CITY of SAN BRUNO

COMMUNITY DEVELOPMENT DEPARTMENT

San Francisco Police Credit Union New Administration Building Project

INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

November 2015

Prepared by:

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INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

November 2015

A. BACKGROUND

1. Project Title: San Francisco Police Credit Union New Administration Building

2. Lead Agency Name and Address: City of San Bruno
Community Development Department
567 El Camino Real
San Bruno, CA 94066-4247

3. Contact Person and Phone Number: Matt Neuebaumer
Associate Planner
(650) 616-7074

4. Project Location: 1250 Grundy Lane
San Bruno, CA94066

5. Project Sponsor's Name and Address: Janet Goodman
Program Director
NewGround
15450 South Outer Forty Drive, Suite 300
Chesterfield, MO 63017

6. Existing General Plan Designation: Regional Office

8. Existing Zoning Designation: Planned Development (P-D)

10. Project Description Summary:

The proposed project includes the construction of a three-story, 67,586-square-foot (sf) office building with subsurface parking on a 1.7-acre site located at 1250 Grundy Lane, San Bruno, California. The office building would serve as the San Francisco Police Credit Union new administration building and would include a large reception area, work stations, meeting rooms, a small retail credit union branch, a staff lounge, a training room, a break room, and 16,560 sf of future office expansion or lease space. The necessary entitlements being reviewed by the City of San Bruno include a P-D Amendment, Planned Development Permit, and an Architectural Review Permit.

B. SOURCES

The following documents are referenced information sources utilized by this analysis:

1. Association of Bay Area Governments. Interactive Liquefaction Hazard Map. Available at: http://quake.abag.ca.gov/earthquakes/#LIQUEFACTION. Accessed November 2015.
2. Bay Area Air Quality Management District. Plans & Climate. Available at: http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans.aspx. Accessed November 2015.
3. Bay Area Air Quality Management District. Air Quality Standards and Attainment Status. Available at: http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status. Accessed November 2015.
4. Bay Area Air Quality Management District. *California Environmental Quality Act Air Quality Guidelines*. May 2011.
5. BKF Engineers. *C.3 Regulated Projects Checklist*. October 26, 2015.
6. BKF Engineers. *Rainwater Harvesting and Use Feasibility Worksheet*. November 15, 2011.
7. California Air Resources Board. *Air Quality and Land Use Handbook: A Community Health Perspective*. April 2005.
8. Callander Associates. *Landscape Plan SF Police Credit Union San Bruno, California*. March 28, 2013.
9. City of San Bruno. *Climate Action Plan Public Review Draft*. October 2012.
10. City of San Bruno. *Local Hazard Mitigation Plan ANNEX City of San Bruno*. March 27, 2007.
11. City of San Bruno. Personal communication with Joseph Cervantes, Associate Civil Engineer. July 23, 2013.
12. City of San Bruno. *San Bruno Municipal Code*. 1999.
13. Cornerstone Earth Group. *Design-Level Geotechnical Investigation*. December 20, 2012.
14. Cornerstone Earth Group. *Phase I Environmental Site Assessment*. January 16, 2013.
15. Crane Transportation Group. *Transportation & Circulation Report for the 1250 Grundy Lane Project*. August 27, 2015.
16. Dyett & Bhatia. *San Bruno 2025: General Plan Draft Environmental Impact Report Revised After Public Review*. December 2008.
17. Dyett & Bhatia. *San Bruno General Plan*. December 2008.
18. ENVIRON International Corporation and the California Air Districts. *California Emissions Estimator Model User's Guide Version 2013.2*. July 2013.
19. Federal Aviation Administration. *Notice Criteria Tool*. Available at: https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp. Accessed August 8, 2013.
20. NewGround. *SF Police Credit Union Headquarters*. May 15, 2013.
21. Thomas D. Auer, AIA, NewGround International, Inc. *SF Police Credit Union Headquarters San Bruno, California 94066* (Complete Plan Set). August 12, 2013.

C. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is "Less Than Significant with Mitigation Incorporated" as indicated by the checklist on the following pages.

☐ **Aesthetics**	☐ **Agriculture & Forest Resources**	✖ **Air Quality**
✖ **Biological Resources**	✖ **Cultural Resources**	✖ **Geology & Soils**
☐ **Greenhouse Gas Emissions**	✖ **Hazards and Hazardous Materials**	☐ **Hydrology & Water Quality**
☐ **Land Use and Planning**	☐ **Mineral Resources**	☐ **Noise**
☐ **Population & Housing**	☐ **Public Services**	☐ **Recreation**
✖ **Transportation/Circulation**	☐ **Utilities & Service Systems**	☐ **Mandatory Findings of Significance**

D. DETERMINATION

On the basis of this initial study:

☐ I find that the Proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

✖ I find that although the Proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the applicant. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the Proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature	Date
Matt Neuebaumer, Associate Planner	City of San Bruno
Printed Name	For

E. BACKGROUND AND INTRODUCTION

This Initial Study/Mitigated Negative Declaration (IS/MND) identifies and analyzes the potential environmental impacts of the San Francisco Police Credit Union New Administration Building Project (proposed project). The information and analysis presented in this document is organized in accordance with the order of the California Environmental Quality Act (CEQA) checklist in Appendix G of the CEQA Guidelines. If the analysis provided in this document identifies potentially significant environmental effects of the project, mitigation measures that should be applied to the project are prescribed. The mitigation measures prescribed for environmental effects described in this IS/MND will be implemented in conjunction with the project, as required by CEQA. The mitigation measures will be incorporated into the project through project conditions of approval. The City will adopt findings and a Mitigation Monitoring and Reporting Program for the project in conjunction with approval of the project.

The City of San Bruno completed their General Plan and associated Environmental Impact Report (EIR) in December 2008, and adopted the same documents on March 24, 2009. The General Plan EIR is a program EIR, prepared pursuant to Section 15168 of the CEQA Guidelines (Title 14, California Code of Regulations, Sections 15000 *et seq*.), and includes an examination of the potential wide-ranging effects resulting from implementation of the General Plan land use diagram. Measures to mitigate the significant adverse project and cumulative impacts associated with the General Plan were identified in the General Plan EIR.

The environmental setting and impact discussion for each section of this IS/MND have been largely based on information in the City's General Plan and associated EIR. In addition, detailed technical reports have been prepared for the proposed project, including a Design-Level Geotechnical Investigation and Phase I Environmental Site Assessment by Cornerstone Earth Group, and a Traffic Study by Crane Transportation Group. All technical reports used in the preparation of this IS/MND are available at the City of San Bruno upon request.

F. PROJECT DESCRIPTION

Project Location and Existing Conditions

The proposed project is located on an approximately 1.7-acre site at 1250 Grundy Lane in the City of San Bruno, California (see Figure 1, Regional Project Location). The project site is bounded by Interstate 380 (I-380) to the north and Grundy Lane to the south. An 8,300-square-foot (sf) restaurant building (previously a TGI Fridays) was constructed on the northern portion of the project site in 1979, with associated surface parking making up the remainder of the site (see Figure 2, Project Vicinity Map); however, the building was demolished in May 2014.
The project site has a General Plan land use designation of Regional Office, a zoning designation of Planned Development (P-D), and is located within the Bayhill Office Park. The greater Bayhill Office Park contains 1.5 million sf of office space. As such, existing office buildings surround the project site. Three-story office developments are located to the west and to the east of the site. Additional office buildings are located south of the project site as well.

Figure 1
Regional Location Map

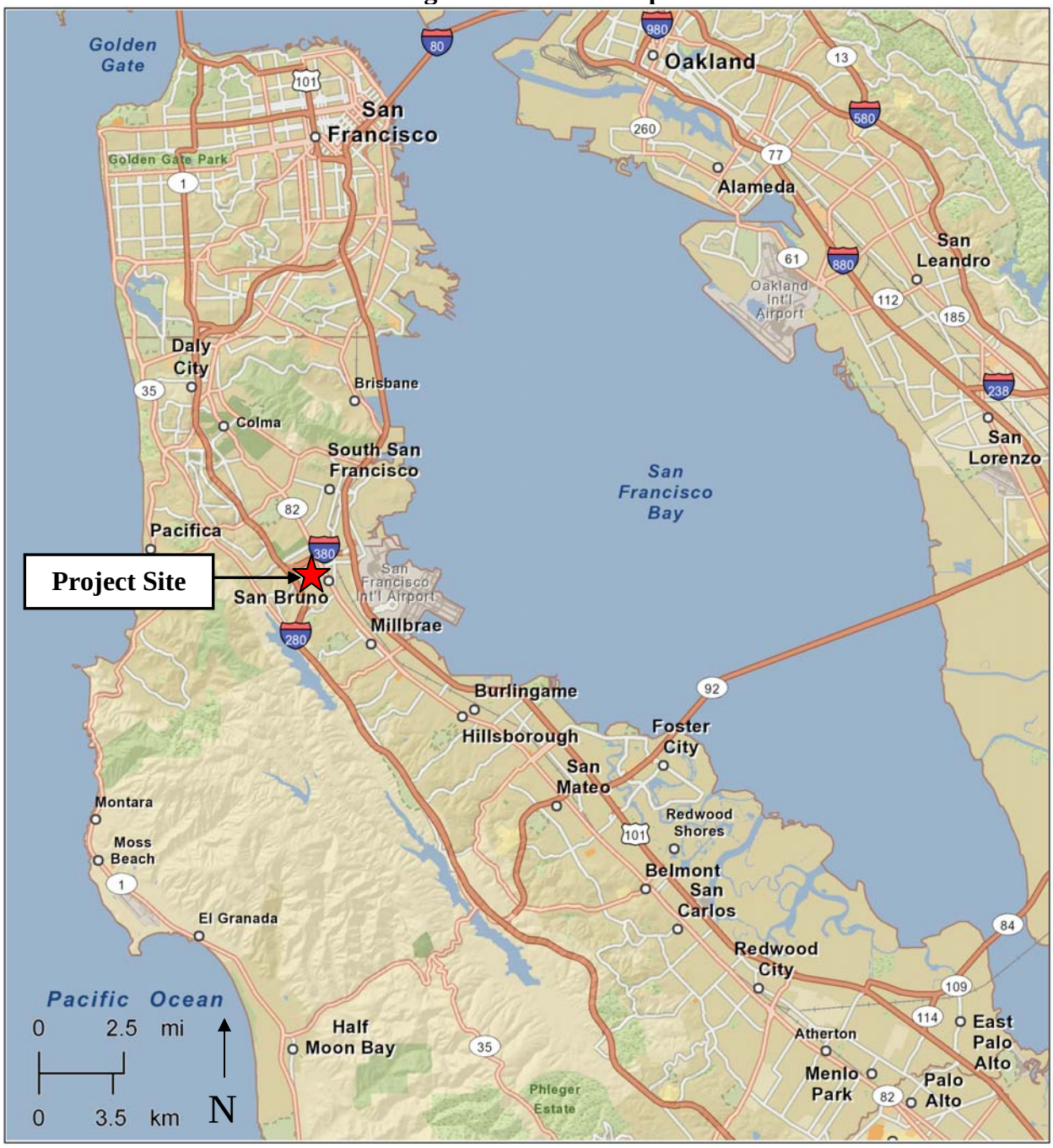


Figure 2
Project Vicinity Map

Vegetation on-site consists of ornamental landscaping, including heritage trees. Heritage trees are defined by the City per the City's Heritage Tree Ordinance, Chapter 8.25 of the City's Municipal Code, as follows:

1. Any native bay (Umbellularia californica), buckeye (Aesculus species), oak (Quercus species), redwood (Sequoia sempervirens), or pine (Pinus radiata) tree that has a diameter of six inches or more measured at fifty-four inches above natural grade;
2. Any tree or stand of trees designated by resolution of the city council to be of special historical value or of significant community benefit;
3. A stand of trees, the nature of which makes each dependent on the others for survival; or
4. Any other tree with a trunk diameter of ten inches or more, measured at fifty-four inches above natural grade.

Proposed Project

The proposed project consists of the construction of a three-story, 67,586 sf office building with a two-level subsurface parking garage (see Figure 3, Project Site Plan). The 24,941 sf first floor of the office building would include a large reception area, meeting rooms, a small retail credit union branch for San Francisco Police Credit Union (SFPCU) members, and 16,560 sf of future office expansion or potential lease space. The 20,863 sf second floor would include various office work stations, and a staff lounge. The 21,782 sf third floor would include various work stations, conference rooms, staff lounge, and a café.

A total of 168 parking spaces would be included in the two-level subsurface parking garage – 82 on the upper level and 86 on the lower level. In addition, the proposed project includes 47 spaces of surface level parking. A total of 16 spaces are reserved for fuel efficient vehicles and electric vehicles. Access to the two-level subsurface parking garage would be achieved through a 26-foot-wide access easement along the eastern boundary of the site, which would act as a shared driveway.

The project is anticipated to accommodate the current staff of the existing SFPCU, as well as future employees in relation to future growth in the next ten years. The total number of employees expected at full capacity would be approximately 210. The environmental analysis contained in this IS/MND is based on the maximum employment projection of 210 employees. Typical hours of operation for the SFPCU offices would be Mondays through Fridays from 8:00 AM to 5:00 PM. Hours of operation for the retail credit union branch would be Mondays through Thursdays from 9:00 AM to 4:00 PM and Fridays from 9:00 AM to 5:00 PM.

A number of existing on-site trees, including heritage trees, would be removed in order to accommodate the proposed project. Heritage tree removal is regulated by the City's Heritage Tree Ordinance, which is intended to retain as many trees as possible. A detailed landscaping plan has been prepared for the project, which indicates that the heritage trees would be replaced at a 2:1 ratio, consistent with the City's Heritage Tree Ordinance (see Figure 4, Project Landscape Plan).

Figure 3
Project Site Plan

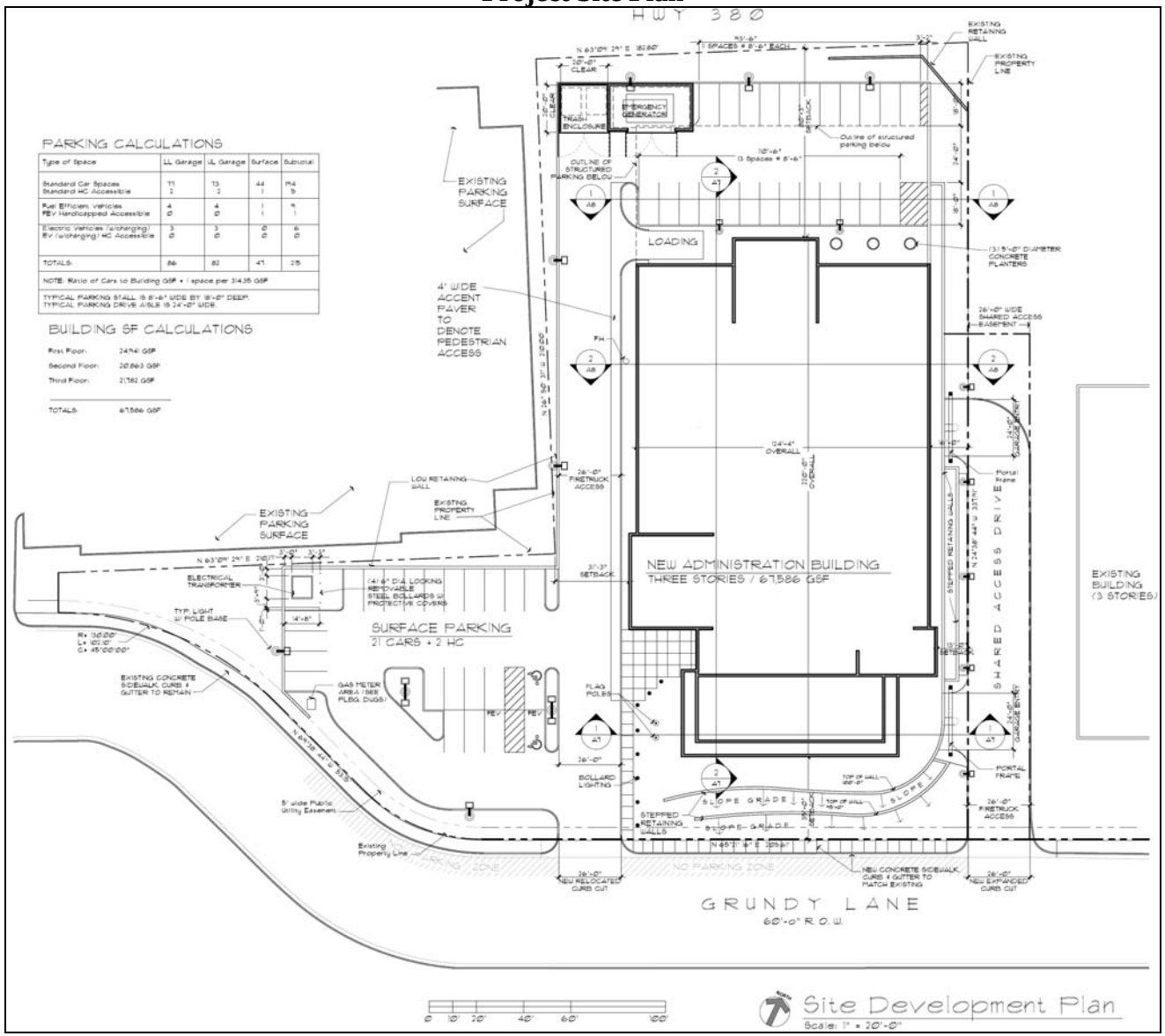
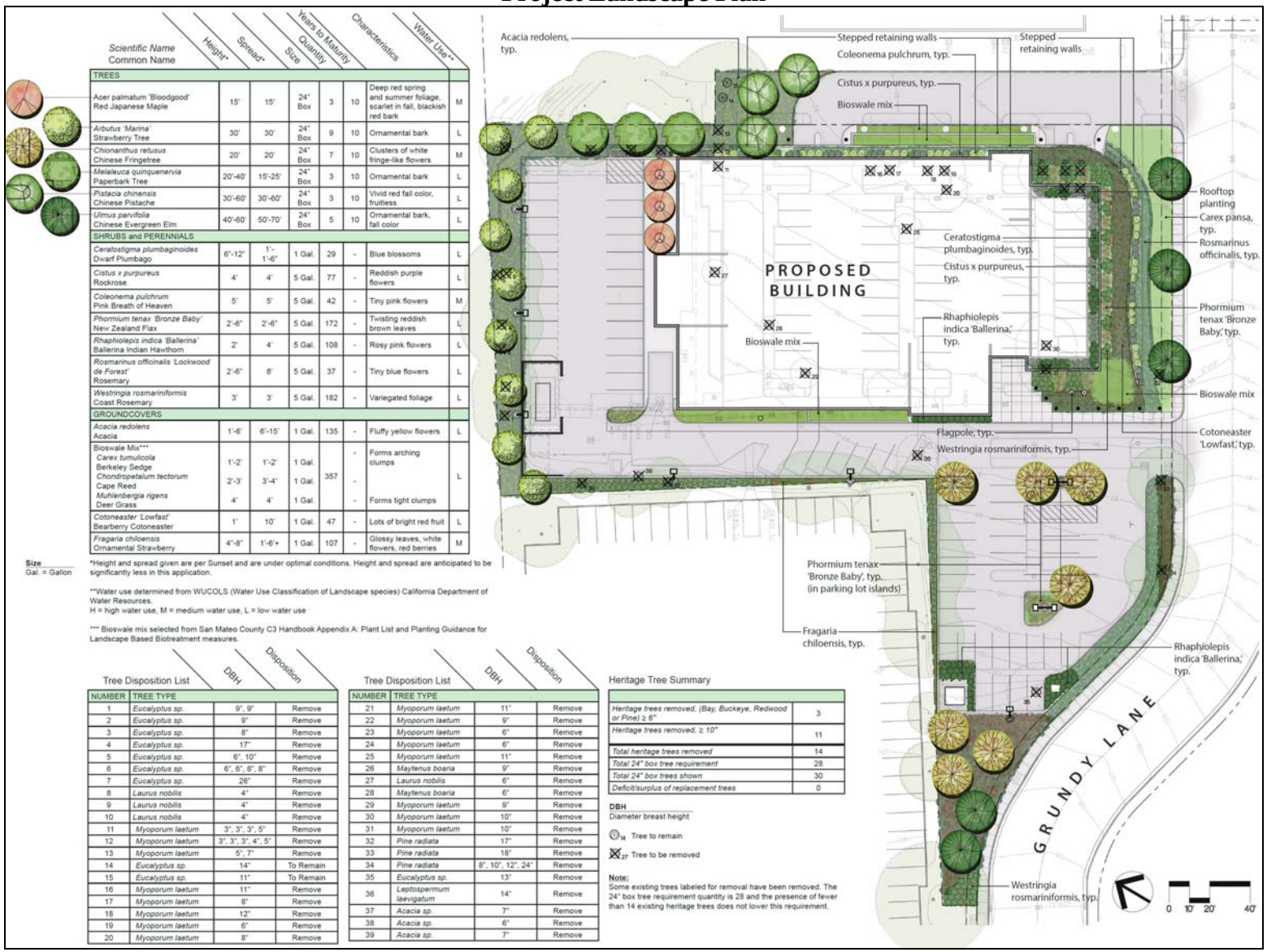


Figure 4
Project Landscape Plan



Scientific Name / Common Name	Height*	Spread*	Size	Quantity	Years to Maturity	Characteristics	Water Use**
TREES							
Acer palmatum 'Bloodgood' Red Japanese Maple	15'	15'	24" Box	3	10	Deep red spring and summer foliage, scarlet in fall, blackish red bark	M
Arbutus 'Marina' Strawberry Tree	30'	30'	24" Box	9	10	Ornamental bark	L
Chionanthus retusus Chinese Fringetree	20'	20'	24" Box	7	10	Clusters of white fringe-like flowers	M
Melaleuca quinquenervia Paperbark Tree	20'-40'	15'-25'	24" Box	3	10	Ornamental bark	L
Pistacia chinensis Chinese Pistache	30'-60'	30'-60'	24" Box	3	10	Vivid red fall color, fruitless	L
Ulmus parvifolia Chinese Evergreen Elm	40'-60'	50'-70'	24" Box	5	10	Ornamental bark, fall color	L
SHRUBS and PERENNIALS							
Ceratostigma plumbaginoides Dwarf Plumbago	6"-12"	1'-1'-6"	1 Gal.	29	-	Blue blossoms	L
Cistus x purpureus Rockrose	4'	4'	5 Gal.	77	-	Reddish purple flowers	L
Coleonema pulchrum Pink Breath of Heaven	5'	5'	5 Gal.	42	-	Tiny pink flowers	M
Phormium tenax 'Bronze Baby' New Zealand Flax	2'-6"	2'-6"	5 Gal.	172	-	Twisting reddish brown leaves	L
Rhaphiolepis indica 'Ballerina' Ballerina Indian Hawthorn	2'	4'	5 Gal.	108	-	Rosy pink flowers	L
Rosmarinus officinalis 'Lockwood de Forest' Rosemary	2'-6"	8'	5 Gal.	37	-	Tiny blue flowers	L
Westringia rosmariniformis Coast Rosemary	3'	3'	5 Gal.	182	-	Variegated foliage	L
GROUNDCOVERS							
Acacia redolens Acacia	1'-6'	6'-15'	1 Gal.	135	-	Fluffy yellow flowers	L
Bioswale Mix***				357			L
Carex tumulicola Berkeley Sedge	1'-2'	1'-2'	1 Gal.		-	Forms arching clumps	
Chondropetalum tectorum Cape Reed	2'-3'	3'-4'	1 Gal.		-		
Muhlenbergia rigens Deer Grass	4'	4'	1 Gal.		-	Forms tight clumps	
Cotoneaster 'Lowfast' Bearberry Cotoneaster	1'	10'	1 Gal.	47	-	Lots of bright red fruit	L
Fragaria chiloensis Ornamental Strawberry	4"-8"	1'-6'+	1 Gal.	107	-	Glossy leaves, white flowers, red berries	M

Size
Gal. = Gallon

*Height and spread given are per Sunset and are under optimal conditions. Height and spread are anticipated to be significantly less in this application.

**Water use determined from WUCOLS (Water Use Classification of Landscape species) California Department of Water Resources.
H = high water use, M = medium water use, L = low water use

*** Bioswale mix selected from San Mateo County C3 Handbook Appendix A: Plant List and Planting Guidance for Landscape Based Biotreatment measures.

Tree Disposition List

NUMBER	TREE TYPE	DBH	Disposition
1	*Eucalyptus sp.*	9", 9"	Remove
2	*Eucalyptus sp.*	9"	Remove
3	*Eucalyptus sp.*	8"	Remove
4	*Eucalyptus sp.*	17"	Remove
5	*Eucalyptus sp.*	6", 10"	Remove
6	*Eucalyptus sp.*	6", 6", 8", 8"	Remove
7	*Eucalyptus sp.*	26"	Remove
8	*Laurus nobilis*	4"	Remove
9	*Laurus nobilis*	4"	Remove
10	*Laurus nobilis*	4"	Remove
11	*Myoporum laetum*	3", 3", 3", 5"	Remove
12	*Myoporum laetum*	3", 3", 3", 4", 5"	Remove
13	*Myoporum laetum*	5", 7"	Remove
14	*Eucalyptus sp.*	14"	To Remain
15	*Eucalyptus sp.*	11"	To Remain
16	*Myoporum laetum*	11"	Remove
17	*Myoporum laetum*	8"	Remove
18	*Myoporum laetum*	12"	Remove
19	*Myoporum laetum*	6"	Remove
20	*Myoporum laetum*	8"	Remove

Tree Disposition List

NUMBER	TREE TYPE	DBH	Disposition
21	*Myoporum laetum*	11"	Remove
22	*Myoporum laetum*	9"	Remove
23	*Myoporum laetum*	6"	Remove
24	*Myoporum laetum*	6"	Remove
25	*Myoporum laetum*	11"	Remove
26	*Maytenus boaria*	9"	Remove
27	*Laurus nobilis*	6"	Remove
28	*Maytenus boaria*	6"	Remove
29	*Myoporum laetum*	9"	Remove
30	*Myoporum laetum*	10"	Remove
31	*Myoporum laetum*	10"	Remove
32	*Pine radiata*	17"	Remove
33	*Pine radiata*	18"	Remove
34	*Pine radiata*	8", 10", 12", 24"	Remove
35	*Eucalyptus sp.*	13"	Remove
36	*Leptospermum laevigatum*	14"	Remove
37	*Acacia sp.*	7"	Remove
38	*Acacia sp.*	6"	Remove
39	*Acacia sp.*	7"	Remove

Heritage Tree Summary

Heritage trees removed, (Bay, Buckeye, Redwood or Pine) ≥ 6"	3
Heritage trees removed, ≥ 10"	11
Total heritage trees removed	14
Total 24" box tree requirement	28
Total 24" box trees shown	30
Deficit/surplus of replacement trees	0

DBH
Diameter breast height

14 Tree to remain

27 Tree to be removed

Note:
Some existing trees labeled for removal have been removed. The 24" box tree requirement quantity is 28 and the presence of fewer than 14 existing heritage trees does not lower this requirement.

The proposed project would connect to existing water and sewer lines along Grundy Lane, as well as existing electrical lines. In addition, the project would connect to the existing storm drainage system and includes improvements to the site's storm drainage system by constructing driveways and/or uncovered parking lots with permeable surfaces, directing runoff from the roof, sidewalks, walkways, patios, driveways, and uncovered parking lots onto vegetated areas, and constructing self-treating stormwater areas.

Construction of the proposed project is anticipated to commence in Spring/Summer 2016 and be completed within 15 months.

Because the existing P-D Zoning District for the site is currently for restaurant uses, a zoning amendment to the P-D Zoning District for the site would be required to allow the proposed office uses. It should be noted that the City of San Bruno Ordinance No. 1284 requires a vote of the public for any building or structure exceeding 50 feet or three stories in height. A vote of the public is also required for all multi-story parking structures. City staff has evaluated the proposed project and has determined that the project does not require a vote of the public per Ordinance No. 1284, as the proposed building would be 50 feet in height or less. Additionally, the proposed project would include two levels of parking below the existing grade. The upper level of parking is more than 50 percent below the existing grade and, thus, does not constitute a story. Furthermore, City staff has routinely determined that sub-grade parking garages do not constitute a multi-story parking structure.

Discretionary Actions

Implementation of the proposed project would require the following discretionary actions by the City of San Bruno:

- Adoption of the IS/MND and a Mitigation Monitoring and Reporting Plan;
- Approval of a P-D Amendment;
- Attainment of a Planned Development Permit; and
- Attainment of an Architectural Review Permit.

G. ENVIRONMENTAL CHECKLIST

The following Checklist contains the environmental checklist form presented in Appendix G of the CEQA Guidelines. The checklist form is used to describe the impacts of the proposed project. A discussion follows each environmental issue identified in the checklist. Included in each discussion are project-specific mitigation measures recommended, as appropriate, as part of the proposed project.

For this checklist, the following designations are used:

Potentially Significant Impact: An impact that could be significant, and for which no mitigation has been identified. If any potentially significant impacts are identified, an EIR must be prepared.

Less Than Significant with Mitigation Incorporated: An impact that requires mitigation to reduce the impact to a less-than-significant level.

Less-Than-Significant Impact: Any impact that would not be considered significant under CEQA relative to existing standards.

No Impact: The project would not have any impact.

I. AESTHETICS. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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?	☐	☐	✖	☐
d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	✖	☐

Discussion

a. According to the City's General Plan EIR, the hills located to the north and west of the City provide a visual backdrop for the City. Partial views of the San Francisco Bay, Oakland hills, and Mount Diablo could be seen from points along the western hills. However, residential homes in the hills have enough elevation gain that smaller buildings within the City's eastern flatlands are miniature on the vast horizon (GP DEIR, p. 3-23). In addition, the City's Ordinance No. 1284 limits structures to three stories (or 50 feet) unless voter approval is obtained. City staff has evaluated the proposed project and has determined that the project does not require a vote of the public per Ordinance No. 1284, as the proposed building would be 50 feet in height or less. Additionally, although the proposed project would include two levels of parking below the existing grade, the upper level of parking is more than 50 percent below the existing grade, and, thus, does not constitute a story. Furthermore, City staff has routinely determined that sub-grade parking garages do not constitute a multi-story parking structure. The proposed project site, although currently vacant, has been previously developed and is surrounded by existing development similar to the proposed uses, including three-story office developments to the west and east of the project site. As such, the proposed project would not result in a substantial adverse effect on a scenic vista and impacts would be ***less than significant***.

b. A scenic corridor could be described as a roadway or highway with unique or distinctive physical or cultural features. The City's General Plan EIR identifies the following roadways as scenic corridors:

- Skyline Boulevard (Highway 35);
- Interstate 280 (I-280);
- Crystal Springs Road;
- Sharp Park Road;

- El Camino Real; and
- Sneath Lane.

The proposed project site is not located directly adjacent to any of the roadways identified as a scenic corridor. Although the City recognizes the scenic corridors listed above as local scenic roadways, Skyline Boulevard is eligible to be designated as a State scenic highway and I-280 is a State-designated scenic highway. The project site is located over 6,500 feet from Skyline Boulevard, over 2,300 feet from I-280, and over 1,500 feet from El Camino Real. In addition, the proposed project site has been previously developed, is surrounded by existing similar developments, and is located in Bayhill Office Park, an area designated for Regional Office land uses. Therefore, implementation of the proposed project would not damage any scenic resources within a State scenic highway, and impacts would be ***less than significant***.

c. The existing visual character of the project site and vicinity is urbanized developed land with a majority of office uses. The project site has been previously developed with a restaurant building and associated surface parking. Existing office buildings surround the proposed project site, including two three-story office developments. In addition, the proposed project would be consistent with the land use designation for the site of Regional Office, and is located in the Bayhill Office Park, an area containing an overall 1.5 million sf of office space. Thus, the proposed project would be considered consistent with the existing visual character of the area. Furthermore, the project would incorporate a variety of architectural and landscape features to increase the aesthetic appeal of the underutilized site (see Figure 4). An Architectural Review Permit is required for the project, which would require the City to review the project's architectural plans to ensure that the proposed development would be compatible and designed consistent with the surrounding developments. Thus, the proposed project would not degrade the existing visual character or quality of the site and its surroundings, and a ***less-than-significant*** impact would result.

d. Although recently demolished, lighting has already been in place at the project site in association with the previous building and parking. The surrounding office developments also contribute to the lit environment surrounding the site. In addition, the proposed project has been designed to minimize the effects of light and glare on adjacent areas, including the use of Light Emitting Diode (LED) lighting, which provides more precise and even distribution of light compared to traditional lighting. The LED lighting would help to focus the light onto only the areas necessary on the project site and minimize overflow of lighting off-site. Calculations for light intensity resultant of the proposed project were conducted, and the project would not cause an overflow of lighting off-site, with the exception of a few areas along Grundy Lane and minimal portions of the properties immediately to the east and west. The proposed project site is not directly adjacent to any residences or other sensitive land uses and is located in a regional office development area. Therefore, 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, and impacts would be considered ***less than significant***.

II. AGRICULTURE AND FOREST RESOURCES. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	✖
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	✖
c. Conflict with existing zoning for, or cause rezoning of, forest land (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 forest land or conversion of forest land to non-forest use?	☐	☐	☐	✖
e. Involve other changes in the existing environment which, due to their location or nature, could individually or cumulatively result in loss of Farmland to non-agricultural use?	☐	☐	☐	✖

Discussion

a, b, e. The proposed project site, although currently vacant, has been previously developed and is surrounded by existing office developments. The site and the surrounding area are designated for Regional Office use. As such, the site or surrounding area is not designated or zoned for agricultural uses and is not currently used for agricultural purposes. The site is not considered Farmland of Prime, Unique, or Statewide Importance and is not under a Williamson Act contract. Thus, agricultural land would not be converted to non-agricultural uses as a result of the proposed project. Consequently, the proposed project would have ***no impact*** to the conversion of Farmland to non-agricultural use or a conflict with a Williamson Act contract.

c, d. The project site is not considered forest land (as defined in Public Resources Code section 12220[g]), timberland (as defined by Public Resources Code section 4526), and is not zoned Timberland Production (as defined by Government Code section 51104[g]). Therefore, the proposed project would have ***no impact*** with regard to conversion of forest land or any potential conflict with forest land, timberland, or Timberland Production zoning.

III. AIR QUALITY. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	✖	☐
b. Violate any air quality standard or contribute substantially 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?	☐	☐	✖	☐
e. Create objectionable odors affecting a substantial number of people?	☐	☐	✖	☐

Discussion

a. The City of San Bruno is within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD), which regulates air quality in the San Francisco Bay Area, and is located in the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB is currently designated as a nonattainment area for State and federal ozone, State and federal particulate matter 2.5 microns in diameter ($PM_{2.5}$), and State particulate matter 10 microns in diameter (PM_{10}) standards. The applicable air quality plan for the SFBAAB is the 2010 Multi-Pollutant Clean Air Plan (CAP), adopted on September 15, 2010.[1] The 2010 CAP was developed, in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG), as a multi-pollutant plan that provides an integrated control strategy to reduce ozone, PM, toxic air contaminants (TACs), and greenhouse gases (GHGs). The 2010 CAP is a roadmap depicting how the Bay Area will achieve compliance with the State and federal air quality standard for ozone as expeditiously as practicable and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The CAP also considers the impacts of ozone control measures on PM emissions, air toxics, and GHGs in a single, integrated plan, and establishes emission control measures to be adopted or implemented in the region.

The aforementioned applicable air quality plan and incorporated emission controls are based on population and employment projections provided by local governments, usually developed as part of the General Plan update process. The project would be considered to conflict with, or obstruct implementation of, an applicable air quality plan if the project would be inconsistent with the plan's growth assumptions, in terms of population, employment, or regional growth in Vehicle Miles Traveled (VMT), which are based on

[1] Bay Area Air Quality Management District. *Current Plans*. Available at: http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans. Accessed September 8, 2015.

ABAG projections that are, in turn, based on the City's General Plan. The proposed project is consistent with the current Regional Office General Plan land use designation for the site, and a General Plan amendment is not proposed as part of the project. In addition, the project site is surrounded by existing development similar to what is proposed for the project, and is located within an area planned for regional office development. Although the proposed project would modify the existing use of the project site and a zoning amendment would be required to allow the proposed office uses, the project would still be considered consistent with growth assumptions of the applicable air quality plan, as they are generally based on General Plan land use designations. Furthermore, the overall number of project trips would likely be less than what has been anticipated for buildout of the site due to the number of shuttle buses serving the area, the project's proximity to San Mateo County Transit District (SamTrans) bus services, Peninsula Corridor Joint Powers Board (Caltrain), and Bay Area Rapid Transit (BART) shuttles. Overall, the project would be considered consistent with growth assumptions of the applicable air quality plan.

In addition, as presented in the sections below, the project would not exceed the applicable thresholds of significance for any pollutant and would not result in emissions that substantially contribute to the nonattainment designations of PM and ozone for the area. Therefore, the proposed project would not conflict with or obstruct implementation of the applicable air quality plans, and a ***less-than-significant*** impact would result.

b,c. According to the CEQA Guidelines, an air quality impact may be considered significant if the proposed project's implementation would result in, or potentially result in, conditions, which violate any existing local, State or federal air quality regulations. In order to evaluate ozone and other criteria air pollutant emissions and support attainment goals for those pollutants designated as nonattainment in the area, the BAAQMD has established significance thresholds associated with development projects for emissions of reactive organic gases (ROG), nitrogen oxide (NO_x), PM_{10}, and $PM_{2.5}$. The BAAQMD's significance thresholds, expressed in pounds per day (lbs/day) for project-level and tons per year (tons/yr) for cumulative, listed in Table 1, are recommended for use in the evaluation of air quality impacts associated with proposed development projects.

Table 1
BAAQMD Thresholds of Significance

Pollutant	Construction (lbs/day)	Operational (lbs/day)	Cumulative (tons/year)
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82	82	15
$PM_{2.5}$	54	54	10

Source: BAAQMD, CEQA Guidelines, May 2011.

In addition, the BAAQMD identifies screening criteria for development projects, which provide a conservative indication of whether a development could result in potentially significant air quality impacts. If a project is below the screening criteria, a detailed air quality assessment of that project's air pollutant emissions would not be required. The

screening criteria for a general office building development are if the development is less than or equal to the following screening level sizes:

- 346 thousand sf (ksf) for operational criteria pollutants; and
- 277 ksf for construction criteria pollutants.

Accordingly, if a general office building development is less than or equal to the screening size for operational and construction criteria pollutants, the development would not be expected to result in potentially significant air quality impacts, and a detailed air quality assessment would not be required.

It should be noted that the BAAQMD resolutions adopting and revising the significance thresholds in 2011 were set aside by the Alameda County Superior Court on March 5, 2012. The Alameda Superior Court did not determine whether the thresholds were valid on the merits, but found that the adoption of the thresholds was a project under CEQA, necessitating environmental review. The BAAQMD appealed the Alameda County Superior Court's decision. The Court of Appeal of the State of California, First Appellate District, reversed the trial court's decision. The Court of Appeal's decision was appealed to the California Supreme Court, which granted limited review, and the matter is currently pending there. The California Supreme Court has indicated that it will address the question whether CEQA review is confined to an analysis of a proposed project's impacts on the existing environment, or does it also require analysis of the existing environment's impacts on the proposed project. The California Supreme Court has not indicated that it will review the underlying question whether adoption of the thresholds is a project under CEQA, and no court has indicated that the thresholds lack evidentiary support. In May of 2012, BAAQMD updated its *CEQA Air Quality Guidelines* to continue to provide direction on recommended analysis methodologies, but without recommended quantitative significance thresholds. The May 2012 BAAQMD *CEQA Air Quality Guidelines* state that lead agencies may reference the Air District's 1999 Thresholds of Significance available on the Air District's website. Lead agencies may also reference the Air District's *CEQA Thresholds Options and Justification Report* developed by staff in 2009. The *CEQA Thresholds Options and Justification Report*, available on the District's website, outlines substantial evidence supporting a variety of thresholds of significance.

Per CEQA Guidelines Section 15064.7, the City has elected to use the BAAQMD's thresholds and methodology for this project, as they are based on substantial evidence and remain the most up-to-date, scientifically-based method available to evaluate air quality impacts in the SFBAAB region. Thus, the BAAQMD's thresholds of significance presented in Table 1 and screening criteria are applicable for this analysis. Accordingly, if the proposed project would not meet the screening criteria and result in emissions in excess of the thresholds of significance presented in Table 1, the project could have a significant effect on air quality.

The proposed project consists of a total of 67,586 sf, or approximately 67.6 ksf, which is below both the construction and operational screening levels for criteria pollutants. However, per the BAAQMD *CEQA Air Quality Guidelines*, analysis of construction-related emissions is still required for projects that would include certain construction

activities, such as extensive material transport (e.g., greater than 10,000 cubic yards of soil import/export). Because the project would involve the export of approximately 17,600 cubic yards of soil, analysis of the proposed project's construction-related emissions is still required.

The proposed project's construction-related emissions were quantified using the California Emissions Estimator Model (CalEEMod) software version 2013.2.2 - a statewide model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify air quality emissions, including GHG emissions, from land use projects. The model applies inherent default values for various land uses, including construction data, trip generation rates based on the Institute of Transportation Engineers (ITE) Manual, vehicle mix, trip length, average speed, etc. Construction was assumed to commence in June 2016 and would be accomplished within an approximately 15-month period. Although not necessary, the proposed project's operational emissions were also quantified and compared to the applicable project-level and cumulative thresholds of significance. The model was adjusted to reflect the project-specific trip generation rate, project-specific indoor and outdoor water usage estimates, and compliance with the California Building Energy Efficiency Standards Code.

According to CalEEMod, the proposed project would result in emissions as shown in Table 2.

Table 2
Maximum Unmitigated Project Emissions

	ROG	**NO_X**	**PM_{10}**	**$PM_{2.5}$**
Construction-Related Emissions (lbs/day)				
Proposed Project	17.46	76.76	10.37	6.05
BAAQMD Thresholds	54	54	82	54
Exceed Thresholds?	**NO**	**YES**	**NO**	**NO**
Operational Emissions (lbs/day)				
Proposed Project	6.48	6.92	4.16	1.18
BAAQMD Thresholds	54	54	82	54
Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**
Cumulative Emissions (tons/yr)				
Proposed Project	1.02	0.93	0.55	0.16
BAAQMD Thresholds	10	10	15	10
Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**

Source: CalEEMod, September 2015 (see Appendix A).

As shown in the table, and as expected from the BAAQMD screening criteria, the proposed project would result in operational emissions below the applicable operational and cumulative thresholds of significance. However, the proposed project's construction-related emissions of NO_X would exceed the applicable threshold of significance. Therefore, the project could violate air quality standards and contribute to the region's nonattainment status of ozone; and a ***potentially significant*** impact would occur.

Mitigation Measure(s)
Implementation of the following mitigation measure would reduce the proposed project's construction-related emissions of NO_X to below the applicable threshold of significance as shown in Table 6. Therefore, with implementation of the following mitigation measure, the above impact would be reduced to a *less-than-significant* level.

Table 3
Maximum Mitigated Project Construction-Related Emissions (lbs/day)

	ROG	NO_X	PM_{10}	$PM_{2.5}$
Proposed Project	16.54	53.62	9.22	4.99
BAAQMD Thresholds	54	54	82	54
Exceed Thresholds?	**NO**	**NO**	**NO**	**NO**

Source: CalEEMod, September 2015 (see Appendix A).

III-1 *Prior to issuance of a grading permit, the project applicant shall show on the grading plans via notation that the contractor shall ensure that all diesel-powered equipment larger than 100 horsepower shall meet USEPA emissions standards for Tier 4 engines or equivalent. The grading plans shall be submitted for review and approval by the City Engineer.*

d. Emissions of carbon monoxide (CO) are of potential concern, as the pollutant is a toxic gas that results from the incomplete combustion of carbon-containing fuels such as gasoline or wood. CO emissions are particularly related to traffic levels.

