.4428
Total	**1.8000e-004**	**1.2000e-004**	**1.2600e-003**	**0.0000**	**5.5000e-004**	**0.0000**	**5.5000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4426**	**0.4426**	**1.0000e-005**	**0.0000**	**0.4428**

3.12 Office Building Exterior Improvements - 2021

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	0.1825					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4000e-003	0.0592	0.2239	3.6000e-004		6.3000e-004	6.3000e-004		6.3000e-004	6.3000e-004	0.0000	30.9208	30.9208	9.4200e-003	0.0000	31.1562
Total	**0.1879**	**0.0592**	**0.2239**	**3.6000e-004**		**6.3000e-004**	**6.3000e-004**		**6.3000e-004**	**6.3000e-004**	**0.0000**	**30.9208**	**30.9208**	**9.4200e-003**	**0.0000**	**31.1562**

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	1.8000e-004	1.2000e-004	1.2600e-003	0.0000	5.5000e-004	0.0000	5.5000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4426	0.4426	1.0000e-005	0.0000	0.4428
Total	**1.8000e-004**	**1.2000e-004**	**1.2600e-003**	**0.0000**	**5.5000e-004**	**0.0000**	**5.5000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4426**	**0.4426**	**1.0000e-005**	**0.0000**	**0.4428**

3.12 Office Building Exterior Improvements - 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	0.4106					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0394	0.3456	0.4239	8.1000e-004		0.0147	0.0147		0.0137	0.0137	0.0000	69.5806	69.5806	0.0211	0.0000	70.1086
Total	**0.4500**	**0.3456**	**0.4239**	**8.1000e-004**		**0.0147**	**0.0147**		**0.0137**	**0.0137**	**0.0000**	**69.5806**	**69.5806**	**0.0211**	**0.0000**	**70.1086**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	2.4000e-004	2.6300e-003	1.0000e-005	1.2400e-003	1.0000e-005	1.2500e-003	3.3000e-004	1.0000e-005	3.4000e-004	0.0000	0.9593	0.9593	2.0000e-005	0.0000	0.9597
Total	**3.8000e-004**	**2.4000e-004**	**2.6300e-003**	**1.0000e-005**	**1.2400e-003**	**1.0000e-005**	**1.2500e-003**	**3.3000e-004**	**1.0000e-005**	**3.4000e-004**	**0.0000**	**0.9593**	**0.9593**	**2.0000e-005**	**0.0000**	**0.9597**

3.12 Office Building Exterior Improvements - 2022

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	0.4106					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0121	0.1331	0.5038	8.1000e-004		1.4200e-003	1.4200e-003		1.4200e-003	1.4200e-003	0.0000	69.5805	69.5805	0.0211	0.0000	70.1085
Total	**0.4228**	**0.1331**	**0.5038**	**8.1000e-004**		**1.4200e-003**	**1.4200e-003**		**1.4200e-003**	**1.4200e-003**	**0.0000**	**69.5805**	**69.5805**	**0.0211**	**0.0000**	**70.1085**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	2.4000e-004	2.6300e-003	1.0000e-005	1.2400e-003	1.0000e-005	1.2500e-003	3.3000e-004	1.0000e-005	3.4000e-004	0.0000	0.9593	0.9593	2.0000e-005	0.0000	0.9597
Total	**3.8000e-004**	**2.4000e-004**	**2.6300e-003**	**1.0000e-005**	**1.2400e-003**	**1.0000e-005**	**1.2500e-003**	**3.3000e-004**	**1.0000e-005**	**3.4000e-004**	**0.0000**	**0.9593**	**0.9593**	**2.0000e-005**	**0.0000**	**0.9597**

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	0.1184	0.3769	1.4178	5.1100e-003	0.4846	4.2400e-003	0.4889	0.1302	3.9600e-003	0.1342	0.0000	468.1965	468.1965	0.0166	0.0000	468.6119
Unmitigated	0.1184	0.3769	1.4178	5.1100e-003	0.4846	4.2400e-003	0.4889	0.1302	3.9600e-003	0.1342	0.0000	468.1965	468.1965	0.0166	0.0000	468.6119

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
Office Park	476.59	69.18	30.75	981,509	981,509
Office Park	158.10	22.95	10.20	325,599	325,599
Parking Lot	0.00	0.00	0.00		
Total	634.69	92.13	40.95	1,307,108	1,307,108

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.476244	0.050164	0.262181	0.139658	0.017521	0.006864	0.023236	0.006525	0.004137	0.003158	0.009064	0.000471	0.000777
Office Park	0.476244	0.050164	0.262181	0.139658	0.017521	0.006864	0.023236	0.006525	0.004137	0.003158	0.009064	0.000471	0.000777
Parking Lot	0.476244	0.050164	0.262181	0.139658	0.017521	0.006864	0.023236	0.006525	0.004137	0.003158	0.009064	0.000471	0.000777

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,487.5588	1,487.5588	0.0673	0.0139	1,493.3875
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,487.5588	1,487.5588	0.0673	0.0139	1,493.3875
NaturalGas Mitigated	0.0342	0.3113	0.2615	1.8700e-003		0.0237	0.0237		0.0237	0.0237	0.0000	338.8777	338.8777	6.5000e-003	6.2100e-003	340.8914
NaturalGas Unmitigated	0.0342	0.3113	0.2615	1.8700e-003		0.0237	0.0237		0.0237	0.0237	0.0000	338.8777	338.8777	6.5000e-003	6.2100e-003	340.8914

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Office Park	1.58185e+006	8.5300e-003	0.0775	0.0651	4.7000e-004		5.8900e-003	5.8900e-003		5.8900e-003	5.8900e-003	0.0000	84.4135	84.4135	1.6200e-003	1.5500e-003	84.9152
Office Park	4.76848e+006	0.0257	0.2338	0.1964	1.4000e-003		0.0178	0.0178		0.0178	0.0178	0.0000	254.4641	254.4641	4.8800e-003	4.6700e-003	255.9763
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0342**	**0.3113**	**0.2615**	**1.8700e-003**		**0.0237**	**0.0237**		**0.0237**	**0.0237**	**0.0000**	**338.8777**	**338.8777**	**6.5000e-003**	**6.2200e-003**	**340.8914**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Office Park	1.58185e+006	8.5300e-003	0.0775	0.0651	4.7000e-004		5.8900e-003	5.8900e-003		5.8900e-003	5.8900e-003	0.0000	84.4135	84.4135	1.6200e-003	1.5500e-003	84.9152
Office Park	4.76848e+006	0.0257	0.2338	0.1964	1.4000e-003		0.0178	0.0178		0.0178	0.0178	0.0000	254.4641	254.4641	4.8800e-003	4.6700e-003	255.9763
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0342**	**0.3113**	**0.2615**	**1.8700e-003**		**0.0237**	**0.0237**		**0.0237**	**0.0237**	**0.0000**	**338.8777**	**338.8777**	**6.5000e-003**	**6.2200e-003**	**340.8914**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	796960	231.8448	0.0105	2.1700e-003	232.7532
Office Park	1.06675e+006	310.3298	0.0140	2.9000e-003	311.5458
Office Park	3.21571e+006	935.4874	0.0423	8.7500e-003	939.1529
Parking Lot	34020	9.8968	4.5000e-004	9.0000e-005	9.9356
Total		**1,487.5588**	**0.0673**	**0.0139**	**1,493.3875**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	796960	231.8448	0.0105	2.1700e-003	232.7532
Office Park	1.06675e+006	310.3298	0.0140	2.9000e-003	311.5458
Office Park	3.21571e+006	935.4874	0.0423	8.7500e-003	939.1529
Parking Lot	34020	9.8968	4.5000e-004	9.0000e-005	9.9356
Total		**1,487.5588**	**0.0673**	**0.0139**	**1,493.3875**

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	1.5313	8.0000e-005	8.5100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0165	0.0165	4.0000e-005	0.0000	0.0176
Unmitigated	1.5313	8.0000e-005	8.5100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0165	0.0165	4.0000e-005	0.0000	0.0176

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	0.1828					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.3478					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	7.9000e-004	8.0000e-005	8.5100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0165	0.0165	4.0000e-005	0.0000	0.0176
Total	**1.5314**	**8.0000e-005**	**8.5100e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.0165**	**0.0165**	**4.0000e-005**	**0.0000**	**0.0176**

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	0.1828					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.3478					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	7.9000e-004	8.0000e-005	8.5100e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0165	0.0165	4.0000e-005	0.0000	0.0176
Total	**1.5314**	**8.0000e-005**	**8.5100e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.0165**	**0.0165**	**4.0000e-005**	**0.0000**	**0.0176**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	152.5559	1.9823	0.0479	216.3892
Unmitigated	152.5559	1.9823	0.0479	216.3892

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Office Park	60.6481 / 37.1714	152.5559	1.9823	0.0479	216.3892
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**152.5559**	**1.9823**	**0.0479**	**216.3892**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Office Park	60.6481 / 37.1714	152.5559	1.9823	0.0479	216.3892
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**152.5559**	**1.9823**	**0.0479**	**216.3892**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	64.4172	3.8069	0.0000	159.5908
Unmitigated	64.4172	3.8069	0.0000	159.5908

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Office Park	317.34	64.4172	3.8069	0.0000	159.5908
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**64.4172**	**3.8069**	**0.0000**	**159.5908**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Office Park	317.34	64.4172	3.8069	0.0000	159.5908
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**64.4172**	**3.8069**	**0.0000**	**159.5908**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Cranes	1	8.00	2	231	0.29	Diesel
Forklifts	1	8.00	365	89	0.20	Diesel
Generator Sets	4	0.30	52	84	0.74	Diesel
Pressure Washers	1	16.00	1	13	0.30	Diesel

UnMitigated/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
Equipment Type	tons/yr										MT/yr					
Cranes	3.7000e-004	4.1800e-003	1.8900e-003	1.0000e-005		1.7000e-004	1.7000e-004		1.6000e-004	1.6000e-004	0.0000	0.5070	0.5070	1.6000e-004	0.0000	0.5111
Forklifts	0.0207	0.1925	0.2106	2.8000e-004		0.0128	0.0128		0.0117	0.0117	0.0000	24.5082	24.5082	7.9300e-003	0.0000	24.7063
Generator Sets	1.2900e-003	0.0114	0.0143	3.0000e-005		5.7000e-004	5.7000e-004		5.7000e-004	5.7000e-004	0.0000	2.2043	2.2043	1.0000e-004	0.0000	2.2069
Pressure Washers	4.0000e-005	3.0000e-004	2.4000e-004	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.0355	0.0355	0.0000	0.0000	0.0356
Total	**0.0224**	**0.2084**	**0.2270**	**3.2000e-004**		**0.0135**	**0.0135**		**0.0125**	**0.0125**	**0.0000**	**27.2549**	**27.2549**	**8.1900e-003**	**0.0000**	**27.4599**

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

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	56.6400	0.0000	0.0000	56.6400

11.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	80	56.6400	0.0000	0.0000	56.6400
Total		**56.6400**	**0.0000**	**0.0000**	**56.6400**

Attachment F

PROJECT PHASE 2 SUMMER EMISSION REPORT

PREPARED BY SWCA ENVIRONMENTAL CONSULTANTS, INC.

Haskins Way Rezone Phase II

San Mateo County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	256.23	1000sqft	1.47	256,232.00	0
Office Park	85.00	1000sqft	0.39	85,000.00	0
Enclosed Parking with Elevator	340.00	Space	0.61	136,000.00	0
Parking Lot	243.00	Space	3.15	97,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	70
Climate Zone	5			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See Appendix F of the Environmental Impact Report

Construction Phase - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

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Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Trips and VMT - See Appendix F of the Environmental Impact Report

Demolition -

Grading - See Appendix F of the Environmental Impact Report

Architectural Coating - See Appendix F of the Environmental Impact Report

Vehicle Trips - See Appendix F of the Environmental Impact Report

Land Use Change -

Sequestration - See Appendix F of the Environmental Impact Report

Construction Off-road Equipment Mitigation - See Appendix F of the Environmental Impact Report

Operational Off-Road Equipment - See Appendix F of the Environmental Impact Report

Stationary Sources - Emergency Generators and Fire Pumps -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	170,616.00	0.00

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tblArchitecturalCoating	ConstArea_Nonresidential_Interior	511,848.00	0.00
tblArchitecturalCoating	ConstArea_Parking	13,992.00	0.00
tblArchitecturalCoating	ConstArea_Parking	13,992.00	0.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00

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tblConstructionPhase	NumDays	10.00	35.00
tblGrading	AcresOfGrading	25.00	0.00
tblGrading	MaterialExported	0.00	7,102.00
tblGrading	MaterialImported	0.00	6,070.00
tblLandUse	LandUseSquareFeet	256,230.00	256,232.00
tblLandUse	LotAcreage	5.88	1.47
tblLandUse	LotAcreage	1.95	0.39
tblLandUse	LotAcreage	3.06	0.61
tblLandUse	LotAcreage	2.19	3.15
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	5.00
tblOffRoadEquipment	UsageHours	8.00	6.00

tblOffRoadEquipment	UsageHours	8.00	3.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	7.00	6.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	7.00	6.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	6.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOffRoadEquipment	UsageHours	8.00	5.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	2.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	365.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	52.00
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	1.00
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	0.30
tblOperationalOffRoadEquipment	OperHoursPerDay	8.00	16.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	4.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblSequestration	NumberOfNewTrees	0.00	80.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00

tblTripsAndVMT	HaulingTripLength	20.00	12.60
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripLength	20.00	19.00
tblTripsAndVMT	HaulingTripNumber	149.00	1,509.00
tblTripsAndVMT	HaulingTripNumber	1,647.00	659.00
tblTripsAndVMT	VendorTripNumber	94.00	3.00
tblTripsAndVMT	VendorTripNumber	94.00	6.00
tblTripsAndVMT	VendorTripNumber	94.00	21.00
tblTripsAndVMT	VendorTripNumber	94.00	51.00
tblTripsAndVMT	WorkerTripNumber	40.00	20.00
tblTripsAndVMT	WorkerTripNumber	38.00	19.00
tblTripsAndVMT	WorkerTripNumber	41.00	7.00
tblTripsAndVMT	WorkerTripNumber	40.00	20.00
tblTripsAndVMT	WorkerTripNumber	38.00	19.00
tblTripsAndVMT	WorkerTripNumber	207.00	6.00
tblTripsAndVMT	WorkerTripNumber	207.00	13.00
tblTripsAndVMT	WorkerTripNumber	207.00	46.00
tblTripsAndVMT	WorkerTripNumber	207.00	114.00
tblTripsAndVMT	WorkerTripNumber	41.00	11.00
tblTripsAndVMT	WorkerTripNumber	41.00	19.00
tblVehicleTrips	CC_TTP	48.00	10.00
tblVehicleTrips	CW_TTP	33.00	71.00

tblVehicleTrips	ST_TR	1.64	0.27
tblVehicleTrips	SU_TR	0.76	0.12
tblVehicleTrips	WD_TR	11.42	1.86

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					
2020	8.7295	107.7794	65.7336	0.1928	3.6229	3.6946	7.3174	0.7823	3.4507	4.2329	0.0000	19,861.8089	19,861.8089	4.1682	0.0000	19,966.0125
2021	39.5175	90.4773	81.4953	0.1711	1.9637	4.3076	6.2712	0.5124	3.9935	4.2655	0.0000	16,447.1771	16,447.1771	4.7418	0.0000	16,545.7463
2022	38.4577	76.5489	79.5712	0.1705	1.6504	3.1882	4.8386	0.4455	3.0040	3.4496	0.0000	16,386.6432	16,386.6432	3.9211	0.0000	16,484.6716
Maximum	**39.5175**	**107.7794**	**81.4953**	**0.1928**	**3.6229**	**4.3076**	**7.3174**	**0.7823**	**3.9935**	**4.2655**	**0.0000**	**19,861.8089**	**19,861.8089**	**4.7418**	**0.0000**	**19,966.0125**

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					
2020	2.5208	39.6338	73.7125	0.1928	2.6939	0.3191	3.0131	0.6416	0.3150	0.9566	0.0000	19,861.8089	19,861.8089	4.1682	0.0000	19,966.0125
2021	32.3545	28.4344	95.9821	0.1711	1.8907	0.3092	2.1184	0.5124	0.3090	0.7388	0.0000	16,447.1771	16,447.1771	4.7418	0.0000	16,545.7463
2022	32.3210	28.1005	91.8984	0.1705	1.6504	0.2843	1.9347	0.4455	0.2832	0.7287	0.0000	16,386.6432	16,386.6432	3.9211	0.0000	16,484.6716
Maximum	**32.3545**	**39.6338**	**95.9821**	**0.1928**	**2.6939**	**0.3191**	**3.0131**	**0.6416**	**0.3150**	**0.9566**	**0.0000**	**19,861.8089**	**19,861.8089**	**4.7418**	**0.0000**	**19,966.0125**

	ROG	NOx	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	**22.50**	**65.00**	**-15.34**	**0.00**	**13.84**	**91.84**	**61.65**	**8.08**	**91.32**	**79.71**	**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	8.3954	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156
Energy	0.1876	1.7057	1.4328	0.0102		0.1296	0.1296		0.1296	0.1296		2,046.8421	2,046.8421	0.0392	0.0375	2,059.0054
Mobile	0.9572	2.6440	10.6870	0.0396	3.7308	0.0313	3.7621	0.9990	0.0292	1.0283		3,999.4629	3,999.4629	0.1357		4,002.8561
Offroad	0.6222	6.2823	4.0816	9.3900e-003		0.2922	0.2922		0.2727	0.2727		878.4964	878.4964	0.2408		884.5153
Total	**10.1624**	**10.6329**	**16.2959**	**0.0593**	**3.7308**	**0.4535**	**4.1842**	**0.9990**	**0.4319**	**1.4309**		**6,925.0036**	**6,925.0036**	**0.4163**	**0.0375**	**6,946.5925**

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	lb/day										lb/day					
Area	8.3954	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156
Energy	0.1876	1.7057	1.4328	0.0102		0.1296	0.1296		0.1296	0.1296		2,046.8421	2,046.8421	0.0392	0.0375	2,059.0054
Mobile	0.9572	2.6440	10.6870	0.0396	3.7308	0.0313	3.7621	0.9990	0.0292	1.0283		3,999.4629	3,999.4629	0.1357		4,002.8561
Offroad	0.6222	6.2823	4.0816	9.3900e-003		0.2922	0.2922		0.2727	0.2727		878.4964	878.4964	0.2408		884.5153
Total	**10.1624**	**10.6329**	**16.2959**	**0.0593**	**3.7308**	**0.4535**	**4.1842**	**0.9990**	**0.4319**	**1.4309**		**6,925.0036**	**6,925.0036**	**0.4163**	**0.0375**	**6,946.5925**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/28/2020	11/24/2020	5	20	
2	Soils Abatement/Remove/Replace	Site Preparation	11/11/2020	12/8/2020	5	20	
3	Site Prep and Make Ready	Site Preparation	12/9/2020	1/26/2021	5	35	
4	Parking Garage Underground	Building Construction	1/8/2021	2/18/2021	5	30	
5	Office Building Underground	Building Construction	1/8/2021	3/4/2021	5	40	
6	Parking Garage Core Construction	Building Construction	2/18/2021	7/7/2021	5	100	
7	Office Building Core Construction	Building Construction	3/5/2021	3/4/2022	5	261	
8	Parking Garage Exterior Improvements	Architectural Coating	5/18/2021	6/16/2021	5	22	
9	Office Building Tenant Improvements	Architectural Coating	11/14/2021	9/15/2022	5	219	
10	Landscaping and Site Improvements	Paving	11/25/2021	5/25/2022	5	130	
11	Office Building Exterior Improvements	Architectural Coating	12/4/2021	3/4/2022	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.76

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Air Compressors	2	7.00	78	0.48
Demolition	Concrete/Industrial Saws	2	6.00	81	0.73
Demolition	Dumpers/Tenders	1	4.00	16	0.38
Demolition	Excavators	2	3.00	158	0.38

Demolition	Forklifts	1	7.00	89	0.20
Demolition	Off-Highway Trucks	2	4.00	402	0.38
Demolition	Rubber Tired Dozers	2	6.00	247	0.40
Demolition	Skid Steer Loaders	1	6.00	65	0.37
Demolition	Sweepers/Scrubbers	1	4.00	64	0.46
Demolition	Tractors/Loaders/Backhoes	2	5.00	97	0.37
Soils Abatement/Remove/Replace	Crawler Tractors	1	4.00	212	0.43
Soils Abatement/Remove/Replace	Dumpers/Tenders	2	6.00	16	0.38
Soils Abatement/Remove/Replace	Excavators	2	5.00	158	0.38
Soils Abatement/Remove/Replace	Off-Highway Trucks	3	4.00	402	0.38
Soils Abatement/Remove/Replace	Plate Compactors	2	5.00	8	0.43
Soils Abatement/Remove/Replace	Rubber Tired Loaders	2	5.00	203	0.36
Soils Abatement/Remove/Replace	Scrapers	2	4.00	367	0.48
Soils Abatement/Remove/Replace	Sweepers/Scrubbers	1	4.00	64	0.46
Soils Abatement/Remove/Replace	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Site Prep and Make Ready	Bore/Drill Rigs	2	7.00	221	0.50
Site Prep and Make Ready	Dumpers/Tenders	1	6.00	16	0.38
Site Prep and Make Ready	Excavators	1	4.00	158	0.38
Site Prep and Make Ready	Off-Highway Trucks	2	4.00	402	0.38
Site Prep and Make Ready	Plate Compactors	2	5.00	8	0.43
Site Prep and Make Ready	Rubber Tired Loaders	2	6.00	203	0.36
Site Prep and Make Ready	Scrapers	2	6.00	367	0.48
Site Prep and Make Ready	Sweepers/Scrubbers	1	4.00	64	0.46
Site Prep and Make Ready	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Bore/Drill Rigs	1	7.00	221	0.50
Parking Garage Underground	Excavators	2	7.00	158	0.38
Parking Garage Underground	Generator Sets	2	4.00	84	0.74

Parking Garage Underground	Plate Compactors	2	4.00	8	0.43
Parking Garage Underground	Rough Terrain Forklifts	2	2.00	100	0.40
Parking Garage Underground	Rubber Tired Loaders	1	2.00	203	0.36
Parking Garage Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Parking Garage Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Trenchers	2	4.00	78	0.50
Office Building Underground	Bore/Drill Rigs	2	4.00	221	0.50
Office Building Underground	Excavators	2	7.00	158	0.38
Office Building Underground	Generator Sets	2	4.00	84	0.74
Office Building Underground	Plate Compactors	2	4.00	8	0.43
Office Building Underground	Rough Terrain Forklifts	2	8.00	100	0.40
Office Building Underground	Rubber Tired Loaders	1	6.00	203	0.36
Office Building Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Office Building Underground	Trenchers	4	7.00	78	0.50
Parking Garage Core Construction	Aerial Lifts	1	7.00	63	0.31
Parking Garage Core Construction	Cement and Mortar Mixers	6	4.00	9	0.56
Parking Garage Core Construction	Cranes	1	7.00	231	0.29
Parking Garage Core Construction	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Core Construction	Plate Compactors	1	4.00	8	0.43
Parking Garage Core Construction	Pumps	1	6.00	84	0.74
Parking Garage Core Construction	Rough Terrain Forklifts	1	6.00	100	0.40
Parking Garage Core Construction	Welders	3	6.00	46	0.45
Office Building Core Construction	Aerial Lifts	4	7.00	63	0.31
Office Building Core Construction	Air Compressors	4	6.00	78	0.48
Office Building Core Construction	Cranes	2	7.00	231	0.29
Office Building Core Construction	Off-Highway Trucks	2	4.00	402	0.38

Office Building Core Construction	Rough Terrain Forklifts	2	6.00	100	0.40
Office Building Core Construction	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Core Construction	Welders	5	7.00	46	0.45
Parking Garage Exterior Improvements	Aerial Lifts	1	6.00	63	0.31
Parking Garage Exterior Improvements	Cranes	1	3.00	231	0.29
Parking Garage Exterior Improvements	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Exterior Improvements	Other General Industrial Equipment	1	4.00	88	0.34
Parking Garage Exterior Improvements	Pressure Washers	1	2.00	13	0.30
Parking Garage Exterior Improvements	Rough Terrain Forklifts	1	5.00	100	0.40
Parking Garage Exterior Improvements	Welders	2	5.00	46	0.45
Office Building Tenant Improvements	Aerial Lifts	1	7.00	63	0.31
Office Building Tenant Improvements	Air Compressors	1	7.00	78	0.48
Office Building Tenant Improvements	Off-Highway Trucks	2	4.00	402	0.38
Office Building Tenant Improvements	Rough Terrain Forklifts	1	7.00	100	0.40
Office Building Tenant Improvements	Sweepers/Scrubbers	1	6.00	64	0.46
Office Building Tenant Improvements	Welders	1	5.00	46	0.45
Landscaping and Site Improvements	Cement and Mortar Mixers	2	4.00	9	0.56
Landscaping and Site Improvements	Dumpers/Tenders	1	6.00	16	0.38
Landscaping and Site Improvements	Paving Equipment	2	7.00	132	0.36
Landscaping and Site Improvements	Plate Compactors	2	4.00	8	0.43
Landscaping and Site Improvements	Rollers	2	5.00	80	0.38
Landscaping and Site Improvements	Rough Terrain Forklifts	1	3.00	100	0.40
Landscaping and Site Improvements	Rubber Tired Dozers	2	4.00	247	0.40
Landscaping and Site Improvements	Skid Steer Loaders	1	6.00	65	0.37
Landscaping and Site Improvements	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Office Building Exterior Improvements	Aerial Lifts	3	6.00	63	0.31
Office Building Exterior Improvements	Off-Highway Trucks	2	4.00	402	0.38

Office Building Exterior Improvements	Other General Industrial Equipment	2	7.00	88	0.34
Office Building Exterior Improvements	Pressure Washers	1	4.00	13	0.30
Office Building Exterior Improvements	Rough Terrain Forklifts	3	7.00	100	0.40
Office Building Exterior Improvements	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Exterior Improvements	Welders	2	6.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	16	20.00	0.00	1,509.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Soils Abatement/Remove/Re	16	20.00	0.00	659.00	10.80	7.30	12.60	LD_Mix	HDT_Mix	HHDT
Site Prep and Make Ready	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Underground	15	6.00	3.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Underground	18	13.00	6.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Core Construction	15	46.00	21.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Core Construction	20	114.00	51.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Exterior Improvements	8	11.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Tenant Improvements	7	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Landscaping and Site Improvements	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Exterior Improvements	14	7.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6146	0.0000	1.6146	0.2445	0.0000	0.2445			0.0000			0.0000
Off-Road	4.2780	39.9671	28.3055	0.0546		2.0943	2.0943		1.9720	1.9720		5,249.6062	5,249.6062	1.2985		5,282.0685
Total	**4.2780**	**39.9671**	**28.3055**	**0.0546**	**1.6146**	**2.0943**	**3.7089**	**0.2445**	**1.9720**	**2.2165**		**5,249.6062**	**5,249.6062**	**1.2985**		**5,282.0685**

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	0.6358	22.9028	9.6605	0.0588	1.2446	0.0715	1.3161	0.3406	0.0684	0.4090		6,659.2546	6,659.2546	0.8242		6,679.8596
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	0.0326	0.4139	1.5400e-003	0.1643	9.9000e-004	0.1653	0.0436	9.1000e-004	0.0445		153.4238	153.4238	2.9700e-003		153.4979
Total	**0.6908**	**22.9354**	**10.0743**	**0.0603**	**1.4089**	**0.0725**	**1.4813**	**0.3842**	**0.0693**	**0.4535**		**6,812.6784**	**6,812.6784**	**0.8272**		**6,833.3575**

3.2 Demolition - 2020

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					0.7266	0.0000	0.7266	0.1100	0.0000	0.1100			0.0000			0.0000
Off-Road	0.6993	4.3864	30.8868	0.0546		0.0926	0.0926		0.0926	0.0926	0.0000	5,249.6062	5,249.6062	1.2985		5,282.0685
Total	**0.6993**	**4.3864**	**30.8868**	**0.0546**	**0.7266**	**0.0926**	**0.8191**	**0.1100**	**0.0926**	**0.2026**	**0.0000**	**5,249.6062**	**5,249.6062**	**1.2985**		**5,282.0685**

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	0.6358	22.9028	9.6605	0.0588	1.2446	0.0715	1.3161	0.3406	0.0684	0.4090		6,659.2546	6,659.2546	0.8242		6,679.8596
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	0.0326	0.4139	1.5400e-003	0.1643	9.9000e-004	0.1653	0.0436	9.1000e-004	0.0445		153.4238	153.4238	2.9700e-003		153.4979
Total	**0.6908**	**22.9354**	**10.0743**	**0.0603**	**1.4089**	**0.0725**	**1.4813**	**0.3842**	**0.0693**	**0.4535**		**6,812.6784**	**6,812.6784**	**0.8272**		**6,833.3575**

3.3 Soils Abatement/Remove/Replace - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0745	0.0000	0.0745	0.0113	0.0000	0.0113			0.0000			0.0000
Off-Road	3.5033	37.2418	23.8956	0.0585		1.5054	1.5054		1.3880	1.3880		5,629.9145	5,629.9145	1.7916		5,674.7048
Total	**3.5033**	**37.2418**	**23.8956**	**0.0585**	**0.0745**	**1.5054**	**1.5798**	**0.0113**	**1.3880**	**1.3993**		**5,629.9145**	**5,629.9145**	**1.7916**		**5,674.7048**

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	0.2026	7.6025	3.0443	0.0178	0.3607	0.0214	0.3821	0.0987	0.0205	0.1192		2,016.1860	2,016.1860	0.2479		2,022.3838
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	0.0326	0.4139	1.5400e-003	0.1643	9.9000e-004	0.1653	0.0436	9.1000e-004	0.0445		153.4238	153.4238	2.9700e-003		153.4979
Total	**0.2575**	**7.6350**	**3.4582**	**0.0194**	**0.5250**	**0.0224**	**0.5474**	**0.1423**	**0.0214**	**0.1637**		**2,169.6098**	**2,169.6098**	**0.2509**		**2,175.8817**

3.3 Soils Abatement/Remove/Replace - 2020

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					0.0335	0.0000	0.0335	5.0800e-003	0.0000	5.0800e-003			0.0000			0.0000
Off-Road	0.8732	4.6770	29.2932	0.0585		0.1317	0.1317		0.1317	0.1317	0.0000	5,629.9145	5,629.9145	1.7916		5,674.7048
Total	**0.8732**	**4.6770**	**29.2932**	**0.0585**	**0.0335**	**0.1317**	**0.1652**	**5.0800e-003**	**0.1317**	**0.1368**	**0.0000**	**5,629.9145**	**5,629.9145**	**1.7916**		**5,674.7048**

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	0.2026	7.6025	3.0443	0.0178	0.3607	0.0214	0.3821	0.0987	0.0205	0.1192		2,016.1860	2,016.1860	0.2479		2,022.3838
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	0.0326	0.4139	1.5400e-003	0.1643	9.9000e-004	0.1653	0.0436	9.1000e-004	0.0445		153.4238	153.4238	2.9700e-003		153.4979
Total	**0.2575**	**7.6350**	**3.4582**	**0.0194**	**0.5250**	**0.0224**	**0.5474**	**0.1423**	**0.0214**	**0.1637**		**2,169.6098**	**2,169.6098**	**0.2509**		**2,175.8817**

3.4 Site Prep and Make Ready - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	3.8762	42.9197	27.5908	0.0714		1.6922	1.6922		1.5588	1.5588		6,892.1512	6,892.1512	2.2097		6,947.3943
Total	**3.8762**	**42.9197**	**27.5908**	**0.0714**	**1.5908**	**1.6922**	**3.2829**	**0.1718**	**1.5588**	**1.7306**		**6,892.1512**	**6,892.1512**	**2.2097**		**6,947.3943**

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	0.0522	0.0310	0.3932	1.4600e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		145.7526	145.7526	2.8200e-003		145.8230
Total	**0.0522**	**0.0310**	**0.3932**	**1.4600e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**145.7526**	**145.7526**	**2.8200e-003**		**145.8230**

3.4 Site Prep and Make Ready - 2020

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					0.7158	0.0000	0.7158	0.0773	0.0000	0.0773			0.0000			0.0000
Off-Road	0.9870	5.0603	34.8207	0.0714		0.1410	0.1410		0.1410	0.1410	0.0000	6,892.1512	6,892.1512	2.2097		6,947.3943
Total	**0.9870**	**5.0603**	**34.8207**	**0.0714**	**0.7158**	**0.1410**	**0.8568**	**0.0773**	**0.1410**	**0.2183**	**0.0000**	**6,892.1512**	**6,892.1512**	**2.2097**		**6,947.3943**

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	0.0522	0.0310	0.3932	1.4600e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		145.7526	145.7526	2.8200e-003		145.8230
Total	**0.0522**	**0.0310**	**0.3932**	**1.4600e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**145.7526**	**145.7526**	**2.8200e-003**		**145.8230**

3.4 Site Prep and Make Ready - 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					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	3.5814	38.0146	26.5918	0.0715		1.4921	1.4921		1.3748	1.3748		6,897.6776	6,897.6776	2.2115		6,952.9653
Total	**3.5814**	**38.0146**	**26.5918**	**0.0715**	**1.5908**	**1.4921**	**3.0829**	**0.1718**	**1.3748**	**1.5465**		**6,897.6776**	**6,897.6776**	**2.2115**		**6,952.9653**

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	0.0487	0.0278	0.3641	1.4100e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		140.5564	140.5564	2.5300e-003		140.6197
Total	**0.0487**	**0.0278**	**0.3641**	**1.4100e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**140.5564**	**140.5564**	**2.5300e-003**		**140.6197**

3.4 Site Prep and Make Ready - 2021

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					0.7158	0.0000	0.7158	0.0773	0.0000	0.0773			0.0000			0.0000
Off-Road	0.9870	5.0601	34.8207	0.0715		0.1408	0.1408		0.1408	0.1408	0.0000	6,897.6776	6,897.6776	2.2115		6,952.9653
Total	**0.9870**	**5.0601**	**34.8207**	**0.0715**	**0.7158**	**0.1408**	**0.8567**	**0.0773**	**0.1408**	**0.2181**	**0.0000**	**6,897.6776**	**6,897.6776**	**2.2115**		**6,952.9653**

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	0.0487	0.0278	0.3641	1.4100e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		140.5564	140.5564	2.5300e-003		140.6197
Total	**0.0487**	**0.0278**	**0.3641**	**1.4100e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**140.5564**	**140.5564**	**2.5300e-003**		**140.6197**