In addition to screening criteria for criteria pollutants and GHG, BAAQMD has established screening criteria for localized CO emissions, including the following:

- Consistency with applicable congestion management programs;
- Increase in traffic volumes at intersections to more than 44,000 vehicles per hour; and
- Increase in traffic volumes at intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, underpass, etc.).

As the City has elected to use the BAAQMD's thresholds and methodology for this project, the BAAQMD's screening criteria for localized CO emissions presented above are utilized for this analysis.

The proposed project is consistent with the existing land use designation for the site; thus, the project would be consistent with any established congestion management program, because such programs are typically based on land use designations. According to the traffic assessment prepared for the proposed project, none of the study intersection would operate at traffic volumes in excess of the BAAQMD localized CO emissions screening criteria, even under 2030 Cumulative Plus Project conditions. The traffic assessment also concluded that the estimated amount of new trips associated with the proposed project would not result in any significant impacts to nearby roadways or intersections. As such, a substantial increase in levels of CO at surrounding intersections would not occur, and

the project would not generate localized concentrations of CO that would exceed standards.

Toxic Air Contaminants (TACs) are also a category of environmental concern. The CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (Handbook) provides recommendations for siting new sensitive land uses near sources typically associated with significant levels of TAC emissions, including, but not limited to, freeways and high traffic roads, distribution centers, and rail yards. The CARB has identified diesel particulate matter (DPM) from diesel-fueled engines as a TAC; thus, high volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic are identified as having the highest associated health risks from DPM. Health risks from TACs are a function of both the concentration of emissions and the duration of exposure. Health-related risks associated with DPM in particular are primarily associated with long-term exposure and associated risk of contracting cancer.

Children, pregnant women, the elderly, and those with existing health problems are considered more sensitive to air pollution than others. Accordingly, land uses that are typically considered to be sensitive receptors include residences, schools, day care centers, playgrounds, and medical facilities. The proposed project includes the development of an office building, which would not be considered a sensitive receptor. Commodore Park and two multi-family residential developments are located 600 feet or more north of the project site, but are separated from the site by I-380. In addition, single-family residences are located south of the project site, on the opposite side of San Bruno Avenue. The residences to the north would be considered the closest sensitive receptors to the project site.

The project does not involve long-term operation of any stationary diesel engine or other major on-site stationary source of TACs. Emissions of DPM resulting from construction-related equipment and vehicles are minimal and temporary. Relatively few vehicle trips associated with the proposed use would be expected to be composed of diesel-fueled vehicles. In addition, the CARB's Handbook includes distribution centers with associated diesel truck trips of more than 100 trucks per day as a source of substantial TAC emissions. The project is not a distribution center and would not be located near an existing distribution center. Therefore, the project would not generate any substantial concentrations of TACs, and would not expose nearby sensitive receptors to emissions of TACs.

It should be noted that the project site is located near an existing rail line to the east, running parallel to Huntington Avenue and Herman Street. However, CARB does not consider train tracks to be a significant source of TAC emissions and is only concerned with rail yards due to the substantial amount of trains and idling. The project site is not located near an existing rail yard and, thus, the project would not be affected by DPM emissions associated with a rail yard.

The CARB, per its Handbook, considers that any project placing sensitive receptors within 500 feet of a major roadway or freeway may have the potential to expose those

receptors to DPM. Similarly, the BAAQMD recommends placement of overlay zones at least 500 feet from all freeways and high volume roadways. Directly adjacent to the north of the site is I-380, approximately 90 feet from the nearest travel lane. The nearby freeway could be considered a source of DPM; however, the proposed office use is not considered a sensitive land use, as the only sustained on-site human activity occurs indoors. Thus, an increase in any potential risks associated with DPM emissions from the nearby I-380 would not occur with implementation of the proposed project.

In conclusion, the proposed project would not expose sensitive receptors to substantial concentrations of any TACs. Therefore, impacts related to exposure of sensitive receptors to substantial pollutant concentrations would be considered ***less than significant***.

e. Typical sources of objectionable odor include industrial or intensive agricultural uses. Surrounding land uses include office buildings similar to that of the proposed project. Heavy industrial uses are not located in the vicinity of the project site. In addition, the project site has not been and is not currently used for agricultural purposes, and is not located near any intensive agricultural uses. According to the City's General Plan EIR, two facilities within the City have the potential to generate nuisance odors – the San Bruno Transfer Station and the South San Francisco-San Bruno Wastewater Treatment Facility. However, the facilities are not located in the vicinity of the project site, and the General Plan EIR states that complaints have not been filed for either facility in a number of years. Thus, the future employees at the project site would not be subjected to any objectionable odors from existing industrial or agricultural sources.

Office land uses are not typically associated with the creation of substantial objectionable odors. Diesel fumes from construction equipment and delivery trucks are often found to be objectionable; however, construction of the proposed project would be temporary and diesel emissions would be minimal and regulated. Accordingly, the project would not be expected to create objectionable odors affecting a substantial number of people.

It should be noted that emissions of DPM from the nearby freeway could potentially result in objectionable odors at the project site. However, similar to the discussion above, because the project site has been previously developed and sustained on-site human activity would only occur indoors, an increase in any objectionable odors associated with DPM emissions from the nearby I-380 would not occur with implementation of the proposed project.

For the aforementioned reasons, construction and operation of the proposed project would have a ***less-than-significant*** impact with respect to creating objectionable odors affecting a substantial number of people.

IV. BIOLOGICAL RESOURCES. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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 California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	✖		☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	✖	☐
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, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	✖	☐
d. Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	☐	☐	✖	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	✖	☐
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	✖

Discussion

a. According to Figure 6-1, Vegetative Communities and Special Species Habitat, of the City's General Plan, the proposed project site does not contain any areas identified as a vegetative community or special species habitat. In addition, a search of the California Department of Fish and Wildlife's (CDFW) Natural Diversity Database (CNDDB) was performed for the proposed project location to determine the records of sensitive plant and wildlife species within the general vicinity of the area. A total of 43 federally listed, State listed, or special-status plant and wildlife species were identified for the general project area.

Many of the plant and wildlife species occur in specialized habitats, such as riparian, wetlands, marshes, ponds, and other aquatic habitats (e.g., California red-legged frog, California clapper rail, California black rail, Serpentine Bunchgrass, San Francisco garter

snake, western pond turtle, etc.), as well as coastal scrub (e.g., western leatherwood), sandy ground (e.g., San Francisco Bay spineflower), slopes (e.g., Marin western flax, San Mateo woolly sunflower, San Mateo thorn-mint, fountain thistle, etc.), grasslands (e.g., Crystal Springs lessingia, San Francisco owl's-clover, etc.), and mountain ridges (e.g., Franciscan onion). The proposed project site is surrounded by other office buildings and structures similar to that of the proposed project. Immediately adjacent to the site to the north is I-380. The site is relatively flat and the only vegetation on-site is ornamental landscaping. As discussed below, the proposed project site does not contain and is not considered, associated with, or located within the vicinity of any riparian habitat, wetlands, or other sensitive natural community. The absence of suitable habitat and the highly disturbed and urbanized nature of the site and surrounding area would eliminate the potential for many of the special-status species to occur on site. Accordingly, the majority of the species identified by the CNDDB search to potentially occur in the area would not be present at the project site and would not be affected by implementation of the proposed project.

Although the proposed project site is highly disturbed and lacks essential habitat for special-status plants and wildlife species, the potential exists for migratory bird species to be present in the on-site trees. Migratory bird species are protected by the federal Migratory Bird Treaty Act. Development of the proposed project would require removal of the existing ornamental vegetation on the project site, including some of the on-site trees. Should any of the migratory bird species be found nesting in the on-site trees during construction activities, the proposed project could result in a ***potentially significant*** impact associated with a substantial adverse effect on a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or U.S. Fish and Wildlife Service (USFWS).

Mitigation Measure(s)

Implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level.

IV-1 *A nesting survey shall be conducted 15 days prior to commencing construction work if this work would occur between March 1 and September 1 (If construction work would not occur during the nesting season, a nesting survey is not required). If special-status birds are not identified nesting within the area of effect, further mitigation is not required. If special-status birds are identified nesting within the area of effect, a radius around the nest(s) shall be staked with orange construction fencing. The radius buffer size shall be determined by a qualified biologist. Construction or earth-moving activities shall be restricted within the identified buffer until the determination is made by a qualified biologist that the young have fledged (i.e., left the nest) and have attained sufficient flight skills to avoid project construction zones. This typically occurs by June 15th; however, the date may be later and would have to be determined by a qualified ornithologist.*

b,c. Wetlands or seasonal wetlands generally denote areas where the soil is seasonally saturated and/or inundated by fresh water for a significant portion of the wet season, and then seasonally dry during the dry season. To be classified as "wetland," the duration of saturation and/or inundation must be long enough to cause the soils and vegetation to become altered and adapted to the wetland conditions. The proposed project is surrounded by existing development and is in a highly disturbed, urban area associated with regional office land uses. Water features are not located on the project site or in the vicinity of the project, and the site is not within a floodplain or normally subjected to flooding. As such, wetlands, season wetland, or vernal pools do not exist on or are associated with the project site. Similarly, riparian habitat does not exist on the project site or in the vicinity, and the project would not involve removal of any riparian vegetation or sensitive native vegetation. In addition, local or regional sensitive habitat types or natural communities regulated by the CDFW or USFWS are not present or associated with the project footprint.

Consequently, the proposed project would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act, any riparian habitat, or other sensitive natural community. Therefore, impacts related to riparian habitat, wetlands, or other sensitive natural community would be ***less than significant***.

d. As discussed above, the project site is highly disturbed and is located in a currently developed area. Resident or migratory wildlife corridors, or wildlife nursery sites, do not exist on the project site or the immediate vicinity. Therefore, the project would not interfere with the movement of any resident or migratory fish or wildlife species, and impacts would be ***less than significant***.

e. Vegetation on the project site consists of ornamental landscaping, including heritage trees. Removal of a number of the existing vegetation, including 14 heritage trees, would be required for the prosed project. The proposed project is required to comply with the City's Heritage Tree Ordinance, which requires a removal permit and tree replacement of either two 24-inch box size trees or one 36-inch box size tree for each heritage tree removed. According to the landscape plan prepared for the proposed project (see Figure 4), the project would replace the 14 heritage trees removed with a total of 28 new (24-inch) box size trees, which meets the City's Heritage Tree Ordinance requirement. Therefore, the project would not conflict with the applicable tree preservation policy or ordinance, and impacts would be considered ***less than significant***.

f. The San Bruno Mountain Habitat Conservation Plan (HCP) was prepared for the County of San Mateo in 1982 and was authorized by the U.S. Fish and Wildlife Service (USFWS) in 1983. The majority of the San Bruno Mountain is included in the planning area for the HCP. However, the City of San Bruno, including the proposed project site, is not within the planning area for the San Bruno Mountain HCP. The City does not have an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or State habitat conservation plan. Therefore, ***no impact*** would occur related to a conflict with such a plan.

V. CULTURAL RESOURCES. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☐	✖	☐
b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?	☐	✖	☐	☐
c. Directly or indirectly destroy a unique paleontological resource on site or unique geologic features?	☐	✖	☐	☐
d. Disturb any human remains, including those interred outside of formal cemeteries.	☐	✖	☐	☐

Discussion

a. The term cultural resources encompasses archaeological, traditional, and "built environment" resources, including, but not necessarily limited to, buildings, structures, objects, districts, and sites (generally 45 years old or older). A historic resource is a structure, site, or feature that is representative of a historic period or building type, but is not of landmark quality. According to Figure 3.11-1 of the City's General Plan EIR, the project site is not in the vicinity of any identified historic resource. In addition, the proposed project site is currently vacant and does not contain any historical resources. Therefore, implementation of the proposed project would result in a ***less-than-significant*** impact related to historical resources as defined in Section 15064.5.

b-d. According to the City's General Plan EIR, due to the geology of the area, few known fossils or paleontological resources exist in the City. In addition, the project site has been previously developed and is surrounded by existing development. Thus, surface artifacts are unlikely to occur at the site. However, the City's General Plan EIR states that a high possibility exists for the City to contain Native American resources due to the City's location between the San Francisco Bay and the coastal mountain range. Consequently, the possibility exists that during construction activities, such as grading and excavation, unidentified archaeological resources, paleontological resources, or human remains may be uncovered, which could result in a ***potentially significant*** impact.

Mitigation Measure(s)
Implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level.

V-1 *Prior to the issuance of a grading permit or building permit, project plans shall include a requirement (via notation) indicating that if historic and/or cultural resources, or human remains are encountered during site grading or other site work, all such work shall be halted immediately within the area of discovery and the contractor shall immediately notify the City of the discovery. In such case, the applicant shall retain the services of a*

qualified archaeologist for the purpose of recording, protecting, or curating the discovery as appropriate. The archaeologist shall be required to submit to the City for review and approval a report of the findings and method of curation or protection of the resources. Further grading or site work within the vicinity of the discovery, as identified by the qualified archaeologist, shall not be allowed until the preceding steps have been taken. All fees associated with the services of the qualified archaeologist shall be paid by the project applicant.

V-2 *Pursuant to State Health and Safety Code §7050.5 (c) State Public Resources Code §5097.98, if human bone or bone of unknown origin is found during construction, all work shall stop in the vicinity of the find and the San Mateo County Coroner shall be contacted immediately. If the remains are determined to be Native American, the coroner shall notify the Native American Heritage Commission who shall notify the person believed to be the most likely descendant. The most likely descendant shall work with the contractor to develop a program for re-internment of the human remains and any associated artifacts. Additional work is not to take place in the immediate vicinity of the find, which shall be identified by the qualified archaeologist, until the identified appropriate actions have been implemented. All fees associated with the services of the qualified archaeologist shall be paid by the project applicant.*

VI. GEOLOGY AND SOILS. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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 based on other substantial evidence of a known fault?	☐	☐	✖	☐
ii. Strong seismic ground shaking?	☐	☐	✖	☐
iii. Seismic-related ground failure, including liquefaction?	☐	✖	☐	☐
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 a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	✖	☐	☐
d. Be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code?	☐	☐	✖	☐
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?	☐	☐	☐	✖

Discussion

a.i, a.ii. The San Francisco Bay area is one of the most seismically active areas in the Country. While seismologists cannot predict earthquake events, the U.S. Geological Survey's Working Group on California Earthquake Probabilities 2007 estimates a 63 percent chance of at least one magnitude 6.7 or greater earthquake occurring in the Bay Area region between 2007 and 2036. As seen with damage in San Francisco and Oakland due to the 1989 Loma Prieta earthquake that was centered about 50 miles south of San Francisco, significant damage can occur at considerable distances. Higher levels of shaking and damage would be expected for earthquakes occurring at closer distances.

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The nearest State-considered active fault to the site is the San Andreas Fault, which is located 1.4 miles from the site. In addition, the San Gregorio Fault and the Monte Vista-Shannon Fault are located 6.6 miles and 15.4 miles from the project site, respectively. However, the site is not located within a State-designated Alquist Priolo Earthquake Fault Zone. According to the Geotechnical Investigation prepared for the proposed project,

surface expression of fault traces are not known to cross the site.[2] Nonetheless, the project design would comply with the California Building Code, which includes seismic design standards for buildings. As such, fault rupture hazard is not expected to be a significant geologic hazard at the project site.

According to the Geotechnical Investigation prepared for the proposed project, moderate to severe (design-level) earthquakes could cause strong ground shaking, which is the case for most sites within the Bay Area. Peak ground acceleration (PGA) is a measure of the maximum acceleration experienced by soil or rock particles during an earthquake, and is used in building codes to prescribe how much horizontal force a structure should be able to withstand in a seismic event. The PGA is measured in units of "g," acceleration due to gravity. The PGA for the project site was estimated in the Geotechnical Investigation to be approximately 0.58g.

The State of California regulates development in California through a variety of tools that reduce or mitigate potential hazards from earthquakes or other geologic hazards. The California Building Standards Code, Unreinforced Masonry Building Law, Alquist-Priolo Earthquake Fault Zoning Act, and the State of California Seismic Hazards Mapping Act govern development in potentially seismically active areas. The proposed project would be required to comply with the aforementioned regulations, as applicable. Implementation of the seismic considerations of the building codes and regulations would ensure that strong seismic ground shaking would not cause substantial adverse effects to the proposed project.

Because the project would not expose people or structures to potential substantial adverse effects associated with fault rupture or strong seismic ground shaking, impacts would be considered ***less than significant***.

a.iii,c. The San Bruno area, as with much of San Mateo County, has not been mapped under the California Seismic Hazard Mapping Act. However, the site is not currently located within a Seismic Hazard Zone for liquefaction. According to the Association of Bay Area Governments (ABAG, 2011), the project site is located within an area of very low liquefaction potential.

Strong seismic shaking could trigger liquefaction, soil softening, ground deformation due to settlement, and/or flow failures in sloping ground. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap. Loose unsaturated sandy soils are also susceptible to settlement during strong seismic shaking. Primarily stiff to hard cohesive and medium dense to very dense granular soils were encountered at the site. Thus, the potential for substantial differential seismic settlement affecting the proposed improvements is low. In addition, the groundwater level is anticipated to be on the order of 50 feet deep or deeper. Accordingly, the Geotechnical Investigation prepared for the proposed project concluded similar to ABAG that the site has a low potential for liquefaction.

[2] Cornerstone Earth Group. *Design-Level Geotechnical Investigation*. December 20, 2012.

The project would be designed consistent with the seismic design standards in the California Building Code, as well as with the engineering recommendations provided in the Geotechnical Investigation for the proposed project. Consequently, the proposed project would not be expected to expose people or structures to potential substantial adverse effects associated with seismic-related ground failure, including liquefaction.

However, according to the Geotechnical Investigation, during current site development, the site was apparently graded to create a level building pad and parking lot, with cuts and fills likely on the order of 10 feet or more. The thickness of fill generally ranges from two to five feet across the majority of the site, but was found to be 7.5 to 12 feet thick in the northeast corner of the site. The fills generally consisted of medium stiff to hard lean clays over medium dense sands. Below the fills, alternating layers of stiff to hard lean clays with various amounts of sand and silt and medium dense to very dense sands with various amounts of silt and clay were encountered to the maximum depth explored of 49.5 feet. Based on the current development plan, the majority of the undocumented fill would be removed during the excavation of the subterranean garage; however, any remaining existing fills within the new building pad area should be replaced with compacted, engineered fill. Should existing fills not be entirely removed from the project site, a ***potentially significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

VI-1 *During construction, the project contractor shall ensure that all fills are completely removed from within building areas and proposed site retaining wall areas and to a lateral distance of at least five feet beyond the building or retaining wall footprint, or to a lateral distance equal to fill depth below the perimeter footing, whichever is greater.*

Provided the fills meet the "Material for Fill" requirements set forth in the Geotechnical Investigation prepared for the proposed project by Cornerstone Earth Group, the fills may be reused when backfilling the excavations. The fills are anticipated to be acceptable for reuse based on review of the soil boring samples collected on-site. However, if materials are encountered that do not meet the requirements (e.g., debris, wood, trash), such materials should be screened out of the remaining material and be removed from the site.

Backfill of excavations shall be placed in lifts and compacted in accordance with the "Compaction" recommendations in the Geotechnical Investigation. Fills extending into planned pavement and flatwork areas may be left in place provided they are determined to be at a low risk for future differential settlement and that the upper 12 to 18 inches of fill below pavement subgrade is re-worked and compacted in accordance with the Compaction recommendations.

aiv. The proposed project site has been previously developed and is surrounded by existing development. In addition, the project site is relatively flat. Therefore, ***no impact*** related to exposure of people or structures to potential substantial adverse effects associated with landslides would occur.

b. The proposed project has been previously developed and is surrounded by existing development. Land on the site is flat and would have a slight potential for soil erosion. However, during the early stages of construction activities, topsoil would be exposed due to grading and leveling of the site. After grading and leveling and prior to overlaying the ground surface with impervious surfaces and structures, the potential exists for wind and water erosion to occur, which would adversely affect project site soils. However, as required under the federal Clean Water Act, because the project would disturb more than one acre of land during construction, the project would be required to obtain coverage under and comply with the State's Construction General Permit to minimize or avoid sedimentation associated with stormwater runoff during construction. In addition, per Section 12.12.050, Erosion Control, of the City's Municipal Code, a complete and detailed plan for erosion control shall be prepared and included within the grading plan for the project. The project would be required to implement the San Mateo Countywide Water Pollution Prevention Program's construction Best Management Practices (BMPs), including temporary erosion controls to stabilize all denuded areas until permanent erosion controls are established.

After construction is completed, implementation of the impervious surfaces on the site would preclude future erosion on the site. In addition, the proposed project site is a C.3 regulated project and is required to include appropriate site design measures, source controls, and hydraulically-sized stormwater treatment measures. Design measures for the project include, but are not limited to, the following:

- Direct roof runoff onto vegetated areas;
- Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas;
- Direct runoff from driveways and/or uncovered parking lots onto vegetated areas;
- Construction of driveways and/or uncovered parking lots with permeable surfaces; and
- Self-treating stormwater area.

As shown in the Landscape Plan (see Figure 4), the project design includes a variety of vegetation to aid in the prevention of erosion. Therefore, because the proposed project would comply with all applicable policies and regulations, and include design measures for erosion reduction and control, impacts related to soil erosion or loss of topsoil would be considered ***less than significant***.

d. According to the Geotechnical Analysis prepared for the proposed project, the project site soils exhibit low to moderate plasticity and expansion potential. A Plasticity Index (PI) test was performed on a representative sample of soil at the basement foundation level at a depth of 16 feet. The PI test showed a PI of 14, which indicated low plasticity and

expansion potential to wetting and drying cycles. Therefore, the proposed project would not be located on expansive soil, and a ***less-than-significant*** impact would result.

e. The project site is currently connected to the City's sewer system, and would remain connected to the City's system upon implementation of the proposed project. Septic tanks or alternative wastewater disposal systems are not proposed for the project and would not be required. Therefore, ***no impact*** would occur from soils incapable of adequately supporting the use of septic tanks.

VII. GREENHOUSE GAS EMISSIONS. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	✖	☐
b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gasses?	☐	☐	✖	☐

Discussion

a,b. Implementation of the proposed project would cumulatively contribute to increases of GHG emissions that are associated with global climate change. Estimated GHG emissions attributable to future development would be primarily associated with increases of carbon dioxide (CO_2) and, to a lesser extent, other GHG pollutants, such as methane (CH_4) and nitrous oxide (N_2O). Sources of GHG emissions include area sources, mobile sources or vehicles, utilities (electricity and natural gas), water usage, wastewater generation, and the generation of solid waste. The common unit of measurement for GHG is expressed in terms of annual metric tons of CO_2 equivalents ($MTCO_2e$/yr).

The BAAQMD identifies screening criteria for development projects, which provide a conservative indication of whether a development could result in a potentially significant impact associated with GHG emissions. If the screening criterion for GHG is met by a project, a detailed assessment of that project's GHG emissions would not be required.[3] The operational GHG screening criterion for a general office building development is if the development is less than or equal to 53 ksf. Because the project consists of a total of 67,586 sf, or approximately 67.5 ksf, a detailed GHG assessment is required for the proposed project.

The BAAQMD threshold of significance for project-level operational GHG emissions is 1,100 $MTCO_2e$/yr. Construction GHG emissions are a one-time release and are, therefore, not typically expected to generate a significant contribution to global climate change. As such, BAAQMD has not established a threshold of significance for construction-related GHG emissions and does not require quantification. Nonetheless, the

[3] As explained in detail in the Air Quality section of this IS/MND, the BAAQMD resolutions adopting and revising the significance thresholds in 2011 were set aside by the Alameda County Superior Court on March 5, 2012. The Alameda Superior Court did not determine whether the thresholds were valid on the merits, but found that the adoption of the thresholds was a project under CEQA, necessitating environmental review. The BAAQMD appealed the Alameda County Superior Court's decision. The Court of Appeal of the State of California, First Appellate District, reversed the trial court's decision. The Court of Appeal's decision was appealed to the California Supreme Court, which granted limited review, and the matter is currently pending there. The California Supreme Court has not indicated that it will review the underlying question whether adoption of the thresholds is a project under CEQA, and no court has indicated that the thresholds lack evidentiary support. Per CEQA Guidelines Section 15064.7, the City has elected to use the BAAQMD's thresholds, screening, and analysis methodology for this project, as they are based on substantial evidence and remain the most up-to-date, scientifically-based method available to evaluate air quality impacts in the SFBAAB region.

proposed project's construction-related GHG emissions have been quantified, amortized, and added to the estimated proposed project operational emissions in order to provide a conservative analysis.

Analysis of the proposed project's construction and operational GHG emissions included estimations of CO_2, N_2O, and CH_4 emissions and was conducted using CalEEMod, with incorporation of the project-specific trip generation, project-specific indoor and outdoor water usage estimates, and compliance with the California Building Energy Efficiency Standards Code. According to the CalEEMod results, the proposed project would result in unmitigated GHG emissions as shown in Table 4. As shown in the table, even when considering the amortized construction-related GHG emissions in the project's total GHG emissions, the estimated emissions would be below the applicable threshold of significance of 1,100 $MTCO_2e$/yr.

Table 4
Unmitigated Project GHG Emissions

	Annual GHG Emissions
Construction-Related GHG Emissions[1]	22.06 $MTCO_2e$/yr
Operational GHG Emissions	1,026.73 $MTCO_2e$/yr
Total Annual GHG Emissions	1,048.79 $MTCO_2e$/yr
BAAQMD Threshold	1,100 $MTCO_2e$/yr
Exceeds Threshold?	**NO**

[1] Total construction-related GHG emissions of 551.57 $MTCO_2e$/yr amortized over the anticipated lifetime of the project (i.e., 25 years for this analysis).[4]

Source: CalEEMod, September 2015 (see Appendix A).

It should be noted that the City of San Bruno currently has a draft Climate Action Plan (CAP). The CAP presents specific actions the City may wish to take to reduce GHG emissions. The goal of the CAP is a 15 percent reduction in GHG emissions relative to a 2005 baseline. Assembly Bill (AB) 32 requires that Statewide GHG emissions be reduced to 1990 levels by the year 2020. In accordance with AB 32, CARB prepared the *Climate Change Scoping Plan* (Scoping Plan) for California, approved in 2008, which provides the outline for actions to reduce California's GHG emissions. The City's CAP goal was selected to be consistent with the AB 32 Scoping Plan and BAAQMD guidelines. Actions implemented by the State are projected to meet the vast majority of the 15 percent reduction goal. City actions would supplement State policies to ultimately achieve the 15 percent goal at the local level. The City of San Bruno is committed to the GHG emissions reduction target of 15 percent below baseline 2005 levels by 2020.

In order to determine the proposed project's compliance with the City's draft CAP, CalEEMod was used to estimate the GHG emissions associated with buildout of the

[4] The BAAQMD does not recommend any specific operational lifetimes for use in amortizing construction-related GHG emissions; however, the Sacramento Metropolitan Air Quality Management District, per its *Guide to Air Quality Assessment in Sacramento County*, suggests an operational lifetime for a new conventional commercial building of 25 years. The estimates are derived from the State of California Executive Order D-16-00 and US Green Building Council's October 2003 report on *The Costs and Financial Benefits of Green Buildings*.

proposed project under both the baseline 2005 condition and the year 2020 condition. The 2005 baseline condition assumes buildout of the proposed project in the year 2005 without compliance with any State mandated regulations (i.e., the California Building Energy Efficiency Standards Code). Amortized construction GHG emissions were also taken into account for the 2005 and 2020 estimates. According to the CalEEMod results, total GHG emissions under baseline 2005 conditions (operational plus amortized construction emissions) would be 1,271.50 $MTCO_2e$/yr. Total GHG emissions under 2020 conditions (operational plus amortized construction emissions) would be 993.92 $MTCO_2e$/yr. Consequently, an overall reduction of 21.8 percent (1,271.50 $MTCO_2e$ – 993.92 $MTCO_2e$] / 1,271.50 $MTCO_2e$ x 100% = 21.8%) would result for the proposed project from baseline 2005 conditions by the year 2020, which is consistent with the GHG emission reduction target goals per the City CAP.

Because the proposed project would result in GHG emissions below the BAAQMD's threshold of significance, the project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. In addition, the proposed project would meet the minimum required emissions reduction per the City's draft CAP Therefore, impacts associated with the generation of GHG emissions would be considered ***less than significant***.

VIII. HAZARDS AND HAZARDOUS MATERIALS. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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 likely 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, would it 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 two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	✖	☐
f. For a project within the vicinity of a private airstrip, would the project 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?	☐	☐	✖	☐
h. Expose people or structures to the risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	✖	☐

Discussion

a,b. A Phase I Environmental Site Assessment (ESA) was prepared for the proposed project site in order to determine potentially hazardous conditions at the site. According to the Phase I ESA, an approximately 15-gallon above-ground hydraulic fluid tank associated with a former trash compactor was observed on the west side of the previous building. Evidence of hydraulic fluid leaks was not readily apparent during site reconnaissance. Other hazardous materials were not observed on the project site. As such, the project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

Hazardous material incidents that would be likely to have impacted the project site have not been reported in the vicinity. Several facilities in the vicinity were reported as hazardous materials users, which is typical to many commercial areas. However, facilities associated with hazardous materials use would have an associated spill prevention, control and countermeasure plan to prevent and contain such leaks or spills to the extent feasible. Thus, the project would not be expected to be affected by the routine transport, use, or disposal of hazardous materials associated with the existing uses in the area.

The site was determined to be used for agricultural purposes until the early 1940s. Pesticides may have been applied to crops in the normal course of farming operations. Because the project site was capped by the previous building and associated parking and landscaping features, risk to human health from residual pesticides, if any, is substantially reduced. However, during construction, approximately 21,900 cubic yards of excess soil is anticipated to be exported from the site. As such, if elevated concentrations of agricultural chemicals are present in the on-site soils, off-site disposal of soil could create a hazard to the public or the environment through disposal of such potentially hazardous materials. Accordingly, the Phase I ESA prepared for the project recommends soil sampling of the on-site soils to evaluate whether agricultural chemicals are present.

Operations associated with the proposed project's office uses would not involve the routine transport, use, or disposal of hazardous materials. Thus, during operations, the proposed project would not create any hazards to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment.

In summary, because a potential exists for agricultural chemicals to be present in the on-site soils to be exported, the proposed project could create a significant hazard to the public or the environment through a reasonably foreseeable upset or accidental condition involving the release of hazardous materials into the environment, and a ***potentially significant*** impact would result.

<u>Mitigation Measure(s)</u>
Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

VIII-1 *Prior to export of on-site soils, soil samples shall be collected by an Environmental Consultant to determine the presence/absence of residual organochlorine pesticide levels and pesticide-based metals (arsenic, lead, and mercury). The soil analytical results shall be documented in a report and submitted to the City Planning Department for review and approval. If levels of detected compounds do not exceed appropriate environmental screening criteria (e.g. California Human Health Screening Levels [CHHSLs] and California hazardous waste criteria), soils can be exported for disposal or utilization as fill elsewhere. If residual concentrations are detected in export soils at levels exceeding appropriate*

environmental screening criteria, contaminated soils shall be disposed of at an appropriately permitted landfill.

c. As stated above, operations associated with the proposed project's office uses would not involve the routine transport, use, or disposal of hazardous materials. Soil sampling required per Mitigation Measure VIII-3 would ensure that if any pesticides are found to be present on-site, remediation of the soils would be conducted prior to export. Furthermore, the nearest existing or proposed school facility is Decima M. Allen Elementary School, which is over one-half mile from the project site. Therefore, the proposed project would result in a ***less-than-significant*** impact associated with hazardous emission or handling of hazardous materials within one-quarter mile of an existing or proposed school.

d. The proposed project site has been previously developed, surrounded by existing office land uses, and is located in a regional office area. The project site is not included on the list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Therefore, ***no impact*** would result from implementation of the proposed project.

e. The nearest airport is the San Francisco International Airport (SFO), which is located approximately 1.5 miles east of the project site, on the opposite side of Highway 101. The Federal Aviation Administration (FAA) has established Federal Aviation Regulations (FAR) Part 77 criteria, which are imaginary surfaces that extend outward from the end of each runway and define the maximum heights of structures within the airport vicinity that cannot be exceeded without creating a hazard to aircraft navigation. The City of San Bruno is within the San Mateo County Comprehensive Airport Land Use Plan (CALUP) boundary and falls within the SFO Imaginary Surfaces Height Restrictions Map. According to Figure 3.14-2, SFO Height Restriction Standards, of the City's General Plan EIR, the proposed project site is located in a height restriction area of 350 feet. The maximum height of the proposed project would be 50 feet or less at the highest point, which would not exceed the height restriction of 350 feet. However, according to the FAA Notice Criteria Tool, the proposed project would be in proximity to a navigation facility and may impact the assurance of navigation signal reception. Consequently, per Section 77.9 of Part 77 of the Code of Federal Regulations (CFR), Construction or alteration requiring notice, FAA Form 7460-1 is required to be prepared, submitted, and approved prior to building permit issuance. Alternatively, the City has established an exemption form, which may be submitted to the City in lieu of FAA notification. The proposed project would comply with all applicable General Plan policies intended to minimize potential air safety hazards, as well as the height restrictions and safety compatibility standards of the FAR Part 77 and the San Mateo County CALUP. Therefore, the proposed project would not result in a safety hazard for people residing or working in the project area, and impacts would be ***less than significant***.

f. The proposed project is not within the vicinity of a private airstrip. Thus, the proposed project would not result in a safety hazard for people residing or working in the project area, and ***no impact*** would occur.

g. The City of San Bruno has an Emergency Operations Plan that includes a discussion of fire, earthquake, flooding, and landslide hazards, as well as emergency evacuation routes and a chain of command system to coordinate all departments of first responders. The proposed project is consistent with the designated uses for the site and is located in a regional office area. In addition, the site is surrounded by existing similar developments. Implementation of the proposed project would not modify the existing circulation system in the area and, thus, would not interfere with any evacuation or response routes used by emergency response teams. Because the project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, impacts would be considered ***less than significant***.

h. The proposed project is located in a regional office area that is highly disturbed. The project site and surrounding areas are regularly maintained and are not considered "wildlands" where wildland fires are a risk to structures. However, according to the City's General Plan EIR, the site may be considered a wildand/urban interface hazard area. The proposed project is required to comply with the City's General Plan policies and procedures pertaining to reduction of fire hazards, as well as the State Public Resource Codes 4290 and 4291 that require management along structures and roadsides. Therefore, because the risk of on-site structures being subject to wildland fires is low and the project would be required to comply with applicable policies and regulations, impacts related to exposure of people or structures to the risk of loss, injury, or death involving wildland fires would be considered ***less than significant***.

IX. HYDROLOGY AND WATER QUALITY. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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 (i.e., 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 substantial additional sources of polluted runoff?	☐	☐	✖	☐
f. Otherwise substantially degrade water quality?	☐	☐	✖	☐
g. Place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	✖
h. Place within a 100-year floodplain structures which would impede or redirect flood flows?	☐	☐	✖	☐
i. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.	☐	☐	✖	☐
j. Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	✖

Discussion

a,f. The project consists of the construction of a new office building. During the early stages of construction activities, topsoil would be exposed due to grading and leveling of the site. After grading and leveling, and prior to overlaying the ground surface with impervious surfaces and structures, the potential exists for wind and water erosion to discharge sediment and/or urban pollutants into stormwater runoff, which would

adversely affect water quality. However, as required under the federal Clean Water Act, because the project would disturb more than one acre of land during construction, the project would be required to obtain coverage under and comply with the State's Construction General Permit, which regulates stormwater discharges associated with construction activities. The State's Construction General Permit requires a Storm Water Pollution Prevention Plan (SWPPP) to be prepared for the site. A SWPPP identifies BMPs to control or minimize pollutants from entering stormwater and must address both grading/erosion impacts and non-point source pollution impacts of the development project, including post-construction impacts. In addition, the project would be required to implement the San Mateo Countywide Water Pollution Prevention Program's construction BMPs, including temporary controls to stabilize all denuded areas until permanent controls are established.

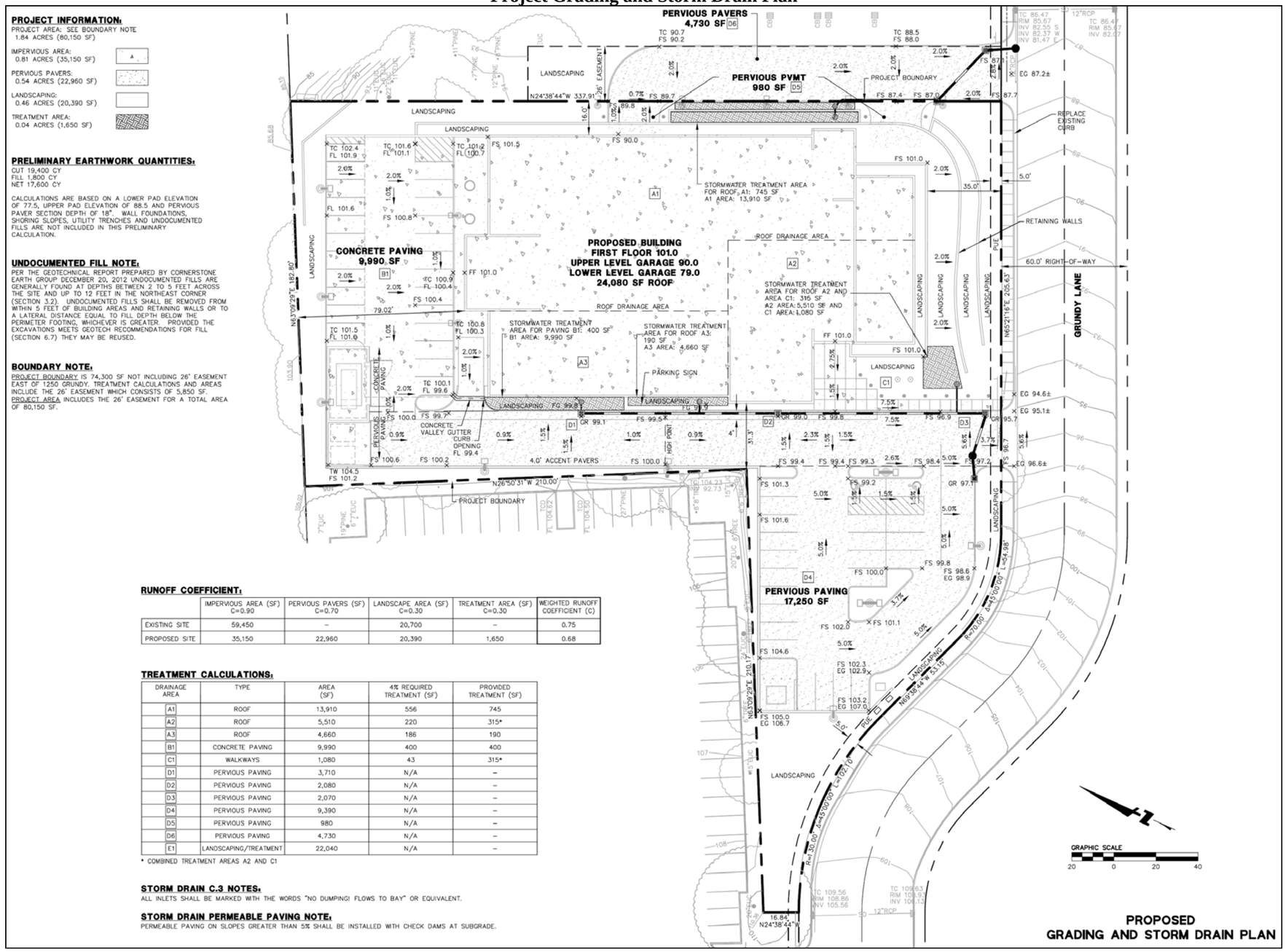
The proposed office use does not involve any operations typically associated with the generation or discharge of polluted water. Thus, typical operations on the project site would not violate any water quality standards or waste discharge requirements, nor degrade water quality. Implementation of the impervious surfaces on the site would result in the generation of urban runoff, which could contain pollutants if the runoff comes into contact with vehicle fluids on parking surfaces and/or landscape fertilizers. However, the proposed project is subject to the California Regional Water Quality Control Board San Francisco Bay Region's Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) Permit Order R2-2009-0074. Accordingly, the proposed project site is a C.3 regulated project per the NPDES Permit Order R2-2009-0074 and is required to include appropriate site design measures, source controls, and hydraulically-sized stormwater treatment measures. As presented in the Treatment Calculations table in Figure 5, Project Grading and Storm Drain Plan, the proposed project meets the required treatment area for the site per the C.3 Regulations. The treatment areas identified in Figure 5 consist of flow-through planters.

Because the proposed project would comply with all applicable regulations and does not involve uses associated with the generation or discharge of polluted water, the proposed project would not violate any water quality standards, waste discharge requirements, or otherwise substantially degrade water quality. Therefore, impacts would be considered ***less than significant***.

b. The City of San Bruno utilizes potable water from the Westside Groundwater Basin to meet more than half of the City's water needs. The project site, although currently vacant, has been previously developed with a restaurant building that was connected to the City's water system. Although an increase in water use at the site would result from implementation of the proposed project, the increase would not be considerable enough to cause a substantial depletion in groundwater supplies. According to the City, the existing water system is adequate to accommodate the proposed project.[5] In addition, the proposed project is consistent with the City's land use designation for the site and the surrounding area.

[5] City of San Bruno. Personal communication with Joseph Cervantes, Associate Civil Engineer. July 23, 2013.

Figure 5
Project Grading and Storm Drain Plan



RUNOFF COEFFICIENT:

	IMPERVIOUS AREA (SF) C=0.90	PERVIOUS PAVERS (SF) C=0.70	LANDSCAPE AREA (SF) C=0.30	TREATMENT AREA (SF) C=0.30	WEIGHTED RUNOFF COEFFICIENT (C)
EXISTING SITE	59,450	–	20,700	–	0.75
PROPOSED SITE	35,150	22,960	20,390	1,650	0.68

TREATMENT CALCULATIONS:

DRAINAGE AREA	TYPE	AREA (SF)	4% REQUIRED TREATMENT (SF)	PROVIDED TREATMENT (SF)
A1	ROOF	13,910	556	745
A2	ROOF	5,510	220	315*
A3	ROOF	4,660	186	190
B1	CONCRETE PAVING	9,990	400	400
C1	WALKWAYS	1,080	43	315*
D1	PERVIOUS PAVING	3,710	N/A	–
D2	PERVIOUS PAVING	2,080	N/A	–
D3	PERVIOUS PAVING	2,070	N/A	–
D4	PERVIOUS PAVING	9,390	N/A	–
D5	PERVIOUS PAVING	980	N/A	–
D6	PERVIOUS PAVING	4,730	N/A	–
E1	LANDSCAPING/TREATMENT	22,040	N/A	–

* COMBINED TREATMENT AREAS A2 AND C1

STORM DRAIN C.3 NOTES:
ALL INLETS SHALL BE MARKED WITH THE WORDS "NO DUMPING! FLOWS TO BAY" OR EQUIVALENT.

STORM DRAIN PERMEABLE PAVING NOTE:
PERMEABLE PAVING ON SLOPES GREATER THAN 5% SHALL BE INSTALLED WITH CHECK DAMS AT SUBGRADE.

As also shown in Figure 5, the proposed project would result in a reduction in impervious surfaces on the site, as compared to the existing conditions, and would include permeable surfaces in the project design. Thus, the proposed project would allow for a greater potential area for groundwater recharge than what currently exists on the site. Therefore, implementation of the proposed project would not interfere substantially with groundwater recharge.

Because the project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge, impacts would be considered ***less than significant***.

c-e. The proposed project site is currently developed and surrounded by existing development in an urban, developed area. As such, the project would not alter the course of a stream or river. Implementation of the proposed project involves the construction of a new building, which would result in an alteration to the existing drainage pattern of the site. Implementation of the impervious surfaces on the site would result in the generation of urban runoff. As shown in Figure 5, the proposed project site currently has 59,450 sf of impervious surfaces associated with the parking area and building foundation for the previous on-site use. The proposed project would include a total new impervious area of 35,150 sf.