3.5 Parking Garage Underground - 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	1.9495	18.9873	19.9545	0.0369		1.0022	1.0022		0.9362	0.9362		3,550.4565	3,550.4565	0.9710		3,574.7318
Total	**1.9495**	**18.9873**	**19.9545**	**0.0369**		**1.0022**	**1.0022**		**0.9362**	**0.9362**		**3,550.4565**	**3,550.4565**	**0.9710**		**3,574.7318**

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	9.3600e-003	0.3081	0.1287	7.9000e-004	0.0203	7.0000e-004	0.0210	5.8300e-003	6.7000e-004	6.5000e-003		87.1803	87.1803	7.4100e-003		87.3655
Worker	0.0154	8.7700e-003	0.1150	4.4000e-004	0.0493	2.9000e-004	0.0496	0.0131	2.6000e-004	0.0133		44.3862	44.3862	8.0000e-004		44.4062
Total	**0.0247**	**0.3169**	**0.2437**	**1.2300e-003**	**0.0695**	**9.9000e-004**	**0.0705**	**0.0189**	**9.3000e-004**	**0.0198**		**131.5665**	**131.5665**	**8.2100e-003**		**131.7717**

3.5 Parking Garage Underground - 2021

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	0.4893	2.7741	23.9077	0.0369		0.0676	0.0676		0.0676	0.0676	0.0000	3,550.4565	3,550.4565	0.9710		3,574.7318
Total	**0.4893**	**2.7741**	**23.9077**	**0.0369**		**0.0676**	**0.0676**		**0.0676**	**0.0676**	**0.0000**	**3,550.4565**	**3,550.4565**	**0.9710**		**3,574.7318**

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	9.3600e-003	0.3081	0.1287	7.9000e-004	0.0203	7.0000e-004	0.0210	5.8300e-003	6.7000e-004	6.5000e-003		87.1803	87.1803	7.4100e-003		87.3655
Worker	0.0154	8.7700e-003	0.1150	4.4000e-004	0.0493	2.9000e-004	0.0496	0.0131	2.6000e-004	0.0133		44.3862	44.3862	8.0000e-004		44.4062
Total	**0.0247**	**0.3169**	**0.2437**	**1.2300e-003**	**0.0695**	**9.9000e-004**	**0.0705**	**0.0189**	**9.3000e-004**	**0.0198**		**131.5665**	**131.5665**	**8.2100e-003**		**131.7717**

3.6 Office Building Underground - 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	3.2943	32.4956	30.9701	0.0549		1.8093	1.8093		1.6788	1.6788		5,285.0376	5,285.0376	1.5320		5,323.3378
Total	**3.2943**	**32.4956**	**30.9701**	**0.0549**		**1.8093**	**1.8093**		**1.6788**	**1.6788**		**5,285.0376**	**5,285.0376**	**1.5320**		**5,323.3378**

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	0.0187	0.6162	0.2574	1.5800e-003	0.0405	1.4000e-003	0.0419	0.0117	1.3400e-003	0.0130		174.3605	174.3605	0.0148		174.7309
Worker	0.0333	0.0190	0.2491	9.6000e-004	0.1068	6.2000e-004	0.1074	0.0283	5.7000e-004	0.0289		96.1702	96.1702	1.7300e-003		96.2135
Total	**0.0521**	**0.6352**	**0.5065**	**2.5400e-003**	**0.1473**	**2.0200e-003**	**0.1493**	**0.0400**	**1.9100e-003**	**0.0419**		**270.5307**	**270.5307**	**0.0166**		**270.9444**

3.6 Office Building Underground - 2021

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	0.7092	3.7272	36.1394	0.0549		0.0969	0.0969		0.0969	0.0969	0.0000	5,285.0376	5,285.0376	1.5320		5,323.3378
Total	**0.7092**	**3.7272**	**36.1394**	**0.0549**		**0.0969**	**0.0969**		**0.0969**	**0.0969**	**0.0000**	**5,285.0376**	**5,285.0376**	**1.5320**		**5,323.3378**

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	0.0187	0.6162	0.2574	1.5800e-003	0.0405	1.4000e-003	0.0419	0.0117	1.3400e-003	0.0130		174.3605	174.3605	0.0148		174.7309
Worker	0.0333	0.0190	0.2491	9.6000e-004	0.1068	6.2000e-004	0.1074	0.0283	5.7000e-004	0.0289		96.1702	96.1702	1.7300e-003		96.2135
Total	**0.0521**	**0.6352**	**0.5065**	**2.5400e-003**	**0.1473**	**2.0200e-003**	**0.1493**	**0.0400**	**1.9100e-003**	**0.0419**		**270.5307**	**270.5307**	**0.0166**		**270.9444**

3.7 Parking Garage Core 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	1.9521	15.6423	13.9182	0.0288		0.6735	0.6735		0.6474	0.6474		2,623.6675	2,623.6675	0.5957		2,638.5588
Total	**1.9521**	**15.6423**	**13.9182**	**0.0288**		**0.6735**	**0.6735**		**0.6474**	**0.6474**		**2,623.6675**	**2,623.6675**	**0.5957**		**2,638.5588**

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	0.0655	2.1567	0.9009	5.5400e-003	0.1417	4.9100e-003	0.1467	0.0408	4.6900e-003	0.0455		610.2618	610.2618	0.0519		611.5581
Worker	0.1179	0.0673	0.8815	3.4100e-003	0.3779	2.2000e-003	0.3801	0.1002	2.0300e-003	0.1023		340.2944	340.2944	6.1400e-003		340.4478
Total	**0.1835**	**2.2240**	**1.7824**	**8.9500e-003**	**0.5196**	**7.1100e-003**	**0.5267**	**0.1410**	**6.7200e-003**	**0.1477**		**950.5562**	**950.5562**	**0.0580**		**952.0059**

3.7 Parking Garage Core Construction - 2021

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	0.5550	5.2854	15.7514	0.0288		0.0867	0.0867		0.0867	0.0867	0.0000	2,623.6675	2,623.6675	0.5957		2,638.5588
Total	**0.5550**	**5.2854**	**15.7514**	**0.0288**		**0.0867**	**0.0867**		**0.0867**	**0.0867**	**0.0000**	**2,623.6675**	**2,623.6675**	**0.5957**		**2,638.5588**

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	0.0655	2.1567	0.9009	5.5400e-003	0.1417	4.9100e-003	0.1467	0.0408	4.6900e-003	0.0455		610.2618	610.2618	0.0519		611.5581
Worker	0.1179	0.0673	0.8815	3.4100e-003	0.3779	2.2000e-003	0.3801	0.1002	2.0300e-003	0.1023		340.2944	340.2944	6.1400e-003		340.4478
Total	**0.1835**	**2.2240**	**1.7824**	**8.9500e-003**	**0.5196**	**7.1100e-003**	**0.5267**	**0.1410**	**6.7200e-003**	**0.1477**		**950.5562**	**950.5562**	**0.0580**		**952.0059**

3.8 Office Building Core 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	3.9585	32.0076	30.1103	0.0587		1.4477	1.4477		1.3879	1.3879		5,482.7347	5,482.7347	1.3110		5,515.5098
Total	**3.9585**	**32.0076**	**30.1103**	**0.0587**		**1.4477**	**1.4477**		**1.3879**	**1.3879**		**5,482.7347**	**5,482.7347**	**1.3110**		**5,515.5098**

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	0.1591	5.2377	2.1880	0.0135	0.3442	0.0119	0.3562	0.0991	0.0114	0.1105		1,482.0644	1,482.0644	0.1259		1,485.2126
Worker	0.2923	0.1667	2.1846	8.4500e-003	0.9365	5.4600e-003	0.9420	0.2484	5.0300e-003	0.2534		843.3383	843.3383	0.0152		843.7184
Total	**0.4514**	**5.4044**	**4.3726**	**0.0219**	**1.2807**	**0.0174**	**1.2981**	**0.3475**	**0.0164**	**0.3639**		**2,325.4027**	**2,325.4027**	**0.1411**		**2,328.9311**

3.8 Office Building Core Construction - 2021

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	0.8356	10.4353	33.6911	0.0587		0.0869	0.0869		0.0869	0.0869	0.0000	5,482.7347	5,482.7347	1.3110		5,515.5098
Total	**0.8356**	**10.4353**	**33.6911**	**0.0587**		**0.0869**	**0.0869**		**0.0869**	**0.0869**	**0.0000**	**5,482.7347**	**5,482.7347**	**1.3110**		**5,515.5098**

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	0.1591	5.2377	2.1880	0.0135	0.3442	0.0119	0.3562	0.0991	0.0114	0.1105		1,482.0644	1,482.0644	0.1259		1,485.2126
Worker	0.2923	0.1667	2.1846	8.4500e-003	0.9365	5.4600e-003	0.9420	0.2484	5.0300e-003	0.2534		843.3383	843.3383	0.0152		843.7184
Total	**0.4514**	**5.4044**	**4.3726**	**0.0219**	**1.2807**	**0.0174**	**1.2981**	**0.3475**	**0.0164**	**0.3639**		**2,325.4027**	**2,325.4027**	**0.1411**		**2,328.9311**

3.8 Office Building Core 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	3.6007	28.4532	29.5639	0.0587		1.2305	1.2305		1.1805	1.1805		5,483.3351	5,483.3351	1.2977		5,515.7764
Total	**3.6007**	**28.4532**	**29.5639**	**0.0587**		**1.2305**	**1.2305**		**1.1805**	**1.1805**		**5,483.3351**	**5,483.3351**	**1.2977**		**5,515.7764**

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	0.1496	4.9283	2.1887	0.0132	0.3443	0.0105	0.3548	0.0991	0.0100	0.1091		1,462.9764	1,462.9764	0.1252		1,466.1061
Worker	0.2753	0.1505	2.0379	8.1400e-003	0.9365	5.3500e-003	0.9418	0.2484	4.9300e-003	0.2533		812.4213	812.4213	0.0137		812.7648
Total	**0.4249**	**5.0787**	**4.2266**	**0.0214**	**1.2808**	**0.0159**	**1.2966**	**0.3475**	**0.0150**	**0.3624**		**2,275.3977**	**2,275.3977**	**0.1389**		**2,278.8709**

3.8 Office Building Core Construction - 2022

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	0.8356	10.4353	33.6911	0.0587		0.0869	0.0869		0.0869	0.0869	0.0000	5,483.3350	5,483.3350	1.2977		5,515.7764
Total	**0.8356**	**10.4353**	**33.6911**	**0.0587**		**0.0869**	**0.0869**		**0.0869**	**0.0869**	**0.0000**	**5,483.3350**	**5,483.3350**	**1.2977**		**5,515.7764**

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	0.1496	4.9283	2.1887	0.0132	0.3443	0.0105	0.3548	0.0991	0.0100	0.1091		1,462.9764	1,462.9764	0.1252		1,466.1061
Worker	0.2753	0.1505	2.0379	8.1400e-003	0.9365	5.3500e-003	0.9418	0.2484	4.9300e-003	0.2533		812.4213	812.4213	0.0137		812.7648
Total	**0.4249**	**5.0787**	**4.2266**	**0.0214**	**1.2808**	**0.0159**	**1.2966**	**0.3475**	**0.0150**	**0.3624**		**2,275.3977**	**2,275.3977**	**0.1389**		**2,278.8709**

3.9 Parking Garage Exterior Improvements - 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					
Archit. Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.0586	8.8517	7.9963	0.0168		0.3816	0.3816		0.3588	0.3588		1,572.4880	1,572.4880	0.4563		1,583.8951
Total	**1.0586**	**8.8517**	**7.9963**	**0.0168**		**0.3816**	**0.3816**		**0.3588**	**0.3588**		**1,572.4880**	**1,572.4880**	**0.4563**		**1,583.8951**

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	0.0161	0.2108	8.2000e-004	0.0904	5.3000e-004	0.0909	0.0240	4.9000e-004	0.0245		81.3748	81.3748	1.4700e-003		81.4114
Total	**0.0282**	**0.0161**	**0.2108**	**8.2000e-004**	**0.0904**	**5.3000e-004**	**0.0909**	**0.0240**	**4.9000e-004**	**0.0245**		**81.3748**	**81.3748**	**1.4700e-003**		**81.4114**

3.9 Parking Garage Exterior Improvements - 2021

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	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2464	2.6879	9.4337	0.0168		0.0291	0.0291		0.0291	0.0291	0.0000	1,572.4880	1,572.4880	0.4563		1,583.8951
Total	**0.2464**	**2.6879**	**9.4337**	**0.0168**		**0.0291**	**0.0291**		**0.0291**	**0.0291**	**0.0000**	**1,572.4880**	**1,572.4880**	**0.4563**		**1,583.8951**

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	0.0161	0.2108	8.2000e-004	0.0904	5.3000e-004	0.0909	0.0240	4.9000e-004	0.0245		81.3748	81.3748	1.4700e-003		81.4114
Total	**0.0282**	**0.0161**	**0.2108**	**8.2000e-004**	**0.0904**	**5.3000e-004**	**0.0909**	**0.0240**	**4.9000e-004**	**0.0245**		**81.3748**	**81.3748**	**1.4700e-003**		**81.4114**

3.10 Office Building Tenant Improvements - 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					
Archit. Coating	11.2772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.3625	11.4669	11.2270	0.0247		0.5273	0.5273		0.4976	0.4976		2,355.5254	2,355.5254	0.6531		2,371.8531
Total	**12.6396**	**11.4669**	**11.2270**	**0.0247**		**0.5273**	**0.5273**		**0.4976**	**0.4976**		**2,355.5254**	**2,355.5254**	**0.6531**		**2,371.8531**

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	0.0487	0.0278	0.3641	1.4100e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		140.5564	140.5564	2.5300e-003		140.6197
Total	**0.0487**	**0.0278**	**0.3641**	**1.4100e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**140.5564**	**140.5564**	**2.5300e-003**		**140.6197**

3.10 Office Building Tenant Improvements - 2021

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	11.2772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3436	3.5316	13.8407	0.0247		0.0385	0.0385		0.0385	0.0385	0.0000	2,355.5254	2,355.5254	0.6531		2,371.8531
Total	**11.6208**	**3.5316**	**13.8407**	**0.0247**		**0.0385**	**0.0385**		**0.0385**	**0.0385**	**0.0000**	**2,355.5254**	**2,355.5254**	**0.6531**		**2,371.8531**

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	0.0487	0.0278	0.3641	1.4100e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		140.5564	140.5564	2.5300e-003		140.6197
Total	**0.0487**	**0.0278**	**0.3641**	**1.4100e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**140.5564**	**140.5564**	**2.5300e-003**		**140.6197**

3.10 Office Building Tenant Improvements - 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	11.2772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.2145	9.7089	10.9318	0.0247		0.4259	0.4259		0.4026	0.4026		2,355.9748	2,355.9748	0.6507		2,372.2430
Total	**12.4916**	**9.7089**	**10.9318**	**0.0247**		**0.4259**	**0.4259**		**0.4026**	**0.4026**		**2,355.9748**	**2,355.9748**	**0.6507**		**2,372.2430**

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	0.0459	0.0251	0.3397	1.3600e-003	0.1561	8.9000e-004	0.1570	0.0414	8.2000e-004	0.0422		135.4035	135.4035	2.2900e-003		135.4608
Total	**0.0459**	**0.0251**	**0.3397**	**1.3600e-003**	**0.1561**	**8.9000e-004**	**0.1570**	**0.0414**	**8.2000e-004**	**0.0422**		**135.4035**	**135.4035**	**2.2900e-003**		**135.4608**

3.10 Office Building Tenant Improvements - 2022

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	11.2772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3436	3.5316	13.8407	0.0247		0.0385	0.0385		0.0385	0.0385	0.0000	2,355.9748	2,355.9748	0.6507		2,372.2430
Total	**11.6208**	**3.5316**	**13.8407**	**0.0247**		**0.0385**	**0.0385**		**0.0385**	**0.0385**	**0.0000**	**2,355.9748**	**2,355.9748**	**0.6507**		**2,372.2430**

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	0.0459	0.0251	0.3397	1.3600e-003	0.1561	8.9000e-004	0.1570	0.0414	8.2000e-004	0.0422		135.4035	135.4035	2.2900e-003		135.4608
Total	**0.0459**	**0.0251**	**0.3397**	**1.3600e-003**	**0.1561**	**8.9000e-004**	**0.1570**	**0.0414**	**8.2000e-004**	**0.0422**		**135.4035**	**135.4035**	**2.2900e-003**		**135.4608**

3.11 Landscaping and Site Improvements - 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	2.0634	20.9931	15.7057	0.0267		1.0502	1.0502		0.9692	0.9692		2,542.1741	2,542.1741	0.7937		2,562.0153
Paving	0.0635					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.1268**	**20.9931**	**15.7057**	**0.0267**		**1.0502**	**1.0502**		**0.9692**	**0.9692**		**2,542.1741**	**2,542.1741**	**0.7937**		**2,562.0153**

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	0.0487	0.0278	0.3641	1.4100e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		140.5564	140.5564	2.5300e-003		140.6197
Total	**0.0487**	**0.0278**	**0.3641**	**1.4100e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**140.5564**	**140.5564**	**2.5300e-003**		**140.6197**

3.11 Landscaping and Site Improvements - 2021

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	0.4787	3.0817	16.9450	0.0267		0.0780	0.0780		0.0780	0.0780	0.0000	2,542.1741	2,542.1741	0.7937		2,562.0153
Paving	0.0635					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5422**	**3.0817**	**16.9450**	**0.0267**		**0.0780**	**0.0780**		**0.0780**	**0.0780**	**0.0000**	**2,542.1741**	**2,542.1741**	**0.7937**		**2,562.0153**

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	0.0487	0.0278	0.3641	1.4100e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		140.5564	140.5564	2.5300e-003		140.6197
Total	**0.0487**	**0.0278**	**0.3641**	**1.4100e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**140.5564**	**140.5564**	**2.5300e-003**		**140.6197**

3.11 Landscaping and Site Improvements - 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	1.7697	17.8870	15.2064	0.0267		0.8625	0.8625		0.7965	0.7965		2,542.3761	2,542.3761	0.7937		2,562.2190
Paving	0.0635					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.8332**	**17.8870**	**15.2064**	**0.0267**		**0.8625**	**0.8625**		**0.7965**	**0.7965**		**2,542.3761**	**2,542.3761**	**0.7937**		**2,562.2190**

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	0.0459	0.0251	0.3397	1.3600e-003	0.1561	8.9000e-004	0.1570	0.0414	8.2000e-004	0.0422		135.4035	135.4035	2.2900e-003		135.4608
Total	**0.0459**	**0.0251**	**0.3397**	**1.3600e-003**	**0.1561**	**8.9000e-004**	**0.1570**	**0.0414**	**8.2000e-004**	**0.0422**		**135.4035**	**135.4035**	**2.2900e-003**		**135.4608**

3.11 Landscaping and Site Improvements - 2022

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	0.4787	3.0816	16.9451	0.0267		0.0779	0.0779		0.0779	0.0779	0.0000	2,542.3761	2,542.3761	0.7937		2,562.2190
Paving	0.0635					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5422**	**3.0816**	**16.9451**	**0.0267**		**0.0779**	**0.0779**		**0.0779**	**0.0779**	**0.0000**	**2,542.3761**	**2,542.3761**	**0.7937**		**2,562.2190**

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	0.0459	0.0251	0.3397	1.3600e-003	0.1561	8.9000e-004	0.1570	0.0414	8.2000e-004	0.0422		135.4035	135.4035	2.2900e-003		135.4608
Total	**0.0459**	**0.0251**	**0.3397**	**1.3600e-003**	**0.1561**	**8.9000e-004**	**0.1570**	**0.0414**	**8.2000e-004**	**0.0422**		**135.4035**	**135.4035**	**2.2900e-003**		**135.4608**

3.12 Office Building Exterior Improvements - 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					
Archit. Coating	18.2494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.9765	17.7248	19.2174	0.0359		0.8128	0.8128		0.7573	0.7573		3,408.4436	3,408.4436	1.0379		3,434.3903
Total	**20.2259**	**17.7248**	**19.2174**	**0.0359**		**0.8128**	**0.8128**		**0.7573**	**0.7573**		**3,408.4436**	**3,408.4436**	**1.0379**		**3,434.3903**

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	0.0180	0.0102	0.1341	5.2000e-004	0.0575	3.4000e-004	0.0578	0.0153	3.1000e-004	0.0156		51.7839	51.7839	9.3000e-004		51.8073
Total	**0.0180**	**0.0102**	**0.1341**	**5.2000e-004**	**0.0575**	**3.4000e-004**	**0.0578**	**0.0153**	**3.1000e-004**	**0.0156**		**51.7839**	**51.7839**	**9.3000e-004**		**51.8073**

3.12 Office Building Exterior Improvements - 2021

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	18.2494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.5399	5.9157	22.3910	0.0359		0.0633	0.0633		0.0633	0.0633	0.0000	3,408.4436	3,408.4436	1.0379		3,434.3903
Total	**18.7892**	**5.9157**	**22.3910**	**0.0359**		**0.0633**	**0.0633**		**0.0633**	**0.0633**	**0.0000**	**3,408.4436**	**3,408.4436**	**1.0379**		**3,434.3903**

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	0.0180	0.0102	0.1341	5.2000e-004	0.0575	3.4000e-004	0.0578	0.0153	3.1000e-004	0.0156		51.7839	51.7839	9.3000e-004		51.8073
Total	**0.0180**	**0.0102**	**0.1341**	**5.2000e-004**	**0.0575**	**3.4000e-004**	**0.0578**	**0.0153**	**3.1000e-004**	**0.0156**		**51.7839**	**51.7839**	**9.3000e-004**		**51.8073**

3.12 Office Building Exterior Improvements - 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	18.2494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.7493	15.3617	18.8380	0.0359		0.6514	0.6514		0.6075	0.6075		3,408.8670	3,408.8670	1.0347		3,434.7342
Total	**19.9987**	**15.3617**	**18.8380**	**0.0359**		**0.6514**	**0.6514**		**0.6075**	**0.6075**		**3,408.8670**	**3,408.8670**	**1.0347**		**3,434.7342**

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	0.0169	9.2400e-003	0.1251	5.0000e-004	0.0575	3.3000e-004	0.0578	0.0153	3.0000e-004	0.0156		49.8855	49.8855	8.4000e-004		49.9066
Total	**0.0169**	**9.2400e-003**	**0.1251**	**5.0000e-004**	**0.0575**	**3.3000e-004**	**0.0578**	**0.0153**	**3.0000e-004**	**0.0156**		**49.8855**	**49.8855**	**8.4000e-004**		**49.9066**

3.12 Office Building Exterior Improvements - 2022

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	18.2494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.5396	5.9139	22.3905	0.0359		0.0631	0.0631		0.0631	0.0631	0.0000	3,408.8670	3,408.8670	1.0347		3,434.7342
Total	**18.7889**	**5.9139**	**22.3905**	**0.0359**		**0.0631**	**0.0631**		**0.0631**	**0.0631**	**0.0000**	**3,408.8670**	**3,408.8670**	**1.0347**		**3,434.7342**

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	0.0169	9.2400e-003	0.1251	5.0000e-004	0.0575	3.3000e-004	0.0578	0.0153	3.0000e-004	0.0156		49.8855	49.8855	8.4000e-004		49.9066
Total	**0.0169**	**9.2400e-003**	**0.1251**	**5.0000e-004**	**0.0575**	**3.3000e-004**	**0.0578**	**0.0153**	**3.0000e-004**	**0.0156**		**49.8855**	**49.8855**	**8.4000e-004**		**49.9066**

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	0.9572	2.6440	10.6870	0.0396	3.7308	0.0313	3.7621	0.9990	0.0292	1.0283		3,999.4629	3,999.4629	0.1357		4,002.8561
Unmitigated	0.9572	2.6440	10.6870	0.0396	3.7308	0.0313	3.7621	0.9990	0.0292	1.0283		3,999.4629	3,999.4629	0.1357		4,002.8561

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
Office Park	476.59	69.18	30.75	981,509	981,509
Office Park	158.10	22.95	10.20	325,599	325,599
Parking Lot	0.00	0.00	0.00		
Total	634.69	92.13	40.95	1,307,108	1,307,108

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.476244	0.050164	0.262181	0.139658	0.017521	0.006864	0.023236	0.006525	0.004137	0.003158	0.009064	0.000471	0.000777
Office Park	0.476244	0.050164	0.262181	0.139658	0.017521	0.006864	0.023236	0.006525	0.004137	0.003158	0.009064	0.000471	0.000777
Parking Lot	0.476244	0.050164	0.262181	0.139658	0.017521	0.006864	0.023236	0.006525	0.004137	0.003158	0.009064	0.000471	0.000777

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	0.1876	1.7057	1.4328	0.0102		0.1296	0.1296		0.1296	0.1296		2,046.8421	2,046.8421	0.0392	0.0375	2,059.0054
NaturalGas Unmitigated	0.1876	1.7057	1.4328	0.0102		0.1296	0.1296		0.1296	0.1296		2,046.8421	2,046.8421	0.0392	0.0375	2,059.0054

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					
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
Office Park	13064.3	0.1409	1.2808	1.0759	7.6800e-003		0.0973	0.0973		0.0973	0.0973		1,536.9791	1,536.9791	0.0295	0.0282	1,546.1126
Office Park	4333.84	0.0467	0.4249	0.3569	2.5500e-003		0.0323	0.0323		0.0323	0.0323		509.8630	509.8630	9.7700e-003	9.3500e-003	512.8929
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1876**	**1.7057**	**1.4328**	**0.0102**		**0.1296**	**0.1296**		**0.1296**	**0.1296**		**2,046.8421**	**2,046.8421**	**0.0392**	**0.0375**	**2,059.0054**

5.2 Energy by Land Use - NaturalGas

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					
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
Office Park	13.0643	0.1409	1.2808	1.0759	7.6800e-003		0.0973	0.0973		0.0973	0.0973		1,536.9791	1,536.9791	0.0295	0.0282	1,546.1126
Office Park	4.33384	0.0467	0.4249	0.3569	2.5500e-003		0.0323	0.0323		0.0323	0.0323		509.8630	509.8630	9.7700e-003	9.3500e-003	512.8929
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1876**	**1.7057**	**1.4328**	**0.0102**		**0.1296**	**0.1296**		**0.1296**	**0.1296**		**2,046.8421**	**2,046.8421**	**0.0392**	**0.0375**	**2,059.0054**

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	8.3954	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156
Unmitigated	8.3954	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156

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	1.0016					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.3850					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	8.7900e-003	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156
Total	**8.3954**	**8.6000e-004**	**0.0945**	**1.0000e-005**		**3.4000e-004**	**3.4000e-004**		**3.4000e-004**	**3.4000e-004**		**0.2023**	**0.2023**	**5.3000e-004**		**0.2156**

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	1.0016					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.3850					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	8.7900e-003	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156
Total	**8.3954**	**8.6000e-004**	**0.0945**	**1.0000e-005**		**3.4000e-004**	**3.4000e-004**		**3.4000e-004**	**3.4000e-004**		**0.2023**	**0.2023**	**5.3000e-004**		**0.2156**

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
Cranes	1	8.00	2	231	0.29	Diesel
Forklifts	1	8.00	365	89	0.20	Diesel
Generator Sets	4	0.30	52	84	0.74	Diesel
Pressure Washers	1	16.00	1	13	0.30	Diesel

UnMitigated/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
Equipment Type	lb/day										lb/day					
Cranes	0.3730	4.1843	1.8923	5.7700e-003		0.1737	0.1737		0.1598	0.1598		558.8304	558.8304	0.1807		563.3488
Forklifts	0.1136	1.0549	1.1538	1.5300e-003		0.0699	0.0699		0.0643	0.0643		148.0308	148.0308	0.0479		149.2277
Generator Sets	0.0495	0.4392	0.5514	9.9000e-004		0.0220	0.0220		0.0220	0.0220		93.4552	93.4552	4.4400e-003		93.5662
Pressure Washers	0.0861	0.6039	0.4841	1.1000e-003		0.0266	0.0266		0.0266	0.0266		78.1800	78.1800	7.7000e-003		78.3726
Total	**0.6222**	**6.2823**	**4.0816**	**9.3900e-003**		**0.2922**	**0.2922**		**0.2727**	**0.2727**		**878.4964**	**878.4964**	**0.2408**		**884.5153**

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

Attachment G

PROJECT PHASE 2 WINTER EMISSION REPORT

PREPARED BY SWCA ENVIRONMENTAL CONSULTANTS, INC.

Haskins Way Rezone Phase II

San Mateo County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	256.23	1000sqft	1.47	256,232.00	0
Office Park	85.00	1000sqft	0.39	85,000.00	0
Enclosed Parking with Elevator	340.00	Space	0.61	136,000.00	0
Parking Lot	243.00	Space	3.15	97,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	70
Climate Zone	5			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - See Appendix F of the Environmental Impact Report

Construction Phase - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

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Off-road Equipment - See Appendix F of the Environmental Impact Report

Off-road Equipment - See Appendix F of the Environmental Impact Report

Trips and VMT - See Appendix F of the Environmental Impact Report

Demolition -

Grading - See Appendix F of the Environmental Impact Report

Architectural Coating - See Appendix F of the Environmental Impact Report

Vehicle Trips - See Appendix F of the Environmental Impact Report

Land Use Change -

Sequestration - See Appendix F of the Environmental Impact Report

Construction Off-road Equipment Mitigation - See Appendix F of the Environmental Impact Report

Operational Off-Road Equipment - See Appendix F of the Environmental Impact Report

Stationary Sources - Emergency Generators and Fire Pumps -

Table Name	Column Name	Default Value	New Value
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tblArchitecturalCoating	ConstArea_Parking	13,992.00	0.00
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tblVehicleTrips	CW_TTP	33.00	71.00

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tblVehicleTrips	WD_TR	11.42	1.86

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					
2020	8.7618	108.6515	66.0673	0.1916	3.6229	3.6972	7.3201	0.7823	3.4533	4.2355	0.0000	19,736.3739	19,736.3739	4.1777	0.0000	19,840.8175
2021	39.5738	90.5032	81.5761	0.1702	1.9637	4.3077	6.2713	0.5124	3.9936	4.2656	0.0000	16,349.0611	16,349.0611	4.7421	0.0000	16,447.6718
2022	38.5127	76.6642	79.6407	0.1696	1.6504	3.1888	4.8392	0.4455	3.0046	3.4501	0.0000	16,291.6786	16,291.6786	3.9226	0.0000	16,389.7431
Maximum	**39.5738**	**108.6515**	**81.5761**	**0.1916**	**3.6229**	**4.3077**	**7.3201**	**0.7823**	**3.9936**	**4.2656**	**0.0000**	**19,736.3739**	**19,736.3739**	**4.7421**	**0.0000**	**19,840.8175**

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					
2020	2.5531	40.5060	74.0462	0.1916	2.6939	0.3218	3.0158	0.6416	0.3175	0.9591	0.0000	19,736.3739	19,736.3739	4.1777	0.0000	19,840.8175
2021	32.4108	28.5618	95.9896	0.1702	1.8907	0.3093	2.1193	0.5124	0.3091	0.7396	0.0000	16,349.0611	16,349.0611	4.7421	0.0000	16,447.6717
2022	32.3760	28.2158	91.9680	0.1696	1.6504	0.2848	1.9352	0.4455	0.2837	0.7293	0.0000	16,291.6786	16,291.6786	3.9226	0.0000	16,389.7431
Maximum	**32.4108**	**40.5060**	**95.9896**	**0.1916**	**2.6939**	**0.3218**	**3.0158**	**0.6416**	**0.3175**	**0.9591**	**0.0000**	**19,736.3739**	**19,736.3739**	**4.7421**	**0.0000**	**19,840.8175**

	ROG	NOx	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	**22.46**	**64.73**	**-15.28**	**0.00**	**13.84**	**91.82**	**61.64**	**8.08**	**91.29**	**79.68**	**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	8.3954	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156
Energy	0.1876	1.7057	1.4328	0.0102		0.1296	0.1296		0.1296	0.1296		2,046.8421	2,046.8421	0.0392	0.0375	2,059.0054
Mobile	0.8817	2.8688	10.9246	0.0377	3.7308	0.0314	3.7622	0.9990	0.0293	1.0283		3,800.7872	3,800.7872	0.1376		3,804.2272
Offroad	0.6222	6.2823	4.0816	9.3900e-003		0.2922	0.2922		0.2727	0.2727		878.4964	878.4964	0.2408		884.5153
Total	**10.0869**	**10.8577**	**16.5334**	**0.0573**	**3.7308**	**0.4536**	**4.1843**	**0.9990**	**0.4320**	**1.4310**		**6,726.3279**	**6,726.3279**	**0.4181**	**0.0375**	**6,747.9636**

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	lb/day										lb/day					
Area	8.3954	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156
Energy	0.1876	1.7057	1.4328	0.0102		0.1296	0.1296		0.1296	0.1296		2,046.8421	2,046.8421	0.0392	0.0375	2,059.0054
Mobile	0.8817	2.8688	10.9246	0.0377	3.7308	0.0314	3.7622	0.9990	0.0293	1.0283		3,800.7872	3,800.7872	0.1376		3,804.2272
Offroad	0.6222	6.2823	4.0816	9.3900e-003		0.2922	0.2922		0.2727	0.2727		878.4964	878.4964	0.2408		884.5153
Total	**10.0869**	**10.8577**	**16.5334**	**0.0573**	**3.7308**	**0.4536**	**4.1843**	**0.9990**	**0.4320**	**1.4310**		**6,726.3279**	**6,726.3279**	**0.4181**	**0.0375**	**6,747.9636**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/28/2020	11/24/2020	5	20	
2	Soils Abatement/Remove/Replace	Site Preparation	11/11/2020	12/8/2020	5	20	
3	Site Prep and Make Ready	Site Preparation	12/9/2020	1/26/2021	5	35	
4	Parking Garage Underground	Building Construction	1/8/2021	2/18/2021	5	30	
5	Office Building Underground	Building Construction	1/8/2021	3/4/2021	5	40	
6	Parking Garage Core Construction	Building Construction	2/18/2021	7/7/2021	5	100	
7	Office Building Core Construction	Building Construction	3/5/2021	3/4/2022	5	261	
8	Parking Garage Exterior Improvements	Architectural Coating	5/18/2021	6/16/2021	5	22	
9	Office Building Tenant Improvements	Architectural Coating	11/14/2021	9/15/2022	5	219	
10	Landscaping and Site Improvements	Paving	11/25/2021	5/25/2022	5	130	
11	Office Building Exterior Improvements	Architectural Coating	12/4/2021	3/4/2022	5	65	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.76