The proposed project site is a C.3 regulated project and is required to include appropriate site design measures, source controls, and hydraulically-sized stormwater treatment measures. Design measures for the project include, but are not limited to, the following:

- Direct roof runoff onto vegetated areas;
- Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas;
- Direct runoff from driveways and/or uncovered parking lots onto vegetated areas;
- Construction of driveways and/or uncovered parking lots with permeable surfaces; and
- Self-treating stormwater areas.

The vegetated areas noted above consist of flow-through infiltration planters. Due to the project design's consistency with C.3 regulations, including incorporation of additional landscaping and stormwater treatment areas and the use of pervious pavers within several drive aisles and parking areas, the rate and/or amount of stormwater runoff from the site would not be expected to substantially change with implementation of the proposed project. In addition, groundwater was not encountered during drilling of borings for the Geotechnical Investigation, and the groundwater level is anticipated to be on the order of approximately 50 feet deep or deeper. The lower garage floor would be approximately 22 feet below grade. As such, groundwater is not anticipated to be encountered, and construction dewatering is not expected to be necessary. Therefore, the project would not result in a substantial increase in the rate or amount of surface runoff in a manner that would result in flooding.

Because the rate or amount of surface runoff is not anticipated to substantially increase, the City's existing stromwater drainage system would have adequate capacity to accommodate the proposed project. In addition, as discussed above, an increase in the potential for urban runoff constituents from the project site's runoff to downstream surface waters would not increase as a result of the proposed project. The proposed project's compliance with C.3 Regulations, including site design measures, source controls, and hydraulically-sized stormwater treatment measures, would ensure that runoff water from the site would not be a substantial source of polluted runoff.

In conclusion, the proposed project would not substantially alter the existing drainage pattern of the site or area that would result in substantial erosion, siltation, or flooding, and would not create or contribute runoff water exceeding the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Therefore, impacts would be considered ***less than significant***.

g. The proposed project consists of a new office building, and the project site is surrounded by existing similar developments in a regional office area. The proposed project would not place any housing within a 100-year floodplain and ***no impact*** would occur.

h,i. According to the Geotechnical Investigation prepared for the proposed project, the project site is located within a Federal Emergency Management Agency (FEMA) flood hazard Zone D. A Zone D flood hazard area is considered an area of undetermined, but possible flood hazard. However, the project site has been previously developed, is relatively flat, and is surrounded by existing development in a regional office area. Accordingly, implementation of the proposed project would not result in an increase in risks associated with placing structures within a 100-year floodplain. In addition, according to Figure 3.13-1, Flooding and Storm Drainage, of the City's General Plan EIR, the project site is not within a potential flood zone. The City's General Plan EIR also states that areas located within the 100-year floodplain do not exist within the City, based on FEMA flood hazard mapping.

The ABAG has compiled a database of Dam Failure Inundation Hazard Maps. The generalized hazard maps were prepared by dam owners as required by the State Office of Emergency Services and are intended for planning purposes. Based on the Dam Failure Inundation Hazard Maps, the proposed project site is not located within a dam failure inundation area.

In conclusion, the proposed project would not place a structure within a 100-year floodplain that would impede or redirect flood flows, and would not expose people or structures to risks involving flooding, including flooding as a result of the failure of a levee or dam. Therefore, impacts related to flooding would be considered ***less than significant***.

j. Tsunamis are defined as sea waves created by undersea fault movement. A tsunami poses little danger away from shorelines. When tsunamis reach the shoreline, high swells of water break and wash inland with great force. The City of San Bruno is located

approximately four miles east of the Pacific Ocean, separated by mountainous terrain, and approximately three miles west of the San Francisco Bay. Although tsunamis could be a hazard to the City, the mapping of the inundation area has not been completed at this time. However, according to the City's Local Hazard Mitigation Plan, if one assumes that a 42-foot tsunami enters the Golden Gate, the tsunami would be roughly 10 feet in the City of San Bruno. The lowest elevation in San Bruno is 12 feet above sea level. As such, the proposed project would not be expected to be exposed to flooding risks associated with tsunamis.

A seiche is a long-wavelength, large-scale wave action set up in a closed body of water such as a lake or reservoir, with destructive capacity that is not as great as that of a tsunami. The proposed project site is not located near a closed body of water large enough for a seiche to occur. Therefore, the proposed project is not anticipated to be impacted by seiches.

Mudflows typically occur in mountainous or hilly terrain, and the project site and surrounding area is relatively flat. Thus, the likelihood for danger from mudflows would be low at the site.

Because the proposed project would not be threatened by a seiche, tsunami, or mudflow, ***no impact*** from such phenomena would occur.

X. LAND USE AND PLANNING. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Physically divide an established community?	☐	☐	☐	✖
b. Conflict with any applicable land use plans, policies, or regulations 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 on environmental effect?	☐	☐	✖	☐
c. Conflict with any applicable habitat conservation plan or natural communities conservation plan?	☐	☐	☐	✖

Discussion

a. The proposed project site is currently developed with a surface parking lot, and is surrounded by existing development. Therefore, the project would not physically divide an established community and ***no impact*** would occur.

b. The proposed office project is consistent with the Regional Office General Plan land use designation for the site. In addition, the site is located within the Bayhill Office Park. The greater Bayhill Office Park contains 1.5 million sf of office space. As such, existing office buildings surround the project site, including three-story office developments to the west and east, and additional office buildings to the south.

The project site has a zoning designation of Planned Development (P-D). Because the existing P-D Zoning District for the site is specific to restaurant use, a zoning amendment to the P-D Zoning District for the site would be required to allow the proposed office uses and specify development standards specific to the proposed project. Upon approval of the zoning amendment, the project would not conflict with any applicable land use plans, policies, or regulations of an agency with jurisdiction over the project, adopted for the purpose of avoiding or mitigating an environmental effect.

It should be noted that the City of San Bruno Ordinance No. 1284 requires a vote of the public for any building or structure exceeding 50 feet or three stories in height. A vote of the public is also required for all multi-story parking structures. City staff has evaluated the proposed project and has determined that the project does not require a vote of the public per Ordinance No. 1284, as the proposed building would be 50 feet in height or less. Additionally, the proposed project would include two levels of parking below the existing grade. The upper level of parking is more than 50 percent below the existing grade and, thus, does not constitute a story. Furthermore, City staff has routinely determined that sub-grade parking garages do not constitute a multi-story parking structure.

In conclusion, the project's overall impact related to a conflict with applicable land use plans, policies, or regulations would be ***less than significant***.

c. The San Bruno Mountain Habitat Conservation Plan (HCP) was prepared for the County of San Mateo in 1982 and was authorized by the U.S. Fish and Wildlife Service (USFWS) in 1983. The majority of the San Bruno Mountain is included in the planning area for the HCP. However, the City of San Bruno, including the proposed project site, is not within the planning area for the San Bruno Mountain HCP. The City does not have an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan. Therefore, ***no impact*** would occur related to a conflict with such a plan.

XI. MINERAL RESOURCES. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
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?	☐	☐	☐	✖
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?	☐	☐	☐	✖

Discussion

a,b. According to the City's General Plan EIR, mineral resources or recovery sites do not exist within the City of San Bruno. In addition, the project site has been previously developed, and is surrounded by other existing developments. Therefore, ***no impact*** to mineral resources would occur as a result of the proposed project.

XII. NOISE. *Would the project result in:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	✖	☐
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne 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 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 two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	✖	☐
f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	✖

Discussion

a, c. Operations at the proposed project would not involve any substantial noise generating sources. In addition, the project site has been previously developed, and is immediately surrounded by existing office developments. The nearest sensitive receptors to the site would be the residences located at the residential development approximately 0.14-mile from the project site on the north side of I-380. In addition, a residential development is located on the northwestern corner of Commodore Drive and Cherry Avenue approximately 0.17-mile from the project site. Consequently, the proposed project would not result in the generation of noise levels in excess of standards or a substantial increase in ambient noise levels in the project vicinity that would adversely affect the nearest residential receptors. However, future employees at the project site would be subjected to noise from existing sources in the area.

The existing noise environment at the project site is defined by noise from existing vehicular traffic on surrounding roadways, most prominently from traffic on adjacent I-380. According to Figure 3.15-2, Existing and Projected Noise Contours, of the City's General Plan EIR, the project site is within a 70 decibel (dB) roadway noise exposure contour. According to Table 7-2, Land Use Compatibility For Community Noise Environments, of the City's General Plan, the normally acceptable exterior day/night

noise level for office buildings is up to 70 dB. The proposed project does not include any outdoor areas that would support outdoor activities

Title 24 of the California Code of Regulations contains the State Noise Insulation Standards, which specify interior noise standards for new developments other than single-family homes. Such new developments are required to be designed to reduce outdoor noise to an interior level of 45 dB or less in any habitable room. Thus, for the proposed project, the anticipated exterior noise level of 70 dB must be reduced by 25 dB in order to meet the State interior noise level standard. Consistent with State and local building codes, the project would be designed to reduce exterior noise levels, including insulated building materials. In particular, the glass proposed to be utilized throughout the proposed project design (i.e., double 1/8-inch insulated glass with a STC rating of 30) would achieve an estimated sound transmission loss of 25 dB. Therefore, the proposed glass material alone would provide a reduction in exterior noise levels sufficient to meet the State's 45 dB interior noise level standard.

In conclusion, the proposed project would not expose persons to or generate noise levels in excess of standards or result in a substantial permanent increase in ambient noise levels in the project vicinity, and impacts would be ***less than significant***.

b. The primary vibration-generating activities associated with the project would occur when the infrastructure such as grading, utilities, and parking lots are constructed. The types of vibration impact include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural. Table 5 shows the typical vibration levels produced by construction equipment.

Table 5
Vibration Levels for Varying Construction Equipment

Type of Equipment	Peak Particle Velocity (ppv) @ 25 feet (inches/second)	Approximate Velocity Level @ 25 feet (VdB)
Large Bulldozer	0.089	87
Loaded Trucks	0.076	86
Small Bulldozer	0.003	58
Auger/Drill Rigs	0.089	87
Jackhammer	0.035	79
Vibratory Hammer	0.070	85
Vibratory Compactor/Roller	0.210	94

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006.

The Table 5 data indicates that construction vibration levels, with the exception of the vibratory compactor/roller, are less than the 0.2 in/sec ppv threshold of damage to buildings at distances of 25 feet. The construction vibration levels of the vibratory compactor/roller, however, are not significantly above the threshold and would not be expected to cause any damage given the distances to the nearest buildings.

The following is an excerpt from the Caltrans Technical Advisory, TAV-02-01-R9601, regarding construction vibrations:

> With the exception of a few instances involving pavement breaking, pile driving, all Caltrans construction vibration measurements have been below the 5 mm/s (0.2 in/sec) architectural damage risk level for continuous vibrations. The highest measured vibration level was 73.1 mm/s (2.88 in/sec) at 3 m (10 ft) from a pavement breaker. This instance marked the only time that the single event safe level of 50 mm/s (2 in/sec) was exceeded during vibration monitoring by Caltrans. Other construction activities and equipment, such as D-8 and D-9 Caterpillars, earthmovers and haul trucks have never exceeded 2.5 mm/s (0.10 in/sec) or one half of the architectural damage risk level, at 3 m (10 ft)).

Based upon the information in Table 5 and the Caltrans Technical Advisory, vibrations are not predicted to exceed safe thresholds at adjacent sensitive receptors. Construction of the project would not require the use of pile driving. Additionally, the risk of annoyance due to construction vibrations is very low considering the distance to the nearest receptors. Therefore, this impact is considered ***less than significant***.

d. During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. Per the City's Noise Ordinance, particularly Section 6.16.070, Construction of buildings and projects, of the City's Municipal Code, construction activities involving equipment that would generate 85 dB at a distance of 100 feet during the hours of 7:00 AM to 10:00 PM or 65 dB at a distance of 100 feet between the hours of 10:00 PM and 7:00 AM are restricted within a residential zone or within a 500-foot radius of a residential zone.

According to Table 3.15-4, Typical Construction Noise Levels, in the City's General Plan EIR, activities involved in construction could generate maximum noise levels ranging from 74 dB to 101 dB at a distance of 50 feet. Building construction would occur at distances of approximately 0.14-mile (or approximately 740 feet) from the nearest sensitive residential receptors. Noise dissipates at a rate of 6 dB per each doubling of distance (e.g., a noise level of 101 dB at 50 feet would be reduced to 95 dB at a distance of 100 feet, 89 dB at a distance of 150 feet, etc.). Thus, the maximum noise to potentially be generated by construction at the site of 101 dB would not generate excessive noise at the nearest sensitive residential receptor.

Although construction activities would be temporary in nature, are anticipated to occur during normal daytime working hours, and would comply with the City's Noise Ordinance, the temporary increase in ambient noise levels could be considered a nuisance to nearby receptors. Therefore, a ***potentially significant*** impact would result.

<u>Mitigation Measure(s)</u>
Implementation of the following mitigation measures would reduce the above impacts to a *less-than-significant* level.

XII-1 *During construction, the project contractor shall ensure the following:*

- *Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shield or shrouds, wherever feasible.*
- *Impact tools (e.g., jack hammer, pavement breakers and rock drills}, if any, used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed-air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed-air exhaust shall be used; the muffler could lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, which could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.*
- *Stationary noise sources shall be located as far from sensitive receptors as possible, and shall be muffled and enclosed within temporary sheds and insulation barriers, or other measures shall be incorporated to the extent feasible.*

e. The San Francisco International Airport (SFO) is located approximately 1.5 miles east of the project site, on the opposite side of Highway 101. According to the City's General Plan EIR, aircraft departures from SFO are the primary source of transportation noise in the City. Figure 3.15-2, Existing and Projected Noise Contours, of the City's General Plan EIR indicates that the project site is between the 60 dB and 65 dB aircraft noise exposure contours. The San Mateo County CALUP establishes noise/land use compatibility standards, as shown in Table 3.15-1 of the General Plan EIR, which specify the compatible noise standard for commercial land uses, including office buildings, to be less than 70 dB. In addition, as discussed above, the normally acceptable exterior day/night noise level for office buildings is up to 70 dB. As also discussed above, the project design includes noise insulating features and building materials that would reduce interior noise levels to the State standard level. Because the proposed project would be subjected to aircraft noise between 60 dB and 65 dB, which is less than the 70 dB compatibility standards, and the project design includes noise insulation in compliance with State and local building codes, the proposed project would not expose people residing or working in the project area to excessive noise levels associated with the nearby airport. Therefore, a ***less-than-significant*** impact would occur.

f. The proposed project is not within the vicinity of a private airstrip. Thus, the proposed project would not result in a safety hazard for people residing or working in the project area, and ***no impact*** would occur.

XIII. POPULATION AND HOUSING. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (e.g., through projects in an undeveloped area or extension of major infrastructure)?	☐	☐	✖	☐
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	✖
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	✖

Discussion

a. The proposed project consists of the construction of a new office building and associated surface and subterranean parking. Development of the proposed project would not involve the creation of any new housing, and, thus, would not directly induce population growth or result in a substantial increase in population in the area. While the project would result in a slight increase in the employee work force within the City, the 210 potential jobs generated on-site would not be expected to induce substantial population growth in the City. Because the project site has been previously developed and is surrounded by existing development, the project would not create new development in a currently undeveloped area and an extension of major infrastructure would not be required. In addition, the proposed project is consistent with the land use designation for the site and the surrounding area. Therefore, impacts to population and housing would be considered ***less than significant***.

b,c. The project site is currently developed with a surface parking lot. Development of the proposed project would not displace existing housing or people and would not result in the need for replacement housing. Therefore, ***no impact*** would occur.

XIV. PUBLIC SERVICES. *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for 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:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Fire protection?	☐	☐	✖	☐
b. Police protection?	☐	☐	✖	☐
c. Schools?	☐	☐	✖	☐
d. Parks?	☐	☐	✖	☐
e. Other Public Facilities?	☐	☐	✖	☐

Discussion

a, b. The proposed project site is located within the jurisdiction of the San Bruno Fire Department (SBFD), which provides fire protection services and emergency medical services within the City and to areas within the County. The nearest fire station is located at 555 El Camino Real in the City of San Bruno, which is approximately 0.65-mile southeast of the site. The San Bruno Police Department provides law enforcement services to the project site.

The proposed project is consistent with the General Plan land use designation for the site and would be consistent with the General Plan goals and policies. The General Plan EIR concluded that development in the City consistent with the General Plan would not result in the need for additional fire or police protection facilities. The General Plan policies would also help to ensure that the City's impacts remain less than significant associated with fire and police protection services. In addition, the proposed project site has been previously developed, and is surrounded by existing similar development; thus, the demand for police and fire protection services would generally remain the same for the area with implementation of the proposed project. Consequently, the current fire and police protection services would be adequate to serve the proposed project, and the project would not result in the need for new or physically altered fire or police service facilities, the construction of which could cause environmental impacts. Thus, a ***less-than-significant*** impact related to fire and police protection would occur.

c. Four school districts serve the San Bruno residents from kindergarten through the community college level. The San Bruno Park School District operates six elementary schools and one middle school, and serves the majority of children within the City from kindergarten through eighth grade. In addition, the South San Francisco Unified School District has one elementary school within the City. The San Mateo Union High School District serves the City's high school students, and the San Mateo Community College District provides post-secondary educational services. According to the General Plan EIR, because the City's schools are under capacity, current facilities may be sufficient to accommodate student growth through the year 2025.

As the proposed project would consist of an office building, the proposed project would not directly induce population growth in the City. Accordingly, implementation of the proposed project would not increase the number of students within the City or the demand for school services. Therefore, the proposed project would result in a ***less-than-significant*** impact associated with the provision of school facilities or services.

d,e. The City of San Bruno currently provides a total of 72 acres of City parkland, including five small pocket parks, 12 neighborhood parks, and one large community park. The Parks and Recreation Services Department maintains all developed municipal park sites, street medians, and landscaping along San Mateo Avenue and at other City facilities. In addition to City parks, local recreation centers, school facilities, and a 108-acre regional park - San Mateo County's Junipero Serra Park - provide recreational opportunities for San Bruno residents. Junipero Serra Park is maintained by the San Mateo County Parks and Recreation Division. Hiking and cycling trails are located west of the City boundary within the Golden Gate National Recreation Area and the San Francisco Peninsula Watershed, accessible from Sneath Lane and San Bruno Avenue. A privately operated driving range, located at the former Willard Engvall school site along Sneath Lane, also provides recreational services.

As the proposed project would consist of an office building, the proposed project would not directly induce population growth in the City. Accordingly, implementation of the proposed project would not increase the demand for parks or other public facilities or services. Therefore, impacts would be ***less than significant***.

XV. RECREATION. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Would the project 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?	☐	☐	✖	☐
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	✖	☐

Discussion

a,b. The proposed project consists of the construction of a new office building. Development of the proposed project would not create housing and would not directly induce population growth within the City of San Bruno. Therefore, an increased demand for new recreational facilities or increased use of existing facilities would not result from implementation of the proposed project, and a ***less-than-significant*** impact with regard to recreational facilities would occur.

XVI. TRANSPORTATION/CIRCULATION. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	✖	☐
b. Exceed, either individually or cumulatively, a level of service standard 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 features (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	✖	☐	☐
e. Result in inadequate emergency access?	☐	☐	✖	☐
f. Conflicts with adopted policies supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	✖	☐

Discussion

a,b. A traffic impact analysis was prepared for the proposed project by Crane Transportation Group (CTG) on August 27, 2015 (see Appendix B). The purpose of the traffic study was to determine any significant traffic impacts that would be associated with the proposed project. The following issues were analyzed:

- Existing A.M. and P.M. Peak Hour, Existing Plus Project Peak Hour, Cumulative, and Cumulative Plus Project traffic conditions at major intersections that may be impacted by the proposed project;
- Project traffic impacts on adjacent roadways that would be used to access the site, including seven key intersections, such as those providing access to Interstate 280 (I-280) freeway and Interstate 380 (I-380); and
- Required measures to mitigate any significant project traffic impacts.

The following seven key intersections on adjacent roadways that would be used to access the site were analyzed in the traffic impact analysis:

- San Bruno Avenue / I-280 Southbound Off-Ramp
- San Bruno Avenue / I-280 Northbound Off-Ramp
- San Bruno Avenue / Cherry Avenue
- San Bruno Avenue / El Camino Real

- El Camino Real / Bayhill Drive
- El Camino Real / I-380 Eastbound Off-Ramp
- El Camino Real / I-380 Westbound Off-Ramp

The project site is located in the City of San Bruno, which is served by several freeways including Highway 101, I-280, and I-380. I-380 runs adjacent to the north project boundary.

The project would gain access directly from Grundy Lane. Grundy Lane connects to Cherry Avenue and Bayhill Drive (via a short extension of Elm Avenue), each of which connects to one or two major arterials in the City of San Bruno: El Camino Real (SR 82), San Bruno Avenue or Sneath Lane

El Camino Real provides local area access to I-380, while San Bruno Avenue and Sneath Lane both provide access to I-280 west of the site. San Bruno Avenue also provides access to Highway 101 to the east of the site. Each facility is briefly described below.

Existing Levels of Service (LOS)

The City of San Bruno considers Level of Service (LOS) D as the acceptable threshold for a signalized intersection in the City of San Bruno for a Non-Congestion Management Agency (CMA) monitored location, while LOS E is the minimum acceptable operation for a signalized CMA monitored location. The El Camino Real / San Bruno Avenue intersection was the only CMA monitored intersection evaluated in the traffic impact analysis.

The LOS for signalized intersections is based on and measured in terms of control delay for the peak fifteen-minute analysis period. The weekday AM peak period is 7:00 AM to 9:00 AM and the PM peak period is 4:00 PM to 6:00 PM. Table 6 below presents the Existing Peak Hour LOS at the study intersections. As shown in the table, all analyzed intersections currently operate at an acceptable (LOS D or better) LOS during both the AM and PM peak traffic hours. The poorest, but still operating acceptably, is at El Camino Real / San Bruno Avenue, which operates at LOS C during the AM peak period and LOS D during the PM peak period. The remaining intersections operate at LOS C or better.

Table 6
Existing Peak Hour LOS at Study Intersections

Location	Control	AM Peak Hour		PM Peak Hour	
		LOS	Average Delay (seconds)	LOS	Average Delay (seconds)
El Camino Real / I-380 WB Off-Ramp	Signal	B	18.1	C	27.8
El Camino Real / I-380 EB Off-Ramp	Signal	A	8.5	B	17.4
El Camino Real / Bayhill Drive	Signal	A	7.6	C	24.8
El Camino Real / San Bruno Ave	Signal	C	34.6	D	44.0
San Bruno Ave / Cherry Ave	Signal	B	19.7	C	26.5
San Bruno Ave / I-280 NB Off-Ramp	Signal	B	19.6	C	24.7
San Bruno Ave / I-280 SB Off-Ramp	Signal	C	20.9	C	20.7

Source: Crane Transportation Group, August 2015.

Existing Plus Project LOS

Table 7 below presents the proposed project's anticipated trip generation. As shown in the table, the 210 employees would be expected to generate 101 inbound and 14 outbound AM peak hour trips, with 21 inbound and 104 outbound PM peak hour trips. Table 8, however, shows the anticipated project trip generation after accounting for peak hour trip reductions due to the project's proximity to dedicated shuttle service.[6] In addition, because the project would generate more than 100 net new trips and include more than 25 employees, implementation of a Transportation Demand Management (TDM) Program is required for the project per C/CAG criteria and City of San Bruno Municipal Code requirements. While the project's TDM is anticipated to further reduce peak hour trips associated with the project, these reductions have not been included in the Traffic Study analysis. It should be noted that reductions in peak hour trips have been documented in nearby communities with similar transit access and TDM program measures.

Project traffic was distributed to the local roadway network based upon existing peak hour traffic flow patterns in the area, the numerous opportunities for freeway access, and the traffic consultant's knowledge of local area AM and PM peak congestion on the various freeway segments. Surveys of residential locations of workers from office developments in nearby South San Francisco were also utilized in developing project distribution projections. Approximately 20 percent of project traffic would be distributed to I-280 both to the north and south, with 35 percent of project traffic traveling on I-380 to Highway 101. The proposed project's resultant existing plus project AM and PM peak

[6] C/CAG TDM Program criteria allow one peak-hour project trip to be credited for each peak-hour trip seat on a dedicated shuttle. Shuttle service runs between the San Bruno BART station and the Bayhill Office Park buildings in a one-way loop via San Bruno Avenue, Cherry Avenue, Sneath Lane, and Huntington Avenue. In addition, shuttle service runs between the San Bruno Caltrain station and the Bayhill Office Park buildings in a one-way loop in the project area using San Bruno Avenue, Cherry Avenue, Sneath Lane, and El Camino Real. With six to seven combined shuttle trips per hour serving the project area during each of the peak traffic hours, approximately 13 to 14 shuttle seats are estimated to be available per hour to offset 13 to 14 peak hour trips. The peak hour trip reduction for the project translates to an approximate reduction in project trips of 10%.

hour volumes are shown distributed to the local roadway network on Figure 6 and Figure 7, respectively.

Table 7
Project Trip Generation

Use	Size or # of Employees	Daily 2-Way Trips		AM Peak Hour Trips				PM Peak Hour Trips			
				Inbound		Outbound		Inbound		Outbound	
		Rate	Vol	Rate	Vol	Rate	Vol	Rate	Vol	Rate	Vol
Police Credit Union Office	210	*	810	**	112	**	15	***	23	***	115

* Ln(T) = 0.84 Ln(X) + 2.23
** Ln(T) = 0.86 Ln (X) + 0.24 (88% in/12% out)
*** T = 0.37(X) + 60.08 (17% in/83% out)

Ln = Natural Log
T = Trips
X = Number of Employees

Source: Crane Transportation Group, August 2015.

Table 8
Project Trip Generation Including Trip Reductions

Use	AM Peak Hour Trips		PM Peak Hour Trips	
	Inbound	Outbound	Inbound	Outbound
Average Trip Generation	112	15	23	115
10% Reduction Due to Dedicated Transit Service	-11	-1	-2	-11
Net Project Trip Generation	101	14	21	104

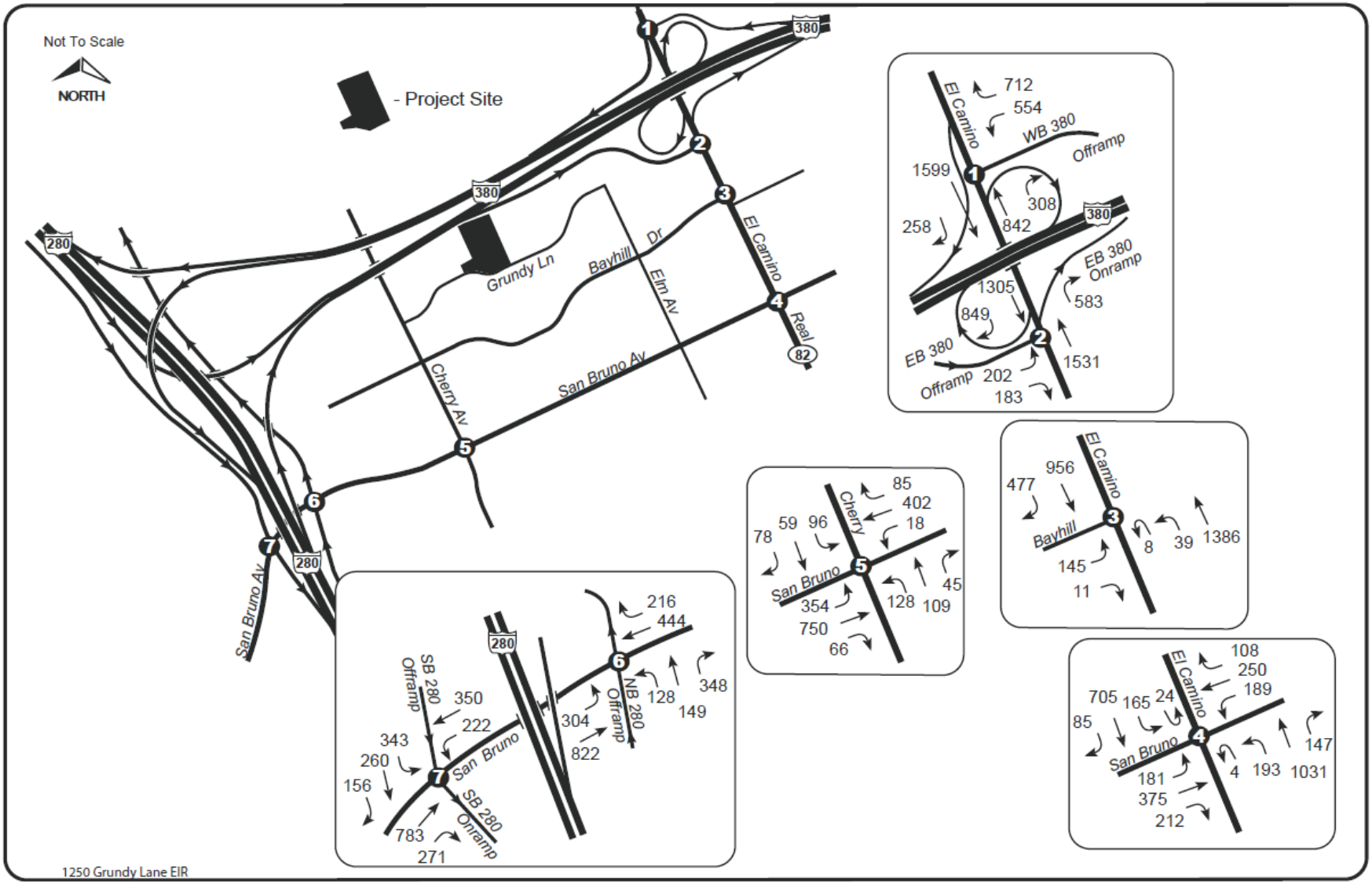
Source: Crane Transportation Group, August 2015.

Standards of Significance

In addition to the City of San Bruno LOS standards, San Mateo County Congestion Management Program (CMP) LOS Standards have been established for roadway segments and intersections near the County line that have been designated CMP roadway system facilities. For Non-CMP intersections, a significant impact would occur if the proposed project would result in any of the following:

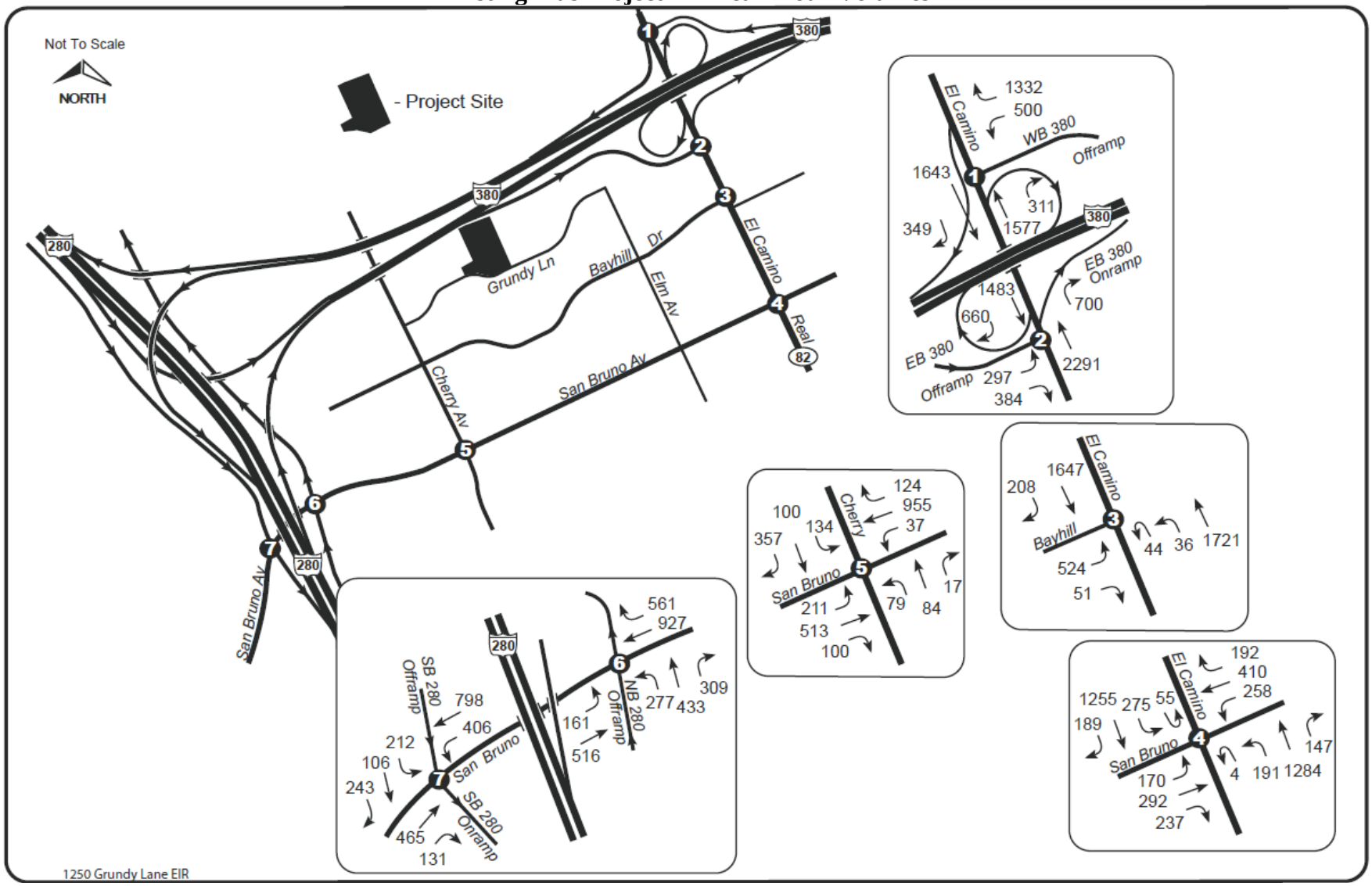
- Deteriorate peak hour intersection operations from an acceptable (LOS D or better) to an unacceptable level (LOS E or LOS F); or
- Exacerbate unacceptable operations by increasing the average control delay by four (4) seconds or more at an intersection operating at LOS E or LOS F.

Figure 6
Existing Plus Project AM Peak Hour Volumes



Source: Crane Transportation Group, August 2015.

Figure 7
Existing Plus Project PM Peak Hour Volumes



Source: Crane Transportation Group, August 2015.

For CMP Intersections, a significant impact would occur if the proposed project would result in any of the following:

- Deteriorate peak hour intersection operations from an acceptable (LOS E or better) to an unacceptable level (LOS F); or
- Exacerbate unacceptable operations by increasing the average critical delay by four (4) seconds or more at an intersection operating at LOS F.

For Caltrans facilities, Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State highway facilities, but Caltrans acknowledges that this many not always be feasible. Because El Camino Real (SR 82) is a predominantly signalized, heavily-traveled road, and in order to provide consistency with the above-described City of San Bruno standards, LOS D is considered the appropriate target LOS for these State highway intersections. The Caltrans Guide goes on to say that if an existing State highway facility is operating at worse than the appropriate target LOS, the existing measure of effectiveness (i.e., vehicle delay at intersections) should be maintained. However, Caltrans typically will consider and defer to a local jurisdiction's significance threshold. As previously noted, for Non-CMP intersections, a significant impact would occur if the proposed project would result in any of the following:

- Deteriorate peak hour intersection operations from an acceptable (LOS D or better) to an unacceptable level (LOS E or LOS F); or
- Exacerbate unacceptable operations by increasing the average control delay by four (4) seconds or more at an intersection operating at LOS E or LOS F.

For CMP Intersections, a significant impact would occur if the proposed project would result in any of the following:

- Deteriorate peak hour intersection operations from an acceptable (LOS E or better) to an unacceptable level (LOS F); or
- Exacerbate unacceptable operations by increasing the average critical delay by four (4) seconds or more at an intersection operating at LOS F

Table 9 presents the addition of project traffic to the existing volumes. As shown in the table, the El Camino Real / San Bruno Avenue intersection would continue to operate at LOS D in the PM peak hour, and all other intersections would operate at LOS C or better. Thus, all intersections would continue to operate within the established LOS thresholds, and impacts to local intersections would not occur as a result of the proposed project.

Table 9
Existing Plus Project Peak Hour LOS at Intersections

Location	Control	AM Existing Peak Hour		PM Existing Peak Hour		AM Existing Plus Project Peak Hour		PM Existing Plus Project Peak Hour	
		LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)
El Camino Real / I-380 WB Off-Ramp	Signal	B	18.1	C	27.8	B	18.5	C	27.9
El Camino Real / I-380 EB Off-Ramp	Signal	A	8.5	B	17.4	A	8.7	B	17.5
El Camino Real / Bayhill Drive	Signal	A	7.6	C	24.8	A	8.2	C	26.6
El Camino Real / San Bruno Ave	Signal	C	34.6	D	44.0	C	34.7	D	44.2
San Bruno Ave / Cherry Ave	Signal	B	19.7	C	26.5	C	20.3	C	27.1
San Bruno Ave / I-280 NB Off-Ramp	Signal	B	19.6	C	24.7	B	19.8	C	24.8
San Bruno Ave / I-280 SB Off-Ramp	Signal	C	20.9	C	20.7	C	20.9	C	20.8

Source: Crane Transportation Group, August 2015.

Cumulative Conditions

Year 2030 AM and PM peak hour traffic volumes were developed using 2030 traffic projections from the San Bruno Transit Corridors Plan Draft EIR. Because these projections included traffic activity from the restaurant on the project site that has now been closed for several years, traffic volumes from this use were removed from the 2030 system in order to present a true “no project” set of projections. It should be noted that planned and funded roadway improvements that would improve circulation system capacity are not anticipated by 2030.

The 2030 Cumulative No Project peak hour LOS for the seven intersections analyzed is shown in Table 10. As shown in the table, the two poorest projected intersections are El Camino Real / San Bruno Ave and El Camino Real / Bayhill Drive. The El Camino Real / San Bruno Ave intersection is projected to operate at unacceptable LOS F during the PM peak hour, while the El Camino Real / Bayhill Drive intersection is projected to operate at unacceptable LOS E during the AM peak hour. However, all other study intersections would operate at acceptable LOS during the AM and PM peak traffic hours under the 2030 Cumulative No Project scenario.

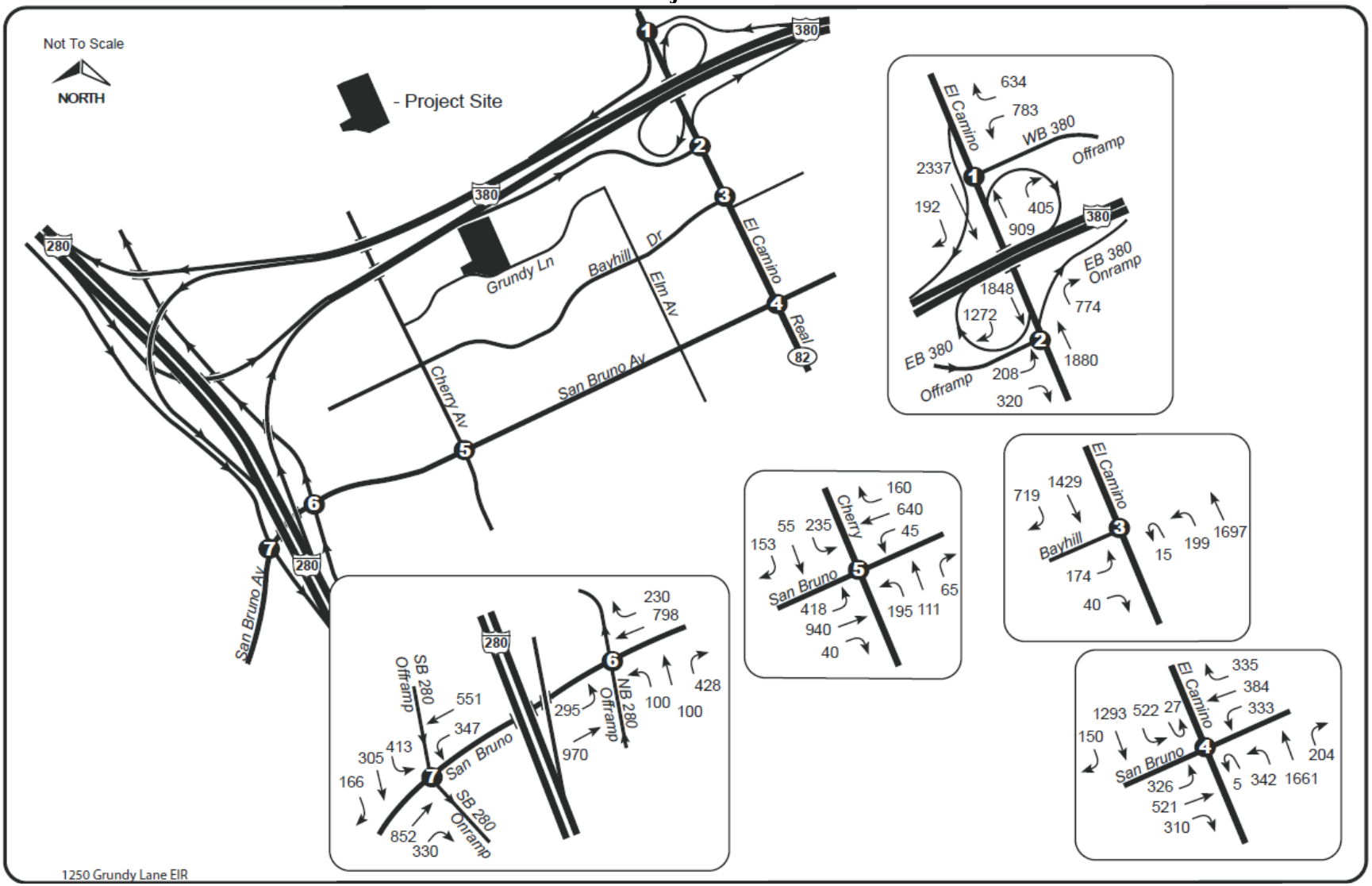
Table 10
2030 Cumulative No Project versus Cumulative Plus Project Peak Hour LOS at Intersections

Location	Control	AM Cumulative No Project Peak Hour		PM Cumulative No Project Peak Hour		AM Cumulative Plus Project Peak Hour		PM Cumulative Plus Project Peak Hour	
		LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)
El Camino Real / I-380 WB Off-Ramp	Signal	C	20.8	C	32.7	C	21.4	C	33.1
El Camino Real / I-380 EB Off-Ramp	Signal	B	10.1	B	17.1	B	10.3	B	17.1
El Camino Real / Bayhill Drive	Signal	E	68.1	D	37.0	E	69.9	D	38.7
El Camino Real / San Bruno Ave	Signal	E	73.7	F	113.3	E	74.1	F	113.7
San Bruno Ave / Cherry Ave	Signal	D	51.5	D	42.2	D	54.3	D	42.7
San Bruno Ave / I-280 NB Off-Ramp	Signal	B	19.7	C	28.4	C	20.1	C	28.6
San Bruno Ave / I-280 SB Off-Ramp	Signal	C	20.9	C	21.5	C	20.9	C	21.6

Source: Crane Transportation Group, August 2015.