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Air Compressors	2	7.00	78	0.48
Demolition	Concrete/Industrial Saws	2	6.00	81	0.73
Demolition	Dumpers/Tenders	1	4.00	16	0.38
Demolition	Excavators	2	3.00	158	0.38

Demolition	Forklifts	1	7.00	89	0.20
Demolition	Off-Highway Trucks	2	4.00	402	0.38
Demolition	Rubber Tired Dozers	2	6.00	247	0.40
Demolition	Skid Steer Loaders	1	6.00	65	0.37
Demolition	Sweepers/Scrubbers	1	4.00	64	0.46
Demolition	Tractors/Loaders/Backhoes	2	5.00	97	0.37
Soils Abatement/Remove/Replace	Crawler Tractors	1	4.00	212	0.43
Soils Abatement/Remove/Replace	Dumpers/Tenders	2	6.00	16	0.38
Soils Abatement/Remove/Replace	Excavators	2	5.00	158	0.38
Soils Abatement/Remove/Replace	Off-Highway Trucks	3	4.00	402	0.38
Soils Abatement/Remove/Replace	Plate Compactors	2	5.00	8	0.43
Soils Abatement/Remove/Replace	Rubber Tired Loaders	2	5.00	203	0.36
Soils Abatement/Remove/Replace	Scrapers	2	4.00	367	0.48
Soils Abatement/Remove/Replace	Sweepers/Scrubbers	1	4.00	64	0.46
Soils Abatement/Remove/Replace	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Site Prep and Make Ready	Bore/Drill Rigs	2	7.00	221	0.50
Site Prep and Make Ready	Dumpers/Tenders	1	6.00	16	0.38
Site Prep and Make Ready	Excavators	1	4.00	158	0.38
Site Prep and Make Ready	Off-Highway Trucks	2	4.00	402	0.38
Site Prep and Make Ready	Plate Compactors	2	5.00	8	0.43
Site Prep and Make Ready	Rubber Tired Loaders	2	6.00	203	0.36
Site Prep and Make Ready	Scrapers	2	6.00	367	0.48
Site Prep and Make Ready	Sweepers/Scrubbers	1	4.00	64	0.46
Site Prep and Make Ready	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Bore/Drill Rigs	1	7.00	221	0.50
Parking Garage Underground	Excavators	2	7.00	158	0.38
Parking Garage Underground	Generator Sets	2	4.00	84	0.74

Parking Garage Underground	Plate Compactors	2	4.00	8	0.43
Parking Garage Underground	Rough Terrain Forklifts	2	2.00	100	0.40
Parking Garage Underground	Rubber Tired Loaders	1	2.00	203	0.36
Parking Garage Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Parking Garage Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Parking Garage Underground	Trenchers	2	4.00	78	0.50
Office Building Underground	Bore/Drill Rigs	2	4.00	221	0.50
Office Building Underground	Excavators	2	7.00	158	0.38
Office Building Underground	Generator Sets	2	4.00	84	0.74
Office Building Underground	Plate Compactors	2	4.00	8	0.43
Office Building Underground	Rough Terrain Forklifts	2	8.00	100	0.40
Office Building Underground	Rubber Tired Loaders	1	6.00	203	0.36
Office Building Underground	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Underground	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Office Building Underground	Trenchers	4	7.00	78	0.50
Parking Garage Core Construction	Aerial Lifts	1	7.00	63	0.31
Parking Garage Core Construction	Cement and Mortar Mixers	6	4.00	9	0.56
Parking Garage Core Construction	Cranes	1	7.00	231	0.29
Parking Garage Core Construction	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Core Construction	Plate Compactors	1	4.00	8	0.43
Parking Garage Core Construction	Pumps	1	6.00	84	0.74
Parking Garage Core Construction	Rough Terrain Forklifts	1	6.00	100	0.40
Parking Garage Core Construction	Welders	3	6.00	46	0.45
Office Building Core Construction	Aerial Lifts	4	7.00	63	0.31
Office Building Core Construction	Air Compressors	4	6.00	78	0.48
Office Building Core Construction	Cranes	2	7.00	231	0.29
Office Building Core Construction	Off-Highway Trucks	2	4.00	402	0.38

Office Building Core Construction	Rough Terrain Forklifts	2	6.00	100	0.40
Office Building Core Construction	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Core Construction	Welders	5	7.00	46	0.45
Parking Garage Exterior Improvements	Aerial Lifts	1	6.00	63	0.31
Parking Garage Exterior Improvements	Cranes	1	3.00	231	0.29
Parking Garage Exterior Improvements	Off-Highway Trucks	1	4.00	402	0.38
Parking Garage Exterior Improvements	Other General Industrial Equipment	1	4.00	88	0.34
Parking Garage Exterior Improvements	Pressure Washers	1	2.00	13	0.30
Parking Garage Exterior Improvements	Rough Terrain Forklifts	1	5.00	100	0.40
Parking Garage Exterior Improvements	Welders	2	5.00	46	0.45
Office Building Tenant Improvements	Aerial Lifts	1	7.00	63	0.31
Office Building Tenant Improvements	Air Compressors	1	7.00	78	0.48
Office Building Tenant Improvements	Off-Highway Trucks	2	4.00	402	0.38
Office Building Tenant Improvements	Rough Terrain Forklifts	1	7.00	100	0.40
Office Building Tenant Improvements	Sweepers/Scrubbers	1	6.00	64	0.46
Office Building Tenant Improvements	Welders	1	5.00	46	0.45
Landscaping and Site Improvements	Cement and Mortar Mixers	2	4.00	9	0.56
Landscaping and Site Improvements	Dumpers/Tenders	1	6.00	16	0.38
Landscaping and Site Improvements	Paving Equipment	2	7.00	132	0.36
Landscaping and Site Improvements	Plate Compactors	2	4.00	8	0.43
Landscaping and Site Improvements	Rollers	2	5.00	80	0.38
Landscaping and Site Improvements	Rough Terrain Forklifts	1	3.00	100	0.40
Landscaping and Site Improvements	Rubber Tired Dozers	2	4.00	247	0.40
Landscaping and Site Improvements	Skid Steer Loaders	1	6.00	65	0.37
Landscaping and Site Improvements	Tractors/Loaders/Backhoes	2	4.00	97	0.37
Office Building Exterior Improvements	Aerial Lifts	3	6.00	63	0.31
Office Building Exterior Improvements	Off-Highway Trucks	2	4.00	402	0.38

Office Building Exterior Improvements	Other General Industrial Equipment	2	7.00	88	0.34
Office Building Exterior Improvements	Pressure Washers	1	4.00	13	0.30
Office Building Exterior Improvements	Rough Terrain Forklifts	3	7.00	100	0.40
Office Building Exterior Improvements	Sweepers/Scrubbers	1	4.00	64	0.46
Office Building Exterior Improvements	Welders	2	6.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	16	20.00	0.00	1,509.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Soils Abatement/Remove/Re	16	20.00	0.00	659.00	10.80	7.30	12.60	LD_Mix	HDT_Mix	HHDT
Site Prep and Make Ready	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Underground	15	6.00	3.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Underground	18	13.00	6.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Core Construction	15	46.00	21.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Core Construction	20	114.00	51.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Parking Garage Exterior Improvements	8	11.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Tenant Improvements	7	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Landscaping and Site Improvements	15	19.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT
Office Building Exterior Improvements	14	7.00	0.00	0.00	10.80	7.30	19.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6146	0.0000	1.6146	0.2445	0.0000	0.2445			0.0000			0.0000
Off-Road	4.2780	39.9671	28.3055	0.0546		2.0943	2.0943		1.9720	1.9720		5,249.6062	5,249.6062	1.2985		5,282.0685
Total	**4.2780**	**39.9671**	**28.3055**	**0.0546**	**1.6146**	**2.0943**	**3.7089**	**0.2445**	**1.9720**	**2.2165**		**5,249.6062**	**5,249.6062**	**1.2985**		**5,282.0685**

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	0.6494	23.5954	9.8864	0.0582	1.2446	0.0733	1.3179	0.3406	0.0702	0.4108		6,585.1047	6,585.1047	0.8309		6,605.8778
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	0.0612	0.0402	0.4008	1.4400e-003	0.1643	9.9000e-004	0.1653	0.0436	9.1000e-004	0.0445		143.9723	143.9723	2.8300e-003		144.0431
Total	**0.7105**	**23.6356**	**10.2872**	**0.0596**	**1.4089**	**0.0743**	**1.4832**	**0.3842**	**0.0711**	**0.4553**		**6,729.0770**	**6,729.0770**	**0.8338**		**6,749.9209**

3.2 Demolition - 2020

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					0.7266	0.0000	0.7266	0.1100	0.0000	0.1100			0.0000			0.0000
Off-Road	0.6993	4.3864	30.8868	0.0546		0.0926	0.0926		0.0926	0.0926	0.0000	5,249.6062	5,249.6062	1.2985		5,282.0685
Total	**0.6993**	**4.3864**	**30.8868**	**0.0546**	**0.7266**	**0.0926**	**0.8191**	**0.1100**	**0.0926**	**0.2026**	**0.0000**	**5,249.6062**	**5,249.6062**	**1.2985**		**5,282.0685**

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	0.6494	23.5954	9.8864	0.0582	1.2446	0.0733	1.3179	0.3406	0.0702	0.4108		6,585.1047	6,585.1047	0.8309		6,605.8778
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	0.0612	0.0402	0.4008	1.4400e-003	0.1643	9.9000e-004	0.1653	0.0436	9.1000e-004	0.0445		143.9723	143.9723	2.8300e-003		144.0431
Total	**0.7105**	**23.6356**	**10.2872**	**0.0596**	**1.4089**	**0.0743**	**1.4832**	**0.3842**	**0.0711**	**0.4553**		**6,729.0770**	**6,729.0770**	**0.8338**		**6,749.9209**

3.3 Soils Abatement/Remove/Replace - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0745	0.0000	0.0745	0.0113	0.0000	0.0113			0.0000			0.0000
Off-Road	3.5033	37.2418	23.8956	0.0585		1.5054	1.5054		1.3880	1.3880		5,629.9145	5,629.9145	1.7916		5,674.7048
Total	**3.5033**	**37.2418**	**23.8956**	**0.0585**	**0.0745**	**1.5054**	**1.5798**	**0.0113**	**1.3880**	**1.3993**		**5,629.9145**	**5,629.9145**	**1.7916**		**5,674.7048**

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	0.2089	7.7668	3.1783	0.0175	0.3607	0.0222	0.3829	0.0987	0.0213	0.1200		1,983.8038	1,983.8038	0.2511		1,990.0802
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	0.0612	0.0402	0.4008	1.4400e-003	0.1643	9.9000e-004	0.1653	0.0436	9.1000e-004	0.0445		143.9723	143.9723	2.8300e-003		144.0431
Total	**0.2701**	**7.8070**	**3.5790**	**0.0190**	**0.5250**	**0.0232**	**0.5482**	**0.1423**	**0.0222**	**0.1645**		**2,127.7762**	**2,127.7762**	**0.2539**		**2,134.1233**

3.3 Soils Abatement/Remove/Replace - 2020

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					0.0335	0.0000	0.0335	5.0800e-003	0.0000	5.0800e-003			0.0000			0.0000
Off-Road	0.8732	4.6770	29.2932	0.0585		0.1317	0.1317		0.1317	0.1317	0.0000	5,629.9145	5,629.9145	1.7916		5,674.7048
Total	**0.8732**	**4.6770**	**29.2932**	**0.0585**	**0.0335**	**0.1317**	**0.1652**	**5.0800e-003**	**0.1317**	**0.1368**	**0.0000**	**5,629.9145**	**5,629.9145**	**1.7916**		**5,674.7048**

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	0.2089	7.7668	3.1783	0.0175	0.3607	0.0222	0.3829	0.0987	0.0213	0.1200		1,983.8038	1,983.8038	0.2511		1,990.0802
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	0.0612	0.0402	0.4008	1.4400e-003	0.1643	9.9000e-004	0.1653	0.0436	9.1000e-004	0.0445		143.9723	143.9723	2.8300e-003		144.0431
Total	**0.2701**	**7.8070**	**3.5790**	**0.0190**	**0.5250**	**0.0232**	**0.5482**	**0.1423**	**0.0222**	**0.1645**		**2,127.7762**	**2,127.7762**	**0.2539**		**2,134.1233**

3.4 Site Prep and Make Ready - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	3.8762	42.9197	27.5908	0.0714		1.6922	1.6922		1.5588	1.5588		6,892.1512	6,892.1512	2.2097		6,947.3943
Total	**3.8762**	**42.9197**	**27.5908**	**0.0714**	**1.5908**	**1.6922**	**3.2829**	**0.1718**	**1.5588**	**1.7306**		**6,892.1512**	**6,892.1512**	**2.2097**		**6,947.3943**

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	0.0581	0.0382	0.3807	1.3700e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		136.7737	136.7737	2.6900e-003		136.8409
Total	**0.0581**	**0.0382**	**0.3807**	**1.3700e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**136.7737**	**136.7737**	**2.6900e-003**		**136.8409**

3.4 Site Prep and Make Ready - 2020

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					0.7158	0.0000	0.7158	0.0773	0.0000	0.0773			0.0000			0.0000
Off-Road	0.9870	5.0603	34.8207	0.0714		0.1410	0.1410		0.1410	0.1410	0.0000	6,892.1512	6,892.1512	2.2097		6,947.3943
Total	**0.9870**	**5.0603**	**34.8207**	**0.0714**	**0.7158**	**0.1410**	**0.8568**	**0.0773**	**0.1410**	**0.2183**	**0.0000**	**6,892.1512**	**6,892.1512**	**2.2097**		**6,947.3943**

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	0.0581	0.0382	0.3807	1.3700e-003	0.1561	9.4000e-004	0.1570	0.0414	8.7000e-004	0.0423		136.7737	136.7737	2.6900e-003		136.8409
Total	**0.0581**	**0.0382**	**0.3807**	**1.3700e-003**	**0.1561**	**9.4000e-004**	**0.1570**	**0.0414**	**8.7000e-004**	**0.0423**		**136.7737**	**136.7737**	**2.6900e-003**		**136.8409**

3.4 Site Prep and Make Ready - 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					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	3.5814	38.0146	26.5918	0.0715		1.4921	1.4921		1.3748	1.3748		6,897.6776	6,897.6776	2.2115		6,952.9653
Total	**3.5814**	**38.0146**	**26.5918**	**0.0715**	**1.5908**	**1.4921**	**3.0829**	**0.1718**	**1.3748**	**1.5465**		**6,897.6776**	**6,897.6776**	**2.2115**		**6,952.9653**

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	0.0544	0.0343	0.3511	1.3200e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		131.9091	131.9091	2.4100e-003		131.9694
Total	**0.0544**	**0.0343**	**0.3511**	**1.3200e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**131.9091**	**131.9091**	**2.4100e-003**		**131.9694**

3.4 Site Prep and Make Ready - 2021

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					0.7158	0.0000	0.7158	0.0773	0.0000	0.0773			0.0000			0.0000
Off-Road	0.9870	5.0601	34.8207	0.0715		0.1408	0.1408		0.1408	0.1408	0.0000	6,897.6776	6,897.6776	2.2115		6,952.9653
Total	**0.9870**	**5.0601**	**34.8207**	**0.0715**	**0.7158**	**0.1408**	**0.8567**	**0.0773**	**0.1408**	**0.2181**	**0.0000**	**6,897.6776**	**6,897.6776**	**2.2115**		**6,952.9653**

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	0.0544	0.0343	0.3511	1.3200e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		131.9091	131.9091	2.4100e-003		131.9694
Total	**0.0544**	**0.0343**	**0.3511**	**1.3200e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**131.9091**	**131.9091**	**2.4100e-003**		**131.9694**

3.5 Parking Garage Underground - 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	1.9495	18.9873	19.9545	0.0369		1.0022	1.0022		0.9362	0.9362		3,550.4565	3,550.4565	0.9710		3,574.7318
Total	**1.9495**	**18.9873**	**19.9545**	**0.0369**		**1.0022**	**1.0022**		**0.9362**	**0.9362**		**3,550.4565**	**3,550.4565**	**0.9710**		**3,574.7318**

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	9.8700e-003	0.3124	0.1398	7.8000e-004	0.0203	7.4000e-004	0.0210	5.8300e-003	7.0000e-004	6.5300e-003		85.6654	85.6654	7.5700e-003		85.8546
Worker	0.0172	0.0108	0.1109	4.2000e-004	0.0493	2.9000e-004	0.0496	0.0131	2.6000e-004	0.0133		41.6555	41.6555	7.6000e-004		41.6745
Total	**0.0271**	**0.3232**	**0.2507**	**1.2000e-003**	**0.0695**	**1.0300e-003**	**0.0706**	**0.0189**	**9.6000e-004**	**0.0199**		**127.3210**	**127.3210**	**8.3300e-003**		**127.5291**

3.5 Parking Garage Underground - 2021

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	0.4893	2.7741	23.9077	0.0369		0.0676	0.0676		0.0676	0.0676	0.0000	3,550.4565	3,550.4565	0.9710		3,574.7318
Total	**0.4893**	**2.7741**	**23.9077**	**0.0369**		**0.0676**	**0.0676**		**0.0676**	**0.0676**	**0.0000**	**3,550.4565**	**3,550.4565**	**0.9710**		**3,574.7318**

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	9.8700e-003	0.3124	0.1398	7.8000e-004	0.0203	7.4000e-004	0.0210	5.8300e-003	7.0000e-004	6.5300e-003		85.6654	85.6654	7.5700e-003		85.8546
Worker	0.0172	0.0108	0.1109	4.2000e-004	0.0493	2.9000e-004	0.0496	0.0131	2.6000e-004	0.0133		41.6555	41.6555	7.6000e-004		41.6745
Total	**0.0271**	**0.3232**	**0.2507**	**1.2000e-003**	**0.0695**	**1.0300e-003**	**0.0706**	**0.0189**	**9.6000e-004**	**0.0199**		**127.3210**	**127.3210**	**8.3300e-003**		**127.5291**

3.6 Office Building Underground - 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	3.2943	32.4956	30.9701	0.0549		1.8093	1.8093		1.6788	1.6788		5,285.0376	5,285.0376	1.5320		5,323.3378
Total	**3.2943**	**32.4956**	**30.9701**	**0.0549**		**1.8093**	**1.8093**		**1.6788**	**1.6788**		**5,285.0376**	**5,285.0376**	**1.5320**		**5,323.3378**

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	0.0197	0.6248	0.2797	1.5600e-003	0.0405	1.4700e-003	0.0420	0.0117	1.4100e-003	0.0131		171.3309	171.3309	0.0151		171.7092
Worker	0.0372	0.0235	0.2403	9.0000e-004	0.1068	6.2000e-004	0.1074	0.0283	5.7000e-004	0.0289		90.2536	90.2536	1.6500e-003		90.2948
Total	**0.0570**	**0.6483**	**0.5199**	**2.4600e-003**	**0.1473**	**2.0900e-003**	**0.1494**	**0.0400**	**1.9800e-003**	**0.0420**		**261.5845**	**261.5845**	**0.0168**		**262.0040**

3.6 Office Building Underground - 2021

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	0.7092	3.7272	36.1394	0.0549		0.0969	0.0969		0.0969	0.0969	0.0000	5,285.0376	5,285.0376	1.5320		5,323.3378
Total	**0.7092**	**3.7272**	**36.1394**	**0.0549**		**0.0969**	**0.0969**		**0.0969**	**0.0969**	**0.0000**	**5,285.0376**	**5,285.0376**	**1.5320**		**5,323.3378**

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	0.0197	0.6248	0.2797	1.5600e-003	0.0405	1.4700e-003	0.0420	0.0117	1.4100e-003	0.0131		171.3309	171.3309	0.0151		171.7092
Worker	0.0372	0.0235	0.2403	9.0000e-004	0.1068	6.2000e-004	0.1074	0.0283	5.7000e-004	0.0289		90.2536	90.2536	1.6500e-003		90.2948
Total	**0.0570**	**0.6483**	**0.5199**	**2.4600e-003**	**0.1473**	**2.0900e-003**	**0.1494**	**0.0400**	**1.9800e-003**	**0.0420**		**261.5845**	**261.5845**	**0.0168**		**262.0040**

3.7 Parking Garage Core 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	1.9521	15.6423	13.9182	0.0288		0.6735	0.6735		0.6474	0.6474		2,623.6675	2,623.6675	0.5957		2,638.5588
Total	**1.9521**	**15.6423**	**13.9182**	**0.0288**		**0.6735**	**0.6735**		**0.6474**	**0.6474**		**2,623.6675**	**2,623.6675**	**0.5957**		**2,638.5588**

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	0.0691	2.1868	0.9788	5.4500e-003	0.1417	5.1500e-003	0.1469	0.0408	4.9300e-003	0.0457		599.6581	599.6581	0.0530		600.9821
Worker	0.1317	0.0830	0.8501	3.2000e-003	0.3779	2.2000e-003	0.3801	0.1002	2.0300e-003	0.1023		319.3589	319.3589	5.8400e-003		319.5048
Total	**0.2008**	**2.2698**	**1.8290**	**8.6500e-003**	**0.5196**	**7.3500e-003**	**0.5270**	**0.1410**	**6.9600e-003**	**0.1480**		**919.0170**	**919.0170**	**0.0588**		**920.4869**

3.7 Parking Garage Core Construction - 2021

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	0.5550	5.2854	15.7514	0.0288		0.0867	0.0867		0.0867	0.0867	0.0000	2,623.6675	2,623.6675	0.5957		2,638.5588
Total	**0.5550**	**5.2854**	**15.7514**	**0.0288**		**0.0867**	**0.0867**		**0.0867**	**0.0867**	**0.0000**	**2,623.6675**	**2,623.6675**	**0.5957**		**2,638.5588**

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	0.0691	2.1868	0.9788	5.4500e-003	0.1417	5.1500e-003	0.1469	0.0408	4.9300e-003	0.0457		599.6581	599.6581	0.0530		600.9821
Worker	0.1317	0.0830	0.8501	3.2000e-003	0.3779	2.2000e-003	0.3801	0.1002	2.0300e-003	0.1023		319.3589	319.3589	5.8400e-003		319.5048
Total	**0.2008**	**2.2698**	**1.8290**	**8.6500e-003**	**0.5196**	**7.3500e-003**	**0.5270**	**0.1410**	**6.9600e-003**	**0.1480**		**919.0170**	**919.0170**	**0.0588**		**920.4869**

3.8 Office Building Core 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	3.9585	32.0076	30.1103	0.0587		1.4477	1.4477		1.3879	1.3879		5,482.7347	5,482.7347	1.3110		5,515.5098
Total	**3.9585**	**32.0076**	**30.1103**	**0.0587**		**1.4477**	**1.4477**		**1.3879**	**1.3879**		**5,482.7347**	**5,482.7347**	**1.3110**		**5,515.5098**

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	0.1678	5.3107	2.3772	0.0132	0.3442	0.0125	0.3568	0.0991	0.0120	0.1110		1,456.3125	1,456.3125	0.1286		1,459.5279
Worker	0.3264	0.2057	2.1069	7.9300e-003	0.9365	5.4600e-003	0.9420	0.2484	5.0300e-003	0.2534		791.4546	791.4546	0.0145		791.8162
Total	**0.4942**	**5.5164**	**4.4840**	**0.0212**	**1.2807**	**0.0180**	**1.2987**	**0.3475**	**0.0170**	**0.3645**		**2,247.7671**	**2,247.7671**	**0.1431**		**2,251.3442**

3.8 Office Building Core Construction - 2021

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	0.8356	10.4353	33.6911	0.0587		0.0869	0.0869		0.0869	0.0869	0.0000	5,482.7347	5,482.7347	1.3110		5,515.5098
Total	**0.8356**	**10.4353**	**33.6911**	**0.0587**		**0.0869**	**0.0869**		**0.0869**	**0.0869**	**0.0000**	**5,482.7347**	**5,482.7347**	**1.3110**		**5,515.5098**

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	0.1678	5.3107	2.3772	0.0132	0.3442	0.0125	0.3568	0.0991	0.0120	0.1110		1,456.3125	1,456.3125	0.1286		1,459.5279
Worker	0.3264	0.2057	2.1069	7.9300e-003	0.9365	5.4600e-003	0.9420	0.2484	5.0300e-003	0.2534		791.4546	791.4546	0.0145		791.8162
Total	**0.4942**	**5.5164**	**4.4840**	**0.0212**	**1.2807**	**0.0180**	**1.2987**	**0.3475**	**0.0170**	**0.3645**		**2,247.7671**	**2,247.7671**	**0.1431**		**2,251.3442**

3.8 Office Building Core 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	3.6007	28.4532	29.5639	0.0587		1.2305	1.2305		1.1805	1.1805		5,483.3351	5,483.3351	1.2977		5,515.7764
Total	**3.6007**	**28.4532**	**29.5639**	**0.0587**		**1.2305**	**1.2305**		**1.1805**	**1.1805**		**5,483.3351**	**5,483.3351**	**1.2977**		**5,515.7764**

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	0.1576	4.9945	2.3702	0.0130	0.3443	0.0110	0.3553	0.0991	0.0106	0.1096		1,437.6264	1,437.6264	0.1276		1,440.8169
Worker	0.3089	0.1856	1.9577	7.6400e-003	0.9365	5.3500e-003	0.9418	0.2484	4.9300e-003	0.2533		762.5089	762.5089	0.0130		762.8347
Total	**0.4666**	**5.1801**	**4.3279**	**0.0207**	**1.2808**	**0.0164**	**1.2972**	**0.3475**	**0.0155**	**0.3630**		**2,200.1353**	**2,200.1353**	**0.1407**		**2,203.6516**

3.8 Office Building Core Construction - 2022

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	0.8356	10.4353	33.6911	0.0587		0.0869	0.0869		0.0869	0.0869	0.0000	5,483.3350	5,483.3350	1.2977		5,515.7764
Total	**0.8356**	**10.4353**	**33.6911**	**0.0587**		**0.0869**	**0.0869**		**0.0869**	**0.0869**	**0.0000**	**5,483.3350**	**5,483.3350**	**1.2977**		**5,515.7764**

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	0.1576	4.9945	2.3702	0.0130	0.3443	0.0110	0.3553	0.0991	0.0106	0.1096		1,437.6264	1,437.6264	0.1276		1,440.8169
Worker	0.3089	0.1856	1.9577	7.6400e-003	0.9365	5.3500e-003	0.9418	0.2484	4.9300e-003	0.2533		762.5089	762.5089	0.0130		762.8347
Total	**0.4666**	**5.1801**	**4.3279**	**0.0207**	**1.2808**	**0.0164**	**1.2972**	**0.3475**	**0.0155**	**0.3630**		**2,200.1353**	**2,200.1353**	**0.1407**		**2,203.6516**

3.9 Parking Garage Exterior Improvements - 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					
Archit. Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.0586	8.8517	7.9963	0.0168		0.3816	0.3816		0.3588	0.3588		1,572.4880	1,572.4880	0.4563		1,583.8951
Total	**1.0586**	**8.8517**	**7.9963**	**0.0168**		**0.3816**	**0.3816**		**0.3588**	**0.3588**		**1,572.4880**	**1,572.4880**	**0.4563**		**1,583.8951**

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	0.0315	0.0199	0.2033	7.7000e-004	0.0904	5.3000e-004	0.0909	0.0240	4.9000e-004	0.0245		76.3684	76.3684	1.4000e-003		76.4033
Total	**0.0315**	**0.0199**	**0.2033**	**7.7000e-004**	**0.0904**	**5.3000e-004**	**0.0909**	**0.0240**	**4.9000e-004**	**0.0245**		**76.3684**	**76.3684**	**1.4000e-003**		**76.4033**

3.9 Parking Garage Exterior Improvements - 2021

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	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2464	2.6879	9.4337	0.0168		0.0291	0.0291		0.0291	0.0291	0.0000	1,572.4880	1,572.4880	0.4563		1,583.8951
Total	**0.2464**	**2.6879**	**9.4337**	**0.0168**		**0.0291**	**0.0291**		**0.0291**	**0.0291**	**0.0000**	**1,572.4880**	**1,572.4880**	**0.4563**		**1,583.8951**

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	0.0315	0.0199	0.2033	7.7000e-004	0.0904	5.3000e-004	0.0909	0.0240	4.9000e-004	0.0245		76.3684	76.3684	1.4000e-003		76.4033
Total	**0.0315**	**0.0199**	**0.2033**	**7.7000e-004**	**0.0904**	**5.3000e-004**	**0.0909**	**0.0240**	**4.9000e-004**	**0.0245**		**76.3684**	**76.3684**	**1.4000e-003**		**76.4033**

3.10 Office Building Tenant Improvements - 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					
Archit. Coating	11.2772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.3625	11.4669	11.2270	0.0247		0.5273	0.5273		0.4976	0.4976		2,355.5254	2,355.5254	0.6531		2,371.8531
Total	**12.6396**	**11.4669**	**11.2270**	**0.0247**		**0.5273**	**0.5273**		**0.4976**	**0.4976**		**2,355.5254**	**2,355.5254**	**0.6531**		**2,371.8531**

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	0.0544	0.0343	0.3511	1.3200e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		131.9091	131.9091	2.4100e-003		131.9694
Total	**0.0544**	**0.0343**	**0.3511**	**1.3200e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**131.9091**	**131.9091**	**2.4100e-003**		**131.9694**

3.10 Office Building Tenant Improvements - 2021

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	11.2772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3436	3.5316	13.8407	0.0247		0.0385	0.0385		0.0385	0.0385	0.0000	2,355.5254	2,355.5254	0.6531		2,371.8531
Total	**11.6208**	**3.5316**	**13.8407**	**0.0247**		**0.0385**	**0.0385**		**0.0385**	**0.0385**	**0.0000**	**2,355.5254**	**2,355.5254**	**0.6531**		**2,371.8531**

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	0.0544	0.0343	0.3511	1.3200e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		131.9091	131.9091	2.4100e-003		131.9694
Total	**0.0544**	**0.0343**	**0.3511**	**1.3200e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**131.9091**	**131.9091**	**2.4100e-003**		**131.9694**

3.10 Office Building Tenant Improvements - 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	11.2772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.2145	9.7089	10.9318	0.0247		0.4259	0.4259		0.4026	0.4026		2,355.9748	2,355.9748	0.6507		2,372.2430
Total	**12.4916**	**9.7089**	**10.9318**	**0.0247**		**0.4259**	**0.4259**		**0.4026**	**0.4026**		**2,355.9748**	**2,355.9748**	**0.6507**		**2,372.2430**

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	0.0515	0.0309	0.3263	1.2700e-003	0.1561	8.9000e-004	0.1570	0.0414	8.2000e-004	0.0422		127.0848	127.0848	2.1700e-003		127.1391
Total	**0.0515**	**0.0309**	**0.3263**	**1.2700e-003**	**0.1561**	**8.9000e-004**	**0.1570**	**0.0414**	**8.2000e-004**	**0.0422**		**127.0848**	**127.0848**	**2.1700e-003**		**127.1391**

3.10 Office Building Tenant Improvements - 2022

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	11.2772					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3436	3.5316	13.8407	0.0247		0.0385	0.0385		0.0385	0.0385	0.0000	2,355.9748	2,355.9748	0.6507		2,372.2430
Total	**11.6208**	**3.5316**	**13.8407**	**0.0247**		**0.0385**	**0.0385**		**0.0385**	**0.0385**	**0.0000**	**2,355.9748**	**2,355.9748**	**0.6507**		**2,372.2430**

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	0.0515	0.0309	0.3263	1.2700e-003	0.1561	8.9000e-004	0.1570	0.0414	8.2000e-004	0.0422		127.0848	127.0848	2.1700e-003		127.1391
Total	**0.0515**	**0.0309**	**0.3263**	**1.2700e-003**	**0.1561**	**8.9000e-004**	**0.1570**	**0.0414**	**8.2000e-004**	**0.0422**		**127.0848**	**127.0848**	**2.1700e-003**		**127.1391**

3.11 Landscaping and Site Improvements - 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	2.0634	20.9931	15.7057	0.0267		1.0502	1.0502		0.9692	0.9692		2,542.1741	2,542.1741	0.7937		2,562.0153
Paving	0.0635					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.1268**	**20.9931**	**15.7057**	**0.0267**		**1.0502**	**1.0502**		**0.9692**	**0.9692**		**2,542.1741**	**2,542.1741**	**0.7937**		**2,562.0153**

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	0.0544	0.0343	0.3511	1.3200e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		131.9091	131.9091	2.4100e-003		131.9694
Total	**0.0544**	**0.0343**	**0.3511**	**1.3200e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**131.9091**	**131.9091**	**2.4100e-003**		**131.9694**

3.11 Landscaping and Site Improvements - 2021

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	0.4787	3.0817	16.9450	0.0267		0.0780	0.0780		0.0780	0.0780	0.0000	2,542.1741	2,542.1741	0.7937		2,562.0153
Paving	0.0635					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5422**	**3.0817**	**16.9450**	**0.0267**		**0.0780**	**0.0780**		**0.0780**	**0.0780**	**0.0000**	**2,542.1741**	**2,542.1741**	**0.7937**		**2,562.0153**

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	0.0544	0.0343	0.3511	1.3200e-003	0.1561	9.1000e-004	0.1570	0.0414	8.4000e-004	0.0422		131.9091	131.9091	2.4100e-003		131.9694
Total	**0.0544**	**0.0343**	**0.3511**	**1.3200e-003**	**0.1561**	**9.1000e-004**	**0.1570**	**0.0414**	**8.4000e-004**	**0.0422**		**131.9091**	**131.9091**	**2.4100e-003**		**131.9694**

3.11 Landscaping and Site Improvements - 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	1.7697	17.8870	15.2064	0.0267		0.8625	0.8625		0.7965	0.7965		2,542.3761	2,542.3761	0.7937		2,562.2190
Paving	0.0635					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.8332**	**17.8870**	**15.2064**	**0.0267**		**0.8625**	**0.8625**		**0.7965**	**0.7965**		**2,542.3761**	**2,542.3761**	**0.7937**		**2,562.2190**

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	0.0515	0.0309	0.3263	1.2700e-003	0.1561	8.9000e-004	0.1570	0.0414	8.2000e-004	0.0422		127.0848	127.0848	2.1700e-003		127.1391
Total	**0.0515**	**0.0309**	**0.3263**	**1.2700e-003**	**0.1561**	**8.9000e-004**	**0.1570**	**0.0414**	**8.2000e-004**	**0.0422**		**127.0848**	**127.0848**	**2.1700e-003**		**127.1391**

3.11 Landscaping and Site Improvements - 2022

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	0.4787	3.0816	16.9451	0.0267		0.0779	0.0779		0.0779	0.0779	0.0000	2,542.3761	2,542.3761	0.7937		2,562.2190
Paving	0.0635					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5422**	**3.0816**	**16.9451**	**0.0267**		**0.0779**	**0.0779**		**0.0779**	**0.0779**	**0.0000**	**2,542.3761**	**2,542.3761**	**0.7937**		**2,562.2190**