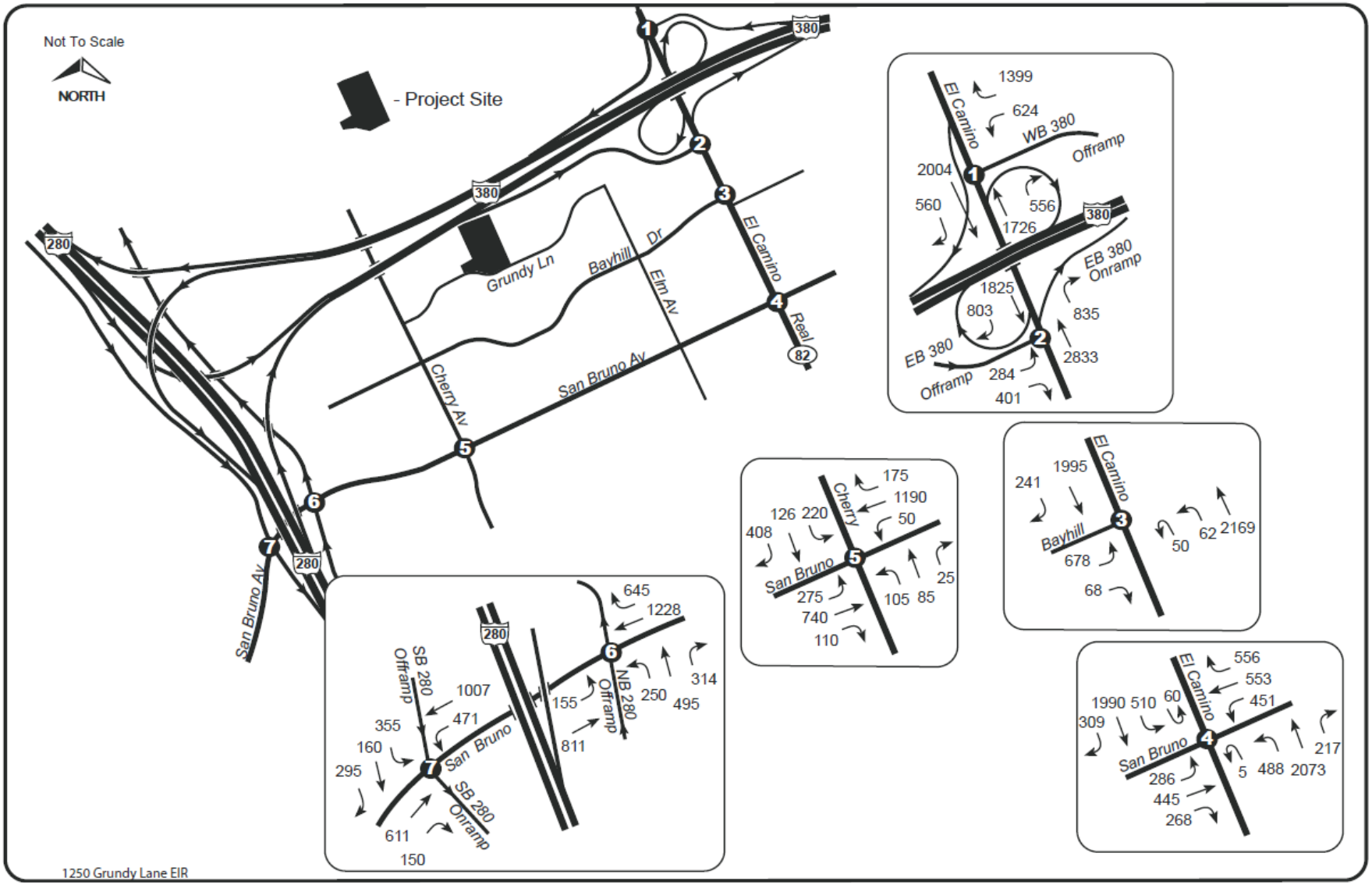
The anticipated volumes for 2030 Cumulative Plus Project conditions for the AM and PM peak hour traffic hours are presented in Figure 8 and Figure 9, respectively. Table 10 presents the 2030 Cumulative Plus Project intersection LOS compared to the 2030 Cumulative No Project conditions. As shown in the table, the addition of project traffic to the year 2030 Cumulative No Project volumes would not result in unacceptable LOS at any of the study intersections per the significance criteria listed above. For the two intersections discussed above that would operate at unacceptable LOS without the proposed project traffic, the addition of project traffic would not increase the average control delay at either intersection by the significance criteria limit of four seconds (e.g., only a 1.8 second delay increase would occur at the El Camino Real / Bayhill Drive intersection, and a 0.4 second delay increase would occur at the El Camino Real / San Bruno Ave intersection). Therefore, all intersections would continue to operate within LOS thresholds under 2030 Cumulative Plus Project conditions, and impacts to study intersections would not occur as a result of the proposed project.

Figure 8
2030 Cumulative Plus Project AM Peak Hour Volumes



Source: Crane Transportation Group, August 2015.

Figure 9
2030 Cumulative Plus Project PM Peak Hour Volumes



Source: Crane Transportation Group, August 2015.

Conclusion

As discussed above, although the proposed project would cause an increase in traffic in the area, the incremental increase would not result in adverse traffic impacts per the thresholds of significance used for this analysis. Therefore, the proposed project would have a ***less-than-significant*** impact with respect to causing an increase in traffic that would be substantial in relation to the existing traffic load and capacity of the street system, and exceeding any LOS standards.

c. The proposed project would not directly induce population growth in the area and would, thus, not be expected to result in any substantial increase in air traffic levels. In addition, as discussed in further detail in Section VIII, Hazards and Hazardous Materials, of this IS/MND, the proposed project would comply with all applicable General Plan policies intended to minimize potential air safety hazards, as well as the height restrictions and safety compatibility standards of the FAR Part 77 and the San Mateo County CALUP. As such, the project would not result in any affects to or from the nearby SFO airport. Because the project would not result in any changes to existing regional air traffic patterns or activity, ***no impact*** would occur.

d. The project would have two driveway connections to the north side of Grundy Lane. Sight lines for the proposed project at each driveway for exiting drivers would be as follows after the proposed surface parking lot immediately west of the project's west driveway is developed:

	PROJECT WEST DRIVEWAY	PROJECT EAST DRIVEWAY
Sight Line to East on Grundy Lane	450'	290'
Sight Line to West on Grundy Lane	250'	300'

On-street parking is currently prohibited along the north side of Grundy Lane to the east of the project site, which would facilitate sight lines in that direction. On-street parking would also be prohibited along the site frontage between the project driveways and partially through the horizontal curve just west of the west driveway, subject to review by the City Public Services Department and Traffic Safety and Parking Committee and approval by the City Council.

Minimum acceptable sight lines on local streets are typically evaluated using stopping sight distances as the criteria. Stopping sight distances based upon speed, according to *A Policy on Geometric Design of Highways and Streets* - a guidance document prepared by the American Association of State Highway and Transportation Officials - are presented in Table 11 below.

Table 11 Stopping Site Distances		
Speed	**Level**	**3% Downgrade**
20 mph	115’	116’
25 mph	155’	158’
30 mph	200’	205’
35 mph	250’	257’
Source: Crane Transportation Group, August 28, 2013.		

While a posted speed limit does not currently exist on Grundy Lane, observed speeds ranged from 20 to 30 mph with an occasional vehicle traveling faster than 30 mph. In addition, a minor downgrade occurs (west to east) along Grundy Lane, just west of the proposed west driveway location. Based upon observed speeds, minor downhill grade, and available sight lines, a minor sight line deficiency for exiting drivers at the project’s west driveway (looking west to see eastbound vehicles) would occur with implementation of the proposed project. Because the proposed project could result in a sight line deficiency, a ***potentially significant*** impact could occur.

Mitigation Measure(s)
Implementation of the following mitigation measure would reduce the above impacts to a *less-than-significant* level.

XVI-1 *Prior to the issuance of a building permit, the project applicant shall coordinate with the City Streets Division to post a 25 mph speed limit sign on the eastbound Grundy Lane approach to the western project driveway. Improvements shall be fully funded by the project applicant.*

e. The proposed project site has been previously developed and is surrounded by existing similar developments. Modifications to the existing circulation system in the project area would not occur as a result of the proposed project. As such, emergency access to the site and/or surrounding area would not be modified from existing. The project design includes sufficient emergency vehicle access to the site. Therefore, impacts related to emergency access would be ***less than significant***.

f. Caltrain and the SamTrans currently provide transit services to the City of San Bruno. The BART provides service to the City as well. Caltrain is a commuter rail service consisting of approximately 77 miles of track with 76 total trains traveling per day between the cities of San Francisco and Gilroy. SamTrans is a fixed-route bus system consisting of 64 routes to, from, and within the City of San Bruno. BART is a 95-mile, automated rapid transit system with 47 stations located along five lines of double track, connecting San Francisco to Millbrae and other East Bay communities – north to Richmond, east to Pittsburg/Bay Point, east to Dublin/Pleasanton, and south to Fremont.

As the proposed project would result in a slight increase in the employee population in the area, an increase in new transit riders or other alternative modes of transportation in the area could result. SamTrans offers BART shuttles and community shuttles that connect BART and rail stations with major employment sites. The Peninsula Traffic

Congestion Relief Alliance (known as Commute.org) serves as a broker between cities and interested employers to help create successful commuter shuttle programs.

A shuttle program currently exists at the Bayhill Office Park that is run by Walmart, which has offices located within Bayhill Office Park. The shuttle service runs in a one-way loop via San Bruno Avenue, Cherry Avenue, Sneath Lane, and Huntington Avenue, with a stop at 850 Cherry Avenue, which is in front of Walmart's office building. The Bayhill Office Park shuttle provides employee shuttle trips to/from the San Bruno BART station and the San Bruno Caltrain station. The Bayhill Office Park shuttle service is funded by Walmart, the Bay Air Quality Management District Transportation Fund, and, for the San Bruno BART shuttle trips only, subsidy monies are also provided by SamTrans. Employee ridership is free for shuttle service to the San Bruno BART and Caltrain stations. The current shuttle program is managed by Walmart rather than Commute.org. Restrictions on ridership for the existing Bayhill Office Park Shuttle do not currently exist; therefore, future employees at the proposed project site could use the existing shuttle to/from the San Bruno BART and Caltrain stations. The applicant for the proposed project could coordinate with Walmart regarding the addition of a new stop location at 1250 Grundy Lane, though utilization of the existing 850 Cherry Avenue shuttle stop by future project employees would necessitate only a short distance walk of approximately one City block, or 1,000 feet, to/from the project site.

Sidewalks are provided along the project's Grundy Lane frontage as well as along both sides of all local streets. The only nearby existing bike routes are along Sneath Lane, where Class II signed and striped bike lanes are provided. Bayhill Drive and Cherry Avenue are all designated as potential future bike routes in the City's General Plan Circulation Element.

Because the proposed project would be located within the Bayhill Office Park, free shuttle services would be available for future employees to/from for the San Bruno BART and Caltrain stations. Pedestrian and bicycle facilities are also available for use in the project vicinity. In addition, the proposed project would be consistent with the General Plan goals and policies associated with alternative transportation, as well as all applicable State and local standards, including compliance with parking standards, and other features supportive of alternative transportation usage. Therefore, the proposed project would not conflict with any adopted policies supporting alternative transportation, and impacts would be ***less than significant***.

XVII. UTILITIES AND SERVICE SYSTEMS. *Would the project:*	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Exceed wastewater treatment requirements of 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 sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	✖	☐
e. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	✖	☐
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	✖	☐
g. Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	✖	☐

Discussion

a-e. The following is a discussion of the proposed project utilities, including the existing water, sewer, and storm drainage systems, and the potential increase in demand for each system.

Wastewater System

The City of San Bruno's sewer system consists of approximately 150 miles of pipeline and seven lift stations. Currently, 2.8 million gallons of effluent per day goes to the South San Francisco-San Bruno Water Quality Control Plant (SSF/SB WQCP). The treatment facility is located one mile north of the San Francisco International Airport within the boundaries of South San Francisco. From the treatment facility, treated wastewater is discharged into the San Francisco Bay from a 60-inch outfall pipeline two miles offshore and 20 feet beneath the surface. The proposed project includes a connection to the existing six-inch lateral lines next to the project site along Grundy Lane. Due to the slight increase in employees at the site, an increase in demand for wastewater treatment would

likely result from implementation of the proposed project. Despite the slight increase in number of employees at the project site, the City has confirmed that the existing infrastructure and facilities have adequate capacity for the associated increase in demand.[7] Therefore, current wastewater services would be adequate to accommodate the proposed project.

Water System

The City of San Bruno uses a local water source to meet more than half of its water needs. Four wells produce approximately half of the City's water supply by drawing potable water from the Westside Groundwater Basin, a deep aquifer located between 250 feet and 500 feet below ground surface. Water purchased from the San Francisco Public Utilities Commission (SFPUC) is the second primary source for the City. The SFPUC's water source is the Hetch Hetchy system, which originates in the Sierra Nevada Mountains and is transported 150 miles through a series of pipelines and tunnels to supply San Francisco and other cities on the Peninsula. In addition to the four wells, the City of San Bruno's water system infrastructure consists of 18 booster pumps, one filtering plant, eight storage tanks (with a combined capacity of eight million gallons), 900 fire hydrants, 9,000 valves, over 100 miles of water mains, ranging from 12 inches to 16 inches in diameter, and 11,300 metered services. Water service would be provided to the project site by means of connecting to the existing two-inch domestic and two-inch fire flow water lines along Grundy Lane. According to the City, the existing infrastructure and facilities would be sufficient to accommodate the proposed project.[8]

Storm Drainage

The proposed project would connect to the City's existing storm drainage system. A Storm Drain Master Plan was developed for the City in May 2014. According to the City's Storm Drain Master Plan, the City's drainage system has a 25-year storm capacity. The proposed project would result in impervious surfaces; however, as discussed in the Hydrology and Water Quality section of this IS/MND, the proposed project would result in a smaller impervious area than what currently exists on the project site. In addition, the proposed project includes compliance with stormwater control requirements per C.3 Regulations, including appropriate site design measures, source controls, and hydraulically-sized stormwater treatment measures. As presented in the Treatment Calculations table in Figure 5, Project Grading and Storm Drain Plan, the project design includes stormwater treatment areas in excess of what is required per the C.3 Regulations. As such, the project would not be expected to result in an increase in stormwater runoff, and the City has determined that the existing storm drainage system has adequate capacity to accommodate the proposed project.[9]

[7] City of San Bruno. Personal communication with Joseph Cervantes, Associate Civil Engineer. July 23, 2013.
[8] *Ibid.*
[9] *Ibid.*

Conclusion

As discussed above, the project would not result in a substantial increase in the demand for water, wastewater, or stormwater service systems. Furthermore, the City confirms that the existing infrastructure and facilities are adequate to accommodate the proposed project. In conclusion, construction of new or expansion of existing water, wastewater, or stormwater drainage system facilities would not be required, and a ***less-than-significant*** impact related to water, wastewater, and stormwater services would result.

f,g. According to the City's General Plan EIR, the City of San Bruno currently utilizes the Ox Mountain Landfill, located in Half Moon Bay off of San Mateo Road. While the landfill is anticipated to reach capacity in 2017, a current expansion is underway that should extend capacity through 2025. In addition, waste stream reduction, such as recycling and continual public education about waste reduction, is expected to lengthen the projected life of the facility. Furthermore, the proposed project is consistent with the land use designation for the site in the General Plan and would comply with all federal, State, and local regulations related to solid waste. Therefore, the proposed project would result in a ***less-than-significant*** impact related to solid waste services.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE.	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Does the project have the potential to degrade the quality of the environment, 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 or eliminate important examples of the major periods of California history or prehistory?	☐	☐	✖	☐
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	✖	☐
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	✖	☐

Discussion

a. As mentioned previously, the project site has a low sensitivity for biological resources and cultural resources. Although unlikely, the potential exists for the project to affect nesting birds during construction activities if found nesting in the existing on-site trees. In addition, the possibility exists that subsurface excavation of the site during grading and other construction activities could unearth deposits of cultural significance. However, this IS/MND includes mitigation measures that would reduce any potential impacts to a less-than-significant level. Therefore, the proposed project would have ***less-than-significant*** overall impacts to the quality of the environment, plant and wildlife species, and important examples of California history or prehistory.

b. The proposed project in conjunction with other development within the City of San Bruno could incrementally contribute to cumulative impacts in the area. However, mitigation measures for all potentially significant project-level impacts identified for the proposed project in this IS/MND have been included that would reduce impacts to less-than-significant levels. All future development projects in the area would be required to undergo the same environmental analysis and mitigate any potential impacts, as necessary. Therefore, the proposed project would not have any impacts that would be cumulatively considerable, and impacts would be ***less than significant***.

c. Because the project site has been previously developed, is surrounded by existing development, and is consistent with the land use designation for the site, substantial adverse effects on human beings are not anticipated with implementation of the proposed project. It should be noted that construction could result in exposure of persons to

pesticide residues within on-site soils. However, this IS/MND includes mitigation measures that would reduce any potential impacts to a less-than-significant level. Therefore, impacts related to environmental effects that could cause adverse effects on human beings would be ***less than significant***.

Appendix A

San Francisco Police Credit Union Headquarters

Bay Area AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	66.98	1000sqft	1.70	66,980.00	0
Enclosed Parking with Elevator	160.00	Space	0.00	64,000.00	0
Parking Lot	44.00	Space	0.00	17,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2015
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 - based on project site plan; NOTE: parking was included for informational purposes with default sf, as the land use does not result in operational emissions and the size would not affect results

Construction Phase - construction GHG not required to be quantified

Off-road Equipment - construction GHG not required to be quantified

Trips and VMT - construction GHG emissions not required to be quantified

Vehicle Trips - wkdy trip rate based on total daily trips plus a 10% reduction from shuttle service to BART & Caltrain, frequency of SamTrans transit service, and project TDM program - according to traffic consultant

Area Coating -

Water And Wastewater - indoor water usage estimate based on City Water Master Plan generation rates; outdoor water usage estimate based on Irrigation Zone Plan for project

Mobile Land Use Mitigation - project would provide 210 jobs

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	250.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	250.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	250.00
tblArchitecturalCoating	EF_Residential_Interior	100.00	250.00
tblConstructionPhase	NumDays	10.00	0.00
tblLandUse	LotAcreage	1.54	1.70
tblLandUse	LotAcreage	1.44	0.00
tblLandUse	LotAcreage	0.40	0.00
tblProjectCharacteristics	OperationalYear	2014	2015
tblVehicleTrips	WD_TR	11.01	10.88
tblWater	IndoorWaterUseRate	11,904,606.44	3,169,600.00
tblWater	OutdoorWaterUseRate	7,296,371.69	238,282.00

2.0 Emissions Summary

	ROG	NOx	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**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1400e-003
Energy											0.0000	472.9712	472.9712	0.0195	5.0800e-003	474.9542
Mobile											0.0000	573.3057	573.3057	0.0268	0.0000	573.8678
Waste											12.6443	0.0000	12.6443	0.7473	0.0000	28.3367
Water											1.0056	5.2320	6.2375	0.1035	2.4900e-003	9.1826
Total											**13.6499**	**1,051.5136**	**1,065.1635**	**0.8971**	**7.5700e-003**	**1,086.3464**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1400e-003
Energy											0.0000	472.9712	472.9712	0.0195	5.0800e-003	474.9542
Mobile											0.0000	571.3007	571.3007	0.0267	0.0000	571.8611
Waste											12.6443	0.0000	12.6443	0.7473	0.0000	28.3367
Water											1.0056	5.2320	6.2375	0.1035	2.4800e-003	9.1810
Total											**13.6499**	**1,049.5086**	**1,063.1585**	**0.8970**	**7.5600e-003**	**1,084.3380**

	ROG	NOx	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**	**0.19**	**0.19**	**0.01**	**0.13**	**0.18**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	1/1/2014	12/31/2013	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 197,262; Non-Residential Outdoor: 65,754 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	11.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 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											0.0000	571.3007	571.3007	0.0267	0.0000	571.8611
Unmitigated											0.0000	573.3057	573.3057	0.0268	0.0000	573.8678

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	728.74	158.74	65.64	1,320,542	1,315,757
Parking Lot	0.00	0.00	0.00		
Total	728.74	158.74	65.64	1,320,542	1,315,757

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.546619	0.062800	0.174631	0.124220	0.034286	0.004915	0.015254	0.022958	0.002060	0.003298	0.006596	0.000695	0.001668

4.4 Fleet Mix

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					
NaturalGas Mitigated											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
NaturalGas Unmitigated											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
Electricity Mitigated											0.0000	400.4485	400.4485	0.0181	3.7500e-003	401.9901
Electricity Unmitigated											0.0000	400.4485	400.4485	0.0181	3.7500e-003	401.9901

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
General Office Building	1.35902e+006											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
Parking Lot	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total												**0.0000**	**72.5227**	**72.5227**	**1.3900e-003**	**1.3300e-003**	**72.9641**

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
General Office Building	1.35902e+006											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
Parking Lot	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total												**0.0000**	**72.5227**	**72.5227**	**1.3900e-003**	**1.3300e-003**	**72.9641**

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	431360	125.4876	5.6700e-003	1.1700e-003	125.9707
General Office Building	929682	270.4553	0.0122	2.5300e-003	271.4964
Parking Lot	15488	4.5056	2.0000e-004	4.0000e-005	4.5230
Total		**400.4485**	**0.0181**	**3.7400e-003**	**401.9901**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	431360	125.4876	5.6700e-003	1.1700e-003	125.9707
General Office Building	929682	270.4553	0.0122	2.5300e-003	271.4964
Parking Lot	15488	4.5056	2.0000e-004	4.0000e-005	4.5230
Total		**400.4485**	**0.0181**	**3.7400e-003**	**401.9901**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1400e-003
Unmitigated											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1400e-003

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											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1400e-003
Total											**0.0000**	**4.8400e-003**	**4.8400e-003**	**1.0000e-005**	**0.0000**	**5.1400e-003**

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											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1400e-003
Total											**0.0000**	**4.8400e-003**	**4.8400e-003**	**1.0000e-005**	**0.0000**	**5.1400e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Unmitigated	6.2375	0.1035	2.4900e-003	9.1826
Mitigated	6.2375	0.1035	2.4800e-003	9.1810

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	3.1696 / 0.238282	6.2375	0.1035	2.4900e-003	9.1826
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**6.2375**	**0.1035**	**2.4900e-003**	**9.1826**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	3.1696 / 0.238282	6.2375	0.1035	2.4800e-003	9.1810
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**6.2375**	**0.1035**	**2.4800e-003**	**9.1810**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	12.6443	0.7473	0.0000	28.3367
Unmitigated	12.6443	0.7473	0.0000	28.3367

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	62.29	12.6443	0.7473	0.0000	28.3367
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**12.6443**	**0.7473**	**0.0000**	**28.3367**

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
General Office Building	62.29	12.6443	0.7473	0.0000	28.3367
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**12.6443**	**0.7473**	**0.0000**	**28.3367**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

San Francisco Police Credit Union Headquarters - YEAR 2020

Bay Area AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	66.98	1000sqft	1.70	66,980.00	0
Enclosed Parking with Elevator	160.00	Space	0.00	64,000.00	0
Parking Lot	44.00	Space	0.00	17,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
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 - based on project site plan; NOTE: parking was included for informational purposes with default sf, as the land use does not result in operational emissions and the size would not affect results

Construction Phase - construction GHG not required to be quantified

Off-road Equipment - construction GHG not required to be quantified

Trips and VMT - construction GHG emissions not required to be quantified

Vehicle Trips - wkdy trip rate based on total daily trips plus a 10% reduction from shuttle service to BART & Caltrain, frequency of SamTrans transit service, and project TDM program - according to traffic consultant

Area Coating -

Water And Wastewater - indoor water usage estimate based on City Water Master Plan generation rates; outdoor water usage estimate based on Irrigation Zone Plan for project

Mobile Land Use Mitigation - project would provide 210 jobs

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	250.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	250.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	250.00
tblArchitecturalCoating	EF_Residential_Interior	100.00	250.00
tblConstructionPhase	NumDays	10.00	0.00
tblLandUse	LotAcreage	1.54	1.70
tblLandUse	LotAcreage	1.44	0.00
tblLandUse	LotAcreage	0.40	0.00
tblProjectCharacteristics	OperationalYear	2014	2020
tblVehicleTrips	WD_TR	11.01	10.88
tblWater	IndoorWaterUseRate	11,904,606.44	3,169,600.00
tblWater	OutdoorWaterUseRate	7,296,371.69	238,282.00

2.0 Emissions Summary

	ROG	NOx	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**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1100e-003
Energy											0.0000	472.9712	472.9712	0.0195	5.0800e-003	474.9542
Mobile											0.0000	491.8373	491.8373	0.0183	0.0000	492.2213
Waste											12.6443	0.0000	12.6443	0.7473	0.0000	28.3367
Water											1.0056	5.2320	6.2375	0.1035	2.4900e-003	9.1826
Total											**13.6499**	**970.0453**	**983.6952**	**0.8886**	**7.5700e-003**	**1,004.6999**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1100e-003
Energy											0.0000	472.9712	472.9712	0.0195	5.0800e-003	474.9542
Mobile											0.0000	490.1182	490.1182	0.0182	0.0000	490.5010
Waste											12.6443	0.0000	12.6443	0.7473	0.0000	28.3367
Water											1.0056	5.2320	6.2375	0.1035	2.4800e-003	9.1810
Total											**13.6499**	**968.3262**	**981.9761**	**0.8885**	**7.5600e-003**	**1,002.9779**

	ROG	**NOx**	**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**	**0.18**	**0.17**	**0.01**	**0.13**	**0.17**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	1/1/2014	12/31/2013	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 197,262; Non-Residential Outdoor: 65,754 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	11.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 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											0.0000	490.1182	490.1182	0.0182	0.0000	490.5010
Unmitigated											0.0000	491.8373	491.8373	0.0183	0.0000	492.2213

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	728.74	158.74	65.64	1,320,542	1,315,757
Parking Lot	0.00	0.00	0.00		
Total	728.74	158.74	65.64	1,320,542	1,315,757

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.546690	0.063179	0.174273	0.121979	0.033815	0.004830	0.015501	0.025302	0.002100	0.003252	0.006757	0.000658	0.001666

4.4 Fleet Mix

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					
NaturalGas Mitigated											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
NaturalGas Unmitigated											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
Electricity Mitigated											0.0000	400.4485	400.4485	0.0181	3.7500e-003	401.9901
Electricity Unmitigated											0.0000	400.4485	400.4485	0.0181	3.7500e-003	401.9901

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
General Office Building	1.35902e+006											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
Parking Lot	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total												**0.0000**	**72.5227**	**72.5227**	**1.3900e-003**	**1.3300e-003**	**72.9641**

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
General Office Building	1.35902e+006											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
Parking Lot	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total												**0.0000**	**72.5227**	**72.5227**	**1.3900e-003**	**1.3300e-003**	**72.9641**

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	431360	125.4876	5.6700e-003	1.1700e-003	125.9707
General Office Building	929682	270.4553	0.0122	2.5300e-003	271.4964
Parking Lot	15488	4.5056	2.0000e-004	4.0000e-005	4.5230
Total		**400.4485**	**0.0181**	**3.7400e-003**	**401.9901**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	431360	125.4876	5.6700e-003	1.1700e-003	125.9707
General Office Building	929682	270.4553	0.0122	2.5300e-003	271.4964
Parking Lot	15488	4.5056	2.0000e-004	4.0000e-005	4.5230
Total		**400.4485**	**0.0181**	**3.7400e-003**	**401.9901**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1100e-003
Unmitigated											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1100e-003

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											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1100e-003
Total											**0.0000**	**4.8400e-003**	**4.8400e-003**	**1.0000e-005**	**0.0000**	**5.1100e-003**

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											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1100e-003
Total											**0.0000**	**4.8400e-003**	**4.8400e-003**	**1.0000e-005**	**0.0000**	**5.1100e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Unmitigated	6.2375	0.1035	2.4900e-003	9.1826
Mitigated	6.2375	0.1035	2.4800e-003	9.1810

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	3.1696 / 0.238282	6.2375	0.1035	2.4900e-003	9.1826
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**6.2375**	**0.1035**	**2.4900e-003**	**9.1826**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	3.1696 / 0.238282	6.2375	0.1035	2.4800e-003	9.1810
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**6.2375**	**0.1035**	**2.4800e-003**	**9.1810**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	12.6443	0.7473	0.0000	28.3367
Unmitigated	12.6443	0.7473	0.0000	28.3367

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	62.29	12.6443	0.7473	0.0000	28.3367
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**12.6443**	**0.7473**	**0.0000**	**28.3367**

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
General Office Building	62.29	12.6443	0.7473	0.0000	28.3367
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**12.6443**	**0.7473**	**0.0000**	**28.3367**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

San Francisco Police Credit Union Headquarters - Baseline 2005

Bay Area AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	66.98	1000sqft	1.70	66,980.00	0
Enclosed Parking with Elevator	160.00	Space	0.00	64,000.00	0
Parking Lot	44.00	Space	0.00	17,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2005
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 - based on project site plan; NOTE: parking was included for informational purposes with default sf, as the land use does not result in operational emissions and the size would not affect results

Construction Phase - construction GHG not required to be quantified

Off-road Equipment - construction GHG not required to be quantified

Trips and VMT - construction GHG emissions not required to be quantified

Vehicle Trips - wkdy trip rate based on total daily trips plus a 10% reduction from shuttle service to BART & Caltrain, frequency of SamTrans transit service, and project TDM program - according to traffic consultant

Area Coating -

Water And Wastewater - indoor water usage estimate based on City Water Master Plan generation rates; outdoor water usage estimate based on Irrigation Zone Plan for project

Mobile Land Use Mitigation - project would provide 210 jobs

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	250.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	250.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	250.00
tblArchitecturalCoating	EF_Residential_Interior	100.00	250.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	150
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	100
tblConstructionPhase	NumDays	10.00	0.00
tblLandUse	LotAcreage	1.54	1.70
tblLandUse	LotAcreage	1.44	0.00
tblLandUse	LotAcreage	0.40	0.00
tblProjectCharacteristics	OperationalYear	2014	2005
tblVehicleTrips	WD_TR	11.01	10.88
tblWater	IndoorWaterUseRate	11,904,606.44	3,169,600.00
tblWater	OutdoorWaterUseRate	7,296,371.69	238,282.00

2.0 Emissions Summary

	ROG	NOx	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**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area											0.0000	4.8400e-003	4.8400e-003	2.0000e-005	0.0000	5.3200e-003
Energy											0.0000	472.9712	472.9712	0.0195	5.0800e-003	474.9542
Mobile											0.0000	671.0279	671.0279	0.0681	0.0000	672.4572
Waste											12.6443	0.0000	12.6443	0.7473	0.0000	28.3367
Water											1.0056	5.2320	6.2375	0.1035	2.4900e-003	9.1826
Total											**13.6499**	**1,149.2359**	**1,162.8857**	**0.9384**	**7.5700e-003**	**1,184.9359**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area											0.0000	4.8400e-003	4.8400e-003	2.0000e-005	0.0000	5.3200e-003
Energy											0.0000	472.9712	472.9712	0.0195	5.0800e-003	474.9542
Mobile											0.0000	668.6700	668.6700	0.0679	0.0000	670.0950
Waste											12.6443	0.0000	12.6443	0.7473	0.0000	28.3367
Water											1.0056	5.2320	6.2375	0.1035	2.4800e-003	9.1810
Total											**13.6499**	**1,146.8780**	**1,160.5279**	**0.9381**	**7.5600e-003**	**1,182.5721**

	ROG	NOx	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**	**0.21**	**0.20**	**0.02**	**0.13**	**0.20**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	1/1/2014	12/31/2013	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 197,262; Non-Residential Outdoor: 65,754 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	11.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 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											0.0000	668.6700	668.6700	0.0679	0.0000	670.0950
Unmitigated											0.0000	671.0279	671.0279	0.0681	0.0000	672.4572

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	728.74	158.74	65.64	1,320,542	1,315,757
Parking Lot	0.00	0.00	0.00		
Total	728.74	158.74	65.64	1,320,542	1,315,757

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.519565	0.128599	0.206359	0.077242	0.011927	0.006545	0.015719	0.018840	0.001351	0.003473	0.007104	0.001203	0.002073

4.4 Fleet Mix

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					
NaturalGas Mitigated											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
NaturalGas Unmitigated											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
Electricity Mitigated											0.0000	400.4485	400.4485	0.0181	3.7500e-003	401.9901
Electricity Unmitigated											0.0000	400.4485	400.4485	0.0181	3.7500e-003	401.9901

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
General Office Building	1.35902e+006											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
Parking Lot	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total												**0.0000**	**72.5227**	**72.5227**	**1.3900e-003**	**1.3300e-003**	**72.9641**

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
General Office Building	1.35902e+006											0.0000	72.5227	72.5227	1.3900e-003	1.3300e-003	72.9641
Parking Lot	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total												**0.0000**	**72.5227**	**72.5227**	**1.3900e-003**	**1.3300e-003**	**72.9641**

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	431360	125.4876	5.6700e-003	1.1700e-003	125.9707
General Office Building	929682	270.4553	0.0122	2.5300e-003	271.4964
Parking Lot	15488	4.5056	2.0000e-004	4.0000e-005	4.5230
Total		**400.4485**	**0.0181**	**3.7400e-003**	**401.9901**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	431360	125.4876	5.6700e-003	1.1700e-003	125.9707
General Office Building	929682	270.4553	0.0122	2.5300e-003	271.4964
Parking Lot	15488	4.5056	2.0000e-004	4.0000e-005	4.5230
Total		**400.4485**	**0.0181**	**3.7400e-003**	**401.9901**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated											0.0000	4.8400e-003	4.8400e-003	2.0000e-005	0.0000	5.3200e-003
Unmitigated											0.0000	4.8400e-003	4.8400e-003	2.0000e-005	0.0000	5.3200e-003

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											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	4.8400e-003	4.8400e-003	2.0000e-005	0.0000	5.3200e-003
Total											**0.0000**	**4.8400e-003**	**4.8400e-003**	**2.0000e-005**	**0.0000**	**5.3200e-003**

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											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping											0.0000	4.8400e-003	4.8400e-003	2.0000e-005	0.0000	5.3200e-003
Total											**0.0000**	**4.8400e-003**	**4.8400e-003**	**2.0000e-005**	**0.0000**	**5.3200e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Unmitigated	6.2375	0.1035	2.4900e-003	9.1826
Mitigated	6.2375	0.1035	2.4800e-003	9.1810

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	3.1696 / 0.238282	6.2375	0.1035	2.4900e-003	9.1826
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**6.2375**	**0.1035**	**2.4900e-003**	**9.1826**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	3.1696 / 0.238282	6.2375	0.1035	2.4800e-003	9.1810
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**6.2375**	**0.1035**	**2.4800e-003**	**9.1810**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	12.6443	0.7473	0.0000	28.3367
Unmitigated	12.6443	0.7473	0.0000	28.3367

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	62.29	12.6443	0.7473	0.0000	28.3367
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**12.6443**	**0.7473**	**0.0000**	**28.3367**

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
General Office Building	62.29	12.6443	0.7473	0.0000	28.3367
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**12.6443**	**0.7473**	**0.0000**	**28.3367**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Appendix B

TRANSPORTATION & CIRCULATION

I. INTRODUCTION

This section presents the traffic and circulation impacts resulting from development of the 67,586-square-foot 1250 Grundy Lane office development which will serve as the headquarters for the San Francisco Police Credit Union. The project will be located on the north side of Grundy Lane and just south of the I-380 freeway and will replace a TGI Friday restaurant which has been closed for several years (see **Figure 1**). Existing and cumulative (year 2030) conditions were evaluated by Crane Transportation Group (CTG) at seven nearby signalized intersections, four of which serve ramp intersections for the I-280 or I-380 freeways. Project impacts to intersection level of service were determined, as were impacts to project access, internal vehicle circulation and pedestrian/bicycle circulation. Where appropriate, data excerpts and findings from the following sources have been included in this section: San Bruno Transit Corridors Plan, by Fehr & Peers, March, 2012; City of San Bruno 2015 Signal Timing for San Bruno Avenue intersections and the City of San Bruno General Plan Circulation Element, 2008.

II. CIRCULATION SYSTEM EVALUATION

This analysis evaluated four scenarios of local circulation system operating conditions. They include Existing conditions, Existing "With Project" conditions, Year 2030 "Without Project" conditions and Year 2030 "With Project" conditions. Year 2030 matched the General Plan buildout horizon.

Traffic operations were evaluated at seven intersections during weekday AM and PM peak traffic hours. Study intersections are identified below, while existing intersection lane geometrics and control at each analysis location are shown in **Figure 2**.

San Bruno Avenue/I-280 Southbound Off-Ramp
San Bruno Avenue/I-280 Northbound Off-Ramp
San Bruno Avenue/Cherry Avenue
San Bruno Avenue/El Camino Real
El Camino Real/Bayhill Drive
El Camino Real/I-380 Eastbound Off-Ramp
El Camino Real/I-380 Westbound Off-Ramp

III. SETTING

A. ROADWAY SYSTEM

The project site is located in the City of San Bruno, which is served by several freeways including U.S. 101, Interstate 280 (I-280) and Interstate 380 (I-380). I-380 runs adjacent to the north project boundary.

The project will gain access directly from Grundy Lane. Grundy Lane connects to Cherry Avenue and Bayhill Drive (via a short extension of Elm Avenue), each of which connects to one or two major arterials in the City of San Bruno: El Camino Real (SR 82), San Bruno Avenue or Sneath Lane (see **Figure 1**).

El Camino Real provides local area access to I-380, while San Bruno Avenue and Sneath Lane both provide access to I-280 to the west of the site. San Bruno Avenue also provides access to the U.S. 101 freeway to the east of the site. Each facility is briefly described below.

1. Regional Roadways

U.S. 101 Freeway (U.S. 101) is an eight-lane freeway that provides access to San Bruno east of the project and extends from downtown San Francisco and northern California to Los Angeles and southern California. In the City of San Bruno it also has additional travel lanes associated with the U.S. 101/I-380 freeway-to-freeway interchange and the U.S. 101/San Francisco International Airport (SFO) interchange.

I-280 is an eight-lane freeway that provides access to San Bruno west of the project area and extends from downtown San Francisco to San Jose. In the City of San Bruno it also has additional travel lanes associated with the I-280/I-380 freeway-to-freeway interchange.

I-380 is a multilane east-west freeway connecting I-280 on the west with the U.S. 101 freeway and the SFO North Access Road on the east. It has an interchange with El Camino Real (State Route 82) between I-280 and U.S. 101.

2 Local Streets

El Camino Real (SR 82) is a six-lane north-south arterial roadway located about a third of a mile east of the project site. In the project area it has signalized intersections with the I-380 east and westbound ramps, Bayhill Drive and San Bruno Avenue.

San Bruno Avenue is a four-lane east-west arterial roadway located about a quarter mile south of the project site. In the project area it has signalized intersections with the I-280 north and southbound ramps, Cherry Avenue, Elm Avenue and El Camino Real.

Sneath Lane is a four-lane east-west arterial roadway located about a half mile north of the project site. It has signalized intersections with El Camino Real, Cherry Avenue and the I-280 ramps.

Cherry Avenue is a four-lane north-south collector street extending from Sneath Lane on the north to San Bruno Avenue. It then continues as a two-lane residential street into the neighborhood south of San Bruno Avenue.

Bayhill Drive is a four-lane collector roadway extending westerly from El Camino Real into the Bayhill area office park to just west of Cherry Avenue. It is signal controlled at El Camino Real and Cherry Avenue and has all way stop control at Elm Avenue.

Grundy Lane is a two-lane local street extending west from the end of Elm Avenue (at a 90-degree turn) to Cherry Avenue. It is stop sign controlled on its approach to Cherry Avenue. On-street parking is allowed in most locations. There is no posted speed limit, but there is centerline striping. There are numerous horizontal curves and a minor uphill gradient east to west.

Elm Avenue is a local street extending north of a signalized intersection with San Bruno Avenue into the Bayhill office area before ending at a 90-degree curve connecting to Grundy Lane. It has four lanes between San Bruno Avenue and Bayhill Drive, and two lanes north of Bayhill Drive. It also extends south of San Bruno Avenue into a residential area.

B. VOLUMES

Weekday AM peak period (7:00-9:00) and PM peak period (4:00-6:00) turn movement counts were conducted on _Wednesday, May 20, 2015 while all local schools were in session.

Resultant existing AM and PM peak hour volumes are presented in **Figures 3** and **4,** respectively.

C. INTERSECTION LEVEL OF SERVICE

1. Analysis Methodology (Signalized Intersections)

Transportation engineers and planners commonly use a grading system called level of service (LOS) to measure and describe the operational status of the local roadway network. LOS is a description of the quality of a roadway facility's operation, ranging from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing oversaturated conditions where traffic flows exceed design capacity, resulting in long queues and delays). Intersections, rather than roadway segments between intersections, are almost always the capacity controlling locations for any circulation system.

For signalized intersections, the 2000 *Highway Capacity Manual* (Transportation Research Board, National Research Council) methodology was utilized. With this methodology, operations are defined by the level of service and average control delay per vehicle (measured in seconds) for the entire intersection. For a signalized intersection, control delay is the portion of the total delay attributed to traffic signal operation. This includes delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 1** summarizes the relationship between delay and LOS for signalized intersections.

2. Minimum Acceptable Standard

LOS D is the minimum acceptable operation for a signalized intersection in the City of San Bruno for a <u>non</u> Congestion Management Agency (CMA) monitored location, while LOS E is the minimum acceptable operation for a signalized CMA monitored location. El Camino Real/San Bruno Avenue is the only CMA monitored intersection evaluated in this study.

3. Existing Intersection Level of Service

Table 2 shows that all analyzed intersections currently operate at good to acceptable (LOS D or better) levels of service during both the AM and PM peak traffic hours. Operation is, in general, better at all locations during the AM peak hour compared to the PM peak hour Poorest, but still acceptable operation is at El Camino Real/San Bruno Avenue (AM-LOS C/PM-LOS D).

D. PLANNED AND FUNDED CIRCULATION SYSTEM IMPACTS

There are no planned and funded improvements that would add capacity to any of the analysis intersections.[1] Class III bicycle lanes are being considered for San Bruno Avenue in the upcoming Bicycle/Pedestrian Master Plan.

E. TRANSIT SERVICE

Transit service in the study area includes primarily local bus operation with shuttle buses to BART and Caltrain service.

1. Bus Service

The San Mateo County Transit District (SamTrans) provides bus service to the City of San Bruno. **Figure 5** shows transit routes in the project area, while route and service specifics are detailed below.

Route 43
San Bruno BART station from downtown Burlingame. Runs along Sneath Lane, Cherry Avenue and San Bruno Avenue in the project area. There is one run on weekday afternoons from Burlingame starting at 3:30 PM.

Route 140
San Bruno BART station to/from Pacifica. Runs along San Bruno Avenue, Cherry Avenue and Sneath Lane in the project area. On weekdays there are 23 runs/day from San Bruno BART between 6:05 AM and 10:12 PM and 23 runs/day from Pacifica to San Bruno BART between 6:25 AM and 10:25 PM.

Route 141
San Bruno BART to/from the neighborhood south of San Bruno Avenue. Closest stop to site is at the San Bruno Avenue/Cherry Avenue intersection. On weekdays there are 13 runs/day from the BART station between 7:21 AM and 6:45 PM.

Route ECR
Daly City BART to/from Palo Alto Transit Center or the Millbrae Transit Center. Weekday and weekend service. On weekdays there are 73 runs/day southbound between 3:58 AM and 12:28 PM, with 71 runs/day northbound between 4:48 AM and 1:26 AM.

[1] Matt Neuebaumer, City of San Bruno Planning Department, August 2013.

2. Shuttle Bus Service

San Bruno BART Shuttle

Shuttle service runs between the San Bruno BART station and the Bayhill area office buildings in a one-way loop via San Bruno Avenue, Cherry Avenue, Sneath Lane and Huntington Avenue. Shuttle service is free. Shuttles run during commute periods, with 12 shuttles leaving the San Bruno BART station from 6:40 to 9:25 AM and 10 shuttles leaving the Bayhill area offices from 4:00 to 6:15 PM. This shuttle is funded jointly by the Bay Area Air Quality Management District Transportation Fund for Clean Air, San Mateo County Transit District and by Walmart.

Bayhill San Bruno Caltrain Shuttle

Shuttle service runs between the San Bruno Caltrain station and the Bayhill area office buildings in a one-way loop in the project area using San Bruno Avenue, Cherry Avenue, Sneath Lane and El Camino Real. Shuttle service is free. Shuttles run during commute periods, with six shuttles leaving the San Bruno Caltrain station from 6:46 to 9:29 AM and seven shuttles leaving the Bayhill area offices from 4:03 to 6:41 PM. This shuttle is funded jointly by the Bay Area Quality Management District Transportation Fund for Clean Air, the Peninsula Corridor Joint Powers Board and the San Mateo County Transportation Authority and participating employers.