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	0.0515	0.0309	0.3263	1.2700e-003	0.1561	8.9000e-004	0.1570	0.0414	8.2000e-004	0.0422		127.0848	127.0848	2.1700e-003		127.1391
Total	**0.0515**	**0.0309**	**0.3263**	**1.2700e-003**	**0.1561**	**8.9000e-004**	**0.1570**	**0.0414**	**8.2000e-004**	**0.0422**		**127.0848**	**127.0848**	**2.1700e-003**		**127.1391**

3.12 Office Building Exterior Improvements - 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					
Archit. Coating	18.2494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.9765	17.7248	19.2174	0.0359		0.8128	0.8128		0.7573	0.7573		3,408.4436	3,408.4436	1.0379		3,434.3903
Total	**20.2259**	**17.7248**	**19.2174**	**0.0359**		**0.8128**	**0.8128**		**0.7573**	**0.7573**		**3,408.4436**	**3,408.4436**	**1.0379**		**3,434.3903**

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	0.0200	0.0126	0.1294	4.9000e-004	0.0575	3.4000e-004	0.0578	0.0153	3.1000e-004	0.0156		48.5981	48.5981	8.9000e-004		48.6203
Total	**0.0200**	**0.0126**	**0.1294**	**4.9000e-004**	**0.0575**	**3.4000e-004**	**0.0578**	**0.0153**	**3.1000e-004**	**0.0156**		**48.5981**	**48.5981**	**8.9000e-004**		**48.6203**

3.12 Office Building Exterior Improvements - 2021

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	18.2494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.5399	5.9157	22.3910	0.0359		0.0633	0.0633		0.0633	0.0633	0.0000	3,408.4436	3,408.4436	1.0379		3,434.3903
Total	**18.7892**	**5.9157**	**22.3910**	**0.0359**		**0.0633**	**0.0633**		**0.0633**	**0.0633**	**0.0000**	**3,408.4436**	**3,408.4436**	**1.0379**		**3,434.3903**

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	0.0200	0.0126	0.1294	4.9000e-004	0.0575	3.4000e-004	0.0578	0.0153	3.1000e-004	0.0156		48.5981	48.5981	8.9000e-004		48.6203
Total	**0.0200**	**0.0126**	**0.1294**	**4.9000e-004**	**0.0575**	**3.4000e-004**	**0.0578**	**0.0153**	**3.1000e-004**	**0.0156**		**48.5981**	**48.5981**	**8.9000e-004**		**48.6203**

3.12 Office Building Exterior Improvements - 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	18.2494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	1.7493	15.3617	18.8380	0.0359		0.6514	0.6514		0.6075	0.6075		3,408.8670	3,408.8670	1.0347		3,434.7342
Total	**19.9987**	**15.3617**	**18.8380**	**0.0359**		**0.6514**	**0.6514**		**0.6075**	**0.6075**		**3,408.8670**	**3,408.8670**	**1.0347**		**3,434.7342**

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	0.0190	0.0114	0.1202	4.7000e-004	0.0575	3.3000e-004	0.0578	0.0153	3.0000e-004	0.0156		46.8207	46.8207	8.0000e-004		46.8407
Total	**0.0190**	**0.0114**	**0.1202**	**4.7000e-004**	**0.0575**	**3.3000e-004**	**0.0578**	**0.0153**	**3.0000e-004**	**0.0156**		**46.8207**	**46.8207**	**8.0000e-004**		**46.8407**

3.12 Office Building Exterior Improvements - 2022

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	18.2494					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.5396	5.9139	22.3905	0.0359		0.0631	0.0631		0.0631	0.0631	0.0000	3,408.8670	3,408.8670	1.0347		3,434.7342
Total	**18.7889**	**5.9139**	**22.3905**	**0.0359**		**0.0631**	**0.0631**		**0.0631**	**0.0631**	**0.0000**	**3,408.8670**	**3,408.8670**	**1.0347**		**3,434.7342**

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	0.0190	0.0114	0.1202	4.7000e-004	0.0575	3.3000e-004	0.0578	0.0153	3.0000e-004	0.0156		46.8207	46.8207	8.0000e-004		46.8407
Total	**0.0190**	**0.0114**	**0.1202**	**4.7000e-004**	**0.0575**	**3.3000e-004**	**0.0578**	**0.0153**	**3.0000e-004**	**0.0156**		**46.8207**	**46.8207**	**8.0000e-004**		**46.8407**

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	0.8817	2.8688	10.9246	0.0377	3.7308	0.0314	3.7622	0.9990	0.0293	1.0283		3,800.7872	3,800.7872	0.1376		3,804.2272
Unmitigated	0.8817	2.8688	10.9246	0.0377	3.7308	0.0314	3.7622	0.9990	0.0293	1.0283		3,800.7872	3,800.7872	0.1376		3,804.2272

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
Office Park	476.59	69.18	30.75	981,509	981,509
Office Park	158.10	22.95	10.20	325,599	325,599
Parking Lot	0.00	0.00	0.00		
Total	634.69	92.13	40.95	1,307,108	1,307,108

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Office Park	9.50	7.30	7.30	71.00	10.00	19.00	82	15	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.476244	0.050164	0.262181	0.139658	0.017521	0.006864	0.023236	0.006525	0.004137	0.003158	0.009064	0.000471	0.000777
Office Park	0.476244	0.050164	0.262181	0.139658	0.017521	0.006864	0.023236	0.006525	0.004137	0.003158	0.009064	0.000471	0.000777
Parking Lot	0.476244	0.050164	0.262181	0.139658	0.017521	0.006864	0.023236	0.006525	0.004137	0.003158	0.009064	0.000471	0.000777

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	0.1876	1.7057	1.4328	0.0102		0.1296	0.1296		0.1296	0.1296		2,046.8421	2,046.8421	0.0392	0.0375	2,059.0054
NaturalGas Unmitigated	0.1876	1.7057	1.4328	0.0102		0.1296	0.1296		0.1296	0.1296		2,046.8421	2,046.8421	0.0392	0.0375	2,059.0054

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					
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
Office Park	13064.3	0.1409	1.2808	1.0759	7.6800e-003		0.0973	0.0973		0.0973	0.0973		1,536.9791	1,536.9791	0.0295	0.0282	1,546.1126
Office Park	4333.84	0.0467	0.4249	0.3569	2.5500e-003		0.0323	0.0323		0.0323	0.0323		509.8630	509.8630	9.7700e-003	9.3500e-003	512.8929
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1876**	**1.7057**	**1.4328**	**0.0102**		**0.1296**	**0.1296**		**0.1296**	**0.1296**		**2,046.8421**	**2,046.8421**	**0.0392**	**0.0375**	**2,059.0054**

5.2 Energy by Land Use - NaturalGas

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					
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
Office Park	13.0643	0.1409	1.2808	1.0759	7.6800e-003		0.0973	0.0973		0.0973	0.0973		1,536.9791	1,536.9791	0.0295	0.0282	1,546.1126
Office Park	4.33384	0.0467	0.4249	0.3569	2.5500e-003		0.0323	0.0323		0.0323	0.0323		509.8630	509.8630	9.7700e-003	9.3500e-003	512.8929
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1876**	**1.7057**	**1.4328**	**0.0102**		**0.1296**	**0.1296**		**0.1296**	**0.1296**		**2,046.8421**	**2,046.8421**	**0.0392**	**0.0375**	**2,059.0054**

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	8.3954	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156
Unmitigated	8.3954	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156

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	1.0016					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.3850					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	8.7900e-003	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156
Total	**8.3954**	**8.6000e-004**	**0.0945**	**1.0000e-005**		**3.4000e-004**	**3.4000e-004**		**3.4000e-004**	**3.4000e-004**		**0.2023**	**0.2023**	**5.3000e-004**		**0.2156**

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	1.0016					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.3850					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	8.7900e-003	8.6000e-004	0.0945	1.0000e-005		3.4000e-004	3.4000e-004		3.4000e-004	3.4000e-004		0.2023	0.2023	5.3000e-004		0.2156
Total	**8.3954**	**8.6000e-004**	**0.0945**	**1.0000e-005**		**3.4000e-004**	**3.4000e-004**		**3.4000e-004**	**3.4000e-004**		**0.2023**	**0.2023**	**5.3000e-004**		**0.2156**

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
Cranes	1	8.00	2	231	0.29	Diesel
Forklifts	1	8.00	365	89	0.20	Diesel
Generator Sets	4	0.30	52	84	0.74	Diesel
Pressure Washers	1	16.00	1	13	0.30	Diesel

UnMitigated/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
Equipment Type	lb/day										lb/day					
Cranes	0.3730	4.1843	1.8923	5.7700e-003		0.1737	0.1737		0.1598	0.1598		558.8304	558.8304	0.1807		563.3488
Forklifts	0.1136	1.0549	1.1538	1.5300e-003		0.0699	0.0699		0.0643	0.0643		148.0308	148.0308	0.0479		149.2277
Generator Sets	0.0495	0.4392	0.5514	9.9000e-004		0.0220	0.0220		0.0220	0.0220		93.4552	93.4552	4.4400e-003		93.5662
Pressure Washers	0.0861	0.6039	0.4841	1.1000e-003		0.0266	0.0266		0.0266	0.0266		78.1800	78.1800	7.7000e-003		78.3726
Total	**0.6222**	**6.2823**	**4.0816**	**9.3900e-003**		**0.2922**	**0.2922**		**0.2727**	**0.2727**		**878.4964**	**878.4964**	**0.2408**		**884.5153**

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

Attachment H

PROJECT PHASE 2 MITIGATION REPORT

PREPARED BY SWCA ENVIRONMENTAL CONSULTANTS, INC.

Haskins Way Rezone Phase II

San Mateo County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Demolition	0.72	0.56	-0.07	0.00	0.92	0.92	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping and Site Improvements	0.70	0.83	-0.10	0.00	0.91	0.91	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Core Construction	0.70	0.57	-0.11	0.00	0.93	0.92	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Exterior Improvements	0.06	0.63	-0.18	0.00	0.91	0.90	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Tenant Improvements	0.07	0.64	-0.25	0.00	0.91	0.91	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Underground	0.77	0.87	-0.16	0.00	0.95	0.94	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Core Construction	0.65	0.58	-0.12	0.00	0.86	0.86	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Exterior Improvements	0.75	0.69	-0.18	0.00	0.92	0.92	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Underground	0.74	0.84	-0.20	0.00	0.93	0.93	0.00	0.00	0.00	0.00	0.00	0.00
Site Prep and Make Ready	0.73	0.87	-0.28	0.00	0.91	0.90	0.00	0.00	0.00	0.00	0.00	0.00
Soils Abatement/Remove/Replace	0.70	0.72	-0.20	0.00	0.90	0.89	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Aerial Lifts	Diesel	Tier 4 Final	10	10	No Change	0.00
Air Compressors	Diesel	Tier 4 Final	7	7	No Change	0.00
Bore/Drill Rigs	Diesel	Tier 4 Final	5	5	No Change	0.00

Cement and Mortar Mixers	Diesel	No Change	0	8	No Change	0.00
Concrete/Industrial Saws	Diesel	Tier 4 Final	2	2	No Change	0.00
Cranes	Diesel	Tier 4 Final	4	4	No Change	0.00
Crawler Tractors	Diesel	Tier 4 Final	1	1	No Change	0.00
Dumpers/Tenders	Diesel	No Change	0	5	No Change	0.00
Excavators	Diesel	Tier 4 Final	9	9	No Change	0.00
Forklifts	Diesel	Tier 4 Final	1	1	No Change	0.00
Generator Sets	Diesel	Tier 4 Final	4	4	No Change	0.00
Off-Highway Trucks	Diesel	Tier 4 Final	15	15	No Change	0.00
Other General Industrial Equipment	Diesel	Tier 4 Final	3	3	No Change	0.00
Paving Equipment	Diesel	Tier 4 Final	2	2	No Change	0.00
Plate Compactors	Diesel	No Change	0	11	No Change	0.00
Pressure Washers	Diesel	No Change	0	2	No Change	0.00
Pumps	Diesel	Tier 4 Final	1	1	No Change	0.00
Rollers	Diesel	Tier 4 Final	2	2	No Change	0.00
Rough Terrain Forklifts	Diesel	Tier 4 Final	13	13	No Change	0.00
Rubber Tired Dozers	Diesel	Tier 4 Final	4	4	No Change	0.00
Rubber Tired Loaders	Diesel	Tier 4 Final	6	6	No Change	0.00
Scrapers	Diesel	Tier 4 Final	4	4	No Change	0.00
Skid Steer Loaders	Diesel	Tier 4 Final	2	2	No Change	0.00
Sweepers/Scrubbers	Diesel	Tier 4 Final	8	8	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	11	11	No Change	0.00
Trenchers	Diesel	Tier 4 Final	6	6	No Change	0.00
Welders	Diesel	Tier 4 Final	13	13	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Aerial Lifts	2.51100E-002	3.98560E-001	7.41410E-001	1.14000E-003	7.54000E-003	6.94000E-003	0.00000E+000	9.99767E+001	9.99767E+001	3.23300E-002	0.00000E+000	1.00785E+002
Air Compressors	1.45050E-001	1.00800E+000	1.22291E+000	2.00000E-003	6.12800E-002	6.12800E-002	0.00000E+000	1.71855E+002	1.71855E+002	1.16700E-002	0.00000E+000	1.72147E+002
Bore/Drill Rigs	1.67500E-002	2.00130E-001	1.32320E-001	6.00000E-004	5.99000E-003	5.51000E-003	0.00000E+000	5.27169E+001	5.27169E+001	1.70500E-002	0.00000E+000	5.31431E+001
Cement and Mortar Mixers	1.26300E-002	7.91600E-002	6.63000E-002	1.50000E-004	3.08000E-003	3.08000E-003	0.00000E+000	9.85294E+000	9.85294E+000	1.02000E-003	0.00000E+000	9.87851E+000
Concrete/Industrial Saws	6.27000E-003	4.94800E-002	5.53000E-002	9.00000E-005	2.97000E-003	2.97000E-003	0.00000E+000	8.06484E+000	8.06484E+000	5.10000E-004	0.00000E+000	8.07762E+000
Cranes	1.12490E-001	1.31344E+000	5.44200E-001	1.59000E-003	5.34800E-002	4.92000E-002	0.00000E+000	1.40029E+002	1.40029E+002	4.52900E-002	0.00000E+000	1.41161E+002
Crawler Tractors	2.89000E-003	3.72400E-002	1.25000E-002	4.00000E-005	1.40000E-003	1.29000E-003	0.00000E+000	3.44906E+000	3.44906E+000	1.12000E-003	0.00000E+000	3.47695E+000
Dumpers/Tenders	6.01000E-003	3.80500E-002	2.05400E-002	6.00000E-005	1.43000E-003	1.43000E-003	0.00000E+000	4.52639E+000	4.52639E+000	4.90000E-004	0.00000E+000	4.53853E+000
Excavators	2.10100E-002	2.00090E-001	2.94370E-001	4.70000E-004	9.70000E-003	8.92000E-003	0.00000E+000	4.08374E+001	4.08374E+001	1.32100E-002	0.00000E+000	4.11676E+001
Forklifts	1.26000E-003	1.13500E-002	1.03300E-002	1.00000E-005	8.50000E-004	7.80000E-004	0.00000E+000	1.17505E+000	1.17505E+000	3.80000E-004	0.00000E+000	1.18455E+000
Generator Sets	1.25100E-002	1.10820E-001	1.28960E-001	2.30000E-004	5.87000E-003	5.87000E-003	0.00000E+000	1.97823E+001	1.97823E+001	1.01000E-003	0.00000E+000	1.98075E+001
Off-Highway Trucks	2.00640E-001	1.68278E+000	1.21855E+000	4.56000E-003	6.15000E-002	5.65800E-002	0.00000E+000	4.00791E+002	4.00791E+002	1.29620E-001	0.00000E+000	4.04032E+002
Other General Industrial Equipment	1.19400E-002	1.11610E-001	1.21610E-001	1.60000E-004	7.24000E-003	6.66000E-003	0.00000E+000	1.40343E+001	1.40343E+001	4.54000E-003	0.00000E+000	1.41477E+001
Paving Equipment	2.06000E-002	2.02450E-001	2.89500E-001	4.60000E-004	9.90000E-003	9.11000E-003	0.00000E+000	4.07058E+001	4.07058E+001	1.31700E-002	0.00000E+000	4.10349E+001
Plate Compactors	6.39000E-003	4.00500E-002	3.35400E-002	8.00000E-005	1.56000E-003	1.56000E-003	0.00000E+000	4.98512E+000	4.98512E+000	5.20000E-004	0.00000E+000	4.99806E+000
Pressure Washers	8.20000E-004	5.76000E-003	4.61000E-003	1.00000E-005	2.60000E-004	2.60000E-004	0.00000E+000	6.73780E-001	6.73780E-001	7.00000E-005	0.00000E+000	6.75450E-001
Pumps	1.42700E-002	1.20380E-001	1.40270E-001	2.50000E-004	6.66000E-003	6.66000E-003	0.00000E+000	2.11953E+001	2.11953E+001	1.16000E-003	0.00000E+000	2.12242E+001
Rollers	1.39000E-002	1.43580E-001	1.51490E-001	2.10000E-004	8.39000E-003	7.72000E-003	0.00000E+000	1.87295E+001	1.87295E+001	6.06000E-003	0.00000E+000	1.88809E+001
Rough Terrain Forklifts	5.85700E-002	7.69630E-001	1.13019E+000	1.70000E-003	2.87200E-002	2.64200E-002	0.00000E+000	1.49311E+002	1.49311E+002	4.82900E-002	0.00000E+000	1.50518E+002
Rubber Tired Dozers	7.34300E-002	7.70970E-001	3.00960E-001	6.80000E-004	3.70100E-002	3.40500E-002	0.00000E+000	6.00300E+001	6.00300E+001	1.94100E-002	0.00000E+000	6.05153E+001

Rubber Tired Loaders	2.05100E-002	2.35950E-001	9.28500E-002	3.60000E-004	7.85000E-003	7.22000E-003	0.00000E+000	3.15690E+001	3.15690E+001	1.02100E-002	0.00000E+000	3.18242E+001
Scrapers	3.51400E-002	4.11850E-001	2.64250E-001	5.50000E-004	1.60500E-002	1.47700E-002	0.00000E+000	4.82544E+001	4.82544E+001	1.56100E-002	0.00000E+000	4.86446E+001
Skid Steer Loaders	4.05000E-003	5.40000E-002	7.80800E-002	1.20000E-004	2.09000E-003	1.92000E-003	0.00000E+000	1.02225E+001	1.02225E+001	3.31000E-003	0.00000E+000	1.03052E+001
Sweepers/Scrubbers	4.30500E-002	3.91760E-001	3.87360E-001	5.10000E-004	2.79300E-002	2.57000E-002	0.00000E+000	4.46376E+001	4.46376E+001	1.44400E-002	0.00000E+000	4.49985E+001
Tractors/Loaders/Backhoes	3.02300E-002	3.05960E-001	3.69600E-001	5.10000E-004	1.78900E-002	1.64600E-002	0.00000E+000	4.47111E+001	4.47111E+001	1.44600E-002	0.00000E+000	4.50726E+001
Trenchers	3.25100E-002	2.98530E-001	2.21540E-001	2.90000E-004	2.16800E-002	1.99400E-002	0.00000E+000	2.52092E+001	2.52092E+001	8.15000E-003	0.00000E+000	2.54131E+001
Welders	2.41560E-001	1.22008E+000	1.39540E+000	2.08000E-003	5.84200E-002	5.84200E-002	0.00000E+000	1.53282E+002	1.53282E+002	1.95800E-002	0.00000E+000	1.53772E+002

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Aerial Lifts	2.80100E-002	6.39600E-001	8.63690E-001	1.14000E-003	1.87000E-003	1.87000E-003	0.00000E+000	9.99766E+001	9.99766E+001	3.23300E-002	0.00000E+000	1.00785E+002
Air Compressors	2.00000E-002	8.66700E-002	1.23336E+000	2.00000E-003	2.67000E-003	2.67000E-003	0.00000E+000	1.71855E+002	1.71855E+002	1.16700E-002	0.00000E+000	1.72147E+002
Bore/Drill Rigs	7.45000E-003	3.23000E-002	2.73330E-001	6.00000E-004	9.90000E-004	9.90000E-004	0.00000E+000	5.27168E+001	5.27168E+001	1.70500E-002	0.00000E+000	5.31431E+001
Cement and Mortar Mixers	1.26300E-002	7.91600E-002	6.63000E-002	1.50000E-004	3.08000E-003	3.08000E-003	0.00000E+000	9.85293E+000	9.85293E+000	1.02000E-003	0.00000E+000	9.87850E+000
Concrete/Industrial Saws	9.40000E-004	4.07000E-003	5.78800E-002	9.00000E-005	1.30000E-004	1.30000E-004	0.00000E+000	8.06484E+000	8.06484E+000	5.10000E-004	0.00000E+000	8.07761E+000
Cranes	1.95800E-002	8.48600E-002	7.18060E-001	1.59000E-003	2.61000E-003	2.61000E-003	0.00000E+000	1.40029E+002	1.40029E+002	4.52900E-002	0.00000E+000	1.41161E+002
Crawler Tractors	4.80000E-004	2.09000E-003	1.76900E-002	4.00000E-005	6.00000E-005	6.00000E-005	0.00000E+000	3.44906E+000	3.44906E+000	1.12000E-003	0.00000E+000	3.47695E+000
Dumpers/Tenders	6.01000E-003	3.80500E-002	2.05400E-002	6.00000E-005	1.43000E-003	1.43000E-003	0.00000E+000	4.52638E+000	4.52638E+000	4.90000E-004	0.00000E+000	4.53853E+000
Excavators	5.72000E-003	2.47800E-002	3.52620E-001	4.70000E-004	7.60000E-004	7.60000E-004	0.00000E+000	4.08373E+001	4.08373E+001	1.32100E-002	0.00000E+000	4.11675E+001
Forklifts	1.60000E-004	7.10000E-004	1.01600E-002	1.00000E-005	2.00000E-005	2.00000E-005	0.00000E+000	1.17505E+000	1.17505E+000	3.80000E-004	0.00000E+000	1.18455E+000
Generator Sets	2.30000E-003	9.98000E-003	1.41970E-001	2.30000E-004	3.10000E-004	3.10000E-004	0.00000E+000	1.97822E+001	1.97822E+001	1.01000E-003	0.00000E+000	1.98075E+001
Off-Highway Trucks	5.58500E-002	2.42020E-001	2.04788E+000	4.56000E-003	7.45000E-003	7.45000E-003	0.00000E+000	4.00790E+002	4.00790E+002	1.29620E-001	0.00000E+000	4.04031E+002
Other General Industrial Equipment	1.97000E-003	8.56000E-003	1.21790E-001	1.60000E-004	2.60000E-004	2.60000E-004	0.00000E+000	1.40343E+001	1.40343E+001	4.54000E-003	0.00000E+000	1.41477E+001

Paving Equipment	5.72000E-003	2.47900E-002	3.52740E-001	4.60000E-004	7.60000E-004	7.60000E-004	0.00000E+000	4.07058E+001	4.07058E+001	1.31700E-002	0.00000E+000	4.10349E+001
Plate Compactors	6.39000E-003	4.00500E-002	3.35400E-002	8.00000E-005	1.56000E-003	1.56000E-003	0.00000E+000	4.98511E+000	4.98511E+000	5.20000E-004	0.00000E+000	4.99805E+000
Pressure Washers	8.20000E-004	5.76000E-003	4.61000E-003	1.00000E-005	2.60000E-004	2.60000E-004	0.00000E+000	6.73770E-001	6.73770E-001	7.00000E-005	0.00000E+000	6.75450E-001
Pumps	2.47000E-003	1.06900E-002	1.52110E-001	2.50000E-004	3.30000E-004	3.30000E-004	0.00000E+000	2.11953E+001	2.11953E+001	1.16000E-003	0.00000E+000	2.12242E+001
Rollers	2.61000E-003	1.13300E-002	1.61180E-001	2.10000E-004	3.50000E-004	3.50000E-004	0.00000E+000	1.87294E+001	1.87294E+001	6.06000E-003	0.00000E+000	1.88809E+001
Rough Terrain Forklifts	2.08700E-002	9.04500E-002	1.28719E+000	1.70000E-003	2.78000E-003	2.78000E-003	0.00000E+000	1.49311E+002	1.49311E+002	4.82900E-002	0.00000E+000	1.50518E+002
Rubber Tired Dozers	8.36000E-003	3.62400E-002	3.06690E-001	6.80000E-004	1.12000E-003	1.12000E-003	0.00000E+000	6.00299E+001	6.00299E+001	1.94100E-002	0.00000E+000	6.05153E+001
Rubber Tired Loaders	4.45000E-003	1.92700E-002	1.63050E-001	3.60000E-004	5.90000E-004	5.90000E-004	0.00000E+000	3.15689E+001	3.15689E+001	1.02100E-002	0.00000E+000	3.18242E+001
Scrapers	6.76000E-003	2.92800E-002	2.47780E-001	5.50000E-004	9.00000E-004	9.00000E-004	0.00000E+000	4.82544E+001	4.82544E+001	1.56100E-002	0.00000E+000	4.86445E+001
Skid Steer Loaders	2.86000E-003	6.53800E-002	8.82800E-002	1.20000E-004	1.90000E-004	1.90000E-004	0.00000E+000	1.02225E+001	1.02225E+001	3.31000E-003	0.00000E+000	1.03052E+001
Sweepers/Scrubbers	1.24500E-002	2.84360E-001	3.83990E-001	5.10000E-004	8.30000E-004	8.30000E-004	0.00000E+000	4.46375E+001	4.46375E+001	1.44400E-002	0.00000E+000	4.49984E+001
Tractors/Loaders/Backhoes	6.22000E-003	2.69500E-002	3.83510E-001	5.10000E-004	8.30000E-004	8.30000E-004	0.00000E+000	4.47110E+001	4.47110E+001	1.44600E-002	0.00000E+000	4.50725E+001
Trenchers	3.51000E-003	1.52000E-002	2.16330E-001	2.90000E-004	4.70000E-004	4.70000E-004	0.00000E+000	2.52092E+001	2.52092E+001	8.15000E-003	0.00000E+000	2.54130E+001
Welders	3.56800E-002	8.17620E-001	1.21900E+000	2.08000E-003	2.38000E-003	2.38000E-003	0.00000E+000	1.53282E+002	1.53282E+002	1.95800E-002	0.00000E+000	1.53772E+002

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Aerial Lifts	-1.15492E-001	-6.04777E-001	-1.64929E-001	0.00000E+000	7.51989E-001	7.30548E-001	0.00000E+000	1.20028E-006	1.20028E-006	0.00000E+000	0.00000E+000	1.19065E-006
Air Compressors	8.62117E-001	9.14018E-001	-8.54519E-003	0.00000E+000	9.56430E-001	9.56430E-001	0.00000E+000	1.16377E-006	1.16377E-006	0.00000E+000	0.00000E+000	1.16180E-006
Bore/Drill Rigs	5.55224E-001	8.38605E-001	-1.06567E+000	0.00000E+000	8.34725E-001	8.20327E-001	0.00000E+000	1.13816E-006	1.13816E-006	0.00000E+000	0.00000E+000	1.31720E-006
Cement and Mortar Mixers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.01493E-006	1.01493E-006	0.00000E+000	0.00000E+000	1.01230E-006
Concrete/Industrial Saws	8.50080E-001	9.17745E-001	-4.66546E-002	0.00000E+000	9.56229E-001	9.56229E-001	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.23799E-006
Cranes	8.25940E-001	9.35391E-001	-3.19478E-001	0.00000E+000	9.51197E-001	9.46951E-001	0.00000E+000	1.14262E-006	1.14262E-006	0.00000E+000	0.00000E+000	1.20430E-006
Crawler Tractors	8.33910E-001	9.43878E-001	-4.15200E-001	0.00000E+000	9.57143E-001	9.53488E-001	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000

Dumpers/Tenders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	2.20927E-006	2.20927E-006	0.00000E+000	0.00000E+000	0.00000E+000
Excavators	7.27749E-001	8.76156E-001	-1.97880E-001	0.00000E+000	9.21649E-001	9.14798E-001	0.00000E+000	1.22437E-006	1.22437E-006	0.00000E+000	0.00000E+000	1.21455E-006
Forklifts	8.73016E-001	9.37445E-001	1.64569E-002	0.00000E+000	9.76471E-001	9.74359E-001	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Generator Sets	8.16147E-001	9.09944E-001	-1.00884E-001	0.00000E+000	9.47189E-001	9.47189E-001	0.00000E+000	1.01101E-006	1.01101E-006	0.00000E+000	0.00000E+000	1.51458E-006
Off-Highway Trucks	7.21641E-001	8.56178E-001	-6.80588E-001	0.00000E+000	8.78862E-001	8.68328E-001	0.00000E+000	1.17268E-006	1.17268E-006	0.00000E+000	0.00000E+000	1.18803E-006
Other General Industrial Equipment	8.35008E-001	9.23304E-001	-1.48014E-003	0.00000E+000	9.64088E-001	9.60961E-001	0.00000E+000	1.42508E-006	1.42508E-006	0.00000E+000	0.00000E+000	7.06827E-007
Paving Equipment	7.22330E-001	8.77550E-001	-2.18446E-001	0.00000E+000	9.23232E-001	9.16575E-001	0.00000E+000	9.82661E-007	9.82661E-007	0.00000E+000	0.00000E+000	1.21847E-006
Plate Compactors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	2.00597E-006	2.00597E-006	0.00000E+000	0.00000E+000	2.00078E-006
Pressure Washers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.48416E-005	1.48416E-005	0.00000E+000	0.00000E+000	0.00000E+000
Pumps	8.26910E-001	9.11198E-001	-8.44086E-002	0.00000E+000	9.50450E-001	9.50450E-001	0.00000E+000	1.41541E-006	1.41541E-006	0.00000E+000	0.00000E+000	9.42320E-007
Rollers	8.12230E-001	9.21089E-001	-6.39646E-002	0.00000E+000	9.58284E-001	9.54663E-001	0.00000E+000	1.06784E-006	1.06784E-006	0.00000E+000	0.00000E+000	1.58891E-006
Rough Terrain Forklifts	6.43674E-001	8.82476E-001	-1.38915E-001	0.00000E+000	9.03203E-001	8.94777E-001	0.00000E+000	1.20554E-006	1.20554E-006	0.00000E+000	0.00000E+000	1.19587E-006
Rubber Tired Dozers	8.86150E-001	9.52994E-001	-1.90391E-002	0.00000E+000	9.69738E-001	9.67107E-001	0.00000E+000	1.16608E-006	1.16608E-006	0.00000E+000	0.00000E+000	1.15673E-006
Rubber Tired Loaders	7.83033E-001	9.18330E-001	-7.56058E-001	0.00000E+000	9.24841E-001	9.18283E-001	0.00000E+000	1.26707E-006	1.26707E-006	0.00000E+000	0.00000E+000	1.25690E-006
Scrapers	8.07627E-001	9.28906E-001	6.23273E-002	0.00000E+000	9.43925E-001	9.39066E-001	0.00000E+000	1.24341E-006	1.24341E-006	0.00000E+000	0.00000E+000	1.23344E-006
Skid Steer Loaders	2.93827E-001	-2.10741E-001	-1.30635E-001	0.00000E+000	9.09091E-001	9.01042E-001	0.00000E+000	9.78233E-007	9.78233E-007	0.00000E+000	0.00000E+000	9.70388E-007
Sweepers/Scrubbers	7.10801E-001	2.74147E-001	8.69992E-003	0.00000E+000	9.70283E-001	9.67704E-001	0.00000E+000	1.12013E-006	1.12013E-006	0.00000E+000	0.00000E+000	1.33338E-006
Tractors/Loaders/Backhoes	7.94244E-001	9.11917E-001	-3.76353E-002	0.00000E+000	9.53605E-001	9.49575E-001	0.00000E+000	1.11829E-006	1.11829E-006	0.00000E+000	0.00000E+000	1.10932E-006
Trenchers	8.92033E-001	9.49084E-001	2.35172E-002	0.00000E+000	9.78321E-001	9.76429E-001	0.00000E+000	1.19004E-006	1.19004E-006	0.00000E+000	0.00000E+000	1.18050E-006
Welders	8.52293E-001	3.29864E-001	1.26415E-001	0.00000E+000	9.59261E-001	9.59261E-001	0.00000E+000	1.17430E-006	1.17430E-006	0.00000E+000	0.00000E+000	1.17057E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input	Mitigation Input	Mitigation Input

No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
No	Replace Ground Cover of Area Disturbed	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	0.00		
No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Demolition	Fugitive Dust	0.02	0.00	0.01	0.00	0.55	0.55
Demolition	Roads	0.01	0.00	0.01	0.00	0.00	0.00
Landscaping and Site Improvements	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping and Site Improvements	Roads	0.01	0.00	0.01	0.00	0.00	0.00
Office Building Core Construction	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Core Construction	Roads	0.16	0.04	0.16	0.04	0.00	0.00
Office Building Exterior Improvements	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Exterior Improvements	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Tenant Improvements	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Tenant Improvements	Roads	0.02	0.00	0.02	0.00	0.00	0.00
Office Building Underground	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Office Building Underground	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Core Construction	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Core Construction	Roads	0.02	0.01	0.02	0.01	0.00	0.00
Parking Garage Exterior Improvements	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Exterior Improvements	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Underground	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Parking Garage Underground	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Site Prep and Make Ready	Fugitive Dust	0.06	0.01	0.03	0.00	0.55	0.55
Site Prep and Make Ready	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Soils Abatement/Remove/Replace	Fugitive Dust	0.00	0.00	0.00	0.00	0.54	0.55
Soils Abatement/Remove/Replace	Roads	0.01	0.00	0.01	0.00	0.00	0.00

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	0.09	0.30		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			

No	Neighborhood Enhancements	Improve Pedestrian Network				
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.00			
No	Commute	Implement Trip Reduction Program				
No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"				
No	Commute	Workplace Parking Charge				
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program				
	Commute	Commute Subtotal	0.00			

No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	100.00
No	Use Low VOC Paint (Residential Exterior)	150.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	150.00
No	Use Low VOC Paint (Parking)	150.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy		
No	Use Reclaimed Water		
No	Use Grey Water		
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction		
No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape		

Solid Waste Mitigation

Mitigation Measures	Input Value

Institute Recycling and Composting Services Percent Reduction in Waste Disposed	