3. Caltrain

Caltrain provides train service between Gilroy, San Jose and San Francisco. The San Bruno station is located at the corner of the San Bruno Avenue/San Mateo Avenue intersection.

4. BART

BART provides service to the City of Millbrae and SFO to the south of San Bruno as well as northerly into San Francisco and then under San Francisco Bay to destinations extending as far as Richmond, Pittsburg and Fremont. The San Bruno BART station is located at the Sneath Lane/Huntington Avenue intersection east of El Camino Real.

F. PEDESTRIAN AND BICYCLE FACILITIES

Sidewalks are provided along the project's Grundy Lane frontage as well as along both sides of all local streets.

The only nearby existing bike routes are along Sneath Lane, where Class II signed and striped bike lanes are provided. Bayhill Drive and Cherry Avenue are all designated as potential future bike routes in the City's General Plan Circulation Element.

G. REGULATORY FRAMEWORK

Plans and policies that pertain to the traffic conditions affecting and affected by the project include: (1) the San Mateo County Congestion Management Program (CMP) Standards; and (2) the City of San Bruno Transportation Demand Management Program.

1. San Mateo County CMP Standards for Regional Roads and Local Streets

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 line, the LOS standard was set as LOS 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 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 by eliminating from the evaluation the traffic volume that is traveling on the route between San Mateo County and an adjacent county, operating conditions would be acceptable on a CMP route the deficiency would not occur.

2. City of San Bruno Transportation Systems Management (TSM) Program

Per Chapter 12-150 of the San Bruno Municipal Code, the City of San Bruno requires that all nonresidential development with more than 25 employees shall be required to implement a Transportation Systems Management (TSM) program.

V. YEAR 2030 "WITHOUT PROJECT" CIRCULATION SYSTEM OPERATION

A. TRAFFIC VOLUMES

Year 2030 AM and PM peak hour traffic volumes were developed using 2030 traffic projections from the San Bruno Transit Corridors Plan Draft EIR (March 2012). Since these projections included traffic activity from the restaurant on the project site that has now been closed for several years, traffic volumes from this use were removed from the 2030 system in order to present a true "without project" set of projections. Trip generation expected from the closed restaurant and its AM and PM peak hour distribution to the local roadway network are provided in the **Appendix**.

Figures 6 and **7** present projected year 2030 AM and PM peak hour "without project" traffic volumes on the local roadway network with no development on the project site.

B. PLANNED & FUNDED ROADWAY IMPROVEMENTS

There are no planned and funded roadway improvements that will improve circulation system capacity by 2030.[2]

C. YEAR 2030 "WITHOUT PROJECT" INTERSECTION LEVELS OF SERVICE

Table 3 shows that all analyzed intersections with year 2030 "without project" volumes would be operating at acceptable levels of service during the AM and PM peak traffic hours, with the exceptions of El Camino Real at San Bruno Avenue during the PM peak traffic hour, which would be experiencing C/CAG unacceptable LOS F operation, and El Camino Real at Bayhill Drive during the AM peak hour, which would be experiencing unacceptable City of San Bruno LOS E operation.

VI. IMPACTS & MITIGATIONS

A. SIGNIFICANCE CRITERIA

Standards of significance have been measured based on CEQA, City of San Bruno and C/CAG Guideline thresholds. Therefore, project impacts would be significant if they result in any of the following conditions:

a. The project would exceed 100 net new peak hour trips on the local roadway system (C/CAG criteria only).

b. Non-CMP Intersections:

- Peak hour intersection operations will deteriorate from an acceptable (LOS D or better) to an unacceptable level (LOS E or LOS F), or
- Exacerbation of unacceptable operations will increase the average control delay by four (4) seconds or more at an intersection operating at LOS E or LOS F.

c. CMP Intersections:

- Peak hour intersection operations will deteriorate from an acceptable level (LOS E or better) to an unacceptable level (LOS F), or
- Exacerbation of unacceptable operations will increase the average control delay by more than four (4) seconds or more at an intersection operating at LOS F.

[2] Matt Neuebaumer, City of San Bruno Planning Department, May 2015.

d. Caltrans Facilities:

- Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on state highway facilities, but Caltrans acknowledges that this may not always be feasible. Because El Camino Real (SR 82) is a predominantly signalized, heavily-traveled road, and in order to provide consistency with the above-described City of San Bruno standards, LOS D is considered the appropriate target LOS for these state highway intersections. The Caltrans Guide goes on to say that if an existing state highway facility is operating at worse than the appropriate target LOS, the existing measure of effectiveness (i.e., vehicle delay at intersections) should be maintained. However, Caltrans typically will consider and defer to a local jurisdiction's significance threshold. As previously noted, for non-CMP intersections, a significant impact would occur if the proposed project would result in any of the following:

  - Deteriorate peak hour intersection operations from an acceptable (LOS D or better) to an unacceptable level (LOS E or LOS F); or
  - Exacerbate unacceptable operations by increasing the average control delay by four (4) seconds or more at an intersection operating at LOS E or LOS F.

  For CMP intersections, a significant impact would occur if the proposed project would result in any of the following:

  - Deteriorate peak hour intersection operations from an acceptable (LOS E or better) to an unacceptable level (LOS F); or
  - Exacerbate unacceptable operations by increasing the average critical delay by four (4) seconds or more at an intersection operating at LOS F.

e. If, in the opinion of the registered traffic engineer conducting the EIR analysis, a significant traffic, pedestrian or bicycle safety concern would be created or worsened.

B. PROJECT TRIP GENERATION

Tables 4 and **5**, **Project Trip Generation**, show that the 67,586-square-foot building with a maximum of 210 employees would be expected to generate 101 inbound and 14 outbound AM peak hour trips, with 21 inbound and 104 outbound PM peak hour trips. Trip generation projections have been developed using a two-phase process. **Table 4** shows the initial peak hour projections using fitted curve equation trip rates for offices from the Institute of Transportation Engineers[3] based upon number of employees. **Table 5** then shows the results of using C/CAG TDM program trip reduction criteria, which would result in a 10 percent reduction in peak hour trips based upon the number of shuttle buses serving the project area. Implementation of a TDM program is required based upon both C/CAG criteria (because the project will generate more than 100 peak hour trips) as well as City of San Bruno criteria (because it will have more than 25 employees). The presence of significant SamTrans bus service, particularly along El Camino Real, would also facilitate in this peak hour trip reduction. It should be noted that there is a

[3] *Trip Generation Manual*, 9th Edition, 2012.

documented reduction in peak hour trips in nearby communities with similar transit and TDM program measures.

C. PROJECT TRIP DISTRIBUTION

Project traffic was distributed to the local roadway network based upon existing peak hour traffic flow patterns in the area, the numerous opportunities for freeway access, and the consultant's knowledge of local area AM and PM peak congestion on the various freeway segments. Surveys of residential locations of workers from office developments in nearby South San Francisco have also been utilized in developing project distribution projections. As shown in **Figure 8,** I-280 would be expected to attract 20 percent of project traffic to the north and 20 percent to the south, 35 percent to I-380 traveling to the U.S. 101 freeway 7 percent to El Camino Real to the north, 5 percent to El Camino Real to the south and the remaining 13 percent locally either internal to the Bayhill area or to areas accessed via San Bruno Avenue and Sneath Lane.

Project increment AM and PM peak hour volumes are shown distributed to the local roadway network on **Figures 9** and **10**. Resultant existing with project AM and PM peak hour volumes are presented in **Figures 11** and **12**, respectively, while year 2030 with project AM and PM peak hour volumes are presented in **Figures 13** and **14**, respectively.

D. PROJECT IMPACTS

IMPACT 1: C/CAG – Project peak hour trip generation would exceed 100 trips and be in excess of C/CAG guidelines. However, the applicant will be preparing and submitting Transportation Demand Management (TDM) Program as a component of the project. This program, once implemented, will be ongoing for the occupied life of the development as required by the City's Municipal Code.

This would be a less than significant impact.

MITIGATION MEASURE 1: No mitigation required.

EXISTING WITH PROJECT CONDITIONS

IMPACT 2: Intersection Level of Service

Table 2 shows that the addition of project traffic to existing volumes would not result in unacceptable level of service at any intersection evaluated for this study. Impacts would not meet either City of San Bruno or C/CAG significance criteria levels.

This would be a less than significant impact.

MITIGATION MEASURE 2: No mitigation required.

YEAR 2030 WITH PROJECT CONDITIONS

IMPACT 3: Intersection Level of Service

Table 3 shows that the addition of project traffic to year 2030 "without" project volumes would not result in unacceptable level of service at any intersection evaluated for this study. Impacts would not meet either City of San Bruno or C/CAG significance criteria levels. For the two intersections that would already have unacceptable operation without project traffic (El Camino Real/Bayhill Drive during the AM peak hour and El Camino Real/San Bruno Avenue during the PM peak hour), the addition of project traffic would not increase average control delay at either location by the significance criteria limit of 4 seconds. (Only a 1.8 second delay increase at El Camino Real/Bayhill Drive and only a 0.4 second delay increase at El Camino Real/San Bruno Avenue).

This would be a less than significant impact.

MITIGATION MEASURE 3: No mitigation required.

IMPACT 4: Sight Line Adequacy at Project Driveway Connections to Grundy Lane

The project would have two driveway connections to the north side of Grundy Lane. Sight lines at each driveway for exiting drivers would be as follows after project construction and development of a new surface parking lot immediately west of the project's west driveway.

	PROJECT WEST DRIVEWAY	PROJECT EAST DRIVEWAY
Sight Line to East on Grundy Lane	450'	290'
Sight Line to West on Grundy Lane	250'	300'

On-street parking is currently prohibited along the north side of Grundy Lane to the east of the project site, which will facilitate sight lines in this direction. The project is also proposing that on-street parking will be prohibited along the site frontage between the project driveways and partially through the horizontal curve just west of the west driveway. This will require Planning Commission review and City Council approval.

Minimum acceptable sight lines on local streets are typically evaluated using stopping sight distance as the criteria. Based upon data in *A Policy on Geometric Design of Highways and Streets*,[4] 6th Edition, stopping sight distances based upon speed would be as follows.

[4] American Association of State Highway and Transportation Officials, 2011.

SPEED	STOPPING SIGHT DISTANCE	
	LEVEL	3% DOWNGRADE
20 mph	115’	116’
25 mph	155’	158’
30 mph	200’	205’
35 mph	250’	257’

While there is no posted speed limit on Grundy Lane, observed speeds ranged from 20 to 30 miles per hour (mph) with an occasional vehicle traveling higher than 30 mph. There is also a minor downgrade (west to east) along Grundy Lane just west of the proposed west driveway location. Based upon observed speeds, minor downhill grade and available sight lines, there would be a minor sight line deficiency for exiting drivers at the project’s west driveway (looking west to see eastbound vehicles).

This would be a significant impact.

MITIGATION MEASURE 4: Sight Line Impact at Project West Driveway Connection to Grundy Lane

- Post a 25 mph speed limit sign on the eastbound Grundy Lane approach to the western project driveway. The project shall be fully responsible for the cost of this measure.

Impact reduced to a less than significant level.

IMPACT 5: Pedestrian & Bicycle Circulation

There are sidewalks along both sides of Grundy Lane as well as along all other streets within and adjacent to the Bayhill office area. There should be no impacts associated with project pedestrian traffic.

Project bicycle riders will use the local roadway system for access. A Class II signed and striped bike lane is provided along Sneath Lane and a Class III signed bike lane has just been provided along San Bruno Avenue. Grundy Lane is 50 feet wide, and even with on-street parking provides greater than normal width for bicycle riders on a local street. Very few bicycle riders were observed on the streets within the Bayhill office area during field surveys, potentially due to very few office employees living within a reasonable cycling distance in combination with high volume levels on nearby arterial streets that would be used as bicycle commute routes. The same will potentially be true for the employees of the proposed project. However, the project will be providing facilities for bike riders as part of their TDM program (bike lockers and showers).

This would be a less than significant impact.

MITIGATION MEASURE 5: No mitigation required.

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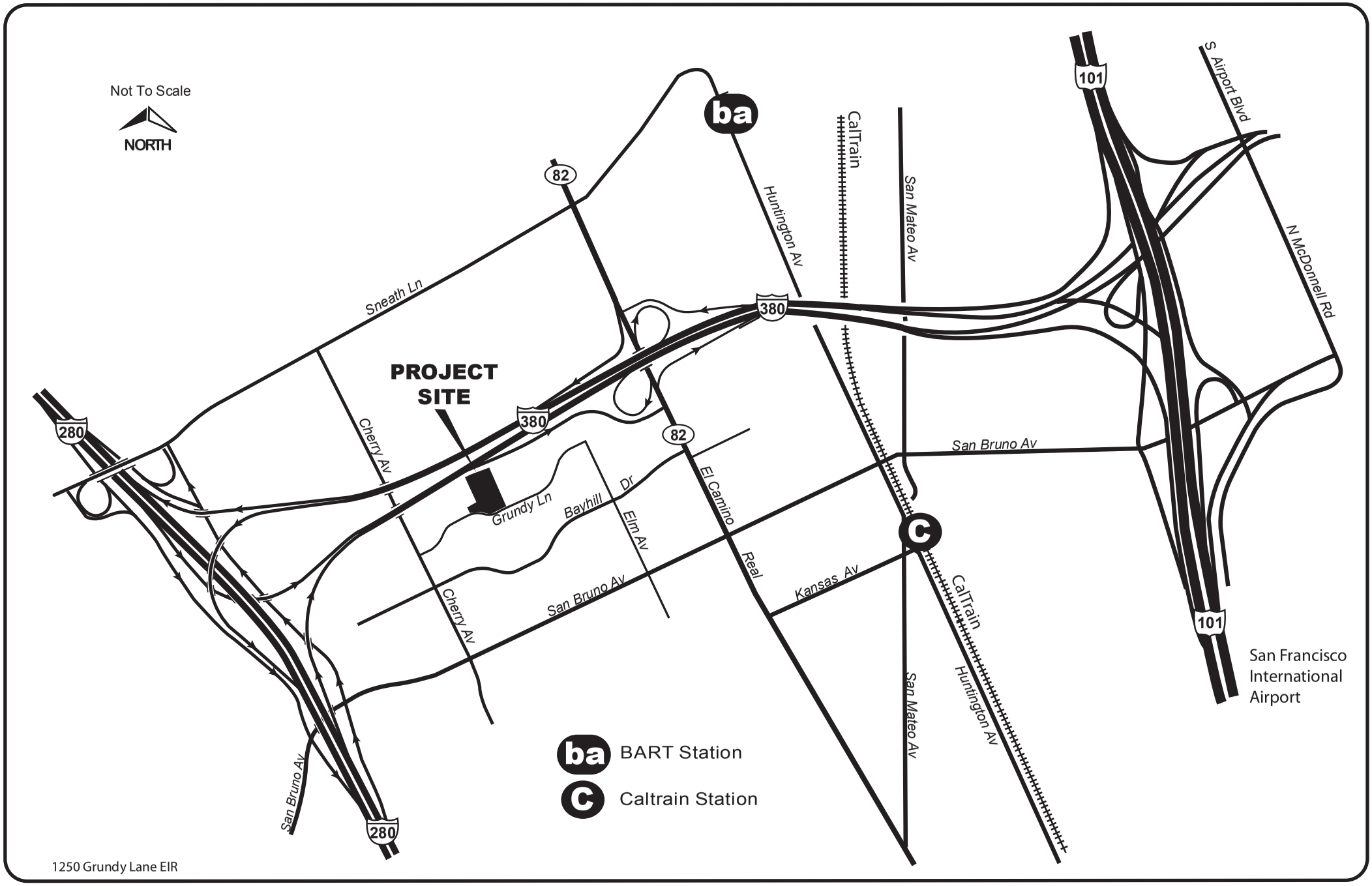
Figures



1250 Grundy Lane EIR

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Figure 1
Area Map

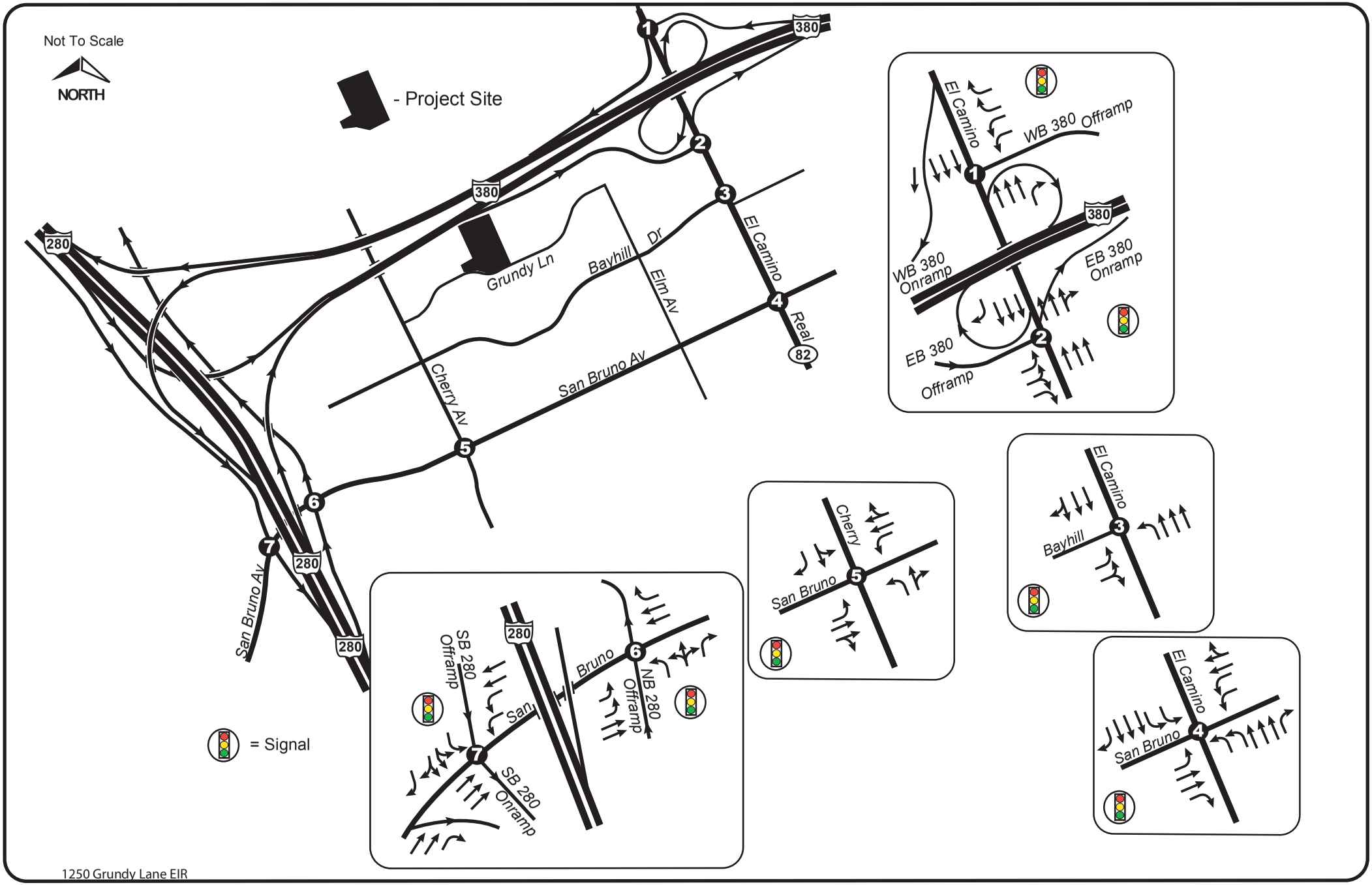

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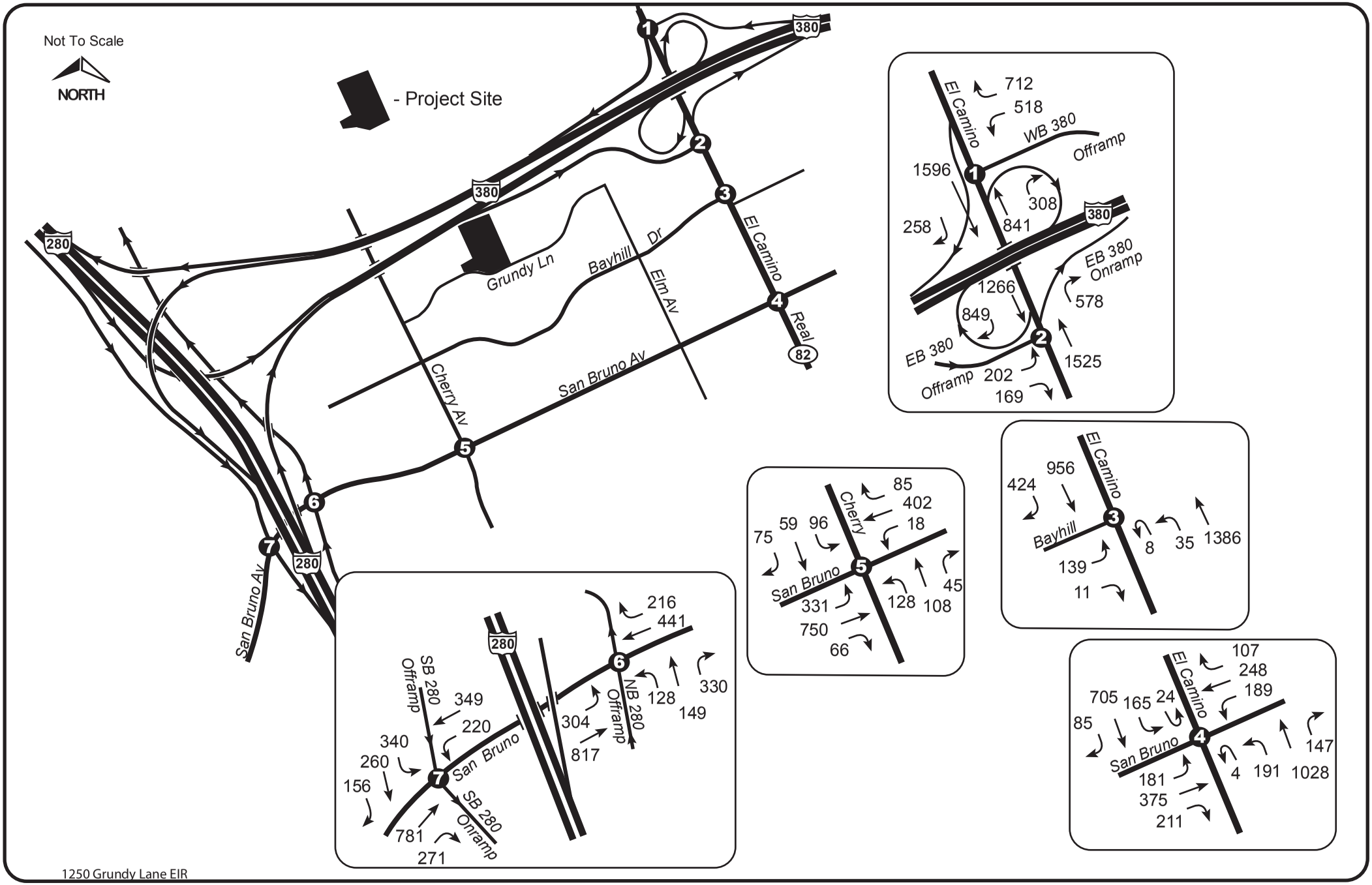
Figure 2

Existing Lane Geometrics and Intersection Control



1250 Grundy Lane EIR

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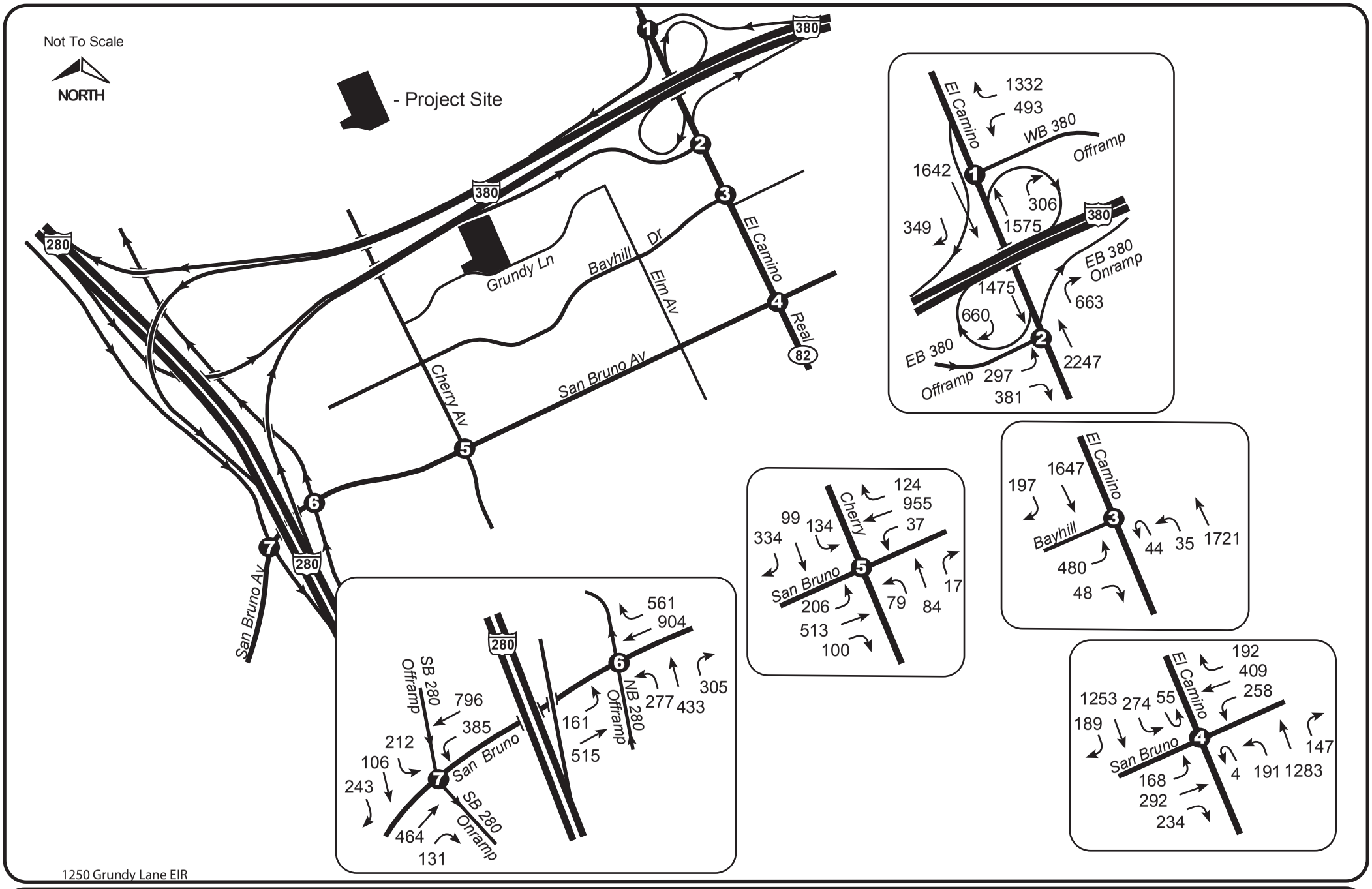
Figure 3

Existing AM Peak Hour (7:45-8:45)
Wednesday, May 20, 2015



1250 Grundy Lane EIR

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Figure 4

Existing PM Peak Hour (5:00-6:00)
Wednesday, May 20, 2015

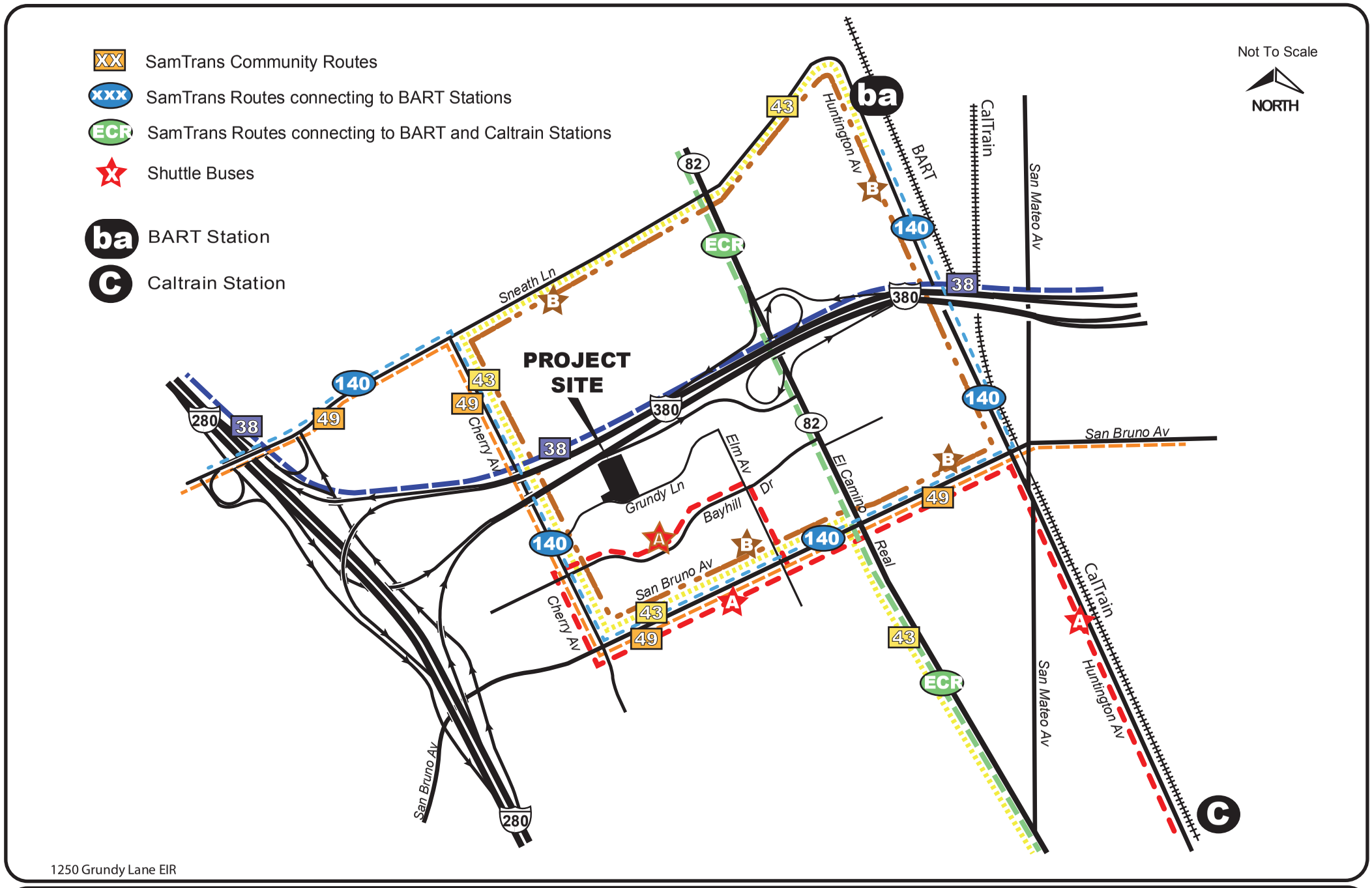

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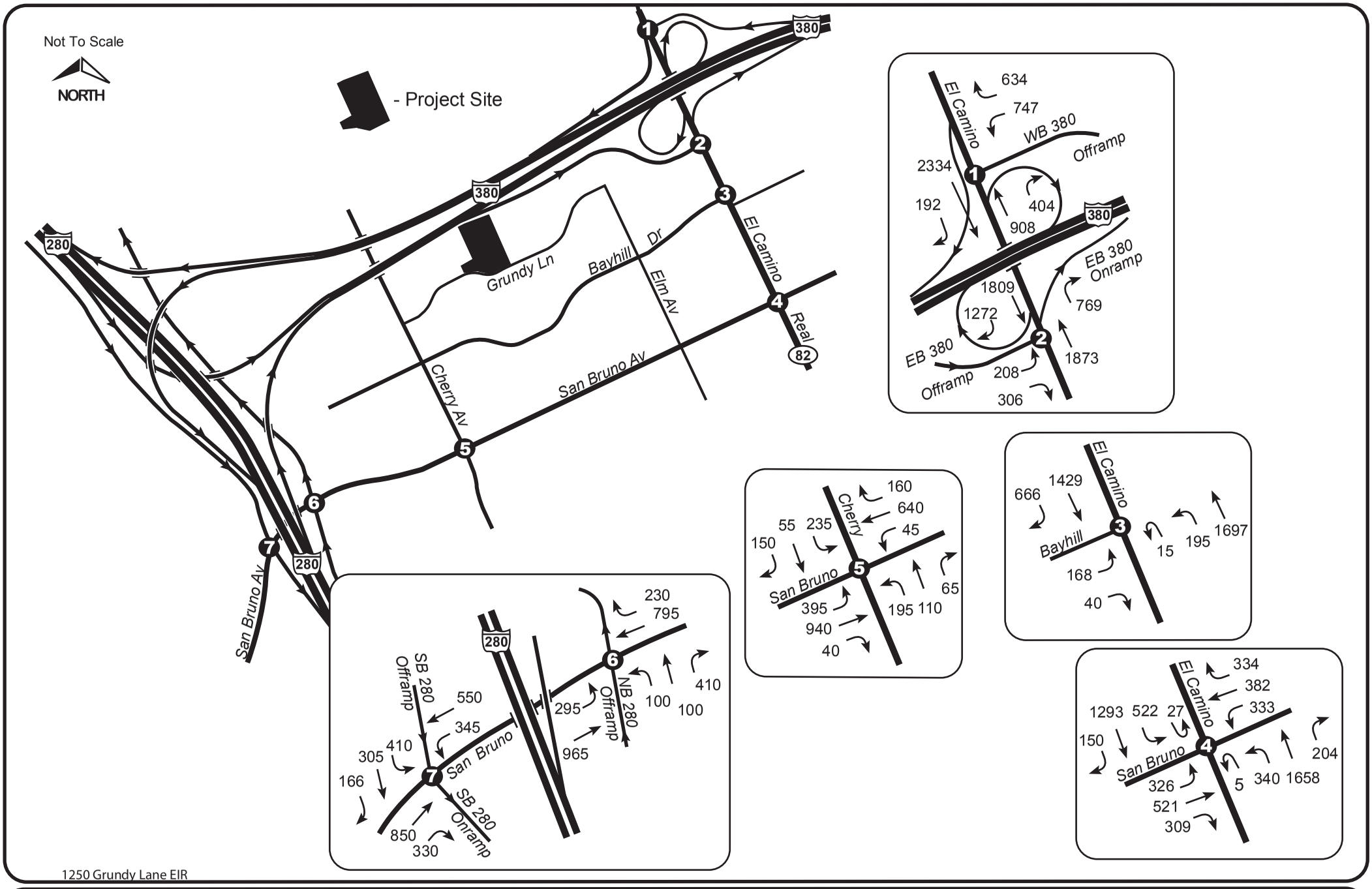
Figure 5

Bus and Shuttle Routes



1250 Grundy Lane EIR

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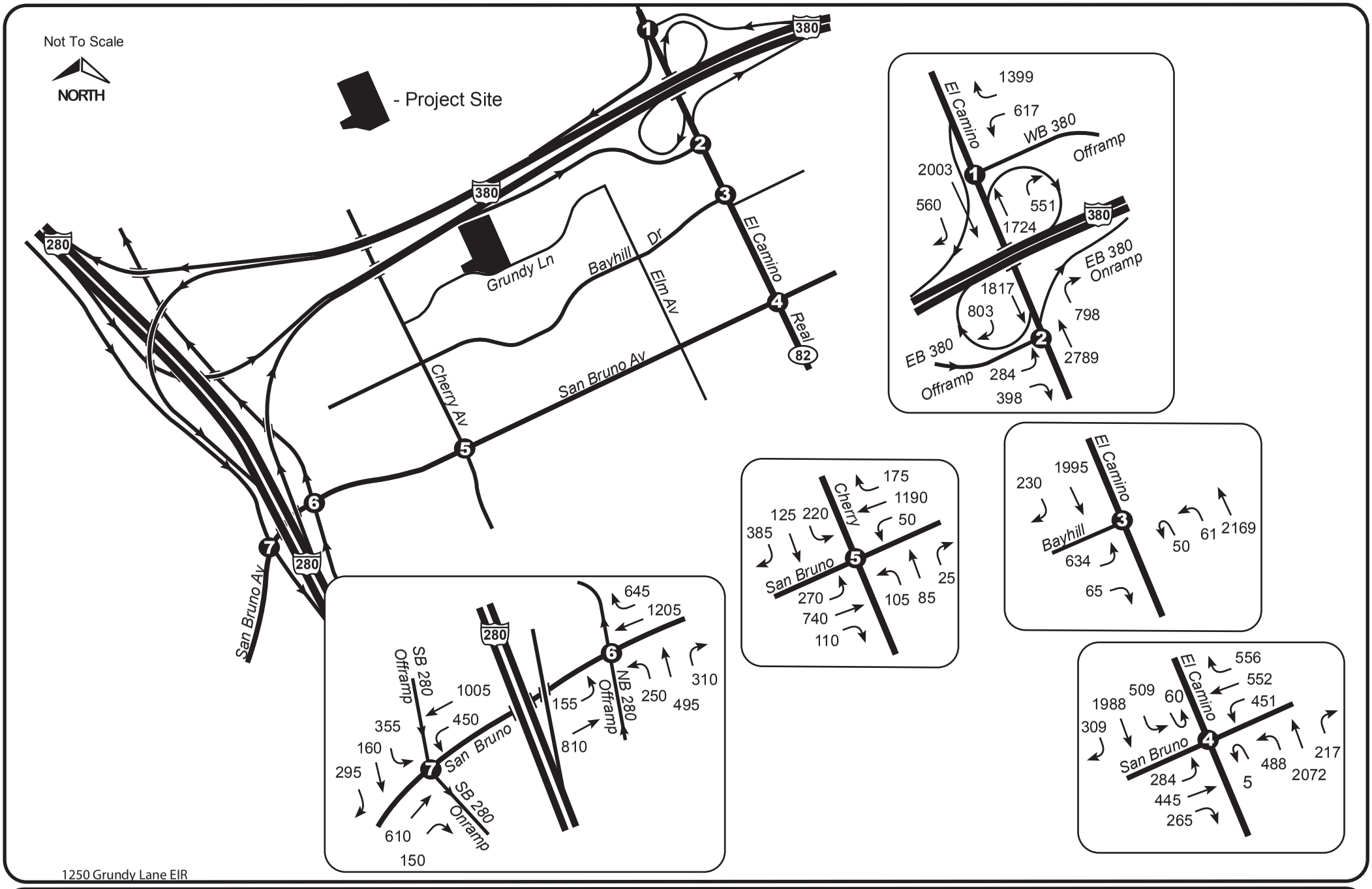
Figure 6
Year 2030 without Project
AM Peak Hour Volumes



1250 Grundy Lane EIR

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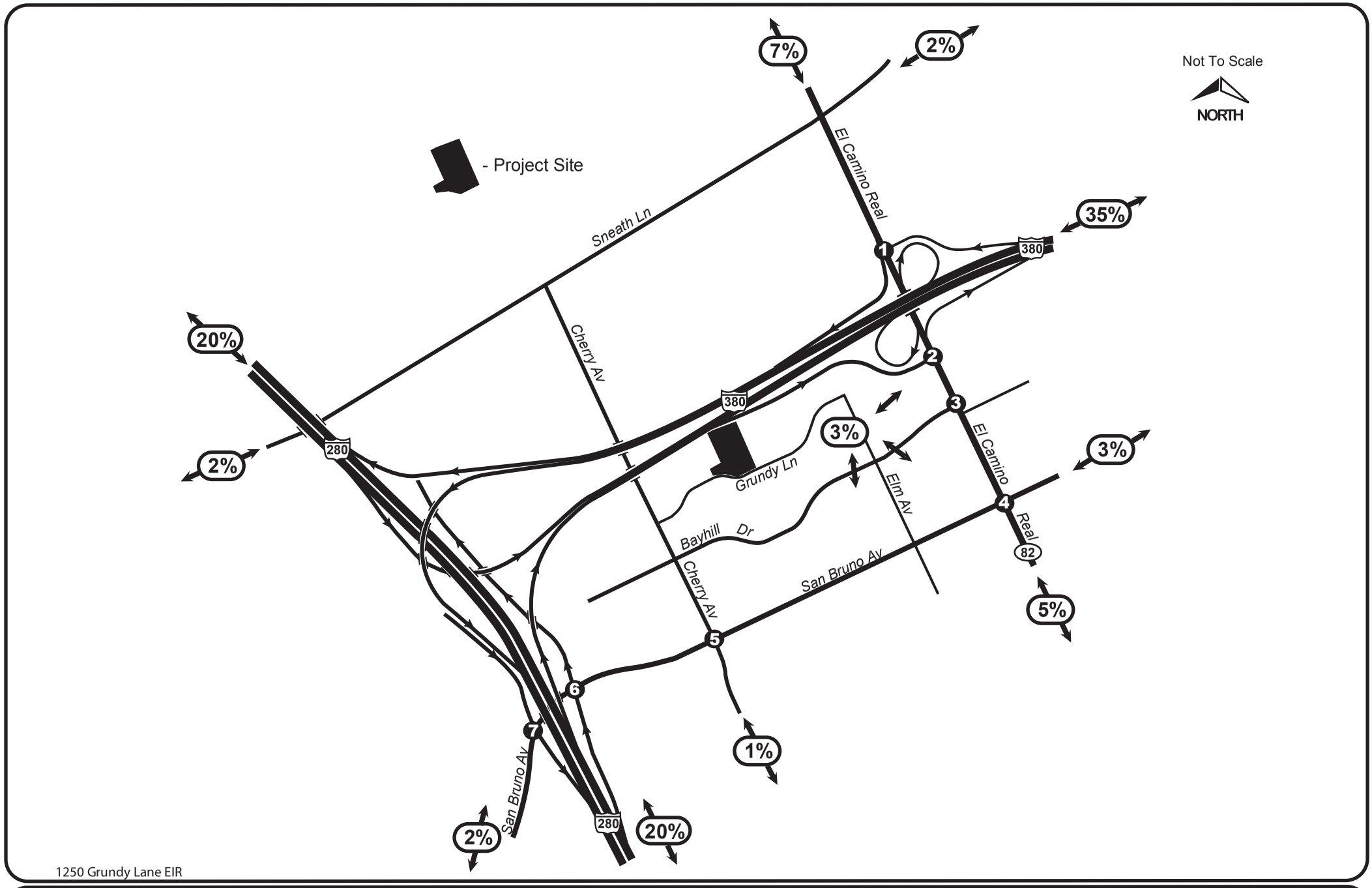
Figure 7

Year 2030 without Project
PM Peak Hour Volumes



1250 Grundy Lane EIR

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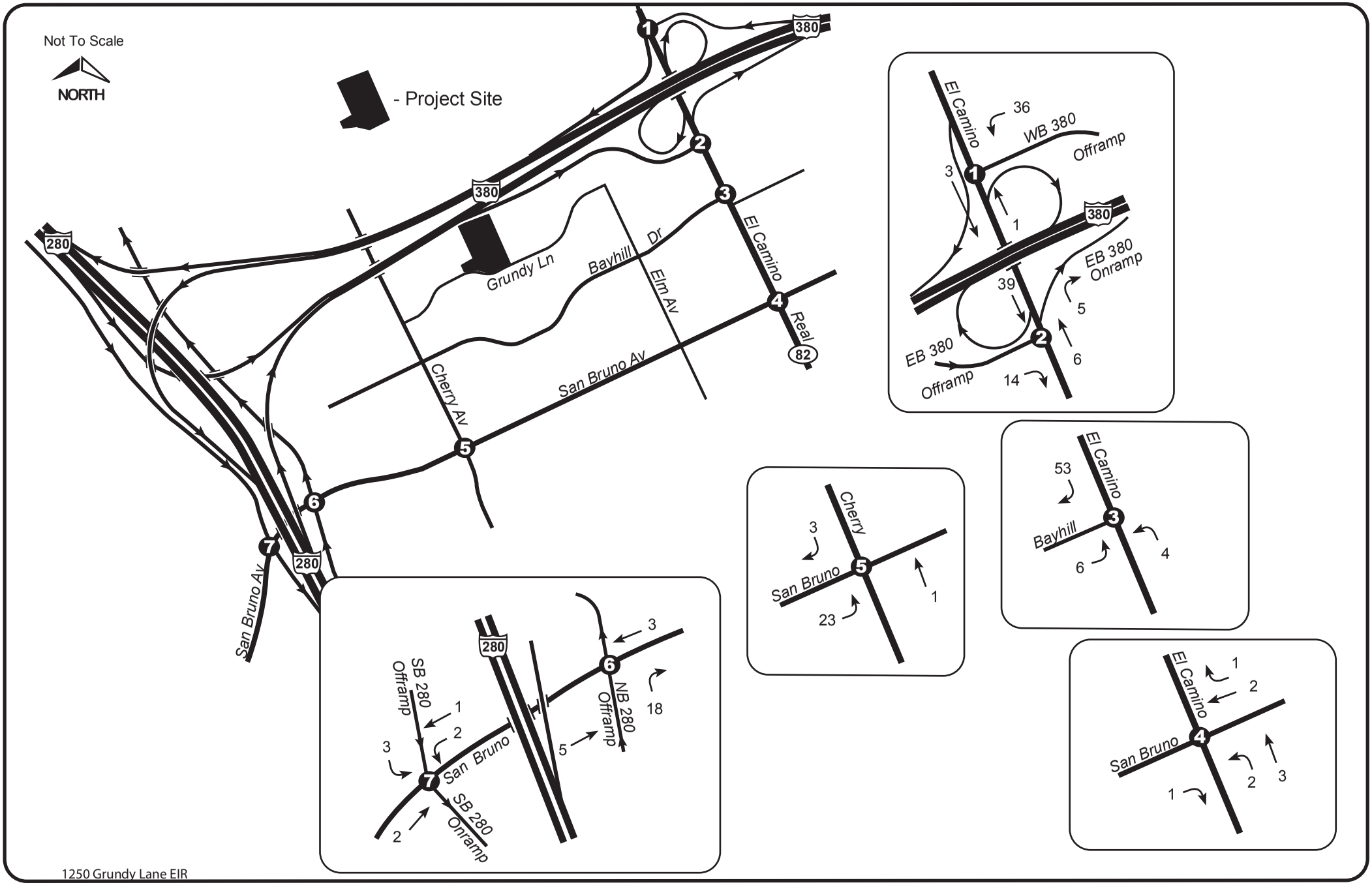
Figure 8

Project Traffic Distribution



1250 Grundy Lane EIR

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Figure 9

Existing & 2030 AM Peak Hour
Project Inrement

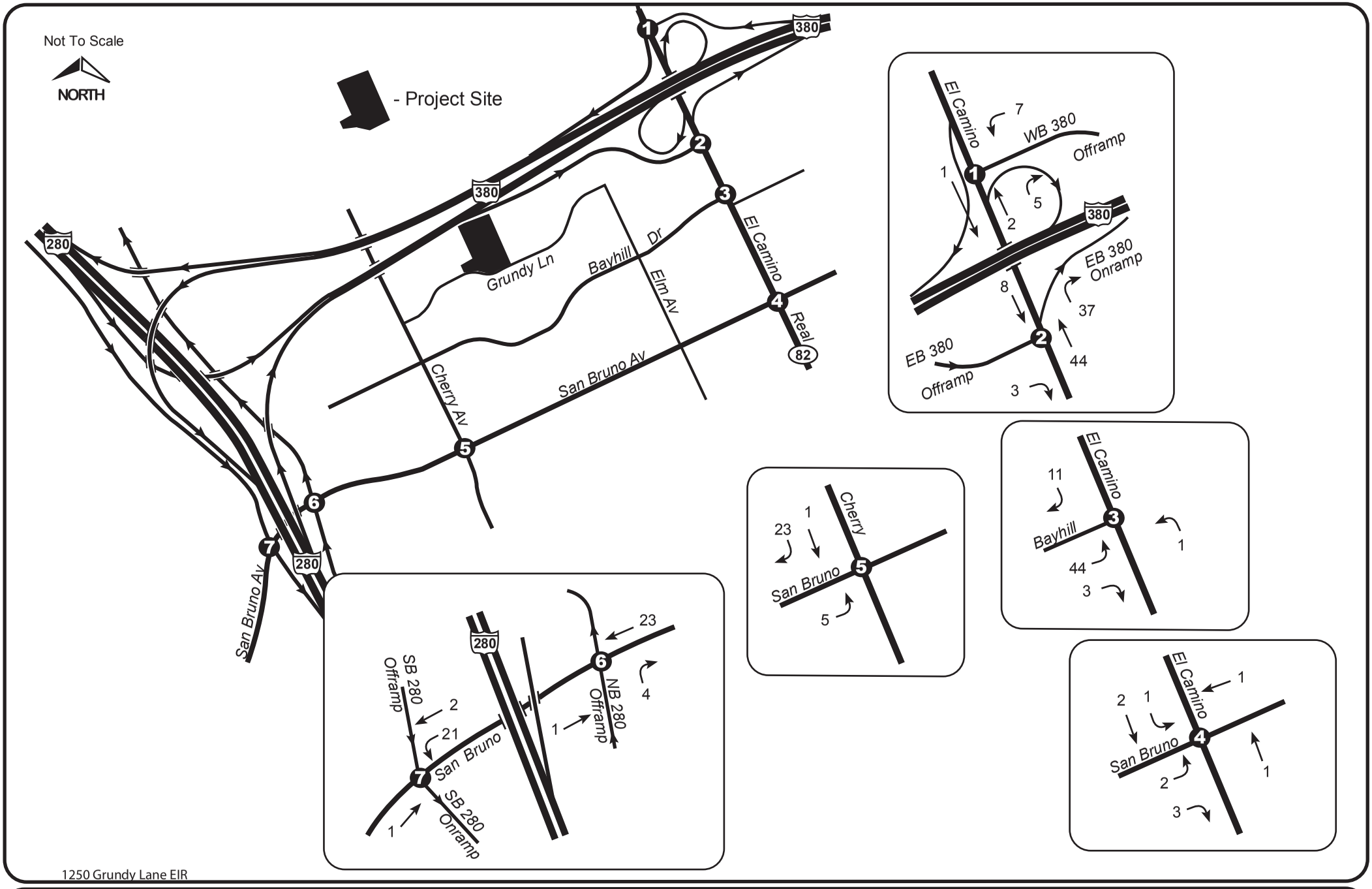

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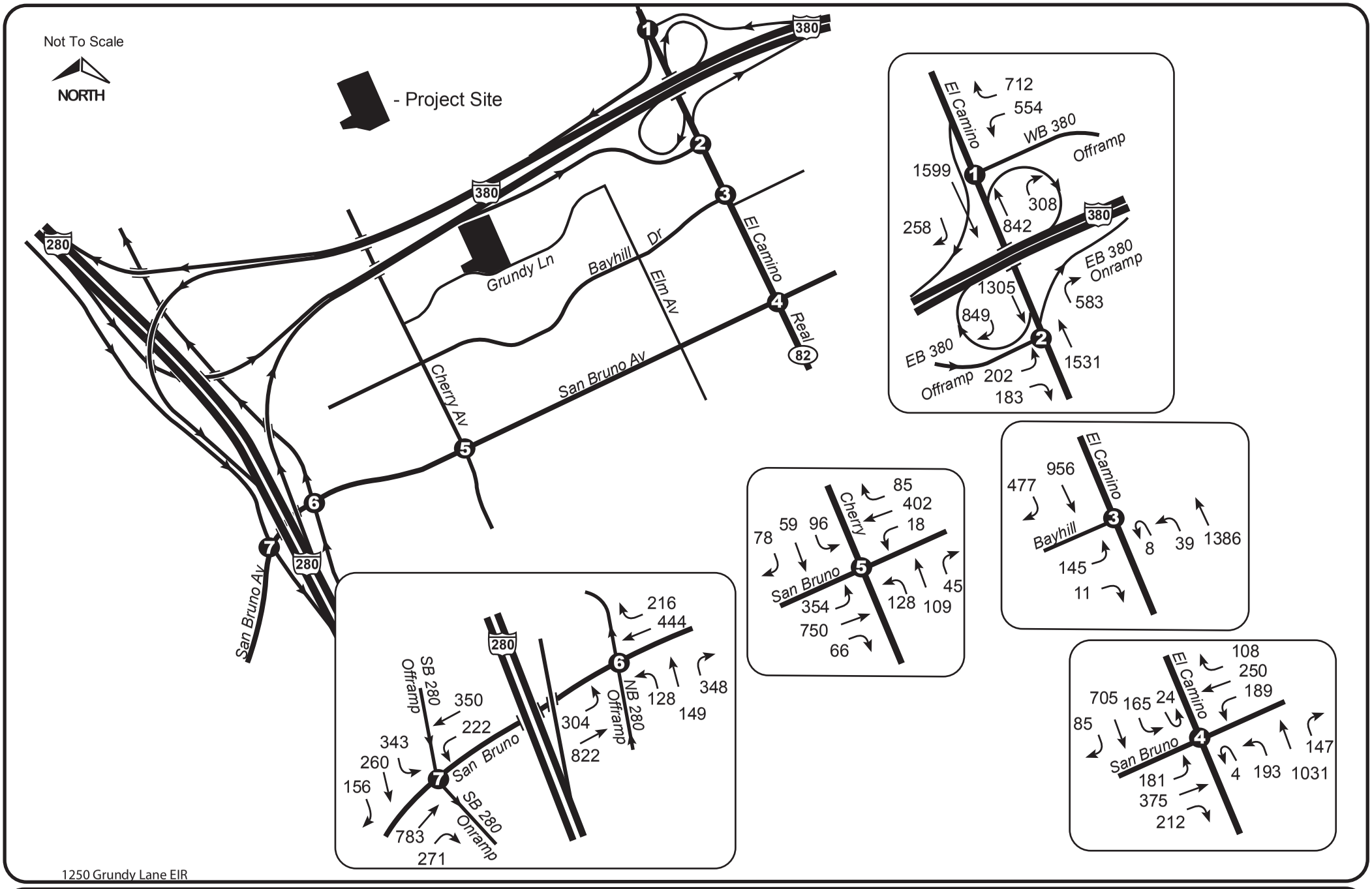
Figure 10

Existing & 2030 PM Peak Hour Project Increment



1250 Grundy Lane EIR

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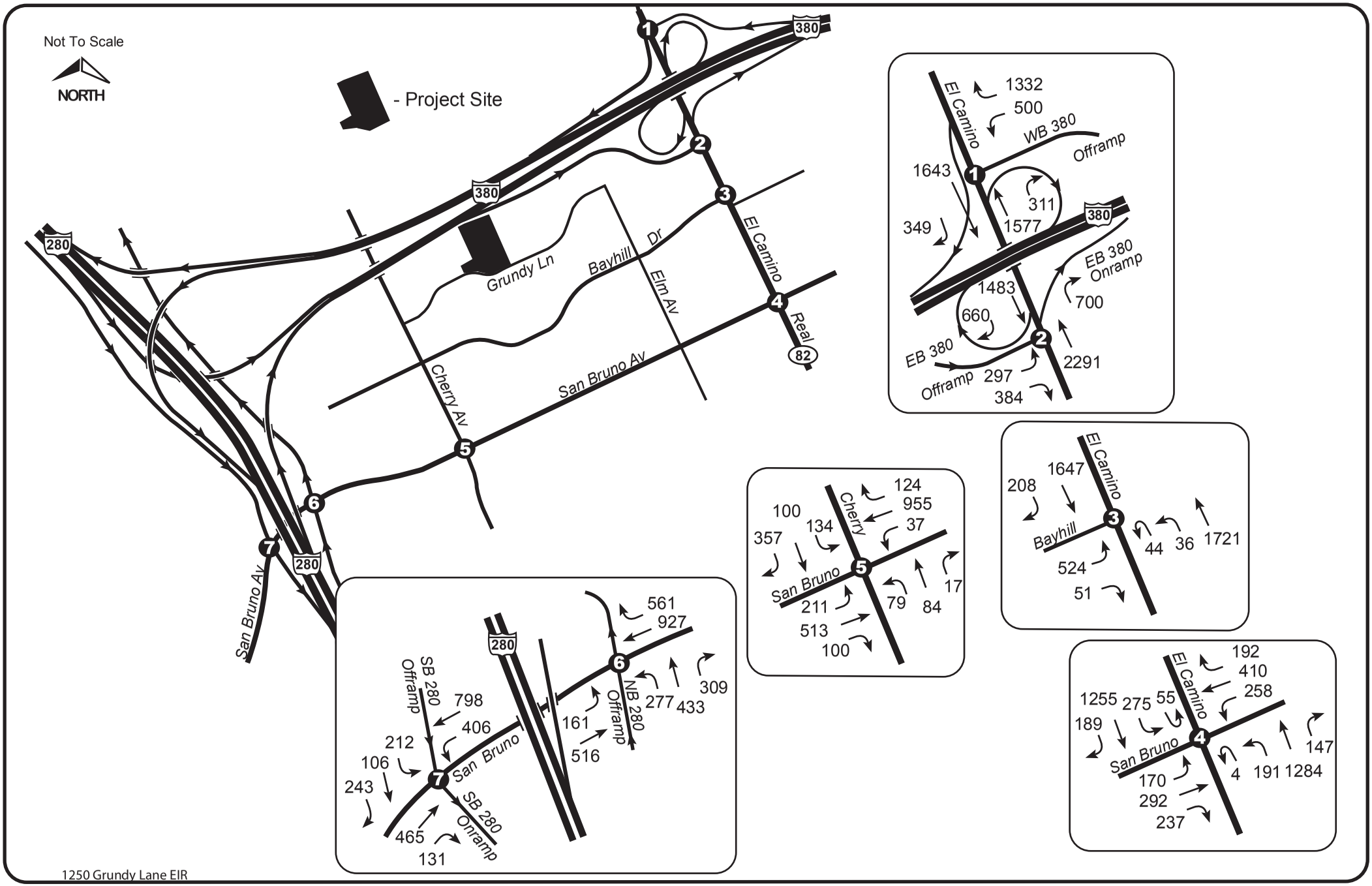
Figure 11

Existing with Project
AM Peak Hour Volumes



1250 Grundy Lane EIR

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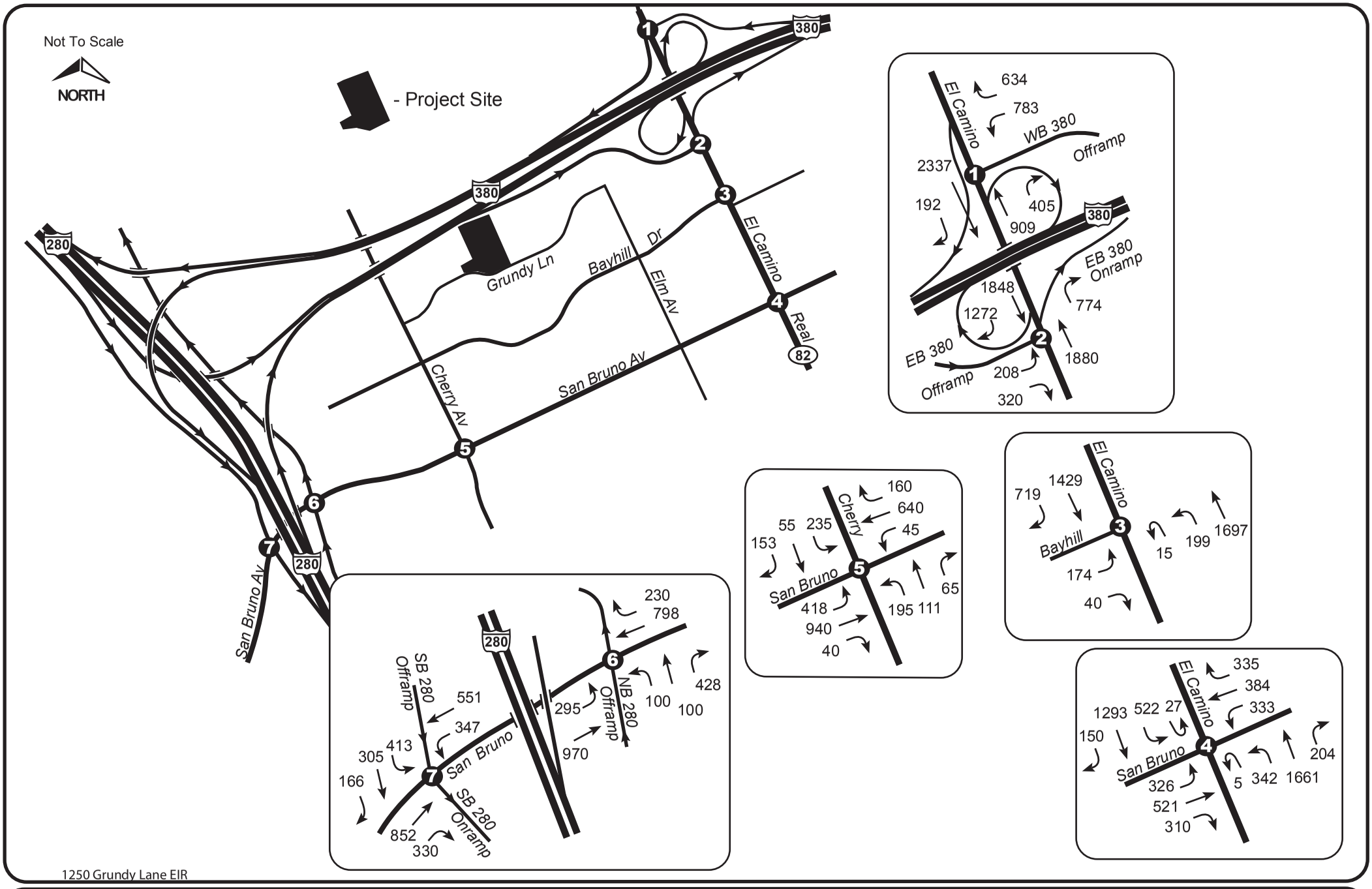
Figure 12
Existing with Project
PM Peak Hour Volumes



1250 Grundy Lane EIR

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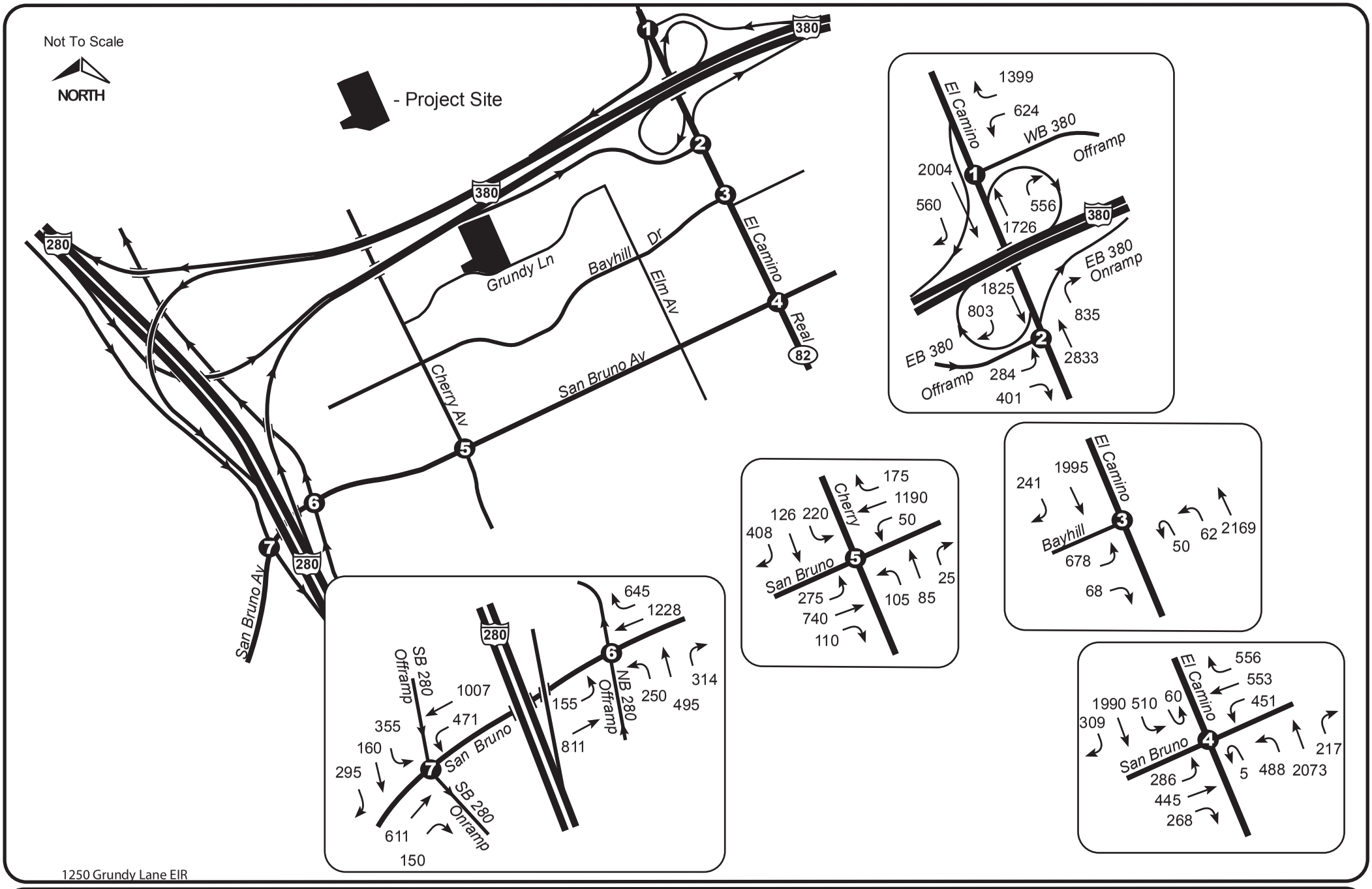
Figure 13
Year 2030 with Project
AM Peak Hour Volumes



1250 Grundy Lane EIR

CRANE TRANSPORTATION GROUP

Figure 14
Year 2030 with Project
PM Peak Hour Volumes

Tables

Table 1

SIGNALIZED INTERSECTION LOS CRITERIA

Level of Service	Description	Average Control Delay (Seconds Per Vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	> 80.0

Source: 2000 Highway Capacity Manual (Transportation Research Board).

Table 2

INTERSECTION LEVELS OF SERVICE

EXISTING WITHOUT & WITH 1250 GRUNDY LANE PROJECT

Intersection	Traffic Control	Peak Hour	Existing		Existing + 1250 Grundy Lane Project		Significant Impact Due to Project? Jurisdiction Criteria*	
			Average Delay	LOS	Average Delay	LOS	SB	CMP
El Camino Real/I-380 WB Ramps (SB/CT)	Signal	AM PM	18.1 27.8	B C	18.5 27.9	B C	No	--
El Camino Real/I-380 EB Ramps (SB/CT)	Signal	AM PM	8.5 17.4	A B	8.7 17.5	A B	No	--
El Camino Real (SR 82)/ Bayhill Dr. (SB/CT)	Signal	AM PM	7.6 24.8	A C	8.2 26.6	A C	No	--
El Camino Real (SR 82)/ San Bruno Ave. (SB/CMP/CT)	Signal	AM PM	34.6 44.0	C D	34.7 44.2	C D	No	No
San Bruno Ave./Cherry Ave. (SB)	Signal	AM PM	19.7 26.5	B C	20.3 27.1	C C	No	--
San Bruno Ave./I-280 NB Ramps (SB/CT)	Signal	AM PM	19.6 24.7	B C	19.8 24.8	B C	No	--
San Bruno Ave./I-280 SB Ramps (SB/CT)	Signal	AM PM	20.9 20.7	C C	20.9 20.8	C C	No	--

LOS calculations performed using the 2000 *Highway Capacity Manual* – Special Report 209 delay methods for signalized intersections. Level of service – average control delay in seconds.

*Jurisdictions: SB=San Bruno, CMP=C/CAG Congestion Management Program,
City of San Bruno and CMP significance thresholds are provided on pages 7 and 8.
Unacceptable operations in **bold** type.

Source: Crane Transportation Group, August 2015

Table 3

INTERSECTION LEVELS OF SERVICE

CUMULATIVE (2030) WITHOUT & WITH 1250 GRUNDY LANE PROJECT (WITHOUT PROJECT = 2030 GENERAL PLAN WITH TRANSIT CORRIDORS DEVELOPMENT)

Intersection	Traffic Control	Peak Hour	Cumulative (2030) Without Project		Cumulative + 1250 Grundy Lane Project		Significant Impact Due to Project? Jurisdicction Criteria*	
			Average Delay	LOS	Average Delay	LOS	SB	CMP
El Camino Real/I-380 WB Ramps (SB/CT)	Signal	AM PM	20.8 32.7	C C	21.4 33.1	C C	No	--
El Camino Real/I-380 EB Ramps (SB/CT)	Signal	AM PM	10.1 17.1	B B	10.3 17.1	B B	No	--
El Camino Real (SR 82)/ Bayhill Dr. (SB/CT)	Signal	AM PM	68.1 37.0	E D	69.9 38.7	E D	No	--
El Camino Real (SR 82)/ San Bruno Ave. (SB/CMP/CT)	Signal	AM PM	73.7 113.3	E F	74.1 113.7	E F	No	No
San Bruno Ave./Cherry Ave. (SB)	Signal	AM PM	51.5 42.2	D D	54.3 42.7	D D	No	--
San Bruno Ave./I-280 NB Ramps (SB/CT)	Signal	AM PM	19.7 28.4	B C	20.1 28.6	C C	No	--
San Bruno Ave./I-280 SB Ramps (SB/CT)	Signal	AM PM	20.9 21.5	C C	20.9 21.6	C C	No	--

LOS calculations performed using the 2000 *Highway Capacity Manual* – Special Report 209 delay methods for signalized intersections. Level of service – average control delay in seconds.

* Jurisdictions: SB=San Bruno, CMP=C/CAG Congestion Management Program
City of San Bruno and CMP significance thresholds are provided on pages 7 and 8.
Unacceptable operations in **bold** type.

Source: Crane Transportation Group, August 2015

Table 4

PROJECT GROSS TRIP GENERATION

USE	SIZE OR #OF EMPLOYEES	DAILY 2-WAY TRIPS		AM PEAK HOUR TRIPS				PM PEAK HOUR TRIPS			
				INBOUND		OUTBOUND		INBOUND		OUTBOUND	
		RATE	VOL	RATE	VOL	RATE	VOL	RATE	VOL	RATE	VOL
Police Credit Union Office	210 employees	*	810	**	112	**	15	***	23	***	115

* Ln(T) = 0.84 Ln(X) + 2.23
** Ln(T) = 0.86 Ln (X) + 0.24 (88% in/12% out)
*** T = 0.37(X) + 60.08 (17% in/83% out)

Ln = Natural Log
T = Trips
X = Number of Employees

Trip Rate Source: Trip Generation Manual, 9th Edition, by the Institute of Transportation Engineers, 2012
Compiled by: Crane Transportation Group

Table 5

PROJECT NET TRIP GENERATION BASED UPON TRIP REDUCTIONS DUE TO PRESENCE OF SHUTTLE SERVICE TO BART & CALTRAIN, FREQUENT SAMTRANS BUS SERVICE AND PROJECT TDM PROGRAM

	AM PEAK HOUR TRIPS		PM PEAK HOUR TRIPS	
	INBOUND	OUTBOUND	INBOUND	OUTBOUND
Average Trip Generation	112	15	23	115
10% Reduction Due to Transit Availability & TDM Program	- 11	- 1	- 2	- 11
Net Project Trip Generation	101	14	21	104

Source: Crane Transportation Group

Appendix

Appendix Table 1

TRIP GENERATION

FORMER SITE USE

	SIZE	AM PEAK HOUR TRIPS				PM PEAK HOUR TRIPS			
		RATE	VOL	RATE	VOL	RATE	VOL	RATE	VOL
Quality Restaurant	8300 SQ.FT.	.61	5	.20	2	5.02	42	2.47	21

Trip Rate Source: Trip Generation Manual, 9th Edition, by the Institute of Transportation Engineers, 2012
Compiled by: Crane Transportation Group

TECHNICAL APPENDIX

Capacity Worksheets

Existing

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	554	712	842	0	0	1599
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.88	0.91			0.91
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3400	2760	5036			5036
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3400	2760	5036			5036
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.96	0.97
Adj. Flow (vph)	571	734	868	0	0	1648
RTOR Reduction (vph)	0	46	0	0	0	0
Lane Group Flow (vph)	571	688	868	0	0	1648
Confl. Peds. (#/hr)	6	6		6	6	
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	3%	3%	3%	1%	1%	3%
Turn Type	Prot	custom	NA			NA
Protected Phases	8	7 8	2			6 7
Permitted Phases		8				
Actuated Green, G (s)	27.4	57.4	54.6			84.6
Effective Green, g (s)	27.4	57.4	54.6			84.6
Actuated g/C Ratio	0.23	0.48	0.46			0.70
Clearance Time (s)	4.0		4.0			
Vehicle Extension (s)	3.0		3.0			
Lane Grp Cap (vph)	776	1320	2291			3550
v/s Ratio Prot	c0.17	c0.25	0.17			c0.33
v/s Ratio Perm						
v/c Ratio	0.74	0.52	0.38			0.46
Uniform Delay, d1	42.9	21.8	21.5			7.8
Progression Factor	1.00	1.00	0.77			1.00
Incremental Delay, d2	3.6	0.4	0.4			0.1
Delay (s)	46.6	22.1	17.1			7.9
Level of Service	D	C	B			A
Approach Delay (s)	32.8		17.1			7.9
Approach LOS	C		B			A

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	202	183	0	1531	1305	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.91	0.91	
Frpb, ped/bikes	0.99	0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	0.96	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3306	1392		5036	5036	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3306	1392		5036	5036	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	213	193	0	1612	1374	0
RTOR Reduction (vph)	30	63	0	0	0	0
Lane Group Flow (vph)	249	64	0	1612	1374	0
Confl. Peds. (#/hr)	6	6	6			
Confl. Bikes (#/hr)		10				
Heavy Vehicles (%)	3%	1%	1%	3%	3%	1%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	14.3	14.3		97.7	97.7	
Effective Green, g (s)	14.3	14.3		97.7	97.7	
Actuated g/C Ratio	0.12	0.12		0.81	0.81	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	393	165		4100	4100	
v/s Ratio Prot	c0.08			c0.32	0.27	
v/s Ratio Perm		0.05				
v/c Ratio	0.63	0.39		0.39	0.34	
Uniform Delay, d1	50.4	48.8		3.0	2.8	
Progression Factor	1.00	1.00		0.97	0.71	
Incremental Delay, d2	3.3	1.5		0.3	0.2	
Delay (s)	53.7	50.3		3.2	2.2	
Level of Service	D	D		A	A	
Approach Delay (s)	52.6			3.2	2.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	145	11	8	39	1386	956	477
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0	
Lane Util. Factor	0.97			1.00	0.91	0.91	
Frpb, ped/bikes	1.00			1.00	1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	1.00	
Frt	0.99			1.00	1.00	0.95	
Flt Protected	0.96			0.95	1.00	1.00	
Satd. Flow (prot)	3435			1782	5036	4754	
Flt Permitted	0.96			0.27	1.00	1.00	
Satd. Flow (perm)	3435			500	5036	4754	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	149	11	8	40	1429	986	492
RTOR Reduction (vph)	5	0	0	0	0	64	0
Lane Group Flow (vph)	155	0	0	48	1429	1414	0
Confl. Peds. (#/hr)	14	14		5			5
Confl. Bikes (#/hr)		10					
Heavy Vehicles (%)	1%	1%	2%	1%	3%	3%	1%
Turn Type	Prot		custom	Prot	NA	NA	
Protected Phases	4			5	2	6	
Permitted Phases			5				
Actuated Green, G (s)	10.7			15.0	101.3	82.3	
Effective Green, g (s)	10.7			15.0	101.3	82.3	
Actuated g/C Ratio	0.09			0.12	0.84	0.69	
Clearance Time (s)	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	306			62	4251	3260	
v/s Ratio Prot	c0.05				0.28	c0.30	
v/s Ratio Perm				c0.10			
v/c Ratio	0.51			0.77	0.34	0.43	
Uniform Delay, d1	52.1			50.9	2.0	8.4	
Progression Factor	1.00			1.00	1.00	0.70	
Incremental Delay, d2	1.3			44.2	0.2	0.4	
Delay (s)	53.5			95.1	2.2	6.3	
Level of Service	D			F	A	A	
Approach Delay (s)	53.5				5.3	6.3	
Approach LOS	D				A	A	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	181	375	212	189	250	108	4	193	1031	147	24	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.6	3.5	3.5	3.6			3.5	4.5	4.5		3.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			0.97	0.91	1.00		0.97
Frpb, ped/bikes	1.00	1.00	0.92	1.00	0.98			1.00	1.00	0.93		1.00
Flpb, ped/bikes	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	0.95			1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (prot)	1787	3539	1476	3467	3326			3467	5036	1494		3467
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (perm)	1787	3539	1476	3467	3326			3467	5036	1494		3467
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)	195	403	228	203	269	116	4	208	1109	158	26	177
RTOR Reduction (vph)	0	0	203	0	35	0	0	0	0	48	0	0
Lane Group Flow (vph)	195	403	25	203	350	0	0	212	1109	110	0	203
Confl. Peds. (#/hr)	17		17	17		17	23	23		23	23	23
Confl. Bikes (#/hr)			10			10				10		
Heavy Vehicles (%)	1%	2%	1%	1%	2%	1%	1%	1%	3%	1%	1%	1%
Turn Type	Prot	NA	custom	Prot	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			1							6		
Actuated Green, G (s)	18.3	22.7	12.7	12.4	17.8			12.7	53.1	53.1		12.7
Effective Green, g (s)	18.3	22.7	12.7	12.4	17.8			12.7	53.1	53.1		12.7
Actuated g/C Ratio	0.16	0.19	0.11	0.11	0.15			0.11	0.45	0.45		0.11
Clearance Time (s)	3.5	4.6	3.5	3.5	3.6			3.5	4.5	4.5		3.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	279	686	160	367	506			376	2285	678		376
v/s Ratio Prot	c0.11	0.11		0.06	c0.11			c0.06	c0.22			0.06
v/s Ratio Perm			0.02							0.07		
v/c Ratio	0.70	0.59	0.15	0.55	0.69			0.56	0.49	0.16		0.54
Uniform Delay, d1	46.7	42.9	47.3	49.7	47.0			49.5	22.4	18.8		49.4
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	7.4	1.3	0.5	1.8	4.1			1.9	0.7	0.5		1.5
Delay (s)	54.2	44.2	47.7	51.5	51.1			51.5	23.1	19.3		50.9
Level of Service	D	D	D	D	D			D	C	B		D
Approach Delay (s)		47.5			51.2				26.8			
Approach LOS		D			D				C			

Intersection Summary			
HCM 2000 Control Delay	34.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	117.0	Sum of lost time (s)	16.1
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	705	85
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.5	4.5
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	0.93
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5036	1494
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5036	1494
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	758	91
RTOR Reduction (vph)	0	48
Lane Group Flow (vph)	758	43
Confl. Peds. (#/hr)		23
Confl. Bikes (#/hr)		10
Heavy Vehicles (%)	3%	1%
Turn Type	NA	custom
Protected Phases	2	
Permitted Phases		6
Actuated Green, G (s)	53.1	53.1
Effective Green, g (s)	53.1	53.1
Actuated g/C Ratio	0.45	0.45
Clearance Time (s)	4.5	4.5
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	2285	678
v/s Ratio Prot	0.15	
v/s Ratio Perm		0.03
v/c Ratio	0.33	0.06
Uniform Delay, d1	20.5	18.0
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.2
Delay (s)	20.9	18.1
Level of Service	C	B
Approach Delay (s)	26.5	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	354	750	66	18	402	85	128	109	45	96	59	78
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
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1805	3525		1803	3466		1802	1803			1841	1581
Flt Permitted	0.95	1.00		0.95	1.00		0.55	1.00			0.61	1.00
Satd. Flow (perm)	1805	3525		1803	3466		1051	1803			1166	1581
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	393	833	73	20	447	94	142	121	50	107	66	87
RTOR Reduction (vph)	0	5	0	0	17	0	0	23	0	0	0	57
Lane Group Flow (vph)	393	901	0	20	524	0	142	148	0	0	173	30
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Confl. Bikes (#/hr)			10			10			10			10
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	custom
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		6
Actuated Green, G (s)	19.8	43.4		0.9	24.5		13.7	13.7			13.7	24.5
Effective Green, g (s)	19.8	43.4		0.9	24.5		13.7	13.7			13.7	24.5
Actuated g/C Ratio	0.28	0.62		0.01	0.35		0.20	0.20			0.20	0.35
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	510	2185		23	1213		205	352			228	553
v/s Ratio Prot	c0.22	c0.26		0.01	0.15			0.08				
v/s Ratio Perm							0.14				c0.15	0.02
v/c Ratio	0.77	0.41		0.87	0.43		0.69	0.42			0.76	0.06
Uniform Delay, d1	23.0	6.8		34.5	17.4		26.2	24.7			26.6	15.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	7.1	0.6		127.6	1.1		9.7	0.8			13.5	0.2
Delay (s)	30.1	7.4		162.1	18.5		35.9	25.5			40.1	15.3
Level of Service	C	A		F	B		D	C			D	B
Approach Delay (s)		14.2			23.7			30.2			31.8	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.4%	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												
Volume (vph)	304	822	0	0	444	216	128	149	348	0	0	0
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			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frpb, ped/bikes	1.00	1.00			1.00	0.97	1.00	0.98	0.96			
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	0.94	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	3467	3574			3574	1547	1698	1580	1453			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)	3467	3574			3574	1547	1698	1580	1453			
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	317	856	0	0	462	225	133	155	362	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	113	0	31	113	0	0	0
Lane Group Flow (vph)	317	856	0	0	462	112	120	246	140	0	0	0
Confl. Peds. (#/hr)	7		7	7		7	7		7			
Confl. Bikes (#/hr)						20			20			
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	13.5	62.4			44.9	44.9	19.6	19.6	19.6			
Effective Green, g (s)	13.5	62.4			44.9	44.9	19.6	19.6	19.6			
Actuated g/C Ratio	0.15	0.69			0.50	0.50	0.22	0.22	0.22			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	520	2477			1783	771	369	344	316			
v/s Ratio Prot	c0.09	c0.24			0.13		0.07	c0.16				
v/s Ratio Perm						0.07			0.10			
v/c Ratio	0.61	0.35			0.26	0.15	0.33	0.71	0.44			
Uniform Delay, d1	35.8	5.6			13.0	12.2	29.6	32.6	30.5			
Progression Factor	0.95	1.38			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	1.9	0.4			0.4	0.4	0.5	6.9	1.0			
Delay (s)	36.1	8.0			13.3	12.6	30.1	39.5	31.5			
Level of Service	D	A			B	B	C	D	C			
Approach Delay (s)		15.6			13.1			34.6			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	783	271	222	350	0	0	0	0	343	260	156
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
Lane Util. Factor		0.91	1.00	0.97	0.95					0.91	0.86	0.91
Frpb, ped/bikes		1.00	0.96	1.00	1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	0.99	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (prot)		5136	1530	3467	3574					1626	3161	1421
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (perm)		5136	1530	3467	3574					1626	3161	1421
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	0	842	291	239	376	0	0	0	0	369	280	168
RTOR Reduction (vph)	0	0	225	0	0	0	0	0	0	0	3	117
Lane Group Flow (vph)	0	842	66	239	376	0	0	0	0	218	445	34
Confl. Peds. (#/hr)			7	7						7		7
Confl. Bikes (#/hr)			20			20						
Heavy Vehicles (%)	2%	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%
Turn Type		NA	custom	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			4									4
Actuated Green, G (s)		46.2	20.3	11.5	61.7					20.3	20.3	20.3
Effective Green, g (s)		46.2	20.3	11.5	61.7					20.3	20.3	20.3
Actuated g/C Ratio		0.51	0.23	0.13	0.69					0.23	0.23	0.23
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		2636	345	443	2450					366	712	320
v/s Ratio Prot		c0.16		c0.07	0.11					0.13	c0.14	
v/s Ratio Perm			0.04									0.02
v/c Ratio		0.32	0.19	0.54	0.15					0.60	0.62	0.11
Uniform Delay, d1		12.7	28.2	36.8	5.0					31.2	31.4	27.7
Progression Factor		1.00	1.00	0.84	0.17					1.00	1.00	1.00
Incremental Delay, d2		0.1	0.3	1.2	0.1					2.6	1.7	0.1
Delay (s)		12.8	28.5	32.0	1.0					33.8	33.1	27.8
Level of Service		B	C	C	A					C	C	C
Approach Delay (s)		16.8			13.0			0.0			32.3	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	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	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	518	712	841	0	0	1596
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.88	0.91			0.91
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3400	2760	5036			5036
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3400	2760	5036			5036
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.96	0.97
Adj. Flow (vph)	534	734	867	0	0	1645
RTOR Reduction (vph)	0	47	0	0	0	0
Lane Group Flow (vph)	534	687	867	0	0	1645
Confl. Peds. (#/hr)	6	6		6	6	
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	3%	3%	3%	1%	1%	3%
Turn Type	Prot	custom	NA			NA
Protected Phases	8	7 8	2			6 7
Permitted Phases		8				
Actuated Green, G (s)	26.1	56.1	55.9			85.9
Effective Green, g (s)	26.1	56.1	55.9			85.9
Actuated g/C Ratio	0.22	0.47	0.47			0.72
Clearance Time (s)	4.0		4.0			
Vehicle Extension (s)	3.0		3.0			
Lane Grp Cap (vph)	739	1290	2345			3604
v/s Ratio Prot	c0.16	c0.25	0.17			c0.33
v/s Ratio Perm						
v/c Ratio	0.72	0.53	0.37			0.46
Uniform Delay, d1	43.6	22.7	20.7			7.2
Progression Factor	1.00	1.00	0.77			1.00
Incremental Delay, d2	3.5	0.4	0.4			0.1
Delay (s)	47.1	23.1	16.5			7.3
Level of Service	D	C	B			A
Approach Delay (s)	33.2		16.5			7.3
Approach LOS	C		B			A

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	202	169	0	1525	1266	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.91	0.91	
Frpb, ped/bikes	0.99	0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	0.97	0.85		1.00	1.00	
Flt Protected	0.96	1.00		1.00	1.00	
Satd. Flow (prot)	3319	1391		5036	5036	
Flt Permitted	0.96	1.00		1.00	1.00	
Satd. Flow (perm)	3319	1391		5036	5036	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	213	178	0	1605	1333	0
RTOR Reduction (vph)	24	70	0	0	0	0
Lane Group Flow (vph)	244	53	0	1605	1333	0
Confl. Peds. (#/hr)	6	6	6			
Confl. Bikes (#/hr)		10				
Heavy Vehicles (%)	3%	1%	1%	3%	3%	1%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	14.1	14.1		97.9	97.9	
Effective Green, g (s)	14.1	14.1		97.9	97.9	
Actuated g/C Ratio	0.12	0.12		0.82	0.82	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	389	163		4108	4108	
v/s Ratio Prot	c0.07			c0.32	0.26	
v/s Ratio Perm		0.04				
v/c Ratio	0.63	0.33		0.39	0.32	
Uniform Delay, d1	50.4	48.6		3.0	2.8	
Progression Factor	1.00	1.00		0.95	0.72	
Incremental Delay, d2	3.2	1.2		0.3	0.2	
Delay (s)	53.6	49.8		3.1	2.2	
Level of Service	D	D		A	A	
Approach Delay (s)	52.4			3.1	2.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	139	11	8	35	1386	956	424
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0	
Lane Util. Factor	0.97			1.00	0.91	0.91	
Frpb, ped/bikes	1.00			1.00	1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	1.00	
Frt	0.99			1.00	1.00	0.95	
Flt Protected	0.96			0.95	1.00	1.00	
Satd. Flow (prot)	3434			1781	5036	4776	
Flt Permitted	0.96			0.28	1.00	1.00	
Satd. Flow (perm)	3434			521	5036	4776	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	143	11	8	36	1429	986	437
RTOR Reduction (vph)	5	0	0	0	0	56	0
Lane Group Flow (vph)	149	0	0	44	1429	1367	0
Confl. Peds. (#/hr)	14	14		5			5
Confl. Bikes (#/hr)		10					
Heavy Vehicles (%)	1%	1%	2%	1%	3%	3%	1%
Turn Type	Prot		custom	Prot	NA	NA	
Protected Phases	4			5	2	6	
Permitted Phases			5				
Actuated Green, G (s)	10.5			14.4	101.5	83.1	
Effective Green, g (s)	10.5			14.4	101.5	83.1	
Actuated g/C Ratio	0.09			0.12	0.85	0.69	
Clearance Time (s)	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	300			62	4259	3307	
v/s Ratio Prot	c0.04				0.28	c0.29	
v/s Ratio Perm				c0.08			
v/c Ratio	0.50			0.71	0.34	0.41	
Uniform Delay, d1	52.2			50.8	2.0	7.9	
Progression Factor	1.00			1.00	1.00	0.68	
Incremental Delay, d2	1.3			31.0	0.2	0.4	
Delay (s)	53.5			81.8	2.2	5.8	
Level of Service	D			F	A	A	
Approach Delay (s)	53.5				4.6	5.8	
Approach LOS	D				A	A	

Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	181	375	211	189	248	107	4	191	1028	147	24	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.6	3.5	3.5	3.6			3.5	4.5	4.5		3.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			0.97	0.91	1.00		0.97
Frpb, ped/bikes	1.00	1.00	0.92	1.00	0.98			1.00	1.00	0.93		1.00
Flpb, ped/bikes	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	0.95			1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (prot)	1787	3539	1475	3467	3326			3467	5036	1494		3467
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (perm)	1787	3539	1475	3467	3326			3467	5036	1494		3467
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)	195	403	227	203	267	115	4	205	1105	158	26	177
RTOR Reduction (vph)	0	0	203	0	35	0	0	0	0	48	0	0
Lane Group Flow (vph)	195	403	24	203	347	0	0	209	1105	110	0	203
Confl. Peds. (#/hr)	17		17	17		17	23	23		23	23	23
Confl. Bikes (#/hr)			10			10				10		
Heavy Vehicles (%)	1%	2%	1%	1%	2%	1%	1%	1%	3%	1%	1%	1%
Turn Type	Prot	NA	custom	Prot	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			1							6		
Actuated Green, G (s)	18.2	22.6	12.6	12.4	17.8			12.6	53.1	53.1		12.6
Effective Green, g (s)	18.2	22.6	12.6	12.4	17.8			12.6	53.1	53.1		12.6
Actuated g/C Ratio	0.16	0.19	0.11	0.11	0.15			0.11	0.45	0.45		0.11
Clearance Time (s)	3.5	4.6	3.5	3.5	3.6			3.5	4.5	4.5		3.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	278	684	159	368	506			374	2289	679		374
v/s Ratio Prot	c0.11	0.11		0.06	c0.10			c0.06	c0.22			0.06
v/s Ratio Perm			0.02							0.07		
v/c Ratio	0.70	0.59	0.15	0.55	0.69			0.56	0.48	0.16		0.54
Uniform Delay, d1	46.7	42.9	47.3	49.6	46.9			49.5	22.3	18.8		49.4
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	7.8	1.3	0.5	1.8	3.8			1.8	0.7	0.5		1.6
Delay (s)	54.5	44.2	47.7	51.4	50.7			51.3	23.0	19.3		51.0
Level of Service	D	D	D	D	D			D	C	B		D
Approach Delay (s)		47.6			50.9				26.6			
Approach LOS		D			D				C			

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	116.8	Sum of lost time (s)	16.1
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	705	85
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.5	4.5
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	0.93
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5036	1494
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5036	1494
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	758	91
RTOR Reduction (vph)	0	48
Lane Group Flow (vph)	758	43
Confl. Peds. (#/hr)		23
Confl. Bikes (#/hr)		10
Heavy Vehicles (%)	3%	1%
Turn Type	NA	custom
Protected Phases	2	
Permitted Phases		6
Actuated Green, G (s)	53.1	53.1
Effective Green, g (s)	53.1	53.1
Actuated g/C Ratio	0.45	0.45
Clearance Time (s)	4.5	4.5
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	2289	679
v/s Ratio Prot	0.15	
v/s Ratio Perm		0.03
v/c Ratio	0.33	0.06
Uniform Delay, d1	20.4	17.9
Progression Factor	1.00	1.00
Incremental Delay, d2	0.4	0.2
Delay (s)	20.8	18.1
Level of Service	C	B
Approach Delay (s)	26.4	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	331	750	66	18	402	85	128	108	45	96	59	75
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
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1805	3525		1803	3466		1802	1802			1841	1582
Flt Permitted	0.95	1.00		0.95	1.00		0.56	1.00			0.62	1.00
Satd. Flow (perm)	1805	3525		1803	3466		1061	1802			1182	1582
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	368	833	73	20	447	94	142	120	50	107	66	83
RTOR Reduction (vph)	0	5	0	0	17	0	0	22	0	0	0	53
Lane Group Flow (vph)	368	901	0	20	524	0	142	148	0	0	173	30
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Confl. Bikes (#/hr)			10			10			10			10
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	custom
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		6
Actuated Green, G (s)	18.5	42.2		0.9	24.6		13.6	13.6			13.6	24.6
Effective Green, g (s)	18.5	42.2		0.9	24.6		13.6	13.6			13.6	24.6
Actuated g/C Ratio	0.27	0.61		0.01	0.36		0.20	0.20			0.20	0.36
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	486	2165		23	1241		210	356			233	566
v/s Ratio Prot	c0.20	c0.26		0.01	0.15			0.08				
v/s Ratio Perm							0.13				c0.15	0.02
v/c Ratio	0.76	0.42		0.87	0.42		0.68	0.41			0.74	0.05
Uniform Delay, d1	23.0	6.9		33.8	16.7		25.5	24.1			25.9	14.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	6.6	0.6		127.6	1.1		8.3	0.8			12.0	0.2
Delay (s)	29.7	7.5		161.4	17.7		33.8	24.9			37.9	14.6
Level of Service	C	A		F	B		C	C			D	B
Approach Delay (s)		13.9			22.9			28.9			30.4	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	68.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.1%	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												
Volume (vph)	304	817	0	0	441	216	128	149	330	0	0	0
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			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frpb, ped/bikes	1.00	1.00			1.00	0.97	1.00	0.98	0.96			
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	0.94	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	3467	3574			3574	1547	1698	1586	1452			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)	3467	3574			3574	1547	1698	1586	1452			
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	317	851	0	0	459	225	133	155	344	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	112	0	28	115	0	0	0
Lane Group Flow (vph)	317	851	0	0	459	113	120	240	129	0	0	0
Confl. Peds. (#/hr)	7		7	7		7	7		7			
Confl. Bikes (#/hr)						20			20			
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	13.5	62.8			45.3	45.3	19.2	19.2	19.2			
Effective Green, g (s)	13.5	62.8			45.3	45.3	19.2	19.2	19.2			
Actuated g/C Ratio	0.15	0.70			0.50	0.50	0.21	0.21	0.21			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	520	2493			1798	778	362	338	309			
v/s Ratio Prot	c0.09	c0.24			0.13		0.07	c0.15				
v/s Ratio Perm						0.07			0.09			
v/c Ratio	0.61	0.34			0.26	0.15	0.33	0.71	0.42			
Uniform Delay, d1	35.8	5.4			12.7	12.0	30.0	32.8	30.6			
Progression Factor	0.96	1.32			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	1.9	0.4			0.3	0.4	0.5	6.7	0.9			
Delay (s)	36.3	7.5			13.1	12.4	30.5	39.5	31.5			
Level of Service	D	A			B	B	C	D	C			
Approach Delay (s)		15.3			12.8			34.7			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	781	271	220	349	0	0	0	0	340	260	156
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
Lane Util. Factor		0.91	1.00	0.97	0.95					0.91	0.86	0.91
Frpb, ped/bikes		1.00	0.96	1.00	1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	0.99	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (prot)		5136	1530	3467	3574					1626	3161	1421
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (perm)		5136	1530	3467	3574					1626	3161	1421
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	0	840	291	237	375	0	0	0	0	366	280	168
RTOR Reduction (vph)	0	0	226	0	0	0	0	0	0	0	3	117
Lane Group Flow (vph)	0	840	65	237	375	0	0	0	0	216	444	34
Confl. Peds. (#/hr)			7	7						7		7
Confl. Bikes (#/hr)			20			20						
Heavy Vehicles (%)	2%	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%
Turn Type		NA	custom	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			4									4
Actuated Green, G (s)		46.5	20.1	11.4	61.9					20.1	20.1	20.1
Effective Green, g (s)		46.5	20.1	11.4	61.9					20.1	20.1	20.1
Actuated g/C Ratio		0.52	0.22	0.13	0.69					0.22	0.22	0.22
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		2653	341	439	2458					363	705	317
v/s Ratio Prot		c0.16		c0.07	0.10					0.13	c0.14	
v/s Ratio Perm			0.04									0.02
v/c Ratio		0.32	0.19	0.54	0.15					0.60	0.63	0.11
Uniform Delay, d1		12.6	28.4	36.8	4.9					31.3	31.6	27.8
Progression Factor		1.00	1.00	0.84	0.17					1.00	1.00	1.00
Incremental Delay, d2		0.1	0.3	1.3	0.1					2.6	1.8	0.1
Delay (s)		12.6	28.6	32.2	1.0					33.9	33.4	28.0
Level of Service		B	C	C	A					C	C	C
Approach Delay (s)		16.8			13.1			0.0			32.5	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	500	1332	1577	0	0	1643
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.88	0.91			0.91
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3467	2814	5136			5136
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3467	2814	5136			5136
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.96	0.97
Adj. Flow (vph)	515	1373	1626	0	0	1694
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	515	1371	1626	0	0	1694
Confl. Peds. (#/hr)	23	23				
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	Prot	custom	NA			NA
Protected Phases	8	7 8	2			6 7
Permitted Phases		8				
Actuated Green, G (s)	27.2	83.2	58.8			114.8
Effective Green, g (s)	27.2	83.2	58.8			114.8
Actuated g/C Ratio	0.18	0.55	0.39			0.77
Clearance Time (s)	4.0		4.0			
Vehicle Extension (s)	3.0		3.0			
Lane Grp Cap (vph)	628	1560	2013			3930
v/s Ratio Prot	0.15	c0.49	c0.32			0.33
v/s Ratio Perm						
v/c Ratio	0.82	0.88	0.81			0.43
Uniform Delay, d1	59.0	29.0	40.6			6.2
Progression Factor	1.00	1.00	0.71			1.00
Incremental Delay, d2	8.4	6.0	3.0			0.3
Delay (s)	67.5	35.0	31.7			6.5
Level of Service	E	C	C			A
Approach Delay (s)	43.8		31.7			6.5
Approach LOS	D		C			A

Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	297	384	0	2291	1483	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.91	0.91	
Frpb, ped/bikes	0.97	0.91		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	0.95	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3235	1324		5136	5136	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3235	1324		5136	5136	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	303	392	0	2338	1513	0
RTOR Reduction (vph)	51	51	0	0	0	0
Lane Group Flow (vph)	424	169	0	2338	1513	0
Confl. Peds. (#/hr)	20	20	20			
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	26.0	26.0		116.0	116.0	
Effective Green, g (s)	26.0	26.0		116.0	116.0	
Actuated g/C Ratio	0.17	0.17		0.77	0.77	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	560	229		3971	3971	
v/s Ratio Prot	c0.13			c0.46	0.29	
v/s Ratio Perm		0.13				
v/c Ratio	0.76	0.74		0.59	0.38	
Uniform Delay, d1	59.0	58.8		7.1	5.5	
Progression Factor	1.00	1.00		1.54	0.75	
Incremental Delay, d2	5.8	11.7		0.6	0.2	
Delay (s)	64.8	70.4		11.5	4.4	
Level of Service	E	E		B	A	
Approach Delay (s)	66.6			11.5	4.4	
Approach LOS	E			B	A	

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	524	51	44	36	1721	1647	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0	
Lane Util. Factor	0.97			1.00	0.91	0.91	
Frpb, ped/bikes	0.99			1.00	1.00	0.99	
Flpb, ped/bikes	1.00			0.99	1.00	1.00	
Frt	0.99			1.00	1.00	0.98	
Flt Protected	0.96			0.95	1.00	1.00	
Satd. Flow (prot)	3421			1766	5085	4937	
Flt Permitted	0.96			0.25	1.00	1.00	
Satd. Flow (perm)	3421			465	5085	4937	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	546	53	46	38	1793	1716	217
RTOR Reduction (vph)	6	0	0	0	0	8	0
Lane Group Flow (vph)	593	0	0	84	1793	1925	0
Confl. Peds. (#/hr)	20	20		20			20
Confl. Bikes (#/hr)		10					
Heavy Vehicles (%)	1%	1%	2%	1%	2%	2%	2%
Turn Type	Prot		custom	Prot	NA	NA	
Protected Phases	4			5	2	6	
Permitted Phases			5				
Actuated Green, G (s)	31.9			16.0	110.1	90.1	
Effective Green, g (s)	31.9			16.0	110.1	90.1	
Actuated g/C Ratio	0.21			0.11	0.73	0.60	
Clearance Time (s)	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	727			49	3732	2965	
v/s Ratio Prot	c0.17				0.35	c0.39	
v/s Ratio Perm				c0.18			
v/c Ratio	0.82			1.71	0.48	0.65	
Uniform Delay, d1	56.2			67.0	8.2	19.6	
Progression Factor	1.00			1.00	1.00	0.61	
Incremental Delay, d2	7.0			393.5	0.4	1.0	
Delay (s)	63.3			460.5	8.6	12.9	
Level of Service	E			F	A	B	
Approach Delay (s)	63.3				28.9	12.9	
Approach LOS	E				C	B	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	170	292	237	258	410	192	4	191	1284	147	55	275
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
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			0.97	0.91	1.00		0.97
Frpb, ped/bikes	1.00	1.00	0.92	1.00	0.97			1.00	1.00	0.93		1.00
Flpb, ped/bikes	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	0.95			1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (prot)	1787	3574	1470	3467	3313			3467	5136	1480		3467
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (perm)	1787	3574	1470	3467	3313			3467	5136	1480		3467
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)	175	301	244	266	423	198	4	197	1324	152	57	284
RTOR Reduction (vph)	0	0	208	0	36	0	0	0	0	57	0	0
Lane Group Flow (vph)	175	301	36	266	585	0	0	201	1324	95	0	341
Confl. Peds. (#/hr)	20		20	20		20	20	20		20	20	20
Confl. Bikes (#/hr)			20			20				20		
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA	custom	Prot	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	8		7	4		5	5	2		1	1
Permitted Phases			1							2		
Actuated Green, G (s)	17.9	31.9	20.7	16.1	30.1			13.7	57.1	57.1		20.7
Effective Green, g (s)	17.9	31.9	20.7	16.1	30.1			13.7	57.1	57.1		20.7
Actuated g/C Ratio	0.13	0.22	0.15	0.11	0.21			0.10	0.40	0.40		0.15
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	225	804	214	393	703			334	2068	595		506
v/s Ratio Prot	c0.10	0.08		0.08	c0.18			0.06	c0.26			c0.10
v/s Ratio Perm			0.02							0.06		
v/c Ratio	0.78	0.37	0.17	0.68	0.83			0.60	0.64	0.16		0.67
Uniform Delay, d1	60.0	46.5	53.0	60.4	53.4			61.4	34.1	27.0		57.4
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	15.5	1.3	0.4	4.6	11.1			3.0	1.5	0.6		3.5
Delay (s)	75.5	47.8	53.4	64.9	64.5			64.5	35.6	27.6		60.9
Level of Service	E	D	D	E	E			E	D	C		E
Approach Delay (s)		56.4			64.6				38.4			
Approach LOS		E			E				D			

Intersection Summary			
HCM 2000 Control Delay	44.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	141.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	1255	189
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	0.93
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5136	1482
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5136	1482
Peak-hour factor, PHF	0.97	0.97
Adj. Flow (vph)	1294	195
RTOR Reduction (vph)	0	55
Lane Group Flow (vph)	1294	140
Confl. Peds. (#/hr)		20
Confl. Bikes (#/hr)		20
Heavy Vehicles (%)	1%	1%
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	64.1	64.1
Effective Green, g (s)	64.1	64.1
Actuated g/C Ratio	0.45	0.45
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	2321	669
v/s Ratio Prot	c0.25	
v/s Ratio Perm		0.09
v/c Ratio	0.56	0.21
Uniform Delay, d1	28.5	23.5
Progression Factor	1.00	1.00
Incremental Delay, d2	1.0	0.7
Delay (s)	29.4	24.2
Level of Service	C	C
Approach Delay (s)	34.7	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	211	513	100	37	955	124	79	84	17	134	100	357
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
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99			1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00			0.98	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1805	3443		1624	3481		1772	1835			1818	1521
Flt Permitted	0.95	1.00		0.95	1.00		0.45	1.00			0.76	1.00
Satd. Flow (perm)	1805	3443		1624	3481		846	1835			1422	1521
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)	227	552	108	40	1027	133	85	90	18	144	108	384
RTOR Reduction (vph)	0	17	0	0	11	0	0	8	0	0	0	210
Lane Group Flow (vph)	227	643	0	40	1149	0	85	100	0	0	252	174
Confl. Peds. (#/hr)	19		19	19		19	19		19	19		19
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)				0								
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		4
Actuated Green, G (s)	14.5	49.2		3.0	37.7		26.0	26.0			26.0	26.0
Effective Green, g (s)	14.5	49.2		3.0	37.7		26.0	26.0			26.0	26.0
Actuated g/C Ratio	0.16	0.55		0.03	0.42		0.29	0.29			0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	290	1878		54	1454		243	528			409	438
v/s Ratio Prot	c0.13	0.19		0.02	c0.33			0.05				
v/s Ratio Perm							0.10				c0.18	0.11
v/c Ratio	0.78	0.34		0.74	0.79		0.35	0.19			0.62	0.40
Uniform Delay, d1	36.3	11.5		43.2	22.8		25.4	24.2			27.8	25.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	12.9	0.5		41.8	4.5		3.9	0.8			6.8	2.7
Delay (s)	49.2	12.0		85.0	27.3		29.3	25.0			34.6	28.5
Level of Service	D	B		F	C		C	C			C	C
Approach Delay (s)		21.5			29.2			26.9			30.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.8%	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												
Volume (vph)	161	516	0	0	927	561	277	433	309	0	0	0
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			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frpb, ped/bikes	1.00	1.00			1.00	0.96	1.00	1.00	0.96			
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	0.99	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	3467	3574			3574	1538	1698	1687	1457			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)	3467	3574			3574	1538	1698	1687	1457			
Peak-hour factor, PHF	0.94	0.94	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92
Adj. Flow (vph)	171	549	0	0	986	597	295	461	329	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	89	0	3	188	0	0	0
Lane Group Flow (vph)	171	549	0	0	986	508	265	521	108	0	0	0
Confl. Peds. (#/hr)	10		7	7		10	10		10			
Confl. Bikes (#/hr)						20			20			
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		4	4				
Permitted Phases						6			4			
Actuated Green, G (s)	6.0	50.0			40.0	40.0	32.0	32.0	32.0			
Effective Green, g (s)	6.0	50.0			40.0	40.0	32.0	32.0	32.0			
Actuated g/C Ratio	0.07	0.56			0.44	0.44	0.36	0.36	0.36			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	231	1985			1588	683	603	599	518			
v/s Ratio Prot	c0.05	0.15			0.28		0.16	c0.31				
v/s Ratio Perm						c0.33			0.07			
v/c Ratio	0.74	0.28			0.62	0.74	0.44	0.87	0.21			
Uniform Delay, d1	41.2	10.5			19.2	20.7	22.1	27.1	20.2			
Progression Factor	0.85	0.56			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	11.9	0.3			1.8	7.2	2.3	15.9	0.9			
Delay (s)	47.0	6.2			21.0	27.9	24.5	42.9	21.1			
Level of Service	D	A			C	C	C	D	C			
Approach Delay (s)		15.9			23.6			32.5			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	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												
Volume (vph)	0	465	131	406	798	0	0	0	0	212	106	243
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
Lane Util. Factor		0.91	1.00	0.97	0.95					0.91	0.86	0.91
Frpb, ped/bikes		1.00	0.95	1.00	1.00					1.00	0.99	0.98
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	0.94	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.99	1.00
Satd. Flow (prot)		5136	1518	3467	3574					1626	2982	1421
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.99	1.00
Satd. Flow (perm)		5136	1518	3467	3574					1626	2982	1421
Peak-hour factor, PHF	0.97	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	0	484	136	423	831	0	0	0	0	221	110	253
RTOR Reduction (vph)	0	0	114	0	0	0	0	0	0	0	97	115
Lane Group Flow (vph)	0	484	22	423	831	0	0	0	0	152	198	22
Confl. Peds. (#/hr)			7	7						7		7
Confl. Bikes (#/hr)			20			20						
Heavy Vehicles (%)	2%	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%
Turn Type		NA	custom	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			4									4
Actuated Green, G (s)		47.1	14.6	16.3	67.4					14.6	14.6	14.6
Effective Green, g (s)		47.1	14.6	16.3	67.4					14.6	14.6	14.6
Actuated g/C Ratio		0.52	0.16	0.18	0.75					0.16	0.16	0.16
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		2687	246	627	2676					263	483	230
v/s Ratio Prot		0.09		c0.12	c0.23					c0.09	0.07	
v/s Ratio Perm			0.01									0.02
v/c Ratio		0.18	0.09	0.67	0.31					0.58	0.41	0.10
Uniform Delay, d1		11.3	32.1	34.4	3.7					34.9	33.8	32.1
Progression Factor		1.00	1.00	0.84	2.44					1.00	1.00	1.00
Incremental Delay, d2		0.0	0.2	2.3	0.2					3.1	0.6	0.2
Delay (s)		11.3	32.2	31.3	9.3					37.9	34.4	32.3
Level of Service		B	C	C	A					D	C	C
Approach Delay (s)		15.9			16.7			0.0			34.8	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	493	1332	1575	0	0	1642
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.88	0.91			0.91
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3467	2814	5136			5136
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3467	2814	5136			5136
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.96	0.97
Adj. Flow (vph)	508	1373	1624	0	0	1693
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	508	1371	1624	0	0	1693
Confl. Peds. (#/hr)	23	23				
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	Prot	custom	NA			NA
Protected Phases	8	7 8	2			6 7
Permitted Phases		8				
Actuated Green, G (s)	27.1	83.1	58.9			114.9
Effective Green, g (s)	27.1	83.1	58.9			114.9
Actuated g/C Ratio	0.18	0.55	0.39			0.77
Clearance Time (s)	4.0		4.0			
Vehicle Extension (s)	3.0		3.0			
Lane Grp Cap (vph)	626	1558	2016			3934
v/s Ratio Prot	0.15	c0.49	c0.32			0.33
v/s Ratio Perm						
v/c Ratio	0.81	0.88	0.81			0.43
Uniform Delay, d1	59.0	29.1	40.5			6.1
Progression Factor	1.00	1.00	0.71			1.00
Incremental Delay, d2	7.9	6.0	2.9			0.3
Delay (s)	66.9	35.1	31.6			6.5
Level of Service	E	D	C			A
Approach Delay (s)	43.7		31.6			6.5
Approach LOS	D		C			A

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	297	381	0	2247	1475	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.91	0.91	
Frpb, ped/bikes	0.97	0.91		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	0.95	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3240	1323		5136	5136	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3240	1323		5136	5136	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	303	389	0	2293	1505	0
RTOR Reduction (vph)	52	52	0	0	0	0
Lane Group Flow (vph)	418	170	0	2293	1505	0
Confl. Peds. (#/hr)	20	20	20			
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	25.9	25.9		116.1	116.1	
Effective Green, g (s)	25.9	25.9		116.1	116.1	
Actuated g/C Ratio	0.17	0.17		0.77	0.77	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	559	228		3975	3975	
v/s Ratio Prot	c0.13			c0.45	0.29	
v/s Ratio Perm		0.13				
v/c Ratio	0.75	0.75		0.58	0.38	
Uniform Delay, d1	58.9	58.9		6.9	5.4	
Progression Factor	1.00	1.00		1.54	0.75	
Incremental Delay, d2	5.4	12.4		0.6	0.2	
Delay (s)	64.4	71.3		11.2	4.3	
Level of Service	E	E		B	A	
Approach Delay (s)	66.6			11.2	4.3	
Approach LOS	E			B	A	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	480	48	44	35	1721	1647	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0	
Lane Util. Factor	0.97			1.00	0.91	0.91	
Frpb, ped/bikes	0.99			1.00	1.00	0.99	
Flpb, ped/bikes	1.00			0.99	1.00	1.00	
Frt	0.99			1.00	1.00	0.98	
Flt Protected	0.96			0.95	1.00	1.00	
Satd. Flow (prot)	3419			1766	5085	4944	
Flt Permitted	0.96			0.25	1.00	1.00	
Satd. Flow (perm)	3419			465	5085	4944	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	500	50	46	36	1793	1716	205
RTOR Reduction (vph)	6	0	0	0	0	7	0
Lane Group Flow (vph)	544	0	0	82	1793	1914	0
Confl. Peds. (#/hr)	20	20		20			20
Confl. Bikes (#/hr)		10					
Heavy Vehicles (%)	1%	1%	2%	1%	2%	2%	2%
Turn Type	Prot		custom	Prot	NA	NA	
Protected Phases	4			5	2	6	
Permitted Phases			5				
Actuated Green, G (s)	29.7			16.0	112.3	92.3	
Effective Green, g (s)	29.7			16.0	112.3	92.3	
Actuated g/C Ratio	0.20			0.11	0.75	0.62	
Clearance Time (s)	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	676			49	3806	3042	
v/s Ratio Prot	c0.16				0.35	c0.39	
v/s Ratio Perm				c0.18			
v/c Ratio	0.80			1.67	0.47	0.63	
Uniform Delay, d1	57.4			67.0	7.3	18.1	
Progression Factor	1.00			1.00	1.00	0.58	
Incremental Delay, d2	6.9			376.5	0.4	0.9	
Delay (s)	64.3			443.5	7.7	11.5	
Level of Service	E			F	A	B	
Approach Delay (s)	64.3				26.8	11.5	
Approach LOS	E				C	B	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	168	292	234	258	409	192	4	191	1283	147	55	274
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
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			0.97	0.91	1.00		0.97
Frpb, ped/bikes	1.00	1.00	0.92	1.00	0.97			1.00	1.00	0.93		1.00
Flpb, ped/bikes	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	0.95			1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (prot)	1787	3574	1470	3467	3313			3467	5136	1481		3467
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (perm)	1787	3574	1470	3467	3313			3467	5136	1481		3467
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)	173	301	241	266	422	198	4	197	1323	152	57	282
RTOR Reduction (vph)	0	0	206	0	36	0	0	0	0	57	0	0
Lane Group Flow (vph)	173	301	35	266	584	0	0	201	1323	95	0	339
Confl. Peds. (#/hr)	20		20	20		20	20	20		20	20	20
Confl. Bikes (#/hr)			20			20				20		
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA	custom	Prot	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	8		7	4		5	5	2		1	1
Permitted Phases			1							2		
Actuated Green, G (s)	17.7	31.7	20.7	16.1	30.1			13.7	57.1	57.1		20.7
Effective Green, g (s)	17.7	31.7	20.7	16.1	30.1			13.7	57.1	57.1		20.7
Actuated g/C Ratio	0.12	0.22	0.15	0.11	0.21			0.10	0.40	0.40		0.15
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	223	800	214	394	704			335	2071	597		506
v/s Ratio Prot	c0.10	0.08		0.08	c0.18			0.06	c0.26			c0.10
v/s Ratio Perm			0.02							0.06		
v/c Ratio	0.78	0.38	0.16	0.68	0.83			0.60	0.64	0.16		0.67
Uniform Delay, d1	60.0	46.6	52.9	60.2	53.3			61.3	34.0	26.9		57.2
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	15.5	1.4	0.4	4.5	10.9			2.9	1.5	0.6		3.4
Delay (s)	75.5	47.9	53.3	64.8	64.2			64.2	35.5	27.5		60.6
Level of Service	E	D	D	E	E			E	D	C		E
Approach Delay (s)		56.4			64.3				38.2			
Approach LOS		E			E				D			

Intersection Summary			
HCM 2000 Control Delay	44.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	141.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	1253	189
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	0.93
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5136	1482
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5136	1482
Peak-hour factor, PHF	0.97	0.97
Adj. Flow (vph)	1292	195
RTOR Reduction (vph)	0	55
Lane Group Flow (vph)	1292	140
Confl. Peds. (#/hr)		20
Confl. Bikes (#/hr)		20
Heavy Vehicles (%)	1%	1%
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	64.1	64.1
Effective Green, g (s)	64.1	64.1
Actuated g/C Ratio	0.45	0.45
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	2324	670
v/s Ratio Prot	c0.25	
v/s Ratio Perm		0.09
v/c Ratio	0.56	0.21
Uniform Delay, d1	28.3	23.4
Progression Factor	1.00	1.00
Incremental Delay, d2	1.0	0.7
Delay (s)	29.3	24.1
Level of Service	C	C
Approach Delay (s)	34.6	
Approach LOS	C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	206	513	100	37	955	124	79	84	17	134	99	334
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
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99			1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00			0.98	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1805	3443		1805	3481		1772	1835			1818	1521
Flt Permitted	0.95	1.00		0.95	1.00		0.46	1.00			0.76	1.00
Satd. Flow (perm)	1805	3443		1805	3481		853	1835			1420	1521
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)	222	552	108	40	1027	133	85	90	18	144	106	359
RTOR Reduction (vph)	0	17	0	0	11	0	0	8	0	0	0	210
Lane Group Flow (vph)	222	643	0	40	1149	0	85	100	0	0	250	149
Confl. Peds. (#/hr)	19		19	19		19	19		19	19		19
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		4
Actuated Green, G (s)	14.4	49.1		2.9	37.6		26.0	26.0			26.0	26.0
Effective Green, g (s)	14.4	49.1		2.9	37.6		26.0	26.0			26.0	26.0
Actuated g/C Ratio	0.16	0.55		0.03	0.42		0.29	0.29			0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	288	1878		58	1454		246	530			410	439
v/s Ratio Prot	c0.12	0.19		0.02	c0.33			0.05				
v/s Ratio Perm							0.10				c0.18	0.10
v/c Ratio	0.77	0.34		0.69	0.79		0.35	0.19			0.61	0.34
Uniform Delay, d1	36.2	11.4		43.1	22.8		25.3	24.1			27.6	25.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	12.0	0.5		29.0	4.5		3.8	0.8			6.6	2.1
Delay (s)	48.2	11.9		72.1	27.2		29.1	24.9			34.2	27.3
Level of Service	D	B		E	C		C	C			C	C
Approach Delay (s)		21.1			28.7			26.7			30.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.4%	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												
Volume (vph)	161	515	0	0	904	561	277	433	305	0	0	0
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			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frpb, ped/bikes	1.00	1.00			1.00	0.96	1.00	1.00	0.96			
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	0.99	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	3467	3574			3574	1538	1698	1687	1457			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)	3467	3574			3574	1538	1698	1687	1457			
Peak-hour factor, PHF	0.94	0.94	0.92	0.92	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92
Adj. Flow (vph)	171	548	0	0	962	597	295	461	324	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	89	0	3	188	0	0	0
Lane Group Flow (vph)	171	548	0	0	962	508	265	520	104	0	0	0
Confl. Peds. (#/hr)	10		7	7		10	10		10			
Confl. Bikes (#/hr)						20			20			
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		4	4				
Permitted Phases						6			4			
Actuated Green, G (s)	6.0	50.0			40.0	40.0	32.0	32.0	32.0			
Effective Green, g (s)	6.0	50.0			40.0	40.0	32.0	32.0	32.0			
Actuated g/C Ratio	0.07	0.56			0.44	0.44	0.36	0.36	0.36			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	231	1985			1588	683	603	599	518			
v/s Ratio Prot	c0.05	0.15			0.27		0.16	c0.31				
v/s Ratio Perm						c0.33			0.07			
v/c Ratio	0.74	0.28			0.61	0.74	0.44	0.87	0.20			
Uniform Delay, d1	41.2	10.5			19.0	20.7	22.1	27.0	20.1			
Progression Factor	0.85	0.58			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	11.9	0.3			1.7	7.2	2.3	15.7	0.9			
Delay (s)	46.8	6.4			20.7	27.9	24.5	42.8	21.0			
Level of Service	D	A			C	C	C	D	C			
Approach Delay (s)		16.0			23.5			32.4			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.6%	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												
Volume (vph)	0	464	131	385	796	0	0	0	0	212	106	243
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
Lane Util. Factor		0.91	1.00	0.97	0.95					0.91	0.86	0.91
Frpb, ped/bikes		1.00	0.95	1.00	1.00					1.00	0.99	0.98
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	0.94	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.99	1.00
Satd. Flow (prot)		5136	1518	3467	3574					1626	2982	1421
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.99	1.00
Satd. Flow (perm)		5136	1518	3467	3574					1626	2982	1421
Peak-hour factor, PHF	0.97	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	0	483	136	401	829	0	0	0	0	221	110	253
RTOR Reduction (vph)	0	0	114	0	0	0	0	0	0	0	97	115
Lane Group Flow (vph)	0	483	22	401	829	0	0	0	0	152	198	22
Confl. Peds. (#/hr)			7	7						7		7
Confl. Bikes (#/hr)			20			20						
Heavy Vehicles (%)	2%	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%
Turn Type		NA	custom	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			4									4
Actuated Green, G (s)		47.7	14.6	15.7	67.4					14.6	14.6	14.6
Effective Green, g (s)		47.7	14.6	15.7	67.4					14.6	14.6	14.6
Actuated g/C Ratio		0.53	0.16	0.17	0.75					0.16	0.16	0.16
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		2722	246	604	2676					263	483	230
v/s Ratio Prot		0.09		c0.12	c0.23					c0.09	0.07	
v/s Ratio Perm			0.01									0.02
v/c Ratio		0.18	0.09	0.66	0.31					0.58	0.41	0.10
Uniform Delay, d1		11.0	32.1	34.7	3.7					34.9	33.8	32.1
Progression Factor		1.00	1.00	0.85	2.40					1.00	1.00	1.00
Incremental Delay, d2		0.0	0.2	2.3	0.2					3.1	0.6	0.2
Delay (s)		11.0	32.2	31.8	9.1					37.9	34.4	32.3
Level of Service		B	C	C	A					D	C	C
Approach Delay (s)		15.7			16.5			0.0			34.8	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Year 2030

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	783	634	909	0	0	2337
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.88	0.91			0.91
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3400	2760	5036			5036
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3400	2760	5036			5036
Peak-hour factor, PHF	0.99	0.99	0.99	0.97	0.96	0.99
Adj. Flow (vph)	791	640	918	0	0	2361
RTOR Reduction (vph)	0	35	0	0	0	0
Lane Group Flow (vph)	791	605	918	0	0	2361
Confl. Peds. (#/hr)	6	6		6	6	
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	3%	3%	3%	1%	1%	3%
Turn Type	Prot	custom	NA			NA
Protected Phases	8	7 8	2			6 7
Permitted Phases		8				
Actuated Green, G (s)	33.2	63.2	48.8			78.8
Effective Green, g (s)	33.2	63.2	48.8			78.8
Actuated g/C Ratio	0.28	0.53	0.41			0.66
Clearance Time (s)	4.0		4.0			
Vehicle Extension (s)	3.0		3.0			
Lane Grp Cap (vph)	940	1453	2047			3306
v/s Ratio Prot	c0.23	0.22	0.18			c0.47
v/s Ratio Perm						
v/c Ratio	0.84	0.42	0.45			0.71
Uniform Delay, d1	40.9	17.2	25.8			13.3
Progression Factor	1.00	1.00	0.75			1.00
Incremental Delay, d2	6.9	0.2	0.6			0.7
Delay (s)	47.8	17.4	20.0			14.1
Level of Service	D	B	C			B
Approach Delay (s)	34.2		20.0			14.1
Approach LOS	C		C			B

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	208	320	0	1880	1848	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.91	0.91	
Frpb, ped/bikes	0.98	0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	0.94	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3232	1399		5036	5036	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3232	1399		5036	5036	
Peak-hour factor, PHF	0.97	0.97	0.95	0.97	0.97	0.95
Adj. Flow (vph)	214	330	0	1938	1905	0
RTOR Reduction (vph)	20	20	0	0	0	0
Lane Group Flow (vph)	349	155	0	1938	1905	0
Confl. Peds. (#/hr)	6	6	6			
Confl. Bikes (#/hr)		10				
Heavy Vehicles (%)	3%	1%	1%	3%	3%	1%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	19.2	19.2		92.8	92.8	
Effective Green, g (s)	19.2	19.2		92.8	92.8	
Actuated g/C Ratio	0.16	0.16		0.77	0.77	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	517	223		3894	3894	
v/s Ratio Prot	0.11			c0.38	0.38	
v/s Ratio Perm		c0.11				
v/c Ratio	0.67	0.69		0.50	0.49	
Uniform Delay, d1	47.5	47.6		5.0	5.0	
Progression Factor	1.00	1.00		0.96	0.63	
Incremental Delay, d2	3.5	9.0		0.4	0.3	
Delay (s)	50.9	56.6		5.2	3.4	
Level of Service	D	E		A	A	
Approach Delay (s)	52.8			5.2	3.4	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	174	40	15	199	1697	1429	719
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0	
Lane Util. Factor	0.97			1.00	0.91	0.91	
Frpb, ped/bikes	0.99			1.00	1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	1.00	
Frt	0.97			1.00	1.00	0.95	
Flt Protected	0.96			0.95	1.00	1.00	
Satd. Flow (prot)	3369			1786	5036	4753	
Flt Permitted	0.96			0.20	1.00	1.00	
Satd. Flow (perm)	3369			382	5036	4753	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	176	40	15	201	1714	1443	726
RTOR Reduction (vph)	18	0	0	0	0	76	0
Lane Group Flow (vph)	198	0	0	216	1714	2093	0
Confl. Peds. (#/hr)	14	14		5			5
Confl. Bikes (#/hr)		10					
Heavy Vehicles (%)	1%	1%	2%	1%	3%	3%	1%
Turn Type	Prot		custom	Prot	NA	NA	
Protected Phases	4			5	2	6	
Permitted Phases			5				
Actuated Green, G (s)	12.3			19.7	99.7	76.0	
Effective Green, g (s)	12.3			19.7	99.7	76.0	
Actuated g/C Ratio	0.10			0.16	0.83	0.63	
Clearance Time (s)	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	345			62	4184	3010	
v/s Ratio Prot	c0.06				0.34	c0.44	
v/s Ratio Perm				c0.57			
v/c Ratio	0.57			3.48	0.41	0.70	
Uniform Delay, d1	51.4			50.1	2.6	14.4	
Progression Factor	1.00			1.00	1.00	0.70	
Incremental Delay, d2	2.3			1157.1	0.3	1.2	
Delay (s)	53.7			1207.2	2.9	11.3	
Level of Service	D			F	A	B	
Approach Delay (s)	53.7				137.7	11.3	
Approach LOS	D				F	B	

Intersection Summary			
HCM 2000 Control Delay	69.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	326	521	310	333	384	335	5	342	1661	204	27	522
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.6	3.5	3.5	3.6			3.5	4.5	4.5		3.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			0.97	0.91	1.00		0.97
Frpb, ped/bikes	1.00	1.00	0.93	1.00	0.97			1.00	1.00	0.92		1.00
Flpb, ped/bikes	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	0.93			1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (prot)	1787	3539	1493	3467	3202			3467	5036	1470		3467
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (perm)	1787	3539	1493	3467	3202			3467	5036	1470		3467
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)	343	548	326	351	404	353	5	360	1748	215	28	549
RTOR Reduction (vph)	0	0	283	0	105	0	0	0	0	57	0	0
Lane Group Flow (vph)	343	548	43	351	652	0	0	365	1748	158	0	577
Confl. Peds. (#/hr)	17		17	17		17	23	23		23	23	23
Confl. Bikes (#/hr)			10			10				10		
Heavy Vehicles (%)	1%	2%	1%	1%	2%	1%	1%	1%	3%	1%	1%	1%
Turn Type	Prot	NA	custom	Prot	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			1							6		
Actuated Green, G (s)	29.5	43.0	19.5	17.9	32.4			19.5	52.5	52.5		19.5
Effective Green, g (s)	29.5	43.0	19.5	17.9	32.4			19.5	52.5	52.5		19.5
Actuated g/C Ratio	0.20	0.29	0.13	0.12	0.22			0.13	0.35	0.35		0.13
Clearance Time (s)	3.5	4.6	3.5	3.5	3.6			3.5	4.5	4.5		3.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	353	1021	195	416	696			453	1774	517		453
v/s Ratio Prot	c0.19	0.15		0.10	c0.20			0.11	c0.35			c0.17
v/s Ratio Perm			0.03							0.11		
v/c Ratio	0.97	0.54	0.22	0.84	0.94			0.81	0.99	0.31		1.27
Uniform Delay, d1	59.3	44.6	57.9	64.2	57.3			62.9	47.9	35.0		64.8
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	40.1	0.5	0.6	14.4	20.0			10.1	18.2	1.5		139.5
Delay (s)	99.5	45.2	58.5	78.6	77.3			73.0	66.0	36.5		204.3
Level of Service	F	D	E	E	E			E	E	D		F
Approach Delay (s)		64.0			77.7				64.4			
Approach LOS		E			E				E			

Intersection Summary			
HCM 2000 Control Delay	74.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	149.0	Sum of lost time (s)	16.1
Intersection Capacity Utilization	101.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	1293	150
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.5	4.5
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	0.92
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5036	1470
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5036	1470
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	1361	158
RTOR Reduction (vph)	0	57
Lane Group Flow (vph)	1361	101
Confl. Peds. (#/hr)		23
Confl. Bikes (#/hr)		10
Heavy Vehicles (%)	3%	1%
Turn Type	NA	custom
Protected Phases	2	
Permitted Phases		6
Actuated Green, G (s)	52.5	52.5
Effective Green, g (s)	52.5	52.5
Actuated g/C Ratio	0.35	0.35
Clearance Time (s)	4.5	4.5
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	1774	517
v/s Ratio Prot	0.27	
v/s Ratio Perm		0.07
v/c Ratio	0.77	0.20
Uniform Delay, d1	42.8	33.6
Progression Factor	1.00	1.00
Incremental Delay, d2	3.2	0.8
Delay (s)	46.1	34.4
Level of Service	D	C
Approach Delay (s)	88.7	
Approach LOS	F	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	418	940	40	45	640	160	195	111	65	235	55	153
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
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1805	3549		1805	3446		1803	1781			1848	1576
Flt Permitted	0.95	1.00		0.95	1.00		0.27	1.00			0.68	1.00
Satd. Flow (perm)	1805	3549		1805	3446		520	1781			1286	1576
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.92
Adj. Flow (vph)	454	1022	43	49	696	174	212	121	71	255	220	166
RTOR Reduction (vph)	0	3	0	0	24	0	0	24	0	0	0	125
Lane Group Flow (vph)	454	1062	0	49	846	0	212	168	0	0	475	41
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Confl. Bikes (#/hr)			10			10			10			10
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	custom
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		6
Actuated Green, G (s)	21.0	40.6		3.0	22.6		36.0	36.0			36.0	22.6
Effective Green, g (s)	21.0	40.6		3.0	22.6		36.0	36.0			36.0	22.6
Actuated g/C Ratio	0.23	0.44		0.03	0.25		0.39	0.39			0.39	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	413	1573		59	850		204	699			505	388
v/s Ratio Prot	c0.25	0.30		0.03	c0.25			0.09				
v/s Ratio Perm							c0.41				0.37	0.03
v/c Ratio	1.10	0.67		0.83	1.00		1.04	0.24			0.94	0.11
Uniform Delay, d1	35.3	20.3		44.0	34.4		27.8	18.6			26.8	26.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	73.9	2.3		60.6	29.7		73.7	0.2			25.9	0.5
Delay (s)	109.2	22.6		104.7	64.2		101.5	18.8			52.7	27.2
Level of Service	F	C		F	E		F	B			D	C
Approach Delay (s)		48.5			66.3			62.2			46.1	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	54.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	295	970	0	0	798	230	100	100	428	0	0	0
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			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frpb, ped/bikes	1.00	1.00			1.00	0.97	1.00	0.97	0.95			
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	0.91	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	3467	3574			3574	1548	1698	1511	1450			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)	3467	3574			3574	1548	1698	1511	1450			
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.92	0.92
Adj. Flow (vph)	301	990	0	0	814	235	102	102	437	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	112	0	75	84	0	0	0
Lane Group Flow (vph)	301	990	0	0	814	123	92	207	183	0	0	0
Confl. Peds. (#/hr)	7		7	7		7	7		7			
Confl. Bikes (#/hr)						20			20			
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	13.1	64.3			47.2	47.2	17.7	17.7	17.7			
Effective Green, g (s)	13.1	64.3			47.2	47.2	17.7	17.7	17.7			
Actuated g/C Ratio	0.15	0.71			0.52	0.52	0.20	0.20	0.20			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	504	2553			1874	811	333	297	285			
v/s Ratio Prot	c0.09	0.28			c0.23		0.05	c0.14				
v/s Ratio Perm						0.08			0.13			
v/c Ratio	0.60	0.39			0.43	0.15	0.28	0.70	0.64			
Uniform Delay, d1	36.0	5.1			13.2	11.1	30.7	33.7	33.2			
Progression Factor	0.93	2.04			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	1.8	0.4			0.7	0.4	0.5	7.0	4.9			
Delay (s)	35.3	10.8			13.9	11.5	31.2	40.6	38.2			
Level of Service	D	B			B	B	C	D	D			
Approach Delay (s)		16.5			13.4			38.2			0.0	
Approach LOS		B			B			D			A	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.9%	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												
Volume (vph)	0	852	330	347	551	0	0	0	0	413	305	166
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
Lane Util. Factor		0.91	1.00	0.97	0.95					0.91	0.86	0.91
Frpb, ped/bikes		1.00	0.96	1.00	1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	0.99	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (prot)		5136	1534	3467	3574					1626	3161	1421
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (perm)		5136	1534	3467	3574					1626	3161	1421
Peak-hour factor, PHF	0.93	0.95	0.95	0.95	0.95	0.93	0.93	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	0	897	347	365	580	0	0	0	0	435	321	175
RTOR Reduction (vph)	0	0	259	0	0	0	0	0	0	0	3	105
Lane Group Flow (vph)	0	897	88	365	580	0	0	0	0	252	519	52
Confl. Peds. (#/hr)			7	7						7		7
Confl. Bikes (#/hr)			20			20						
Heavy Vehicles (%)	2%	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%
Turn Type		NA	custom	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			4									4
Actuated Green, G (s)		41.1	22.8	14.1	59.2					22.8	22.8	22.8
Effective Green, g (s)		41.1	22.8	14.1	59.2					22.8	22.8	22.8
Actuated g/C Ratio		0.46	0.25	0.16	0.66					0.25	0.25	0.25
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		2345	388	543	2350					411	800	359
v/s Ratio Prot		c0.17		c0.11	0.16					0.15	c0.16	
v/s Ratio Perm			0.06									0.04
v/c Ratio		0.38	0.23	0.67	0.25					0.61	0.65	0.14
Uniform Delay, d1		16.1	26.6	35.8	6.3					29.7	30.0	26.0
Progression Factor		1.00	1.00	0.82	0.18					1.00	1.00	1.00
Incremental Delay, d2		0.1	0.3	3.1	0.2					2.7	1.8	0.2
Delay (s)		16.2	26.9	32.2	1.4					32.4	31.8	26.2
Level of Service		B	C	C	A					C	C	C
Approach Delay (s)		19.2			13.3			0.0			31.1	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	747	634	908	0	0	2334
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.88	0.91			0.91
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3400	2760	5036			5036
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3400	2760	5036			5036
Peak-hour factor, PHF	0.99	0.99	0.99	0.97	0.96	0.99
Adj. Flow (vph)	755	640	917	0	0	2358
RTOR Reduction (vph)	0	35	0	0	0	0
Lane Group Flow (vph)	755	605	917	0	0	2358
Confl. Peds. (#/hr)	6	6		6	6	
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	3%	3%	3%	1%	1%	3%
Turn Type	Prot	custom	NA			NA
Protected Phases	8	7 8	2			6 7
Permitted Phases		8				
Actuated Green, G (s)	32.5	62.5	49.5			79.5
Effective Green, g (s)	32.5	62.5	49.5			79.5
Actuated g/C Ratio	0.27	0.52	0.41			0.66
Clearance Time (s)	4.0		4.0			
Vehicle Extension (s)	3.0		3.0			
Lane Grp Cap (vph)	920	1437	2077			3336
v/s Ratio Prot	c0.22	0.22	0.18			c0.47
v/s Ratio Perm						
v/c Ratio	0.82	0.42	0.44			0.71
Uniform Delay, d1	41.0	17.6	25.3			12.9
Progression Factor	1.00	1.00	0.76			1.00
Incremental Delay, d2	5.9	0.2	0.6			0.7
Delay (s)	47.0	17.8	19.7			13.6
Level of Service	D	B	B			B
Approach Delay (s)	33.6		19.7			13.6
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	208	306	0	1873	1809	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.91	0.91	
Frpb, ped/bikes	0.98	0.96		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	0.94	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3238	1398		5036	5036	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3238	1398		5036	5036	
Peak-hour factor, PHF	0.97	0.97	0.95	0.97	0.97	0.95
Adj. Flow (vph)	214	315	0	1931	1865	0
RTOR Reduction (vph)	22	22	0	0	0	0
Lane Group Flow (vph)	337	148	0	1931	1865	0
Confl. Peds. (#/hr)	6	6	6			
Confl. Bikes (#/hr)		10				
Heavy Vehicles (%)	3%	1%	1%	3%	3%	1%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	18.6	18.6		93.4	93.4	
Effective Green, g (s)	18.6	18.6		93.4	93.4	
Actuated g/C Ratio	0.16	0.16		0.78	0.78	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	501	216		3919	3919	
v/s Ratio Prot	0.10			c0.38	0.37	
v/s Ratio Perm		c0.11				
v/c Ratio	0.67	0.69		0.49	0.48	
Uniform Delay, d1	47.8	47.9		4.8	4.7	
Progression Factor	1.00	1.00		0.94	0.64	
Incremental Delay, d2	3.5	8.7		0.4	0.3	
Delay (s)	51.4	56.6		4.9	3.3	
Level of Service	D	E		A	A	
Approach Delay (s)	53.1			4.9	3.3	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	168	40	15	195	1697	1429	666
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0	
Lane Util. Factor	0.97			1.00	0.91	0.91	
Frpb, ped/bikes	0.99			1.00	1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	1.00	
Frt	0.97			1.00	1.00	0.95	
Flt Protected	0.96			0.95	1.00	1.00	
Satd. Flow (prot)	3366			1786	5036	4767	
Flt Permitted	0.96			0.20	1.00	1.00	
Satd. Flow (perm)	3366			378	5036	4767	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	170	40	15	197	1714	1443	673
RTOR Reduction (vph)	18	0	0	0	0	70	0
Lane Group Flow (vph)	192	0	0	212	1714	2046	0
Confl. Peds. (#/hr)	14	14		5			5
Confl. Bikes (#/hr)		10					
Heavy Vehicles (%)	1%	1%	2%	1%	3%	3%	1%
Turn Type	Prot		custom	Prot	NA	NA	
Protected Phases	4			5	2	6	
Permitted Phases			5				
Actuated Green, G (s)	12.1			19.9	99.9	76.0	
Effective Green, g (s)	12.1			19.9	99.9	76.0	
Actuated g/C Ratio	0.10			0.17	0.83	0.63	
Clearance Time (s)	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	339			62	4192	3019	
v/s Ratio Prot	c0.06				0.34	c0.43	
v/s Ratio Perm				c0.56			
v/c Ratio	0.57			3.42	0.41	0.68	
Uniform Delay, d1	51.4			50.0	2.6	14.1	
Progression Factor	1.00			1.00	1.00	0.71	
Incremental Delay, d2	2.2			1128.3	0.3	1.1	
Delay (s)	53.6			1178.4	2.8	11.1	
Level of Service	D			F	A	B	
Approach Delay (s)	53.6				132.2	11.1	
Approach LOS	D				F	B	

Intersection Summary			
HCM 2000 Control Delay	68.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	326	521	309	333	382	334	5	340	1658	204	27	522
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.6	3.5	3.5	3.6			3.5	4.5	4.5		3.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			0.97	0.91	1.00		0.97
Frpb, ped/bikes	1.00	1.00	0.93	1.00	0.97			1.00	1.00	0.92		1.00
Flpb, ped/bikes	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	0.93			1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (prot)	1787	3539	1493	3467	3202			3467	5036	1470		3467
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (perm)	1787	3539	1493	3467	3202			3467	5036	1470		3467
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)	343	548	325	351	402	352	5	358	1745	215	28	549
RTOR Reduction (vph)	0	0	282	0	105	0	0	0	0	57	0	0
Lane Group Flow (vph)	343	548	43	351	649	0	0	363	1745	158	0	577
Confl. Peds. (#/hr)	17		17	17		17	23	23		23	23	23
Confl. Bikes (#/hr)			10			10				10		
Heavy Vehicles (%)	1%	2%	1%	1%	2%	1%	1%	1%	3%	1%	1%	1%
Turn Type	Prot	NA	custom	Prot	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	8		7	4		1	1	6		5	5
Permitted Phases			1							6		
Actuated Green, G (s)	29.5	42.9	19.5	17.9	32.3			19.5	52.5	52.5		19.5
Effective Green, g (s)	29.5	42.9	19.5	17.9	32.3			19.5	52.5	52.5		19.5
Actuated g/C Ratio	0.20	0.29	0.13	0.12	0.22			0.13	0.35	0.35		0.13
Clearance Time (s)	3.5	4.6	3.5	3.5	3.6			3.5	4.5	4.5		3.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	354	1019	195	416	694			454	1775	518		454
v/s Ratio Prot	c0.19	0.15		0.10	c0.20			0.10	c0.35			c0.17
v/s Ratio Perm			0.03							0.11		
v/c Ratio	0.97	0.54	0.22	0.84	0.94			0.80	0.98	0.31		1.27
Uniform Delay, d1	59.2	44.6	57.9	64.1	57.3			62.8	47.8	35.0		64.7
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	39.1	0.5	0.6	14.4	19.8			9.5	17.7	1.5		138.3
Delay (s)	98.3	45.2	58.4	78.6	77.1			72.3	65.5	36.5		203.0
Level of Service	F	D	E	E	E			E	E	D		F
Approach Delay (s)		63.7			77.5				63.9			
Approach LOS		E			E				E			

Intersection Summary			
HCM 2000 Control Delay	73.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	148.9	Sum of lost time (s)	16.1
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	1293	150
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.5	4.5
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	0.92
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5036	1470
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5036	1470
Peak-hour factor, PHF	0.95	0.95
Adj. Flow (vph)	1361	158
RTOR Reduction (vph)	0	57
Lane Group Flow (vph)	1361	101
Confl. Peds. (#/hr)		23
Confl. Bikes (#/hr)		10
Heavy Vehicles (%)	3%	1%
Turn Type	NA	custom
Protected Phases	2	
Permitted Phases		6
Actuated Green, G (s)	52.5	52.5
Effective Green, g (s)	52.5	52.5
Actuated g/C Ratio	0.35	0.35
Clearance Time (s)	4.5	4.5
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	1775	518
v/s Ratio Prot	0.27	
v/s Ratio Perm		0.07
v/c Ratio	0.77	0.20
Uniform Delay, d1	42.8	33.5
Progression Factor	1.00	1.00
Incremental Delay, d2	3.2	0.8
Delay (s)	46.0	34.3
Level of Service	D	C
Approach Delay (s)	88.3	
Approach LOS	F	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	395	940	40	45	640	160	195	110	65	235	55	150
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
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99			1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1805	3549		1805	3446		1803	1780			1848	1576
Flt Permitted	0.95	1.00		0.95	1.00		0.27	1.00			0.68	1.00
Satd. Flow (perm)	1805	3549		1805	3446		520	1780			1288	1576
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.92
Adj. Flow (vph)	429	1022	43	49	696	174	212	120	71	255	220	163
RTOR Reduction (vph)	0	3	0	0	24	0	0	24	0	0	0	123
Lane Group Flow (vph)	429	1062	0	49	846	0	212	167	0	0	475	40
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Confl. Bikes (#/hr)			10			10			10			10
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	custom
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		6
Actuated Green, G (s)	21.0	40.6		3.0	22.6		36.0	36.0			36.0	22.6
Effective Green, g (s)	21.0	40.6		3.0	22.6		36.0	36.0			36.0	22.6
Actuated g/C Ratio	0.23	0.44		0.03	0.25		0.39	0.39			0.39	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	413	1573		59	850		204	699			506	388
v/s Ratio Prot	c0.24	0.30		0.03	c0.25			0.09				
v/s Ratio Perm							c0.41				0.37	0.03
v/c Ratio	1.04	0.67		0.83	1.00		1.04	0.24			0.94	0.10
Uniform Delay, d1	35.3	20.3		44.0	34.4		27.8	18.6			26.7	26.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	54.7	2.3		60.6	29.7		73.7	0.2			25.3	0.5
Delay (s)	90.0	22.6		104.7	64.2		101.5	18.8			52.0	27.2
Level of Service	F	C		F	E		F	B			D	C
Approach Delay (s)		41.9			66.3			62.3			45.7	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	51.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	295	965	0	0	795	230	100	100	410	0	0	0
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			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frpb, ped/bikes	1.00	1.00			1.00	0.97	1.00	0.97	0.95			
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	0.91	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	3467	3574			3574	1548	1698	1514	1449			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)	3467	3574			3574	1548	1698	1514	1449			
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.92	0.92
Adj. Flow (vph)	301	985	0	0	811	235	102	102	418	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	111	0	72	85	0	0	0
Lane Group Flow (vph)	301	985	0	0	811	124	92	203	170	0	0	0
Confl. Peds. (#/hr)	7		7	7		7	7		7			
Confl. Bikes (#/hr)						20			20			
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		8	8				
Permitted Phases						6			8			
Actuated Green, G (s)	13.1	64.5			47.4	47.4	17.5	17.5	17.5			
Effective Green, g (s)	13.1	64.5			47.4	47.4	17.5	17.5	17.5			
Actuated g/C Ratio	0.15	0.72			0.53	0.53	0.19	0.19	0.19			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	504	2561			1882	815	330	294	281			
v/s Ratio Prot	c0.09	0.28			c0.23		0.05	c0.13				
v/s Ratio Perm						0.08			0.12			
v/c Ratio	0.60	0.38			0.43	0.15	0.28	0.69	0.60			
Uniform Delay, d1	36.0	5.0			13.0	11.0	30.9	33.7	33.1			
Progression Factor	0.93	2.04			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	1.8	0.4			0.7	0.4	0.5	6.9	3.6			
Delay (s)	35.4	10.6			13.8	11.4	31.3	40.6	36.7			
Level of Service	D	B			B	B	C	D	D			
Approach Delay (s)		16.4			13.2			37.6			0.0	
Approach LOS		B			B			D			A	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.8%	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												
Volume (vph)	0	850	330	345	550	0	0	0	0	410	305	166
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
Lane Util. Factor		0.91	1.00	0.97	0.95					0.91	0.86	0.91
Frpb, ped/bikes		1.00	0.96	1.00	1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	0.99	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (prot)		5136	1534	3467	3574					1626	3161	1421
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (perm)		5136	1534	3467	3574					1626	3161	1421
Peak-hour factor, PHF	0.93	0.95	0.95	0.95	0.95	0.93	0.93	0.92	0.92	0.95	0.95	0.95
Adj. Flow (vph)	0	895	347	363	579	0	0	0	0	432	321	175
RTOR Reduction (vph)	0	0	259	0	0	0	0	0	0	0	3	106
Lane Group Flow (vph)	0	895	88	363	579	0	0	0	0	251	517	51
Confl. Peds. (#/hr)			7	7						7		7
Confl. Bikes (#/hr)			20			20						
Heavy Vehicles (%)	2%	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%
Turn Type		NA	custom	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			4									4
Actuated Green, G (s)		41.1	22.8	14.1	59.2					22.8	22.8	22.8
Effective Green, g (s)		41.1	22.8	14.1	59.2					22.8	22.8	22.8
Actuated g/C Ratio		0.46	0.25	0.16	0.66					0.25	0.25	0.25
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		2345	388	543	2350					411	800	359
v/s Ratio Prot		c0.17		c0.10	0.16					0.15	c0.16	
v/s Ratio Perm			0.06									0.04
v/c Ratio		0.38	0.23	0.67	0.25					0.61	0.65	0.14
Uniform Delay, d1		16.1	26.6	35.7	6.3					29.7	30.0	26.0
Progression Factor		1.00	1.00	0.81	0.18					1.00	1.00	1.00
Incremental Delay, d2		0.1	0.3	2.9	0.2					2.7	1.8	0.2
Delay (s)		16.2	26.9	31.9	1.4					32.4	31.8	26.2
Level of Service		B	C	C	A					C	C	C
Approach Delay (s)		19.2			13.1			0.0			31.0	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	624	1399	1726	0	0	2004
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.88	0.91			0.91
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3467	2814	5136			5136
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3467	2814	5136			5136
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	630	1413	1743	0	0	2024
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	630	1412	1743	0	0	2024
Confl. Peds. (#/hr)	23	23				
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	Prot	custom	NA			NA
Protected Phases	8	7 8	2			6 7
Permitted Phases		8				
Actuated Green, G (s)	28.0	84.0	58.0			114.0
Effective Green, g (s)	28.0	84.0	58.0			114.0
Actuated g/C Ratio	0.19	0.56	0.39			0.76
Clearance Time (s)	4.0		4.0			
Vehicle Extension (s)	3.0		3.0			
Lane Grp Cap (vph)	647	1575	1985			3903
v/s Ratio Prot	0.18	c0.50	c0.34			0.39
v/s Ratio Perm						
v/c Ratio	0.97	0.90	0.88			0.52
Uniform Delay, d1	60.6	29.2	42.7			7.1
Progression Factor	1.00	1.00	0.84			1.00
Incremental Delay, d2	28.7	7.1	4.1			0.5
Delay (s)	89.3	36.2	39.9			7.6
Level of Service	F	D	D			A
Approach Delay (s)	52.6		39.9			7.6
Approach LOS	D		D			A

Intersection Summary			
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	284	401	0	2833	1825	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.91	0.91	
Frpb, ped/bikes	0.96	0.91		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	0.94	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3216	1326		5136	5136	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3216	1326		5136	5136	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.25
Adj. Flow (vph)	287	405	0	2862	1843	0
RTOR Reduction (vph)	26	26	0	0	0	0
Lane Group Flow (vph)	447	193	0	2862	1843	0
Confl. Peds. (#/hr)	20	20	20			
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	27.6	27.6		114.4	114.4	
Effective Green, g (s)	27.6	27.6		114.4	114.4	
Actuated g/C Ratio	0.18	0.18		0.76	0.76	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	591	243		3917	3917	
v/s Ratio Prot	0.14			c0.56	0.36	
v/s Ratio Perm		c0.15				
v/c Ratio	0.76	0.79		0.73	0.47	
Uniform Delay, d1	58.0	58.5		9.5	6.6	
Progression Factor	1.00	1.00		1.23	0.75	
Incremental Delay, d2	5.5	16.2		1.0	0.3	
Delay (s)	63.5	74.7		12.7	5.3	
Level of Service	E	E		B	A	
Approach Delay (s)	67.0			12.7	5.3	
Approach LOS	E			B	A	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	678	68	50	62	2169	1995	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0	
Lane Util. Factor	0.97			1.00	0.91	0.91	
Frpb, ped/bikes	0.99			1.00	1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	1.00	
Frt	0.99			1.00	1.00	0.98	
Flt Protected	0.96			0.95	1.00	1.00	
Satd. Flow (prot)	3420			1772	5085	4943	
Flt Permitted	0.96			0.25	1.00	1.00	
Satd. Flow (perm)	3420			466	5085	4943	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	692	69	51	63	2213	2036	246
RTOR Reduction (vph)	6	0	0	0	0	9	0
Lane Group Flow (vph)	755	0	0	114	2213	2273	0
Confl. Peds. (#/hr)	20	20		20			20
Confl. Bikes (#/hr)		10					
Heavy Vehicles (%)	1%	1%	2%	1%	2%	2%	2%
Turn Type	Prot		custom	Prot	NA	NA	
Protected Phases	4			5	2	6	
Permitted Phases			5				
Actuated Green, G (s)	39.3			16.0	102.7	82.7	
Effective Green, g (s)	39.3			16.0	102.7	82.7	
Actuated g/C Ratio	0.26			0.11	0.68	0.55	
Clearance Time (s)	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	896			49	3481	2725	
v/s Ratio Prot	c0.22				0.44	c0.46	
v/s Ratio Perm				c0.24			
v/c Ratio	0.84			2.33	0.64	0.83	
Uniform Delay, d1	52.4			67.0	13.2	28.0	
Progression Factor	1.00			1.00	1.00	0.67	
Incremental Delay, d2	7.3			655.6	0.9	2.8	
Delay (s)	59.7			722.6	14.1	21.5	
Level of Service	E			F	B	C	
Approach Delay (s)	59.7				48.8	21.5	
Approach LOS	E				D	C	

Intersection Summary			
HCM 2000 Control Delay	38.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	286	445	268	451	553	556	5	488	2073	217	60	510
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
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			0.97	0.91	1.00		0.97
Frpb, ped/bikes	1.00	1.00	0.93	1.00	0.96			1.00	1.00	0.92		1.00
Flpb, ped/bikes	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	0.92			1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (prot)	1787	3574	1487	3467	3161			3467	5136	1475		3467
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (perm)	1787	3574	1487	3467	3161			3467	5136	1475		3467
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	289	449	271	456	559	562	5	493	2094	219	61	515
RTOR Reduction (vph)	0	0	224	0	102	0	0	0	0	59	0	0
Lane Group Flow (vph)	289	449	47	456	1019	0	0	498	2094	160	0	576
Confl. Peds. (#/hr)	20		20	20		20	20	20		20	20	20
Confl. Bikes (#/hr)			20			20				20		
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA	custom	Prot	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	8		7	4		5	5	2		1	1
Permitted Phases			1							2		
Actuated Green, G (s)	21.0	30.0	26.0	21.0	30.0			19.0	57.0	57.0		26.0
Effective Green, g (s)	21.0	30.0	26.0	21.0	30.0			19.0	57.0	57.0		26.0
Actuated g/C Ratio	0.14	0.20	0.17	0.14	0.20			0.13	0.38	0.38		0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	250	714	257	485	632			439	1951	560		600
v/s Ratio Prot	c0.16	0.13		0.13	c0.32			c0.14	c0.41			0.17
v/s Ratio Perm			0.03							0.11		
v/c Ratio	1.16	0.63	0.18	0.94	1.61			1.13	1.07	0.29		0.96
Uniform Delay, d1	64.5	54.9	52.9	63.9	60.0			65.5	46.5	32.3		61.5
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	105.7	4.2	0.3	26.6	282.6			85.1	43.3	1.3		26.7
Delay (s)	170.2	59.1	53.3	90.4	342.6			150.6	89.8	33.6		88.2
Level of Service	F	E	D	F	F			F	F	C		F
Approach Delay (s)		89.3			269.7				96.2			
Approach LOS		F			F				F			

Intersection Summary			
HCM 2000 Control Delay	113.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	1990	309
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	0.92
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5136	1477
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5136	1477
Peak-hour factor, PHF	0.99	0.99
Adj. Flow (vph)	2010	312
RTOR Reduction (vph)	0	59
Lane Group Flow (vph)	2010	253
Confl. Peds. (#/hr)		20
Confl. Bikes (#/hr)		20
Heavy Vehicles (%)	1%	1%
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	64.0	64.0
Effective Green, g (s)	64.0	64.0
Actuated g/C Ratio	0.43	0.43
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	2191	630
v/s Ratio Prot	c0.39	
v/s Ratio Perm		0.17
v/c Ratio	0.92	0.40
Uniform Delay, d1	40.5	29.7
Progression Factor	1.00	1.00
Incremental Delay, d2	7.6	1.9
Delay (s)	48.1	31.7
Level of Service	D	C
Approach Delay (s)	54.3	
Approach LOS	D	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	275	740	110	50	1190	175	105	85	25	220	126	408
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
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99			1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00			0.98	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1805	3470		1805	3470		1784	1811			1810	1521
Flt Permitted	0.95	1.00		0.95	1.00		0.28	1.00			0.73	1.00
Satd. Flow (perm)	1805	3470		1805	3470		532	1811			1359	1521
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)	289	779	116	53	1253	184	111	89	26	232	133	429
RTOR Reduction (vph)	0	13	0	0	12	0	0	11	0	0	0	202
Lane Group Flow (vph)	289	882	0	53	1425	0	111	104	0	0	365	227
Confl. Peds. (#/hr)	19		19	19		19	19		19	19		19
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		4
Actuated Green, G (s)	15.8	48.7		4.0	36.9		26.0	26.0			26.0	26.0
Effective Green, g (s)	15.8	48.7		4.0	36.9		26.0	26.0			26.0	26.0
Actuated g/C Ratio	0.17	0.54		0.04	0.41		0.29	0.29			0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	314	1863		79	1411		152	519			389	436
v/s Ratio Prot	c0.16	0.25		0.03	c0.41			0.06				
v/s Ratio Perm							0.21				c0.27	0.15
v/c Ratio	0.92	0.47		0.67	1.01		0.73	0.20			0.94	0.52
Uniform Delay, d1	36.8	13.0		42.7	26.9		29.2	24.5			31.6	27.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	31.0	0.9		20.1	26.3		26.3	0.9			32.4	4.4
Delay (s)	67.8	13.9		62.8	53.2		55.5	25.3			64.0	31.5
Level of Service	E	B		E	D		E	C			E	C
Approach Delay (s)		27.1			53.6			40.2			46.5	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	42.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	811	0	0	1228	645	250	495	314	0	0	0
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			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frpb, ped/bikes	1.00	1.00			1.00	0.96	1.00	1.00	0.96			
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	0.99	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	3467	3574			3574	1538	1698	1689	1457			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)	3467	3574			3574	1538	1698	1689	1457			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	161	845	0	0	1279	672	260	516	327	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	74	0	3	92	0	0	0
Lane Group Flow (vph)	161	845	0	0	1279	598	234	572	202	0	0	0
Confl. Peds. (#/hr)	10		7	7		10	10		10			
Confl. Bikes (#/hr)						20			20			
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		4	4				
Permitted Phases						6			4			
Actuated Green, G (s)	6.0	50.0			40.0	40.0	32.0	32.0	32.0			
Effective Green, g (s)	6.0	50.0			40.0	40.0	32.0	32.0	32.0			
Actuated g/C Ratio	0.07	0.56			0.44	0.44	0.36	0.36	0.36			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	231	1985			1588	683	603	600	518			
v/s Ratio Prot	c0.05	0.24			0.36		0.14	c0.34				
v/s Ratio Perm						c0.39			0.14			
v/c Ratio	0.70	0.43			0.81	0.88	0.39	0.95	0.39			
Uniform Delay, d1	41.1	11.6			21.6	22.7	21.7	28.3	21.7			
Progression Factor	1.02	0.48			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	8.5	0.6			4.5	14.7	1.9	27.0	2.2			
Delay (s)	50.5	6.2			26.1	37.4	23.6	55.3	23.9			
Level of Service	D	A			C	D	C	E	C			
Approach Delay (s)		13.3			30.0			40.2			0.0	
Approach LOS		B			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.6%	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												
Volume (vph)	0	611	150	471	1007	0	0	0	0	355	160	295
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
Lane Util. Factor		0.91	1.00	0.97	0.95					0.91	0.86	0.91
Frpb, ped/bikes		1.00	0.97	1.00	1.00					1.00	0.99	0.98
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	0.96	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (prot)		5136	1546	3467	3574					1626	3035	1421
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (perm)		5136	1546	3467	3574					1626	3035	1421
Peak-hour factor, PHF	0.97	0.98	0.98	0.98	0.98	0.96	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	0	623	153	481	1028	0	0	0	0	362	163	301
RTOR Reduction (vph)	0	0	81	0	0	0	0	0	0	0	37	98
Lane Group Flow (vph)	0	623	72	481	1028	0	0	0	0	214	385	92
Confl. Peds. (#/hr)			7	7						7		7
Confl. Bikes (#/hr)			20			20						
Heavy Vehicles (%)	2%	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Actuated Green, G (s)		42.1	42.1	17.7	63.8					18.2	18.2	18.2
Effective Green, g (s)		42.1	42.1	17.7	63.8					18.2	18.2	18.2
Actuated g/C Ratio		0.47	0.47	0.20	0.71					0.20	0.20	0.20
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		2402	723	681	2533					328	613	287
v/s Ratio Prot		0.12		c0.14	c0.29					c0.13	0.13	
v/s Ratio Perm			0.05									0.06
v/c Ratio		0.26	0.10	0.71	0.41					0.65	0.63	0.32
Uniform Delay, d1		14.5	13.4	33.7	5.4					33.0	32.8	30.6
Progression Factor		1.00	1.00	0.75	2.49					1.00	1.00	1.00
Incremental Delay, d2		0.1	0.1	2.2	0.3					4.6	2.0	0.6
Delay (s)		14.6	13.4	27.6	13.7					37.6	34.8	31.3
Level of Service		B	B	C	B					D	C	C
Approach Delay (s)		14.3			18.1			0.0			34.7	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	617	1399	1724	0	0	2003
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0			4.0
Lane Util. Factor	0.97	0.88	0.91			0.91
Frpb, ped/bikes	1.00	1.00	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	3467	2814	5136			5136
Flt Permitted	0.95	1.00	1.00			1.00
Satd. Flow (perm)	3467	2814	5136			5136
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	623	1413	1741	0	0	2023
RTOR Reduction (vph)	0	1	0	0	0	0
Lane Group Flow (vph)	623	1412	1741	0	0	2023
Confl. Peds. (#/hr)	23	23				
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	Prot	custom	NA			NA
Protected Phases	8	7 8	2			6 7
Permitted Phases		8				
Actuated Green, G (s)	28.0	84.0	58.0			114.0
Effective Green, g (s)	28.0	84.0	58.0			114.0
Actuated g/C Ratio	0.19	0.56	0.39			0.76
Clearance Time (s)	4.0		4.0			
Vehicle Extension (s)	3.0		3.0			
Lane Grp Cap (vph)	647	1575	1985			3903
v/s Ratio Prot	0.18	c0.50	c0.34			0.39
v/s Ratio Perm						
v/c Ratio	0.96	0.90	0.88			0.52
Uniform Delay, d1	60.5	29.2	42.7			7.1
Progression Factor	1.00	1.00	0.83			1.00
Incremental Delay, d2	26.3	7.1	4.2			0.5
Delay (s)	86.8	36.2	39.6			7.6
Level of Service	F	D	D			A
Approach Delay (s)	51.7		39.6			7.6
Approach LOS	D		D			A

Intersection Summary			
HCM 2000 Control Delay	32.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	284	398	0	2789	1817	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.91		0.91	0.91	
Frpb, ped/bikes	0.97	0.91		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	0.94	0.85		1.00	1.00	
Flt Protected	0.97	1.00		1.00	1.00	
Satd. Flow (prot)	3221	1325		5136	5136	
Flt Permitted	0.97	1.00		1.00	1.00	
Satd. Flow (perm)	3221	1325		5136	5136	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.25
Adj. Flow (vph)	287	402	0	2817	1835	0
RTOR Reduction (vph)	27	27	0	0	0	0
Lane Group Flow (vph)	441	194	0	2817	1835	0
Confl. Peds. (#/hr)	20	20	20			
Confl. Bikes (#/hr)		20				
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	27.5	27.5		114.5	114.5	
Effective Green, g (s)	27.5	27.5		114.5	114.5	
Actuated g/C Ratio	0.18	0.18		0.76	0.76	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	590	242		3920	3920	
v/s Ratio Prot	0.14			c0.55	0.36	
v/s Ratio Perm		c0.15				
v/c Ratio	0.75	0.80		0.72	0.47	
Uniform Delay, d1	58.0	58.6		9.3	6.5	
Progression Factor	1.00	1.00		1.26	0.75	
Incremental Delay, d2	5.2	17.2		0.9	0.3	
Delay (s)	63.1	75.8		12.6	5.2	
Level of Service	E	E		B	A	
Approach Delay (s)	67.2			12.6	5.2	
Approach LOS	E			B	A	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations							
Volume (vph)	634	65	50	61	2169	1995	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0	
Lane Util. Factor	0.97			1.00	0.91	0.91	
Frpb, ped/bikes	0.99			1.00	1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	1.00	
Frt	0.99			1.00	1.00	0.98	
Flt Protected	0.96			0.95	1.00	1.00	
Satd. Flow (prot)	3419			1772	5085	4948	
Flt Permitted	0.96			0.25	1.00	1.00	
Satd. Flow (perm)	3419			466	5085	4948	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	647	66	51	62	2213	2036	235
RTOR Reduction (vph)	6	0	0	0	0	7	0
Lane Group Flow (vph)	707	0	0	113	2213	2264	0
Confl. Peds. (#/hr)	20	20		20			20
Confl. Bikes (#/hr)		10					
Heavy Vehicles (%)	1%	1%	2%	1%	2%	2%	2%
Turn Type	Prot		custom	Prot	NA	NA	
Protected Phases	4			5	2	6	
Permitted Phases			5				
Actuated Green, G (s)	37.2			16.0	104.8	84.8	
Effective Green, g (s)	37.2			16.0	104.8	84.8	
Actuated g/C Ratio	0.25			0.11	0.70	0.57	
Clearance Time (s)	4.0			4.0	4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	3.0	
Lane Grp Cap (vph)	847			49	3552	2797	
v/s Ratio Prot	c0.21				0.44	c0.46	
v/s Ratio Perm				c0.24			
v/c Ratio	0.83			2.31	0.62	0.81	
Uniform Delay, d1	53.5			67.0	12.1	26.1	
Progression Factor	1.00			1.00	1.00	0.65	
Incremental Delay, d2	7.1			646.7	0.8	2.4	
Delay (s)	60.6			713.7	12.9	19.3	
Level of Service	E			F	B	B	
Approach Delay (s)	60.6				46.9	19.3	
Approach LOS	E				D	B	

Intersection Summary			
HCM 2000 Control Delay	37.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Volume (vph)	284	445	265	451	552	556	5	488	2072	217	60	509
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
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95			0.97	0.91	1.00		0.97
Frpb, ped/bikes	1.00	1.00	0.93	1.00	0.96			1.00	1.00	0.92		1.00
Flpb, ped/bikes	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	0.92			1.00	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (prot)	1787	3574	1487	3467	3161			3467	5136	1475		3467
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.95	1.00	1.00		0.95
Satd. Flow (perm)	1787	3574	1487	3467	3161			3467	5136	1475		3467
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	287	449	268	456	558	562	5	493	2093	219	61	514
RTOR Reduction (vph)	0	0	222	0	103	0	0	0	0	59	0	0
Lane Group Flow (vph)	287	449	46	456	1017	0	0	498	2093	160	0	575
Confl. Peds. (#/hr)	20		20	20		20	20	20		20	20	20
Confl. Bikes (#/hr)			20			20				20		
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	NA	custom	Prot	NA		Prot	Prot	NA	Perm	Prot	Prot
Protected Phases	3	8		7	4		5	5	2		1	1
Permitted Phases			1							2		
Actuated Green, G (s)	21.0	30.0	26.0	21.0	30.0			19.0	57.0	57.0		26.0
Effective Green, g (s)	21.0	30.0	26.0	21.0	30.0			19.0	57.0	57.0		26.0
Actuated g/C Ratio	0.14	0.20	0.17	0.14	0.20			0.13	0.38	0.38		0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	250	714	257	485	632			439	1951	560		600
v/s Ratio Prot	c0.16	0.13		0.13	c0.32			c0.14	c0.41			0.17
v/s Ratio Perm			0.03							0.11		
v/c Ratio	1.15	0.63	0.18	0.94	1.61			1.13	1.07	0.29		0.96
Uniform Delay, d1	64.5	54.9	52.9	63.9	60.0			65.5	46.5	32.3		61.5
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00		1.00
Incremental Delay, d2	102.8	4.2	0.3	26.6	281.3			85.1	43.1	1.3		26.4
Delay (s)	167.3	59.1	53.3	90.4	341.3			150.6	89.6	33.6		87.8
Level of Service	F	E	D	F	F			F	F	C		F
Approach Delay (s)		88.5			268.7				96.0			
Approach LOS		F			F				F			

Intersection Summary			
HCM 2000 Control Delay	113.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR
Lane Configurations		
Volume (vph)	1988	309
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	4.0
Lane Util. Factor	0.91	1.00
Frpb, ped/bikes	1.00	0.92
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	5136	1477
Flt Permitted	1.00	1.00
Satd. Flow (perm)	5136	1477
Peak-hour factor, PHF	0.99	0.99
Adj. Flow (vph)	2008	312
RTOR Reduction (vph)	0	59
Lane Group Flow (vph)	2008	253
Confl. Peds. (#/hr)		20
Confl. Bikes (#/hr)		20
Heavy Vehicles (%)	1%	1%
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases		6
Actuated Green, G (s)	64.0	64.0
Effective Green, g (s)	64.0	64.0
Actuated g/C Ratio	0.43	0.43
Clearance Time (s)	4.0	4.0
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	2191	630
v/s Ratio Prot	c0.39	
v/s Ratio Perm		0.17
v/c Ratio	0.92	0.40
Uniform Delay, d1	40.5	29.7
Progression Factor	1.00	1.00
Incremental Delay, d2	7.5	1.9
Delay (s)	48.0	31.7
Level of Service	D	C
Approach Delay (s)	54.1	
Approach LOS	D	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	740	110	50	1190	175	105	85	25	220	125	385
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
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99			1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00			0.98	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1805	3470		1805	3470		1783	1811			1809	1521
Flt Permitted	0.95	1.00		0.95	1.00		0.29	1.00			0.73	1.00
Satd. Flow (perm)	1805	3470		1805	3470		536	1811			1358	1521
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)	284	779	116	53	1253	184	111	89	26	232	132	405
RTOR Reduction (vph)	0	13	0	0	12	0	0	11	0	0	0	202
Lane Group Flow (vph)	284	882	0	53	1425	0	111	104	0	0	364	203
Confl. Peds. (#/hr)	19		19	19		19	19		19	19		19
Confl. Bikes (#/hr)			20			20			20			20
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			4	
Permitted Phases							4			4		4
Actuated Green, G (s)	15.7	48.5		4.0	36.8		26.0	26.0			26.0	26.0
Effective Green, g (s)	15.7	48.5		4.0	36.8		26.0	26.0			26.0	26.0
Actuated g/C Ratio	0.17	0.54		0.04	0.41		0.29	0.29			0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	313	1859		79	1411		153	520			390	436
v/s Ratio Prot	c0.16	0.25		0.03	c0.41			0.06				
v/s Ratio Perm							0.21				c0.27	0.13
v/c Ratio	0.91	0.47		0.67	1.01		0.73	0.20			0.93	0.47
Uniform Delay, d1	36.7	13.1		42.6	26.9		29.0	24.4			31.4	26.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	28.2	0.9		20.1	26.3		25.7	0.9			31.5	3.6
Delay (s)	64.9	13.9		62.7	53.2		54.8	25.2			62.9	30.1
Level of Service	E	B		E	D		D	C			E	C
Approach Delay (s)		26.2			53.5			39.7			45.6	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	90.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	810	0	0	1205	645	250	495	310	0	0	0
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			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frpb, ped/bikes	1.00	1.00			1.00	0.96	1.00	1.00	0.96			
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	0.99	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)	3467	3574			3574	1538	1698	1690	1457			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)	3467	3574			3574	1538	1698	1690	1457			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	161	844	0	0	1255	672	260	516	323	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	74	0	3	92	0	0	0
Lane Group Flow (vph)	161	844	0	0	1255	598	234	571	199	0	0	0
Confl. Peds. (#/hr)	10		7	7		10	10		10			
Confl. Bikes (#/hr)						20			20			
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Prot	NA			NA	Perm	Split	NA	Perm			
Protected Phases	5	2			6		4	4				
Permitted Phases						6			4			
Actuated Green, G (s)	6.0	50.0			40.0	40.0	32.0	32.0	32.0			
Effective Green, g (s)	6.0	50.0			40.0	40.0	32.0	32.0	32.0			
Actuated g/C Ratio	0.07	0.56			0.44	0.44	0.36	0.36	0.36			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	231	1985			1588	683	603	600	518			
v/s Ratio Prot	c0.05	0.24			0.35		0.14	c0.34				
v/s Ratio Perm						c0.39			0.14			
v/c Ratio	0.70	0.43			0.79	0.88	0.39	0.95	0.39			
Uniform Delay, d1	41.1	11.6			21.4	22.7	21.7	28.3	21.7			
Progression Factor	1.01	0.49			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	8.5	0.6			4.1	14.7	1.9	26.7	2.2			
Delay (s)	50.0	6.4			25.5	37.4	23.6	55.0	23.8			
Level of Service	D	A			C	D	C	D	C			
Approach Delay (s)		13.3			29.7			40.0			0.0	
Approach LOS		B			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.6%	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												
Volume (vph)	0	610	150	450	1005	0	0	0	0	355	160	295
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
Lane Util. Factor		0.91	1.00	0.97	0.95					0.91	0.86	0.91
Frpb, ped/bikes		1.00	0.97	1.00	1.00					1.00	0.99	0.98
Flpb, ped/bikes		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Frt		1.00	0.85	1.00	1.00					1.00	0.96	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (prot)		5136	1547	3467	3574					1626	3035	1421
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.98	1.00
Satd. Flow (perm)		5136	1547	3467	3574					1626	3035	1421
Peak-hour factor, PHF	0.97	0.98	0.98	0.98	0.98	0.96	0.92	0.92	0.92	0.98	0.98	0.98
Adj. Flow (vph)	0	622	153	459	1026	0	0	0	0	362	163	301
RTOR Reduction (vph)	0	0	81	0	0	0	0	0	0	0	37	98
Lane Group Flow (vph)	0	622	72	459	1026	0	0	0	0	214	385	92
Confl. Peds. (#/hr)			7	7						7		7
Confl. Bikes (#/hr)			20			20						
Heavy Vehicles (%)	2%	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%
Turn Type		NA	Perm	Prot	NA					Split	NA	Perm
Protected Phases		2		1	6					4	4	
Permitted Phases			2									4
Actuated Green, G (s)		42.6	42.6	17.2	63.8					18.2	18.2	18.2
Effective Green, g (s)		42.6	42.6	17.2	63.8					18.2	18.2	18.2
Actuated g/C Ratio		0.47	0.47	0.19	0.71					0.20	0.20	0.20
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		2431	732	662	2533					328	613	287
v/s Ratio Prot		0.12		c0.13	c0.29					c0.13	0.13	
v/s Ratio Perm			0.05									0.06
v/c Ratio		0.26	0.10	0.69	0.41					0.65	0.63	0.32
Uniform Delay, d1		14.2	13.1	33.9	5.3					33.0	32.8	30.6
Progression Factor		1.00	1.00	0.76	2.49					1.00	1.00	1.00
Incremental Delay, d2		0.1	0.1	2.1	0.3					4.6	2.0	0.6
Delay (s)		14.3	13.2	27.8	13.6					37.6	34.8	31.3
Level of Service		B	B	C	B					D	C	C
Approach Delay (s)		14.0			18.0			0.0			34.7	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group